PB82-183567

EPA-AA-TEB-511-81-5B

Attachments to:

Evaluation of the Paser Magnum/Paser 500/Paser 500 HEI Under Section 511 of the Motor Vehicle Information and Cost Savings Act

This document contains several pages which may not reproduce well. Any questions concerning the legibility of these pages should be directed to: Merrill W. Korth, Emission Control Technology Division, Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, MI 48105 (313) 668-4299 or FTS 374-8299.

May, 1981

Test and Evaluation Branch
Emission Control Technology Division
Office of Mobile Source Air Pollution Control
U.S. Environmental Protection Agency

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA A-TEB-511-81-5B	2.	3. RECIPIENT'S ACCESSION NO. PB82 183567
4. TITLE AND SUBTITLE Evaluation of the Paser Magnum/Paser 500/Paser 500 HEI Under Section 511 of the Motor Vehicle Information and Cost Savings Act.		5. REPORT DATE May 1981
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Edward Anthony Barth		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS United States Environmental Protection Agency Office of Mobile Source Air Pollution Control Test and Evaluation Branch Ann Arbor, MI 48105		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS		13. TYPE OF REPORT AND PERIOD COVERED Technical
		14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

This document contains the attachments of the EPA evaluation of the "Paser Magnum, Paser 500, and Paser 500 HEI" devices under provisions of Section 511 of the Motor Vehicle Information and Cost Savings Act. These attachments include patent information, correspondence between the Applicant and EPA and all documents submitted in support of the application. The entire report is contained in two volumes. The discussions, conclusions and list of all attachments are included in EPA-AA-TEB-511-81-5A, which consists of 22 pages. The attachments are contained in EPA-AA-TEB-511-81-5B, which consists of 181 pages.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Fuel Consumption Automobiles Internal Combustion Engines	Fuel Economy Fuel Saving Devices	

18. DISTRIBUTION STATEMENT release unlimited	19. SECURITY CLASS (This Report) unclassified	21. NO. OF PAGES 181
	20. SECURITY CLASS (This page) unclassified	22. PRICE

EPA Form 2220-1 (9-73)

ATTENTION

AS NOTED IN THE NTIS ANNOUNCEMENT,
PORTIONS OF THIS REPORT ARE NOT LEGIBLE.
HOWEVER, IT IS THE BEST REPRODUCTION
AVAILABLE FROM THE COPY SENT TO NTIS.

List of Attachments

Attachment A	Ignition Device for Internal Combustion Engine, Patent 3,613,653 (provided with 511 Application).
Attachment B	Ignition Device for Internal Combustion Engine, Patent Application No. 2118G (provided with 511 Application).
Attachment C	"Theory and Operation of the Paser 500 Performance - Economy Pack" by C. Mel Adams. Sc.D., P.E. (provided with 511 Application).
Attachment D	Paser 500 Instructions/Warranty Information (provided with 511 Application).
Attachment E	Paser 500 HEI for Electronic Ignitions Instructions/ Warranty Information (provided with 511 Application).
Attachment F	"General Test Laboratory Report Summary" by Harley G. Deihl (provided with 511 Application).
Attachment G	Copy of November 28, 1971 letter from C. Mel Adams to Eugene Irvin, REI Industries, Inc. reviewing General Test Laboratory report (provided with 511 Application).
Attachment H	Copy of May 14, 1980 letter from AmerImex to EPA.
Attachment I	Copy of July 9, 1980 letter from EPA to AmerImex providing EPA test and evaluation policy.
Attachment J	Copy of July 17, 1980 letter from AmerImex to EPA transmitting 511 Application.
Attachment K	Copy of December 24, 1980 letter from EPA to Amerimex requesting additional information and clarification of the information they provided with the 511 Application.
Attachment L	Copy of January 12, 1981 letter from AmerImex to EPA summarizing AmerImex's understanding of the action to be taken as a result of January 6, 1981 meeting with EPA.
Attachment M	Copy of January 13, 1980 (1981?) letter from AmerImex to EPA responding to EPA request of December 24, 1980 for clarification of information.
Attachment N	Copy of January 19, 1981 letter from EPA to AmerImex responding to AmerImex's verbal request on January 6, 1981 that EPA withdraw the previous EPA Paser reports.

Attachment O	Copy of February 10, 1981 letter from AmerImex to EPA regarding EPA's January 19, 1981 letter to AmerImex.
Attachment P	Copy of March 3, 1981 letter from EPA to AmerImex requesting clarification of responses contained in AmerImex's January 13, 1980 (1981?) letter to EPA. This letter also set deadlines for receipt of specified information.
Attachment Q	Copy of March 11, 1981 letter from AmerImex transmitting the Mexican Government Environmental Protection Agency test data to EPA.
Attachment R	Copy of March 24, 1981 letter from AmerImex to EPA in response to EPA's March 3, 1981 letter to AmerImex.
Attachment S	Copy of April 7, 1981 letter from EPA to AmerImex advising AmerImex that EPA intended to complete the 511 Evaluation on the basis of the information available.
Attachment T	Copy of Mexican Government's Department of Public Works testing of Paser Magnum.
Attachment U	Copy of Consumer's Report of Japan's testing of Paser 500.
Attachment V	Copy of Japanese National Defense Academy testing of Paser 500.
Attachment W	Copy of "Auto Mechanic" magazine of Japan's testing of the Paser 500.
Attachment X	Copy of Royal Automobile Club's testing of the Paser Magnum.
Attachment Y	Copy of April 12, 1973 letter from Professor Carlos W. Coon, Jr., to AmerImex.
Attachment Z	Copy of April 11, 1973 letter from Professor J. Martin Hughes to AmerImex.
Attachment AA	Copy of May 30, 1972 letter from Professor James C. Cox, Jr., to AmerImex.

Attachment A

EXHIBIT NO. 1

3613653

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Whereas, THERE HAS BEEN PRESENTED TO THE

Commissioner of Patents

A PETITION PRAYING FOR THE GRANT OF LETTERS PATENT FOR AN ALLEGED NEW AND USEFUL INVENTION THE TITLE AND DESCRIPTION OF WHICH ARE CONTAINED IN THE SPECIFICATION OF WHICH A COPY IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PATENT OFFICE IN THE CLAIMANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID CLAIMANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A PATENT UNDER THE LAW.

NOW, THEREFORE, THESE Letters Patent ARE TO GRANT UNTO THE SAID CLAIMANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID CLAIMANT(S) FOR THE TERM OF SEVENTEEN YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF ISSUE FEES AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM MAKING, USING OR SELLING THE SAID INVENTION THROUGHOUT THE UNITED STATES.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington this nineteenth *day of* October, *in the year of our Lord one thousand nine hundred and* seventy-one, *and of the Independence of the United States of America the one hundred and* ninety-sixth.

Attest:

[signature] [signature]

PATENTED OCT 19 1971

3,613,653

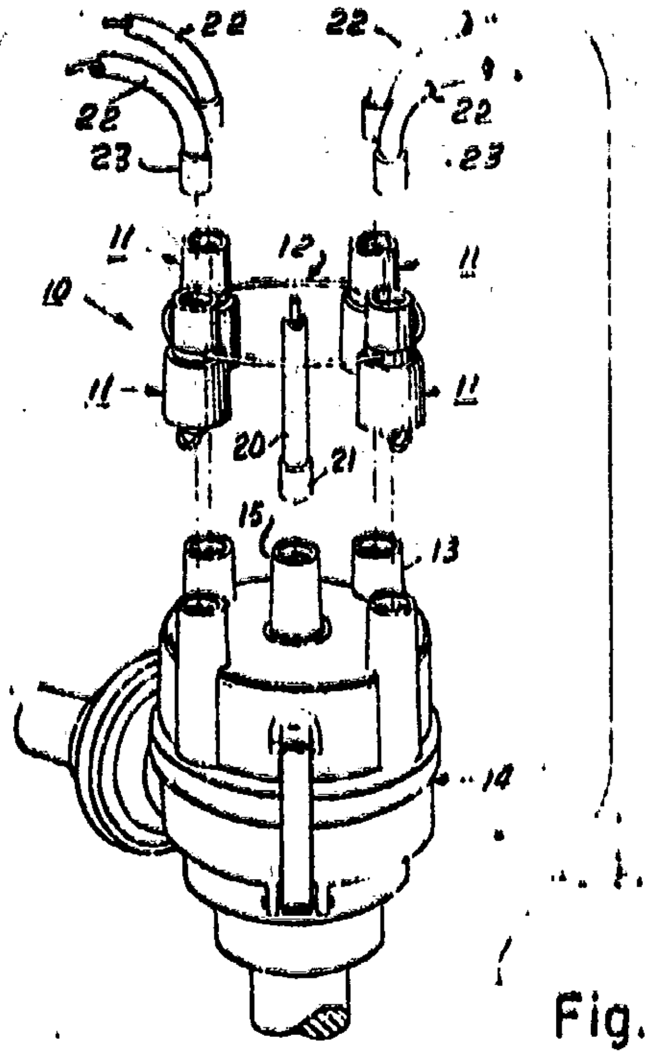


Fig. 1

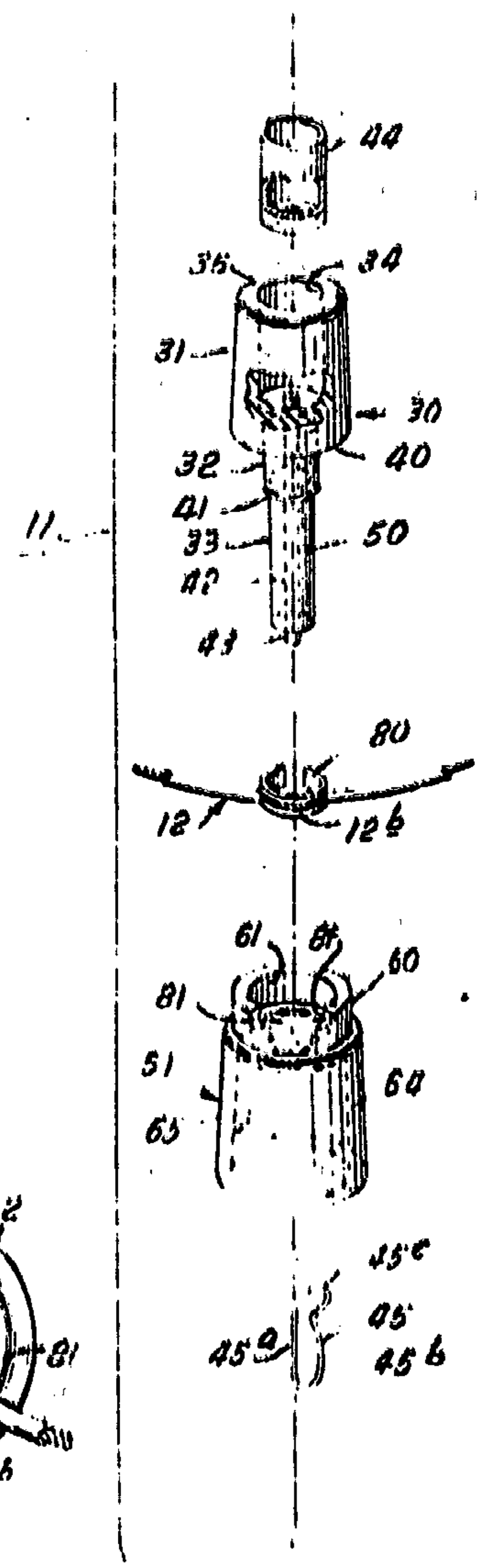


Fig. 2

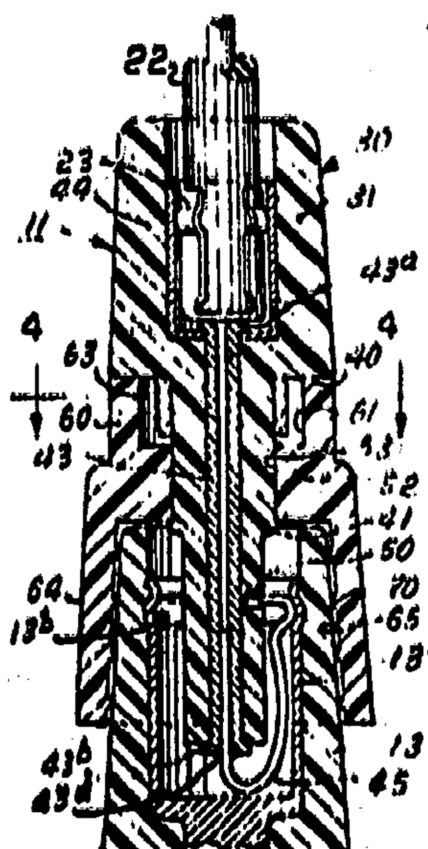


Fig. 3

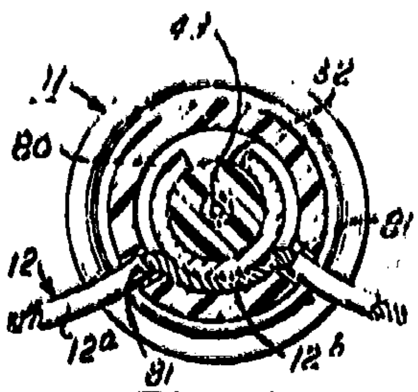


Fig. 4

INVENTORS
Eugene Irvin, Jr.
BY Edwin A Carrell

ATTORNEY

United States Patent

[11] 3,613,653

[72] Inventors Eugene Irvin, Jr.
6635 Lakewood Blvd., Dallas, Tex. 75214;
Edwin A. Carrell, 1608 Westlake Drive,
Plano, Tex. 75074

[21] Appl. No. 21,782
[22] Filed Mar. 23, 1970
[45] Patented Oct. 19, 1971

[54] IGNITION DEVICE FOR INTERNAL COMBUSTION ENGINE
8 Claims, 4 Drawing Figs.

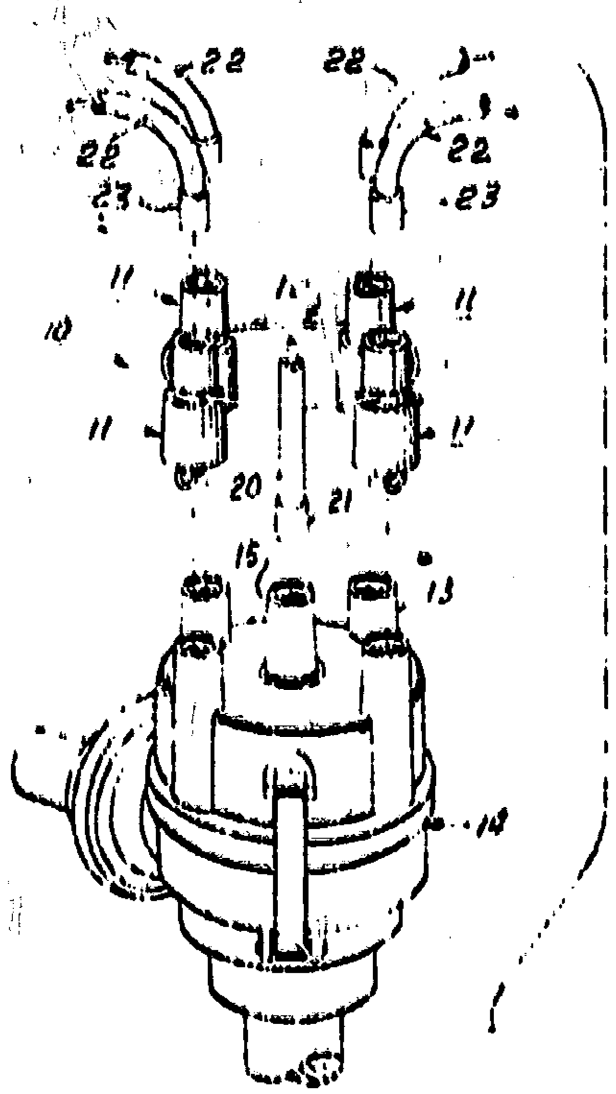
[52] U.S. Cl. .... 123/146.5A, 123/148 A, 123/148 AC, 123/148 DC
[51] Int. Cl. F02p 9/00
[50] Field of Search .... 123/119 E, 146.5, 146.5 A, 148 AC, 148 DC, 148 E

[56] References Cited
UNITED STATES PATENTS

2,451,482	10/1948	Flint	123/146.5 A
2,351,682	6/1944	Hendry et al.	123/148 AC
2,968,296	1/1961	Kaehni	123/148 E
3,500,801	3/1970	Long et al.	123/146.5

Primary Examiner—Laurence M. Goodridge
Attorney—H. Mathews Garland

ABSTRACT: An air pollution control device for use in the ignition system of an internal combustion engine for applying a nonigniting electrical potential to nonfiring cylinders of the engine responsive to current flow to the firing cylinder including an assembly having a spark plug lead coupler connectible into each spark plug lead socket of the distributor head and engageable by the spark plug lead for that particular socket, each coupler having a conductor engageable at a lower end in the distributor head socket and contacted at the upper end by the spark plug wire. A conductive sleeve is secured in spaced electrically insulated relation around the conductor through the coupler, the sleeves in the several couplers of the device being electrically interconnected in series whereby a potential induced in a sleeve by electrical flow through the conductor within such sleeve induces a similar potential in the sleeves of the other couplers inducing a potential in the conductors through such other couplers effecting a nonigniting potential at the plugs of the nonfiring cylinders.



IGNITION DEVICE FOR INTERNAL COMBUSTION ENGINE

This invention relates to a device for improving the combustion characteristics of an internal combustion engine and more specifically relates to an ignition device for electrically enhancing the combustion process of an internal combustion engine.

In recent years air pollution problems, particularly in metropolitan areas of the world, have become monumental and are increasing at such alarming rates that possibly survival of life as currently known on earth is contingent on determining the principal sources of such pollution and finding ways of minimizing if not eliminating it. It is unquestioned that one source, and perhaps the major one, of such air pollution is the present internal combustion engine used in automobiles, busses, aircraft, and any other forms of mobil and stationary apparatus. One of the reasons for the production of pollutants by the internal combustion engine is the inefficiency of the combustion process in the engine resulting in the discharge of many unburned or partially burned products which, for the most part, are gaseous in form so that they laden the air with impurities. Numerous approaches are being taken to minimize the polluting materials being discharged from engines including changing the contents of the fuels being burned, often requiring engine redesign, and in the instance of the present invention, improving the combustion process through the mechanism of the conventional ignition system in present forms of engines.

It has been found that nonigniting electrical condition can be created in each of the nonfiring cylinders of an engine responsive to the flow of current to the firing cylinder improving conditions for combustion in the nonfiring cylinders. The flow of current to each of the firing cylinders is utilized to inductively create a potential providing a field in each of the nonfiring cylinders which effects conditions in such cylinders for improved combustion. Several approaches have been made to utilize the particular electrical concept applicable, but in each instance they have fallen somewhat short of achieving the desired end result and in particular have not been commercially desirable as they interfered with or altered existing structure of the ignition system of an engine and/or required somewhat more than ordinary skill for installation.

It is, therefore, a particularly important object of the invention to provide a new and improved ignition device for an internal combustion engine which reduces air pollution by minimizing the discharge of air-contaminating materials from the cylinders of the engine.

It is another object of the invention to provide a new and improved ignition device which may be installed by an unskilled person without alternation of the existing structure of the ignition system of the engine.

It is another object of the invention to provide a new and improved ignition device for an internal combustion engine which creates a more homogeneous mixture of air and fuel to provide a smoother burning mixture in each cylinder of the engine.

It is another object of the invention to provide a new and improved ignition device which breaks down solid deposits on the piston and cylinder surfaces exposed to the combustion process.

It is a further object of the invention to provide an ignition device which improves the power output of an engine and thus in an automobile the gas mileage is extended by increasing the efficiency of the combustion process.

It is a further object of the invention to provide an ignition device which increases the acceleration of an engine.

It is a further object of the invention to provide an ignition device which reduces oil contamination of an engine.

It is a further object of the invention to provide an ignition device wherein the atmosphere in each cylinder is ionized thereby lowering the voltage required to provide an ignition spark across the gap of each spark plug of the engine.

It is another object of the invention to provide an ignition device which includes no moving parts and thus is not subject to wear.

It is a still further object of the invention to provide an ignition device which is not affected by humidity, various forms of contamination to which an engine is normally subjected, or other conditions normally detrimental to proper performance of spark plugs and other components of an ignition system.

It is a further object of the invention to improve the life of various components of an ignition system including the battery by reducing the voltage necessary to operate the system.

It is a further object of the invention to provide an ignition device which may be readily manufactured to fit any desired number of cylinders of an internal combustion engine.

It is further object of the invention to provide an ignition device which may be installed without the use of tools or particular technical knowledge of the structure of the ignition system of the engine.

It is a further object of the invention to provide an ignition device which is simply connected in between the normal spark plug leads and the distributor head of an ignition system whereby the device is energized by current flowing to each of the spark plugs of an engine.

It is a further object of the invention to provide an ignition device of the character described which does not necessitate penetration or other alteration of the insulation on the various current leads of the existing ignition system in which it is installed.

It is a further object of the invention to provide an ignition device which improves the idle speed of an engine.

These and further objects of the invention will be apparent from reading the following description of an ignition device embodying the invention taken in conjunction with the accompanying drawings wherein:

FIG. 1 is an exploded perspective of an ignition device embodying the invention positioned for coupling the spark plug leads of an engine to the distributor;

FIG. 2 is an exploded perspective view of one of the couplers of the ignition device;

FIG. 3 is an enlarged view in longitudinal section showing one of the couplers connected between a socket on the distributor and a spark plug lead, and

FIG. 4 is a view in section along the line 4—4 of FIG. 3.

In accordance with the invention, the current flowing to each firing cylinder is utilized to inductively create an electrical condition in the leads to and in the nonfiring cylinders which electrical condition is nonigniting and creates a cylinder atmosphere more favorable to a highly efficient combustion process. The exact phenomenon of which occurs to enhance the cylinder atmosphere is not known, though it is believed to be in part a corona effect induced by the voltage at the sparking gap of the nonfiring plugs communicated from the lead in which the current is flowing to the firing cylinder.

Referring to FIG. 1 of the drawings, an ignition device 10 embodying the invention for use with a four cylinder engine includes four identical couplers 11 which are electrically interconnected in series by a conductor 12. The couplers 11 are each connectable with one of four identical spark plug lead sockets 13 on the head of a distributor 14. The distributor is of suitable conventional design serving to distribute electrical current to the several spark plugs of the engine in the usual timed sequence. The distributor has a central electrical socket 15 engageable by a lead 20 having a male member 21 insertable into the socket 15 for electrically coupling the distributor to the ignition coil, not shown, of the engine ignition system. The ignition device 10 electrically couples four identical spark plug leads 22 to the four spark plugs, not shown, in the four cylinders of the engine. The spark plug leads each have a male connector 23 engageable in the head of one of the couplers 11.

Referring to FIGS. 2-4, each of the couplers 11 has an integral tubular body mandrel 30 including a slightly tapered enlarged head portion 31, a reduced tubular central portion 32, and a still further reduced tubular lower end portion 33. The head portion 31 has a blind bore defining a receiver 34. The upper end 35 of the mandrel 30 is somewhat rounded to provide a pleasing appearance and smooth surface for handling and installation of the coupler. The size reduction of the central body portion 32 provides downwardly facing stop shoulder 40 on the bottom of the head of the body. A locking flange or lip 41 is provided around the lower end of the body portion 32. The lower end portion 33 of the body is reduced below the lip 41. A longitudinal bore 42 extends throughout the length of the central and lower portions of the body opening into the bottom of the socket 34 and opening through the lower end of the lower body portion 33. The body 30 is formed of an insulating or dielectric plastic material such as polypropylene.

An electrically conductive tube 43 is disposed through the bore 42 and bradded or flared outwardly at its upper end securing it to a cylindrical conductive spark plug lead socket 44 tightly fitted in the receiver 34 in the upper head of the body. As seen in FIG. 3, the socket 44 is located at the lower end of the receiver 34 and the tube 43 is bradded at its upper end 43a through a hole defined in the center of the bottom of the socket. The lower end 43b of the tube 43 is similarly flared outwardly or bradded against the bottom of the body portion 33 to rigidly lock the tube in the coupler body. The socket 44 is sized to receive a standard male spark plug lead connector 23 so that the spark plug leads may be readily coupled into the upper end of the coupler merely by inserting them by hand into the socket 44. A conductive clip 45 is secured along the lower end of the coupler body as best illustrated in FIG. 3. The straight portion 45a of the clip is inserted upwardly into the bore of the tube 43 while the curved side portion 45b of the clip extends upwardly along the outside cylindrical surface of the body portion 33. An upper, inwardly extending hook portion 45c of the clip is inserted into a sidewardly opening hole 50 in the coupler lower body portion 33 to lock the clip against longitudinal movement on the clip. The socket 44, the tube 43, and the clip 45 are all made of electrically conductive material which most readily discharges the particular structural function required of the part. For example, the socket 44 is made of aluminum, the tube 43 of brass and the clip 45 of a spring steel. The particular arrangement of the conductive components in the body of the coupler provides ease of construction and forms a rigid structure which is not subject to accidental disassembly and thus is long wearing.

A slightly outwardly flared skirt or boot 51 is tightly fitted on the coupler body below the head 31 extending in spaced concentric relation over the central portion 32 and the lower portion 33 of the coupler body. The skirt has a central portion 52 provided with a bore 53 sized to receive the central portion 32 of the coupler body. The locking flange 41 of the body engages the bottom face of the skirt portion 52 below its bore 53 locking the body in the skirt. Epoxy glue may be used in the skirt bore around the body. The skirt has an upper cylindrical end portion 60 having a bore 61 which is larger than the central coupler body portion 32 defining an annular space 63 within the upper portion of the skirt when the skirt is assembled on the coupler body. The lower flared portion 64 of the skirt comprising the major portion of its length has a downwardly and outwardly flared bore 65 shaped to receive the distributor socket 13 for connecting the coupler on the distributor. The internal surface of the lower skirt portion has spaced internal annular ribs 70 which grip the outward surface of the distributor socket on which the coupler is engaged as shown in FIG. 3.

A partial sleeve conductor 80 is disposed within the annular space 63 tightly fitted on the central coupler body portion 32 and circumferentially encompassing a major portion of the body. The sleeve 80 is electrically connected with the conductor 12 as shown in FIG. 4. The insulation 12a is stripped from the conductor along the portion of its length 12b which is disposed within the coupler annular space 63 around the coupler body portion 32 in the upper skirt portion 60. The bare conductor portion 12b is tightly confined with the annular space clamped between the outer surface of the sleeve 80 and the inner surface of the upper skirt portion 60 within its bore 61. The insulation stripped conductor portion 12b is held in sufficiently tight engagement with the conductive sleeve 80 that electrical contact is made between the conductor 12 and the sleeve. The conductor 12 extends from the skirt annular space on each side of the bare portion through a pair of circumferentially spaced semicircular slots 81 formed in and opened upwardly through the upper end of the skirt portion 60. While the preferred form of electrical connection between the conductor 12 and the sleeve 80 is as illustrated to facilitate assembly of each coupler, it will be recognized that the conductor 12 may be made in segments with separate segments extending through the spaced slots 81 with an insulation free end portion of each soldered to the outer surface of the sleeve 80. The spacing of the sleeve 80 from the tube 43 and the insulating character of the body 30 preclude sparking between the sleeve and tube.

A fully assembled ignition device embodying the invention includes one coupler 11 for each spark plug lead of the ignition system of the engine with the conductive sleeves 80 of the several couplers of the ignition device being electrically interconnected in series by the conductor 12. In the particular ignition device 10 illustrated in FIG. 1, for a four cylinder engine, four couplers 11 are interconnected by a single conductor 12. The four couplers are interconnected by a length of conductor 12 measured to properly space the four couplers to fit the sockets 13 on the head of the distributor 14 as shown in FIG. 1. The insulation is stripped at three spaced locations along the length of the conductor 12 to provide bare wire at such locations such as represented by the stripped conductor portion 12b in FIG. 4. Also, a length of each of the free ends of the conductor 12 is stripped of insulation so that at the coupler at which the ends terminate and come together, they may be laid into the annular space 63 of the coupler in the relationship shown in FIG. 4 with the bare ends of the stripped conductor being brought together approximately at the midpoint between the spaced slot 81 along the sleeve 80 in the coupler. The other three couplers will, of course, each be connected with a continuous bare section 12b of the conductor as in FIG. 4 so that the completely assembled ignition device 10 includes four circumferentially spaced couplers 11 with the ends of the conductor 12 being brought together in one of the couplers and the conductor 12 continuing through the other three couplers as in FIG. 4.

The conductor 12 may be inserted through the coupler in several different ways. For example, after the socket 44 and the tubing 43 are assembled in the body 30 of the coupler, the sleeve 80 may be placed on the central body portion 32. The conductor 12 with its stripped insulation portion 12b may be formed into an arcuate shape as in FIG. 4 and laid in place within the upper end portion of the skirt 51 with the insulation strip portion disposed across the skirt as shown in FIG. 4. The body 30 of the coupler is then inserted through the sleeve 80 into the skirt 51. Alternatively, the sleeve 80 is placed on the body portion 32 to the position shown in FIG. 3 and the stripped conductor portion 12b is wrapped partially around the sleeve 80 as in FIGS. 2 and 4 and held against the sleeve as the body 30 is inserted through the skirt until the stop shoulder 41 at the lower end of the body portion 32 engages the internal stop shoulder 55 within the skirt. The bare conductor portion 12b is wedged into the skirt portion 60 to the tightly fitting relationship represented in FIG. 4. The sizing of the slots 81 may be such that when the body portion 30 of the coupler is forced into the skirt, the bottom end surface 40 of the head 31 of the coupler body will tightly engage the segments of the insulation on the conductor 12 at the opposite ends of the bare portion 12b to further tightly clamp the conductor in the coupler. The clip 45 is then assembled on the lower end portion of the coupler body by inserting the straight portion 45a of the clip upwardly into the bore of the tube 43 with the crooked portion 45 of the clip sliding upwardly along the outer surface of the coupler body until the hooked end portion 45c engages the hole 50. If desired, the clip may be soldered to the tube 43 at a point designated 45d in FIG. 3 at the entry of the straight portion of the clip into the bore of the tube.

Any desired number of identical coupler units 11 may be so electrically and physically interconnected to provide an ignition device embodying the invention for an engine of any selected number of cylinders. If desired, the several couplers may be interconnected by a conductor 12 which is not in the closed loop form but rather is a single strip of wire having two free ends. In such a modified assembly a coupler 11 is secured as described at each free end of the conductor and the other couplers of the assembly spaced apart along the length of the conductor between the two end couplers. In such an arrangement the couplers still are electrically connected in series as in the form of FIG. 1.

The completely assembled ignition device 10 is installed in the ignition system of an internal combustion engine by steps suggested in the exploded perspective view of FIG. 1. The spark plug and ignition coil leads are removed from the head of the distributor 14 by pulling the spark plug lead connectors 23 from the sockets 13 and the connector 21 of the ignition coil lead 20 from the socket 15. The ignition device 10 is then held above the distributor in the relationship shown in FIG. 1 with each of the couplers 11 being installed on a socket 13 of the distributor head as shown in FIG. 3. Each coupler is held and manually placed over the distributor head socket to the position shown in FIG. 3 with the lower end portion of the coupler body with the clip 45 being inserted into the conductive female socket 13a of the distributor head socket 13. As shown in FIG. 3 the clip 45 is contoured to conform to a portion of the inner surface of the socket 13a to aid in holding the coupler on the socket. The hook 45c on the clip resiliently engages the locking recess 13b of the socket 13a. The gripping action of the ribs 70 aid in holding the coupler on the socket. The couplers 11 are sequentially installed on the sockets of the distributor head until the ignition device is securely connected with and supported on the distributor head. The spark plug leads are then connected into the proper couplers 11 in the same order in which they previously had been connected into the sockets 13 of the distributor head. The male connector 23 of each spark plug lead is inserted into the position shown in FIG. 3 within the socket 44 of each coupler. The coil lead 20 is then reconnected with the distributor socket 15 to provide energy from the spark coil to the distributor.

If the nonclosed loop or straight string arrangement of the assembly of couplers is used, the coil lead 20 is not removed during installation of the device. The spark plug leads are removed, the couplers are installed in the distributor head around the coil lead, and the spark plug leads are inserted into the couplers.

With the ignition device so connected between and electrically coupling the spark plug leads with the distributor, as the distributor sequentially energizes the spark plug leads, the ignition device is activated functioning to transmit a nonigniting electrical condition from each energized spark plug lead to the nonenergized spark plug leads and thence to the nonfiring cylinders of the engine. The distributor energizes a selected socket 13. An electrical potential is applied from the female socket 13a through the conductive clip 45 and the conductive tube 43 to the female socket 44 of the coupler 11. The potential is applied to the male connector 23 of the spark plug lead and through such lead to the spark plug of the cylinder to be fired. As the current flows through the tube 43 of the coupler 11 to energize the spark plug lead, an electrical field is effected in the vicinity of the tube 43 inducing a potential on the conductive sleeve 80 surrounding and electrically insulated from the tube 43. The character of and the thickness of the material comprising the central body portion 32 of the coupler is such that the potential on the tube 43 does not effect a spark between the tube and the sleeve 80. Also, of course, the character of the material comprising the dielectric along the body portion 32 must be such that the electrical condition between the tube 43 and the sleeve 80 will not effect breakdown of the material. The potential induced in the sleeve 80 is conducted to the insulation bare conductor portion 12b and through such conductor to the serially connected other couplers 11 in the system. The sleeves 80 in the couplers 11 connected with the nonenergized distributor sockets 13 are thus raised to the potential of the sleeve 80 surrounding the energized coupler. The electrical potential of the sleeves 80 of the nonenergized couplers induces an electrical condition in the conductive tubes 43 through such nonenergized couplers which condition is then conducted through the spark plug leads to the plugs of the nonfiring cylinders resulting in nonigniting emissions from such nonfiring plugs. These nonigniting ignitions condition the charge and atmosphere within the nonfiring cylinders to enhance the combustion process in such cylinders when each of the spark plugs in such cylinders are subsequently ignited to effect combustion of such charges. The engine operates in routine fashion with the spark plugs being sequentially fired and the ignition device 10 effecting the desired condition in each of the nonigniting cylinders as each spark plug lead is sequentially energized.

The numerous previously discussed beneficial effects are obtained, including improved acceleration, increased gas mileage, quicker starting, cleaner operating parts within the engine, and most importantly, a substantially reduced discharge of contaminants from the engine due to the improved combustion process. Analyses of exhaust gases from automobile engines operating under normal conditions under the influence of the ignition device of the invention have demonstrated an 84.9 percent decrease in hydrocarbons heavier than methane in one instance and in another instance a 100 percent decrease in such hydrocarbons. In the same tests, the methane measured in such exhaust gases showed a 35.82 percent decrease in the first instance and 100 percent decrease in the second example. In similar tests on the automobile engines, a full second reduction in acceleration time from zero to speeds of 60 miles per hour were measured. Also, an increase in idle speed of up to 200 r.p.m. was found in an engine with the addition of the ignition device without any engine adjustments. Gas mileage increases were found to range up to 20 to 30 percent. The device is readily installed without the use of special tools, and, due to the absence of moving parts and the protection provided the conductors in the device, essentially no deterioration occurs during its operation. Due to the nature of the construction of the device and the manner in which its several couplers are interconnected by the conductor 12, it is readily assembled to function with an engine of any number of cylinders without the necessity of manufacturing and stocking varieties of part sizes and kinds. The uniformity of spark plug lead connections and distributor heads permits the use of a uniform type coupler with only the numbers of couplers being varied to accommodate the device to various engines.

What is claimed and desired to be secured by Letters Patent is:

1. An ignition device for improving the combustion process in the combustion chambers of the cylinders of an internal combustion engine having electrical conductors connected between a distributor and the spark plug of each cylinder of said engine, said device comprising an electrically conductive sleeve supported in electrically insulated relationship around each of said electrical conductors forming one plate of a condenser for each conductor of said engine for inducing an electrical potential in each of said sleeves responsive to current flow in the electrical conductor through said sleeve; and electrical conductor means interconnecting said sleeves together in parallel whereby each of said plates of the individual condensers formed for each electrical conductor are simultaneously energized responsive to current flow through the electrical conductor passing through any one of said sleeves.

2. An ignition device for conditioning the combustion chambers of internal combustion engines comprising a plurality of serially interconnected couplers for electrically connecting the spark plug leads of said engine with the head of the distributor of said engine, each of said couplers including first conductive means for connecting said coupler into a socket of said distributor head, second conductive means spaced therefrom for connection of a spark plug lead with said cou-

pler, an electrical conductor connected between said first and said second coupling means, an electrically conductive sleeve disposed in spaced electrically insulated relationship around said conductor between said first and second coupling means, an electrical conductor extending between said couplers serially interconnecting said sleeves of said couplers whereby an electrical potential is induced in one of said sleeves of said couplers responsive to electric current flowing through said conductor between said first and second coupling means of said coupler, said potential is conducted to the sleeves of the remaining couplers of said ignition device effecting a change of electrical conditions in the nonfiring combustion chambers of said engine by means of said spark plugs in said chambers.

3. An ignition device in accordance with claim 2 wherein said sleeve is split having a gap therein between opposite free ends and said sleeve encompasses a major circumferential portion of said coupler around said conductor through said coupler between said first and second coupling means.

4. An ignition device in accordance with claim 2 wherein in each of said couplers said first conductive means comprises a male connector adapted to be inserted into a spark plug receptacle of said distributor head and said second conductive means comprises a female receptacle for receiving the male connector of a spark plug lead.

5. An ignition device for preconditioning a fuel charge in an internal combustion engine for improving the combustion process in the combustion chambers of said engine comprising: a plurality of serially interconnected electrically conductive couplers for connecting spark plug leads of said engine into the head of the distributor of said engine, each of said couplers comprising an elongate, tubular body mandrel formed of an electrically insulating material, an electrically conductive female socket disposed in an opening at one end of said body mandrel for receiving the male connector of a spark plug lead, an elongate electrical conductor disposed through said body mandrel from said female socket member to a second end of said body mandrel, an electrically conductive connector secured on said second end of said body mandrel in electrically conductive relationship with said conductor through said body mandrel, said second end of said body mandrel and said connector comprising a male connection on said coupler for insertion into a female spark plug lead socket on a distributor head, an electrically conductive sleeve disposed in electrically insulated spaced relationship around said body mandrel encompassing said conductor through said body mandrel and within an electrical field generated around said conductor when said conductor is energized, a tubular skirt of electrically insulating material disposed on said body mandrel around and in spaced relationship from said second male end portion of said body mandrel for fitting over and gripping a said socket member of said distributor head, and an electrical conductor serially interconnecting said conductive sleeves of said couplers of said ignition device, said conductor having a portion thereof disposed through said skirt of each of said couplers and clamped in electrically conducting relationship with said sleeve of said coupler whereby electrical energy passing through one of said couplers from said distributor to a spark plug lead connected thereto induces an electrical condition in said sleeve of said coupler, said electrical condition being communicated to the sleeves of the other couplers of said ignition device for communication to the spark plugs of the nonfiring cylinders of said engine.

6. An ignition device as defined in claim 5 wherein said sleeve is a split sleeve encompassing a major circumferential portion of said conductor through each of said couplers.

7. An ignition device as defined in claim 6 wherein said conductive coupling means on said male portion of said body mandrel of said coupler is a clip having a portion electrically connected with said conductor through said body mandrel and a portion engageable in the female socket of the socket connector of said distributor head of said engine when said device is installed on said engine.

8. An ignition device as defined in claim 7 wherein said conductor between said sleeves of said couplers has an insulation bare portion therein at each of said couplers clamped within said coupler around said sleeve by said skirt of said coupler.

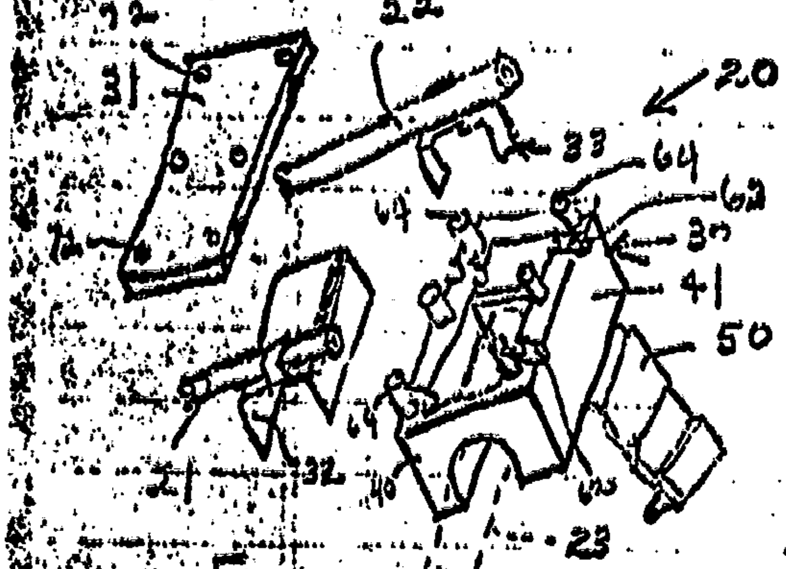


FIG. 2

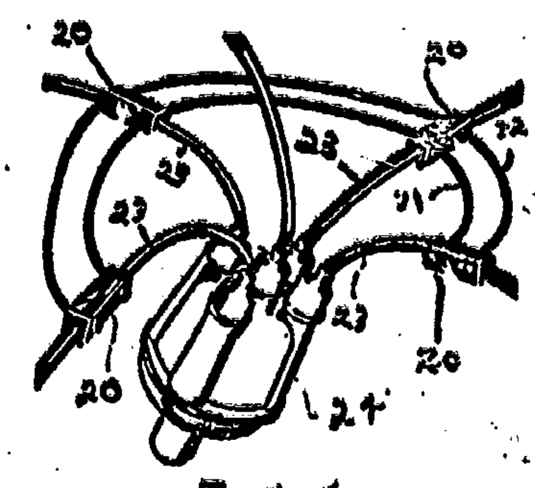


FIG. 1

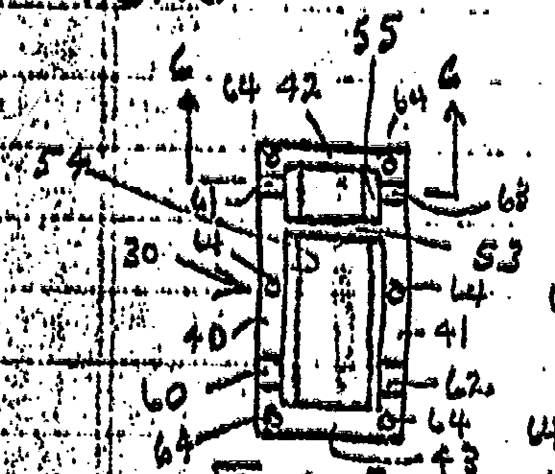


FIG. 3

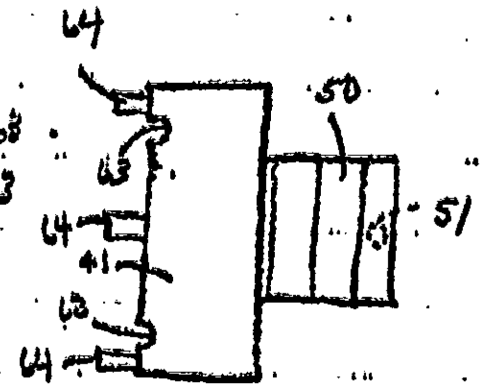


FIG. 4

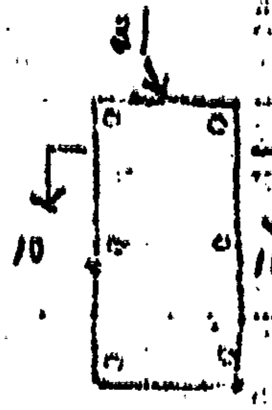


FIG. 8

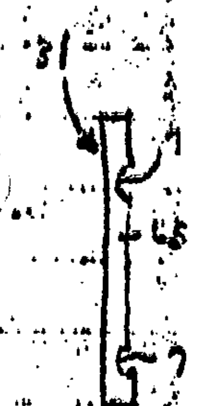


FIG. 11

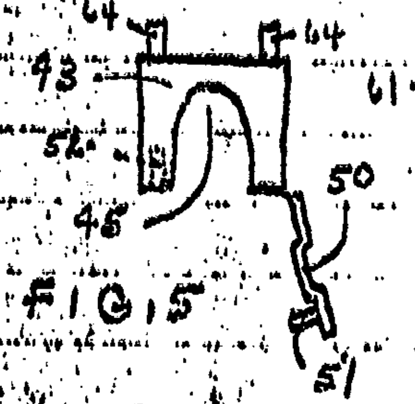


FIG. 5

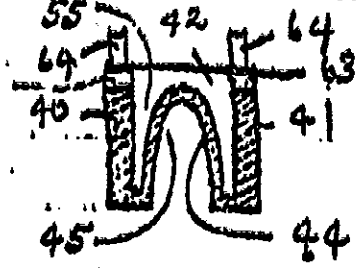


FIG. 6

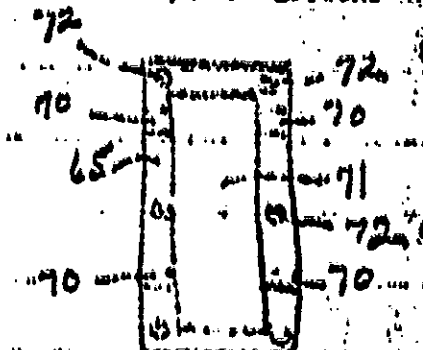


FIG. 9

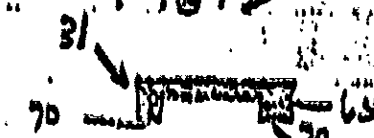


FIG. 10

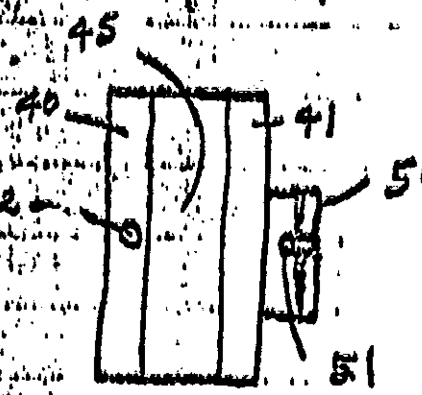


FIG. 7

FIG. 13

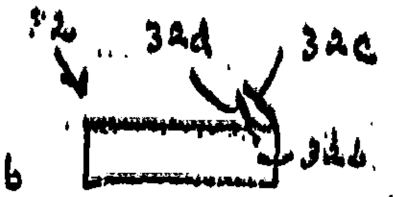


FIG. 14

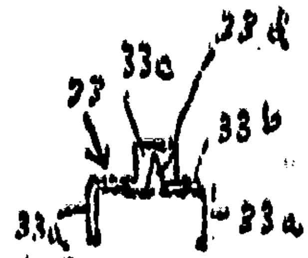


FIG. 16

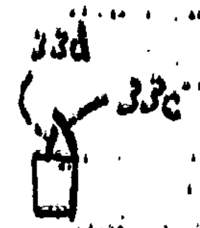


FIG. 17

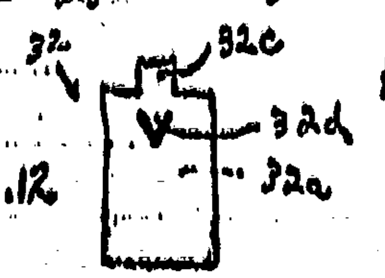


FIG. 12

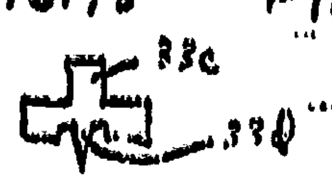


FIG. 15

IGNITION DEVICE FOR INTERNAL COMBUSTION ENGINE

Abstract of the Disclosure

A device for improving the ignition characteristic of an internal combustion engine and reducing the air pollutants discharged by such engine having electrical apparatus for applying an electrostatic charge into the combustion chambers of the engine including a pair of electrical energy conductors, and an induction block connected with the conductors for each of the spark plug wires of the engine each induction block having a longitudinal channel sized to receive a spark plug wire, a retainer for holding the block on the spark plug wire, first and second longitudinally spaced chambers partially encircling the spark plug wire channel in electrical insulated relationship from the channel, first and second electrically conductive plates positioned in the first and second chambers partially encircling the spark plug wire channel, conductive clamping means on each of the plates connecting each plate with one of the pair of conductors between the induction blocks, and removable cover means for holding the pair of electrical conductors with each induction block clamping the first and second plates in the first and second chambers of each block. One such induction block is installed on each spark plug wire of the engine. Current flowing to each firing cylinder of the engine induces an electrical potential in the plates of the induction block on the firing wire which potential on each plate is communicated to the corresponding plate of the induction block on the non-firing spark plug wires inducing an electrostatic potential on the plates around the non-firing spark plug

wires to communicate the electrical potential into the non-firing cylinders improving the combustibility of the fuel in such cylinders.

This invention relates to an internal combustion engine emission device and more particularly to an ignition device for electrically enhancing the combustion process of an internal combustion engine.

In recent years both air pollution and fuel shortage problems have become major obstacles to the continued operation of internal combustion engines for vehicle and other uses as they are presently structured and operated. One of the principal reasons for the both the production of pollutants by the internal combustion engine and the inefficiency of utilization of the fuel by the engine is the inefficiency of the combustion process in the cylinders of the engine resulting in the discharge of many unburned or only partially burned products which, for the most part, are gaseous in nature so that they add further impurities to the air.

It has been found that a non-igniting electrical condition can be developed in each of the non-firing cylinders of an internal combustion engine responsive to the flow of current to the firing cylinder thereby improving conditions for combustion in the non-firing cylinders. The flow of current to each of the firing cylinders is utilized to inductively create a potential providing a field in each of the non-firing cylinders which effects conditions in such cylinders which improve combustion. Several different approaches have been made to utilize this particular electrical concept but in many instances they have fallen somewhat short of achieving the desired end result and in particular have not been commercially desirable as they interfered or altered the existing structure of the ignition system of the internal combustion engine and/or required somewhat more than ordinary skill for installation. One particular prior art device which has utilized the same principles of the present invention successfully is disclosed and claimed in U.S. Patent 3,613,653 issued October 19, 1971 to Eugene Irvin, Jr., the present inventor, and Edmond A. Carrell. The particular mechanical structure disclosed in such patent for connecting the device with the spark plug wires of an engine is not operable with some more recently developed distributors. Also it has been found that the present invention is capable of developing a potential at the non-firing cylinders of approximately 40% greater than that of the device shown in the patent.

It is, therefore, a particularly important object of the present invention to provide a new and improved ignition device for an internal combustion engine for reducing air pollution and improving the fuel efficiency of the engine.

It is another object of the invention to provide a new and improved ignition device of the character described which may be installed by an unskilled person without altering the existing structure of the engine ignition system.

It is another object of the invention to provide a new and improved ignition device of the character described which creates a more homogenous mixture of air and fuel to provide a smoother burning mixture in each cylinder of the engine.

It is another object of the invention to provide a new and improved ignition device which breaks down solid deposits on the piston and cylinder surfaces exposed to the combustion process.

It is a further object of the invention to provide an ignition device which improves the power output of an engine and thus increases the gas mileage of an automobile by increasing the efficiency of the combustion process.

It is a further object of the invention to provide an ignition device which increases the acceleration of an engine.

It is a further object of the invention to provide an ignition device which reduces oil contamination of an engine.

It is a further object of the invention to provide an ignition device wherein the atmosphere in each engine is ionized thereby lowering the voltage required to provide an igniting spark across the gap of each spark plug of the engine.

It is a further object of the invention to provide an ignition device which includes no moving parts and thus is not subject to wear.

It is a still further object of the invention to provide an ignition device which is not affected by humidity and various forms of contamination or other conditions normally detrimental to the proper performance to spark plugs and other components of the ignition system of an internal combustion engine.

It is a further object of the invention to improve the life of the various components of the ignition system of the engine including the battery by reducing the voltage necessary to operate the ignition system.

It is a further object of the invention to provide an ignition device which may be readily assembled to fit any desired number of cylinders of an engine.

It is a further object of the invention to provide an ignition device which may be installed without the use of special tools or particular technical knowledge of the ignition system of the engine.

It is a further object of the invention to provide an ignition device which is connected between the normal spark plug leads of the ignition system of the engine whereby the device is energized by current flowing to each of the spark plugs of the engine.

It is a further object of the invention to provide an ignition device of the character described which does not require that the insulation of the spark plug leads be penetrated for connection of the device.

It is a still further object of the invention to provide an ignition device which improves the idle speed of the engine.

In accordance with the invention, there is provided an ignition device for an internal combustion engine which includes a plurality of induction blocks interconnected by a pair of electrical conductors connecting in parallel condenser plates in each of the induction blocks supported in spaced relation around the spark plug wire on which each of the inductions blocks is mounted. Each of the induction blocks has a longitudinal channel which receives a spark plug wire and first and second electrically conductive plates mounted in spaced relation to and partially encircling the spark plug wire channel. The plates are supported in the block in longitudinal spaced relation. The first plates of each of the blocks are clamped to and electrically connected with a first of the conductors interconnecting the blocks. A second of the plates in each of the induction blocks is secured to and electrically connected with the second of the conductors between the induction blocks. Current flowing in the spark plug wire to the firing cylinder induces an electical potential in the first and second plates of the induction block on such spark plug wire. The electrical potential is conducted through the first and second conductors to the remaining induction blocks supported on the spark plug wires to the non-firing cylinders. The plates partially surrounding the spark plug wires to the non-firing cylinders induce an electrical potential in each such spark plug wires which is communicated to the spark plug of the non-firing cylinders creating an electrical condition in such non-firing cylinders which enhances combustion in such cylinders when fired.

The foregoing objects and advantages of the invention will be better understood from the following detailed description of a preferred embodiment of the invention taken in conjunction with the accompanying drawings wherein:

Figure 1 is a fragmentary assembly view in perspective showing the ignition device of the invention assembled on the spark plug wires of a four cylinder engine;

Figure 2 is an exploded perspective view of one of the ignition block assemblies of the device of the invention;

Figure 3 is a top plan view of the induction block assembly housing;

Figure 4 is a side view in elevation taken at 90° to the right of Figure 3 of the induction block assembly housing;

Figure 5 is an end view of the induction block assembly housing as viewed from the end of the housing nearest the reader in Figure 2;

Figure 6 is a view in section of the induction block assembly housing along the line 6-6 of Figure 3;

Figure 7 is a bottom view of the induction block assembly housing;

Figure 8 is a top view of the cover plate for the induction block assembly housing;

Figure 9 is an inside or bottom view of the cover plate of Figure 8;

Figure 10 is a view in section along the line 10-10 of Figure 8;

Figure 11 is a right edge view of the housing cover plate as seen in Figure 8;

Figure 12 is a top view of the large electrically conductive plate of the induction block assembly showing the conductor tab and conductor point of the plate lying in the same plane as the top of the plate for better illustrating the shape of the tab and point;

Figure 13 is an end view of the plate of Figure 12 showing the tab and point bent upwardly to positions at which the plate is clamped in electrically conductive relationship with the electrical conductor;

Figure 14 is a right side view of the plate as shown in Figure 13;

Figure 15 is a top view of the small electrically conductive plate of the induction block assembly showing the conductor clamp tab and contact point folded into the plane of the top of the plate for better illustrating the shape of the tab and point;

Figure 16 is an end view of the plate of Figure 15 showing the conductor clamp tab and contact point bent upwardly at the position for securing the plate in electrically conductive relationship with a conductor; and

Figure 17 is a right side view of the small plate as shown in Figure 16.

Referring to Figure 1, the ignition device of the invention includes a plurality of induction block assemblies 20 which are interconnected by first and second conductors 21 and 22 and are each clamped on a separate one of spark plug wires 23 leading from a distributor 24 to the spark plugs, not shown, of an internal combustion engine, not shown. In accordance with the invention, the current flowing from the distributor to each firing cylinder is utilized to inductively create an electrical condition in the spark plug wires leading to the non-firing cylinders where an electrical condition is induced which is non-igniting and creates a cylinder atmosphere more favorable to a highly efficient combustion process. The exact phenomenon which occurs in the cylinder to enhance the cylinder atmosphere is not known, though it is believed to be in part a corona effect induced by the voltage at the sparking gap of the non-firing plugs communicated from the spark plug wire leading to the firing cylinder at the time current flows in such wire from the distributor to the spark plug of the firing cylinder.

Referring to Figure 2, each of the induction block assemblies 20 includes a housing 30, a housing cover 31, a first large conductive plate 32, and a second small conductive plate 33.

The details of the housing 30 are shown in Figures 3-6 inclusive. The housing has longitudinal side walls 40 and 41 joined with opposite end walls 42 and 43. A semi-elliptical longitudinal partition 44 extends along a longitudinal axis between the end walls defining a downwardly opening semi-elliptical conductor channel 45 for receiving a spark plug wire 23. A retainer plate 50 is formed integral with and hinged to the bottom edge of the side wall 41. The inside face of the retainer plate is provided with a locking pin 51 positioned perpendicular to the plane of the plate along the free edge of the plate. The pin 51 is insertable into a locking bore 52 formed in the side wall 40 of the housing opening downwardly through the bottom edge of the side wall. The retainer plate 50 folds across the bottom of the housing so that the free inside edge of the plate rests against the bottom edge of the housing side wall 40 clamping the housing on a spark plug wire 23 extending through the channel 45. The housing 30 has a cross partition 53 which runs parallel with the end walls 42 and 43 extending across the housing between the side walls above the semi-elliptical partition 44 having a top edge in the same plane as the top edges of the end walls 42 and 43. The partition 53 is located substantially closer to the end wall 42 than to the end wall 43 so that the partition 53 defines a first upwardly opening large chamber 54 between the partition 53 and the end wall 43 and a second smaller upwardly opening chamber 55 between the partition 53 and the end wall 42. The cross partition 53 extends between the side walls 40 and 41 of the housing to the top surface of the longitudinal partition 44. The first large chamber 54 is designed to receive the first large plate 32 permitting the plate to partially encompass the longitudinal partition 44 within the chamber. The second smaller chamber 55 is designed to receive the second small plate 33 so that the plate partially encompasses the longitudinal partition 44 within the second small chamber. The first side wall 40 is provided along the top edge thereof with a semi-circular channel 60 leading into the first large chamber 54 and with a second semi-circular channel 61 leading to the second smaller chamber 55. Similarly, the other side wall 41 is provided along the top edge thereof with a semi-circular channel 62 aligned with the channel 60 also leading into the first chamber 54 and with a semi-circular channel 63 aligned with the channel 61 leading to the second smaller chamber 55. The channels 60 and 62 permit the first conductor 21 to pass through the first chamber 54 and the channels 61 and 63 permit the second conductor 22 to pass through the second chamber 55. The top edge surfaces of the side and end walls of the housing are provided with mounting pins 64 located at the four corners of the housing and at the midpoints of the side walls for holding the top 31 on the housing.

The housing top 31 is rectangular in shape and is sized to fit over the housing 30 on the top edges of the end and side walls of the housing. The bottom face of the top has a peripheral flange 65 having side wall portions which are provided with semi-circular recesses 70 aligned in pairs toward the opposite ends of the top to register with the pairs of semi-circular channels 60 and 62 and 61 and 63, respectively, to accommodate the two conductors 21 and 22 so that the conductors may pass through the housing for connection with the plates 32 and 33, respectively. The inside face 71 of the top 31 within the peripheral flange 65 defines the top or ceiling of the first and second chambers 54 and 55 providing space for the entrance and exit of the conductors 21 and 22 and the connection of the conductors with the plates 32 and 33 along the top of the first and second chambers.

. The top is provided with bores or holes 72 positioned at the four corners of the top and at the center line of the top along the side edges of the flange 65 to register with the six mounting pins 64 on the housing body for connecting the top 31 on the housing body 30. The pins 64 and the holes 72 are sized to permit a tight fit of the pins in the holes for holding the top on the housing.

The housing 30 and the top 31 of the distribution block assembly are constructed of an electrically insulating material such as a plastic which may be quickly and inexpensively fabricated. The housing and top are each one piece integral units which are molded in accordance with standard plastic fabricating procedures.

The first conductive sleeve 32 which may be considered analagous to a condensor plate as illustrated in Figures 12-14 is an open-sided rectangular shaped channel member having a central or top plate portion 32a and parallel side walls 32b. The plate 32 is sized to fit within the first large chamber 54 so that the side plate portions 32b extend down along the opposite sides of the longitudinal channel member 44 while the top plate portion 32a extends across the top portion of the partition 44. The shape of the plate 32 permits the plate to effectively encompass approximately one-half of the spark plug wire 23 positioned within the channel 45 of the induction block housing 30. Formed integral with the top portion 32a of the plate 32 are a rectangular retainer tab 32c fixed along a bottom edge of the tab with the plate top portion and a triangular conductor contact point 32d which is formed from the material of the top portion

32a by making two connected angular cuts in the top portion so that the contact point 32b may be bent upwardly as evident in Figures 13 a... .4. The retainer tab 32c is designed to be bent partially around the conductor 21 to pinch the conductor between the tab and the top surface of the channel portion 32a for tightly securing the conductor 21 with the plate 32. The contact point 32d is shaped and positioned to pierce the insulation on the conductor 21 for making electrically conductive contact with the conductive wire in the conductor so that electrical communication is established between the plate and the conductive wire through the conductor 21.

The smaller second electrically conductive plate 33, as illustrated in Figures 15-17, is a rectangular open-sided channel-shaped member having side leg portions 33a formed on a top portion 33b. The plate 33 is sized to fit within the smaller distribution block assembly housing chamber 55 so that the plate side portions 33a extend along the sides of the longitudinal partition 44 within the chamber 55 and the top portion 33b of the plate extend across the top portion of the partition within the chamber. The top portion 33b of the plate has a rectangular conductor retainer tab 33c formed integral with the top portion of the plate and connected with the top portion along an edge of the tab. Extending in longitudinal alignment with the tab 33c is a conductor point 33d which also is formed integral with the plate top portion 33b. The tab 33c is designed to bend around to pinch the conductor 22 between the tab and the top face of the plate portion 33b while the point 33d pierces the insulation of the conductor to contact the conductive wire through the center of the conductor 22 to effect electrical connection between the wire in the conductor 22 and the plate 33.

The plates 32 and 33 are made of an electrically conductive material which may be economically manufactured and bent to form the connections between the conductors and the plates. A suitable material for the plates has been found to be brass.

A complete ignition device incorporating the features of the invention includes one ignition block assembly for each of the spark plug wires of the engine on which the device is to be used. As indicated in Figure 1 the induction block assemblies are connected on the conductors 21 and 22 at spaced intervals along the lengths of the conductors to properly position the induction block assemblies for coupling on the spark plug wires 23. Two of the induction block assemblies are secured respectively at opposite ends of the conductors 21 and 22 with the remaining induction block assemblies being connected in spaced relation between such opposite ends for convenient securing on the spark plug wires. The first of the conductors 21 is electrically connected between the first plates 32 in all of the induction block assemblies so that the plates may be considered as electrically connected in parallel. Similarly the second smaller plates 33 of the induction block assemblies are connected with the second conductor 22 so that the plates 33 are considered as electrically connected in parallel. The electrical system forming the first conductor 21 and the plates 32 is in insulated relationship from the electrical system comprising the conductor 22 and the plates 33. Each of the induction block assemblies 20 is connected together and coupled with the first and second conductors 21 and 22 in the general relationship as illustrated in Figure 2. The first larger plate 32 is connected on the conductor 21 by forcing the conductor downwardly on the contact point 32d until the contact point pierces the insulation of the conductor and is forced into the conductor engaging the conductive wire along the center of the conductor. The retainer tab 32c is then bent partially around the conductor insulation to trap or pinch the conductor on the contact point 32d between the inside face of the tab 32c and the top face of the plate portion 32a. The plate is thus tightly secured in electrically conductive relationship with the conductor. Similarly the smaller plate 33 is connected with the conductor 22 by pressing the conductor 22 downwardly on the contact point 33d until the contact point pierces the insulation and engages the conductive wire through the conductor and the tab 33c is bent partially around the conductor to clamp the plate with the conductor in electrically conducting relationship. The large plate 32 is then placed in the large first chamber 54 of the induction block assembly housing 30. The side leg portions 32b of the plate 32 fit downwardly on opposite sides of the housing longitudinal partition 44. Similarly the plate 33 is placed in the smaller housing chamber 55 with the leg portions 33a of the plate fitting downwardly along opposite sides of the partition 44 within the chamber. Thus, the large and small first and second plates partially encompass the partition 44 within the large and small chambers respectively. The top 31 is then placed on the pins 64 and pressed tightly downwardly closing the induction block assembly housing. The conductors 21 and 22 enter the chambers of the housing through the semi-circular recesses or channels provided in the top edges of the housing side walls and the internal flange 65 of the top 31. On those induction block assemblies which are on the opposite ends of the conductors 21 and 22 the conductors simply extend through the channel openings along one side of the induction block assembly housing. In those induction block assemblies that are intermediate the ends of the conductors 21 and 22 the conductors pass into the block assembly housings at one side of the housing and pass outwardly toward the next block assembly through the opposite side of the housing and housing top.

After connection of the induction block assemblies on the conductors 21 and 22 the ignition device is secured on the ignition system of an internal combustion engine, not shown, in the relationship shown in Figure 1. One of the end induction block assemblies is first connected on a convenient one of the spark plug wires by placing the induction block assembly housing on the wire approximately two inches from the distributor 24 with the spark plug wire 23 fitted along the housing assembly channel 45 so that the spark plug wire passes completely through the housing longitudinally along the channel. This, of course, is done with the retainer 50 open as illustrated in Figure 2. The hinged retainer 50 is then folded upwardly toward the housing to a closed position across the open bottom of the channel 45 inserting the retainer pin 51 of the retainer 50 into the hole 52 along the bottom edge of the side wall 40 of the housing. The pin 51 is sized in relation to the hole 52 so that the retainer 50 snaps into a closed locked relationship across the bottom of the retainer housing tightly holding the retainer housing on the spark plug wire. Each of the succeeding induction block assemblies is connected on succeeding spark plug wires until the entire ignition device is coupled with the spark plug wires. One induction block assembly is connected with each of the separate spark plug wires.

Prior to installing the ignition device on the ignition system of an internal combustion engine the engine should be in normal good running order. The carburetor should be adjusted for a normal mixture setting. The spark plug wires and distributor should be in good condition. Upon completion of installation and during the operation of the device on the engine, the induction block assemblies should at all times be securely attached to the spark plug wires. After the engine has been run approximately one thousand miles with the ignition device installed, the oil of the engine should be changed, the oil filter should be changed, and the idle speed of the engine should be adjusted to normal.

With the ignition device connected between and electrically coupling the spark plug leads between the distributor and the spark plugs, as the distributor sequentially energizes each of the spark plug leads the ignition device is activated transmitting a non-igniting electrical condition from each energized spark plug lead to the remaining non-eneriqzed spark plug leads and thus to the non-firing cylinders of the engine. As the current flows in the energized spark plug lead the flow of the current through the first and second conductive plates 32 and 33 produces an electrical potential on each of the plates due to an electrical field around the spark plug wire. The character of the material forming the induction block assembly housing and the spacing between the electrically conductive first and second plates and the energized spark plug wire preclude any sparking effect between the wire and the plates. Also the electrical relationship between the plates and the wire is not such that there is any damage to the insulation on the spark plug wire. The electrical potential developed on each of the plates 32 and 33 is conducted through the contact points on the plates to the conductors 21 and 22 leading to the other induction block assembly on the remaining non-energized spark plug wires. Thus, an electrical potential is developed on the first and second conductive plates 32 and 33 in each of the other induction block assemblies. Such potential on the plates induces an electrical condition in the non-energized spark plug wires which is conducted through such wires to the non-energized spark plugs. Such condition is communicated through the spark plugs into the non-firing cylinders resulting in a low level non-igniting electrical emission from such non-firing plugs. These non-igniting electrical conditions in the non-firing cylinders preconditions the fuel charge and the atmosphere within the non-firing cylinders to enhance the combustion process in such cylinders so that when each of the spark plugs in such cylinders is subsequently energized to ignite the fuel charge in the cylinders the combustion process is improved. As the engine operates in routine fashion with the spark plugs being sequentially fired, the ignition device of the invention effects the desired fuel charge preconditioning in each of the non-igniting cylinders prior to and as each spark plug lead is sequentially energized by the distributor.

The numerous previously discussed beneficial effects are obtained, including improved acceleration, increased gas mileage, quicker starting, cleaner operating parts within the engine, and most importantly, substantially reduced discharge contaminants from the engine due to the improved combustion process and a fuel saving. The device is readily installed without the use of special tools and due to the absence of moving parts and the protection provided the conductors in the device, essentially no deterioration occurs during its operation. Due to the nature of the construction of the device and the manner in which its several ignition block assemblies are interconnected by the conductors 21 and 22, the device may be readily assembled to function with any number of cylinders by utilizing the required number of induction block assemblies without the necessity of manufacturing and stocking varieties of part sizes and kinds. The uniformity of spark plug lead sizes permits the use of the uniform type induction block assembly with only the number of such assemblies being varied to accommodate the device to various engines having different numbers of cylinders. The use of the two conductive condenser plates in each of the induction assemblies blocks and the difference in the size of the plates which is approximately a ratio of four to one between the large and small plates has been found to produce approximately 40% greater potential at the plates of the non-firing cylinders than has been found to be obtainable with prior art devices including that of the inventor referred to in his previously issued patent.

What is claimed is:

1. An ignition device for improving the combustion process in the combustion chambers of the cylinders of an internal combustion engine having spark plug wires connected between a distributor and the spark plug of each cylinder of said engine, said device comprising: a plurality of separate electrically conductive plates insulated from each other and supported in an assembly means for connection partially around and in insulated relationship with each of said spark plug wires defining a plurality of condenser plates for each of said spark plug wires of an engine for inducing an electrical potential in each of said plates responsive to electrical current flow in one of said spark plug wires through one set of said plates; and a plurality of separate electrical conductors interconnecting corresponding ones of said condenser plates in each of said sets of said plates at all of said spark plug wires, each of said separate conductors and said plates connected with said conductors being insulated from each of the other of said conductors and plates connected with said conductors, whereby current flow through any one of said spark plug wires energizing said wire induces an electrical potential in said plates at said wire and said induced electrical potential is communicated with the remainder of said plates connected with each of said conductors at the non-energized ones of said spark plug wires.

2. An ignition device in accordance with claim 1 wherein each set of said condenser plates adapted to be connected with each of said spark plug wires includes two of said plates and a first of said conductors interconnecting said plates interconnects a first of said plates in each set of said plates and

a second of said conductors interconnecting said plates interconnects a second of said plates in each set of said plates.

3. An ignition device in accordance with claim 2 wherein one of said plates is several times as large as another of said plates in each set of said plates.

4. An ignition device in accordance with claim 3 wherein each of said plates is an open-sided channel-shaped member.

5. An ignition device in accordance with claim 4 wherein each set of said plates is supported in a housing provided with a longitudinal channel for receiving a spark plug wire and including a retainer connected with said housing for locking housing on said spark plug wire.

6. An ignition device for conditioning the combustion chambers of internal combustion engines comprising: a plurality of serially interconnected couplers for electrically interconnecting the spark plug wires of said engine, each of said couplers including a first electrically conductive plate adapted to carry an electrical potential responsive to flow of electrical current through the one of said spark plug wires adjacent to said plate, a second electrically conductive plate electrically insulated and spaced from said first plate and adapted to support an electrical potential induced by electrical energy flow through said spark plug wire extending adjacent to said first and second plates, a first electrical conductor interconnecting all of said first

plates in parallel, and a second conductor interconnecting all of said second of said plates and electrically insulated from said first conductor whereby energizing any one of said spark plug wires induces an electrical potential on said first and second plates at said wire and said potential is communicated to the remainder of said first and second plates adjacent the other of said spark plug wires for inducing a potential in said other non-energized spark plug wires.

7. An ignition device in accordance with claim 6 wherein each of said first plates has a surface area several times as large as each of said first plates.

8. An ignition device in accordance with claim 7 wherein each set of said first and second plates is supported in a housing in insulated relationship from each other and said housing has a longitudinal open-sided channel for receiving a spark plug wire and means for clamping said housing on said spark plug wire with said spark plug wire extending through said channel.

9. An ignition device in accordance with claim 8 wherein each of said first and second plates is shaped to partially encompass said channel along said housing whereby said first and second plates of each of said sets is supported partially encompassing a spark plug wire when said housing is secured on said spark plug wire.

10. An ignition device for improving the combustion process in the combustion chambers of the cylinders of an internal combustion engine having a spark plug wire extending from an electrical distributor to each of said cylinders of said engine, said ignition device comprising: a plurality of induction block assemblies and first and second separate electrical conductors interconnecting said induction block assemblies, said induction block assemblies being connected in spaced relation along said first and second conductors between opposite free ends of said first and second conductors, each of said induction block assemblies being adapted to be coupled with a separate one of said spark plug wires and each of said induction block assemblies comprising a housing having substantially parallel opposite end walls and substantially parallel opposite side walls extending between said end walls substantially perpendicular to said walls, a longitudinal semi-elliptical bottom wall extending between said end walls the longitudinal axis of said bottom wall being substantially perpendicular to said end walls, the opposite side edges of said bottom wall being formed integral with the opposite side edges of said side walls, said bottom wall being positioned so that the concave side of said bottom wall opens through the bottom of said housing defining a longitudinal channel to receive a spark plug wire, a hinged retainer secured along one edge with the bottom edge of one of said side walls of said housing and the opposite free edge of said retainer having means for releasably connecting said free edge with the bottom edge of the other of said side walls whereby said hinged retainer is closable across

the bottom of said housing to lock said housing on one of said spark plug wires, a partition formed in said housing integral with and extending between said side walls spaced from said end walls connecting with the top surface of said longitudinal bottom wall closely spaced from one of said end walls defining with said end walls said side walls and top surface of said longitudinal bottom wall an upwardly opening first large chamber and an upwardly opening second smaller chamber, each of said chambers extending around said elliptical longitudinal bottom wall encompassing a substantial portion of said downwardly opening channel for said spark plug wire, a removable top connectible along the inside peripheral face of said top with the top edges of said end and side walls of said housing for closing said first and second chambers, said inside face of said top and the top edges of said end side walls having recess openings for lateral access into said first and second chambers of said housing above said longitudinal bottom wall of said housing for extension of said first electrical conductor into said first chamber of said housing and said second electrical conductor into said second chamber of said housing, a first electrically conductive plate positioned in said first chamber of said housing extending along the length of and along the top and sides of said longitudinal bottom wall within said first chamber of said housing and mechanically and electrically connected with said first electrical conductor within said first chamber of said housing, and a second electrically conductive plate in said second chamber of said housing extending along the length of and around the top and sides of said longitudinal bottom wall of said housing within said second chamber of said housing and electrically and mechanically connected with said second electrical conductor in said second chamber of said housing, said first and second electrically conductive plates being electrically insulated from each other in said housing, said first and second electrical conductors being electrically insulated from each other, said first and second plates in each of said housings being adapted to develop an electrical potential when the spark plug wire extending along said channel of said housing bottom wall is energized, said electrical potential in said first and second plates being electrically communicated to said first and second electrical conductors and further communicated through said electrical conductors to the first and second plates in the induction block on the non-energized spark plug wires imposing said electrical potential on said first and second plates in said induction block assemblies at said non-energized spark plug wires whereby said electrical potential is induced in said non-energized spark plug wires and communicated therethrough to the spark plugs connected with said non-energized spark plug wires for effecting an electrical condition in the combustion chambers in which the non-energized spark plugs are connected for improving combustion conditions of a fuel charge in the non-firing cylinders of said engine preliminary to combustion in said cylinders.

11. An ignition device in accordance with claim 10 wherein each of said first and second electrically conductive plates is a channel-shaped member having a top plate portion having said means for connection with one of said electrical conductors and opposite side wall plate portions substantially parallel with each other and perpendicular to and connected along side edges with said top plate portion defining downwardly opening channel adapted to fit within the appropriate chamber of said housing around said bottom wall of said housing for partially encompassing the spark plug wire passing through said channel formed by said bottom wall of said housing.

C. MEL ADAMS
3509 BIDDLE STREET
CINCINNATI, OHIO 45220

THEORY AND OPERATION OF THE PASER 500 PERFORMANCE-ECONOMY PACK

by

C. Mel Adams, Sc.D., P.E.

Professor of Engineering

Coordinator - Energy Research & Development

University of Cincinnati

Professor of Mettallurgy & Materials Science

Carnegie-Mellon University

I. Introduction

The Paser 500 Performance-Economy Pack, an "Ignition Device for Internal Combustion Engine," described in U.S. Patent 3,613,653 and several foreign patents, is an electronic engine add-on unit which promotes chemical reactions, including the combustion of gasoline and other fuels in the firing chamber of an internal combustion engine which is equipped with an ignition system. The favorable performance of this device has been established in extensive field and laboratory testing and is reflected in reports from fleet operators and other users. The functioning of the Paser 500 has been the subject of intense technical scrutiny for the purpose of explaining and improving the favorable electrical, chemical and thermal events which take place in the firing chamber through the operation of the unit.

II. Inefficiency of the Internal Combustion Engine

The internal combustion engine is a device designed to convert chemical energy in fuel into thermal energy, then into mechanical energy (torque) at the drive shaft. The conversion from chemical energy into thermal energy is accomplished by combustion of the fuel in the firing chamber. This combustion of fuel results in significant increases in pressure in the firing chamber, which causes displacement of a driven member, such as a piston or rotor. The piston or rotor is attached to a drive shaft in such a way that displacement of the piston or rotor causes rotation of the drive shaft.

It follows that the magnitude of the force which causes rotation of the drive shaft (torque) varies in direct proportion to the efficiency of the chemical reaction (combustion of fuel) in the firing chamber. Hence, the more complete the combustion of fuel, the more torque is produced; the less complete the combustion of fuel, the less torque is produced.

It follows also that the amount of residue remaining after the combustion of fuel varies in inverse proportion to the efficiency of the chemical reaction. Hence, an incomplete chemical reaction leaves more residue than does a complete chemical reaction.

It is an accepted and well known fact that the performance of the internal combustion engine is typified by the incomplete combustion of the fuel metered into the firing chamber.

Hence, the incomplete combustion of the fuel not only delivers less torque (mileage and horsepower) than more complete combustion, but it also leaves a reside of fuel either untouched by the combustion process or remaining partially combusted in either the gaseous form (carbon monoxide and hydrocarbon pollutants) or in the solid form (carbon).

III. Operation of the Paser 500

Numerous methods have been employed over the years to increase combustion efficiency in the internal combustion engine. Some of these methods include water-alcohol injection, vaporization of the fuel, eletronic switching in the ignition system, and variations in ignition timing, spark plug gap, ionization voltage, fuel/air ratio, firing chamber design and compression ratio.

The Paser 500 promotes combustion efficiency in an internal combustion engine by discharging induced electrical pulses into the firing chamber to promote chemical activity before the inception of and during combustion of the fuel. The Paser 500 accomplishes this through the attachment to the secondary circuit of the ignition system of an additional capacitive circuit which is charged and discharged by employing the principle of electromagnetic induction. Basically, the operation of the Paser 500 proceeds in the following manner in a multi-cylinder engine:

a. When any spark plug fires, the electrical current moving through the spark plug wire radiates an electro-magnetic field. Without the Paser 500 installed, this energy simply radiates from the spark plug wire and is wasted.

b. With the Paser 500 installed, the electro-magnetic field radiated by the current flowing to the firing spark plug charges a circuit inside the Paser 500 induction sleeve by the process known as electro-magnetic induction.

c. The Paser 500 circuit which has been charged by induction from the firing cylinder spark plug wire is in electrical series with like circuits connected to the non-firing cylinder spark plug wires. Hence, when one of the Paser 500 circuits is charged, all are charged.

d. The Paser 500 circuits connected in series with the non-firing cylinder spark plug wires induce electric fields through the spark plugs into the non-firing cylinders.

e. The result is that when any cylinder fires, an induced electrical field, which is of high intensity but not high enough to pre-ignite the fuel/air mixture, is discharged in all the remaining cylinders. This action occurs not only prior to ignition of the fuel/air charge in the normal manner, but also during combustion. This electrical discharge into the gaseous mixture enhances chemical activity of fuel and air prior to and throughout the combustion process.

The effect is a more complete combustion of the fuel/air mixture. In more technical terms, the Brake Specific Fuel Consumption is reduced; that is, less fuel is required to produce a given measure of horsepower.

The contributions of this enhanced combustion are several. Most important are:

a. More energy is produced per gallon of fuel consumed, so that:
   (1) Fuel economy is improved, and
   (2) Engine power increases.

b. Emissions of carbon monoxide and hydrocarbons are reduced, because there is more complete combustion of these gases. There is less deposition of carbon in the firing chamber because this, too, is more thoroughly burned.

One of the more important chemical events which takes place in the latter stages of combustion is the so-called water-gas reaction:

$$CO + H_2O \quad = \quad CO_2 + H_2$$

The further this reaction proceeds, (a) the more useful energy is abstracted from the fuel, and (b) the less carbon monoxide is emitted. Under usual circumstances (without the Paser 500) this reaction terminates relatively soon after ignition of the fuel/air charge. Tests have shown that the Paser 500 helps sustain and bring the reaction more nearly to completion.

In summary the Paser 500 promotes energy conversion in an internal combustion engine by using induced electrical fields to promote and sustain chemical activity, resulting in more complete combustion of the fuel.

IV. Testing

Part of the overall evaluation of the Paser 500 has been based on test results and data from various sources. The major part has been based on extensive analytical interpretation of test data generated by General Testing Laboratories during 1971. The findings, based on the testing of four vehicles driven over-the-road for 3,000 miles each and a stationary engine mounted in a test cell, are very significant.

a. Fuel Economy. For most circumstances of engine operation Brake Specific Fuel Consumption is reduced. This results in better fuel economy, sometimes more than 20%. This is perhaps the most important effect of the unit. Moreover, there can be no doubt of this result after studying the aggregate data, because one of the most straightforward measurements which can be made during a test is that of fuel consumption if all variables are properly controlled.

b. Engine Power and Energy Utilization. Within the optimum operating limits for most engines, the maximum torque (and therefore horsepower) is increased by the use of the Paser 500. Viewing the fuel consumption and horsepower results together, the energy in horsepower-hours delivered by the engine per gallon of fuel is increased, sometimes spectacularly. Since the Paser 500 in no way modifies the mechanical functions of an internal combustion engine, this enhanced energy release reflects more complete combustion of the fuel.

c. Engine Carbon Deposits. Spark plug life is increased and crankcase dilution is lessened principally by the reduced tendency of deposits to form as a consequence of more complete fuel combustion. In fact, some tests indicated remarkable cleaning of spark plug electrodes and upper cylinders.

d. Emissions. With the Paser 500 installed on an engine, the quantity of toxic exhaust emissions is reduced and the quality improved in the sense that concentrations of carbon monoxide and hydrocarbons are reduced. The quantity of emissions per mile of travel is reduced simply because of improved fuel economy -- if less fuel is needed, clearly less exhaust of whatever composition will result. The reduced concentrations of carbon monoxide and hydrocarbons follow irrefutably from more complete combustion of fuel.

V. Conclusion

The Paser 500 Performance-Economy Pack can be considered a major breakthrough in extracting energy from fuel in an internal combustion engine. This fact is evidenced by consumer experience, field and laboratory testing and is supported by known physical and chemical principles.

C. Mel Adams, Sc.D., P.E.

Dr. Clyde Melvin Adams has lead the technical research team which has conducted in-depth testing and evaluation of the Paser 500 since 1971.

He is a respected member of the engineering profession, having served as a university-level engineering professor and independent engineering consultant for many years.

Among Dr. Adams' accomplishments are the following:

Ph.D in Engineering from Massachusetts Institute of Technology (MIT).

Engineering Professor at MIT for 16 years.

Engineering Professor at the School of Applied Science and Engineering of the University of Wisconsin; Dean of Engineering and Coordinator of Energy Research and Development at the University of Cincinnati; visiting professor of engineering at Carnegie Mellon Institute.

Engineering consultant for many large corporations including --

General Motors, Texaco, Ashland Oil, Dresser Industries, Timken, U.S. Steel, General Dynamics, Avco, Boeing, Fairchild, Lockheed, RCA, Raytheon, Dow, Dupont, Union Carbide, Texas Instruments, Westinghouse, Whirlpool, Reynolds Metals, North American Aviation, United Aircraft, Kennecott Copper, Phelps Dodge and many others.

Engineering consultant for many government agencies including --

Atomic Energy Commission, U.S. Army, Navy and Air Force, Department of Interior. Dr. Adams designed seven of the engineering experiments used by the National Aeronautical and Space Administration during the Skylab program.

Dr. Adams has been granted four patents. He has published technical treatises in more than 75 publications.

EXHIBIT NO. 4

Paser 500

INSTALLATION TIPS

1) Condition of the spark plug wires
The spark plug wires serve as a part of the PASER 500 circuit. Therefore, it is absolutely mandatory that the spark plug wires have good continuity. A vehicle may appear to run alright and still have bad wiring. BE SURE to check each spark plug wire for continuity and replace any found to be defective.

2) Which one first?
On most vehicles the coil wire (the wire in the center of the distributor cap) sticks straight up. In this case start with any spark plug wire and follow the illustrated installation instructions.
On some vehicles the coil wire comes out of the distributor at a right angle and lies across the distributor cap and between two of the spark plug wires. In this case, start with one of the spark plug wires on either side of the coil wire and continue the installation in that direction until the last PASER sleeve is finally installed on the other side of the coil wire. This permits the coil wire to be disconnected from the distributor cap without obstruction by the interconnecting wires of the PASER sleeves.

3) Distributor too close to air cleaner or other obstruction
On some vehicles, the distributor is so close to the air cleaner housing or some other obstruction that there doesn't seem to be enough room for the PASER. Usually only part of the spark plug wires on any one vehicle have this problem of being "cramped for space." If you have such a vehicle, determine how many wires are cramped and obtain one "adaptor" for each problem wire from your PASER dealer. The adaptor is installed between the distributor cap and the PASER sleeve, permitting the PASER installation to avoid the obstruction (see illustration 12). Use adaptors on end PASER sleeves when possible.

4) Loose wire end connector
If your spark plug wires do not fit into the top of the PASER sleeves tightly, expand the metal connector with a screwdriver so that they will have a tight fit.

5) Voltage boosting spark plugs
If you should happen to have U type Champion spark plugs in your vehicle, they must be replaced with normal spark plugs. The U type spark plugs have an internal air gap which greatly reduces the efficiency of the PASER 500.

6) Air fuel ratio
The Air/Fuel ratio should be set to manufacturer's specifications. The PASER functions best with a lean mixture.

7) Air cleaner
Check the condition of the air cleaner. A dirty air cleaner causes the fuel/air ratio to change and wastes fuel.

AFTER INSTALLATION

I. Idle Speed Adjustment
The idle speed of your engine should increase upon or soon after installation of the PASER. It may be necessary to reduce the idle speed at some point during the first 1,000 miles to maintain the manufacturer's specified idle RPM.

II. Oil & Filter Change
The cleaning action of the PASER will loosen the carbon sludge and other deposits which were formed prior to the PASER installation. Most of this cleaning action will occur during the first 1,000 miles of operation and some of the deposits will pass into the crankcase oil and oil filter as contaminants. Therefore, after 1,000 miles of operation with the PASER 500, change the oil and oil filter. After that, the oil and oil filter will stay clean longer and will not require changing as often.

III. Lower Octane Fuel
Most PASER equipped engines can use a lower octane, less expensive fuel. If you are presently using high octane fuel, continue to do so for 2 or 3 full tanks before changing to a lower grade. This will give the PASER a chance to clean the engine.

IV. Maintenance
The PASER 500 does not itself require maintenance, but will not continue to function properly if the other support systems in the engine are not maintained. Observe the manufacturer's recommended tune up schedule and periodically check the continuity of the spark plug wires. This is not a part of most tune up procedures but is very important to the PASER equipped engine.

TROUBLESHOOTING

Within 200 miles after PASER 500 installation on your engine, you should notice increased power, quicker starting, smoother running, better mileage, cooler running, less maintenance. If not, go through the following steps.

1) Check the PASER 500 installation
   a. All connections tight
   b. All connections well insulated
   c. No crossed spark plug wires

2) Check the engine
   a. Normal good running order (tune-up condition, no gas or vacuum leaks, fluid levels, etc.)
   b. Carburetor condition (normal settings)
   c. Spark plug wires (electrical continuity)

3) 1000 Mile Check — required 1000 miles after all installations
   a. Change oil
   b. Change oil filter
   c. Reduce idle speed to normal

What to expect from your PASER 500

Longer Spark Plug Life	Cleaner Engine
Lower Maintenance Costs	More Power
Cooler Running Engine	Faster Acceleration
Lower Octane Fuel Required	Higher Top Speed
Longer Oil & Filter Life	Increased Gas Mileage

Take care of your vehicle and the PASER 500 will help your vehicle take better care of you.

Remember, if the PASER is properly installed on an engine in normal operating order, it always works!

WARRANTY

This device is warranted against deficiencies in material and workmanship for twelve (12) months from date of initial purchase. The responsibility of the manufacturer is limited to the replacement of this unit only. Replacement shall be authorized by the factory only if returned prepaid and upon inspection found to be deficient. Warranty shall not apply to units damaged by misuse, negligence or accident. This also is in lieu of all other warranties expressed or implied.

All inquiries regarding warranty should be addressed to: your authorized dealer.

PLACE STAMP HERE

Paser 500

AMERIMEX INDUSTRIES, INC.
8720 EMPRESS ROW
DALLAS, TEXAS 75247

INTRODUCING THE PASER 500

CONGRATULATIONS! You have purchased one of the most advanced products for improving the performance of your vehicle. Your PASER 500 is a very sophisticated electronic device, but in simple terms, here is how it works.

The engine of your vehicle is a device for converting the chemical energy in fuel into mechanical motion. It does this by burning the fuel under controlled conditions. Present internal combustion engines burn only 50-65% of the fuel injected into them. Much of the potential energy in the fuel you pay for is wasted because of this incomplete combustion. This means that you get less mileage and power than you pay for. It also means that the fuel that does not burn inside the engine remains as raw fuel, carbon or smog to contaminate your engine, pollute the air and cost you hundreds of dollars each year in extra operating costs.

A piece of coal is difficult to ignite simply as a piece of coal, but if the same coal is ground into a fine powder and mixed with oxygen, it becomes very unstable or flammable, sometimes even explosive. Your engine does the same thing to fuel. The carburetor sprays the fuel into the engine and mixes it with oxygen, creating a highly unstable explosive gas.

The PASER 500 makes the fuel/air mixture even more unstable. The PASER 500 directs low voltage electrostatic energy into the combustion chambers of the engine to act upon the gases created by the carburetor. Through this molecular excitement, the fuel becomes even more unstable and burns more readily. This improved burning of the fuel naturally results in better mileage, more power and other money-saving benefits.

P A S E R 5 0 0

CONDITIONAL

30-DAY MONEY-BACK GUARANTEE

The manufacturer and selling Distributor guarantee to the retail customer that the PASER 500 will improve performance, increase mileage and reduce engine maintenance costs, provided that the PASER 500 is installed in accordance with the installation instructions on an engine in normal good running order and serviced in accordance with the After Installation Service recommended, and further provided that the Warranty has been registered with the manufacturer within thirty (30) days of original installation.

OUTLINE OF INSTALLATION PROCEDURE

1) Before Installation — Make sure that the engine is in normal good running order. Pay particular attention to —
   a) Carburetor — check for normal mixture setting.
   b) Spark Plug Wires — check for electrical continuity.

2) During Installation — make sure that all connections are tight and well insulated (see figures 6 & 8 below).

3) After Installation — 1000 miles after PASER 500 installation, perform the following services on the engine:
   a) Change oil
   b) Change oil filter
   c) Reduce idle speed to normal

COMPLETE INSTALLATION PROCEDURE

As the vehicle owner, you are responsible for the three elements vital to the performance of your PASER 500:

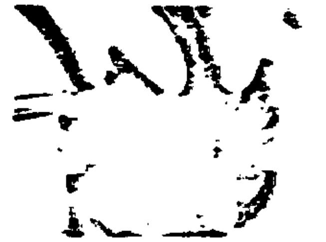
1) The engine must be in normal good running order.
2) The Paser 500 must be installed with tight, well insulated connections.
3) The engine must be serviced 1000 miles after installation of the PASER 500.

It is recommended that installation be performed by a qualified mechanic, who insures that the engine is in normal good running order.

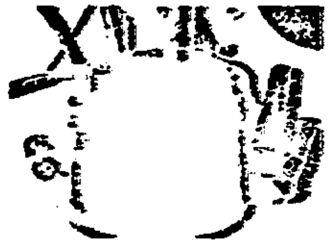
STOP

Read the Illustrated Instructions and Installation Tips completely before beginning the installation.

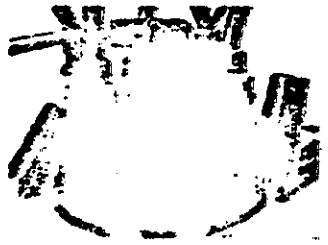
1. Locate the distributor cap and spark plug wires on your engine. Remove the PASER 500 from the packaging and notice the complete Paser unit for your vehicle has one black plastic sleeve for each spark plug wire on your distributor.



2. Remove one spark plug wire from your distributor. Grasp the dust boot. Do not pull on the spark plug wire itself as damage could result.

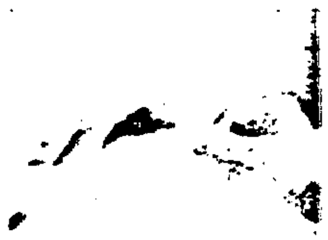


3. Insert the final PASER sleeve in the place of the disconnected wire.



4. Be sure the PASER sleeve is pushed firmly into the distributor cap. PUSH STRAIGHT DOWN. DO NOT TWIST.

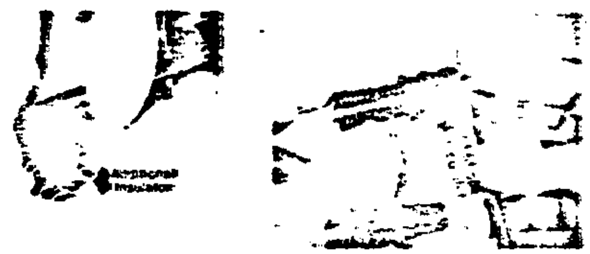
5. Insert the spark plug wire previously removed into the top of the installed PASER sleeve.



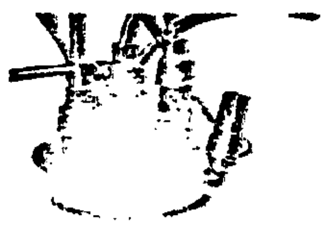
6. If necessary, expand the metal connector on the end of the spark plug wire with a screwdriver to obtain a tight fit into the PASER.

7. Be sure the spark plug wire is pushed firmly into the PASER sleeve. PUSH STRAIGHT DOWN. DO NOT TWIST.

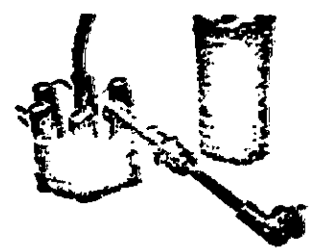
8. The metal connectors on the end of some spark plug wires are too long to permit the original rubber dust boot to fit down on the top of the PASER. If your connectors are this type, simply obtain additional dust boots from your PASER 500 dealer or your local auto parts store and install them under the original boots.



9. & 10. The additional boot will now fit tightly on the PASER sleeve.



11. Now, simply repeat the process with the next sleeve and spark plug wire until all the PASER sleeves are in place on the top of the distributor. Check the installation to make sure the PASER sleeves are pushed firmly into the distributor, and the spark plug wires are firmly in the PASER sleeves. The connections must be tight and sealed by the dust boot for the PASER 500 to function properly.



12. This adapter is required on installation where at anytime the extra height of PASER 500 will not clear a nearby obstruction.

HOME OFFICE COPY
WARRANTY REGISTRATION — PASER 500

Please Print or Type and Fill Out Both Cards

Name of Owner ______________________

Address ______________________

City/State ______________ Zip ________

Phone No. ______________________

Make and Model of Vehicle ______________ No. of Cyl. ________

____

(Authorized Dealer) (Owner)

I Certify That This Unit Was Sold And Installed On

DEALER'S COPY
WARRANTY REGISTRATION — PASER 500

Please Print or Type and Fill Out Both Cards

Name of Owner ______________________

Address ______________________

City/State ______________ Zip ________

Phone No. ______________________

Make and Model of Vehicle ______________ No. of Cyl. ________

____

(Authorized Dealer) (Owner)

I Certify That This Unit Was Sold And Installed On

44

Attachment E

EXHIBIT NO. 5

Paser 500 HEI

FOR ELECTRONIC IGNITIONS

INSTRUCTIONS / WARRANTY INFORMATION

INSTALLATION TIPS

1) Condition of the spark plug wires
The spark plug wires serve as a part of the PASER 500 circuit. Therefore, it is absolutely mandatory that the spark plug wires have good continuity. A vehicle may appear to run alright and still have bad wiring. BE SURE to check each spark plug wire for continuity and replace any found to be defective.

2) Voltage boosting spark plug
If you should happen to have U type Champion spark plugs in your vehicle, they must be replaced with normal spark plugs. The U type spark plugs have an internal air gap which greatly reduces the efficiency of the PASER 500.

3) Air fuel ratio
The Air/Fuel ratio should be set to manufacturer's specifications. The PASER functions best with a lean mixture.

4) Air cleaner
Check the condition of the air cleaner. A dirty air cleaner causes the fuel/air ratio to change and wastes fuel.

AFTER INSTALLATION

I. Idle Speed Adjustment
The idle speed of your engine should increase upon or soon after installation of the PASER. It may be necessary to reduce the idle speed at some point during the first 1,000 miles to maintain the manufacturer's specified idle RPM.

II. Oil & Filter Change
The cleaning action of the PASER will loosen the carbon sludge and other deposits which were formed prior to the PASER installation. Most of this cleaning action will occur during the first 1,000 miles of operation and some of the deposits will pass into the crankcase and oil filter as contaminants. Therefore, after 1,000 miles of operation with the PASER 500, change the oil and oil filter. After that, oil and oil filter will stay clean longer and will not require changing as often.

III. Lower Octane Fuel
Most PASER equipped engines can use a lower octane, less expensive fuel. If you are presently using high octane fuel, continue to do so for 2 or 3 full tanks before changing to a lower grade. This will give the PASER a chance to clean the engine.

IV. Maintenance
The PASER 500 does not itself require maintenance, but will not continue to function properly if the other support systems in the engine are not maintained. Observe the manufacturer's recommended tune up schedule and periodically check the continuity of the spark plug wires. This is not a part of most tune up procedures but is very important to the PASER equipped engine.

TROUBLESHOOTING
Within 200 miles after PASER 500 installation on your engine, you should notice increased power, quick starting, smoother running, better mileage, cooler running, less maintenance. If not, go through the following steps:

1) Check the PASER 500 installation
   a. All induction blocks securely fastened
   b. No crossed spark plug wires

2) Check the engine
   a. Normal good running order (tune-up condition, no gas or vacuum leaks, fluid levels, etc.)
   b. Carburetor condition (normal settings)
   c. Spark plug wires (electrical continuity)

3) 1000 Mile Check — required 1000 miles after all installations
   a. Change oil
   b. Change oil filter
   c. Reduce idle speed to normal

What to expect from your PASER 500

Longer Spark Plug Life	Cleaner Engine
Lower Maintenance Costs	More Power
Cooler Running Engine	Faster Acceleration
Lower Octane Fuel Required	Higher Top Speed
Longer Oil & Filter Life	Increased Gas Mileage

Take care of your vehicle and the PASER 500 will help your vehicle take better care of you.

Remember, if the PASER is properly installed on an engine in normal operating order, it always works!

AMERIMEX INDUSTRIES, INC.
3251 ORADELL LANE, DALLAS, TEXAS 75220
PHONE (214) 358-0268

WARRANTY

This device is warranted against deficiencies in material and workmanship for twelve (12) months from date of initial purchase. The responsibility of the manufacturer is limited to the replacement of this unit only. Replacement shall be authorized by the factory only if returned prepaid and upon inspection found to be deficient. Warranty shall not apply to units damaged by misuse, negligence or accident. This also is in lieu of all other warranties expressed or implied.

All inquiries regarding warranty should be addressed to: your authorized dealer.

INTRODUCING THE PASER 500

CONGRATULATIONS! You have purchased one of the most advanced products for improving the performance of your vehicle. Your PASER 500 is a very sophisticated electronic device, but in simple terms, here is how it works.

The engine of your vehicle is a device for converting the chemical energy in fuel into mechanical motion. It does this by burning the fuel under controlled conditions. Present internal combustion engines burn only 50-65% of the fuel injected into them. Much of the potential energy in the fuel you pay for is wasted because of this incomplete combustion. This means that you get less mileage and power than you pay for. It also means that the fuel that does not burn inside the engine remains as raw fuel, carbon or smog to contaminate your engine, polute the air and cost you hundreds of dollars each year in extra operating costs.

A piece of coal is difficult to ignite simply as a piece of coal, but if the same coal is ground into a fine powder and mixed with oxygen, it becomes very unstable or flammable, sometimes even explosive. Your engine does the same thing to fuel. The carburetor sprays the fuel into the engine and mixes it with oxygen, creating a highly unstable explosive gas.

The PASER 500 makes the fuel/air mixture even more unstable. The PASER 500 directs low voltage electrostatic energy into the combustion chambers of the engine to act upon the gasses created by the carburetor. Through this molecular excitement, the fuel becomes even more unstable and burns more readily. This improved burning of the fuel naturally results in better mileage, more power and other money-saving benefits.

OUTLINE OF INSTALLATION PROCEDURE

1) Before Installation — Make sure that the engine is in normal good running order. Pay particular attention to —
   a) Carburetor — check for normal mixture setting.
   b) Spark Plug Wires — check for electrical continuity.

2) During Installation — make sure that all PASER Induction Blocks are securely attached to the spark plug wires.

3) After installation — 1000 miles after PASER 500 installation, perform the following services on the engine:
   a) Change oil
   b) Change oil filter
   c) Reduce idle speed to normal

COMPLETE INSTALLATION PROCEDURE

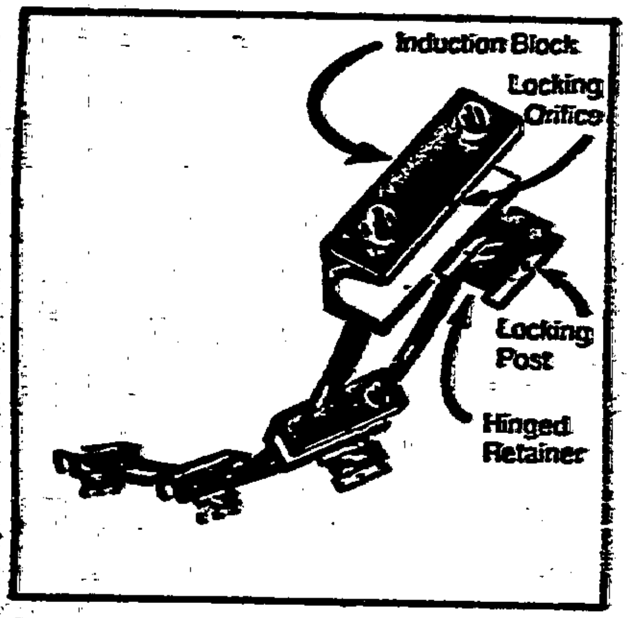
As the vehicle owner, you are responsible for the three elements vital to the performance of your PASER 500.

1) The engine must be in normal good running order.
2) The Paser 500 must be installed securely to the spark plug wires.
3) The engine must be serviced 1000 miles after installation of the PASER 500.

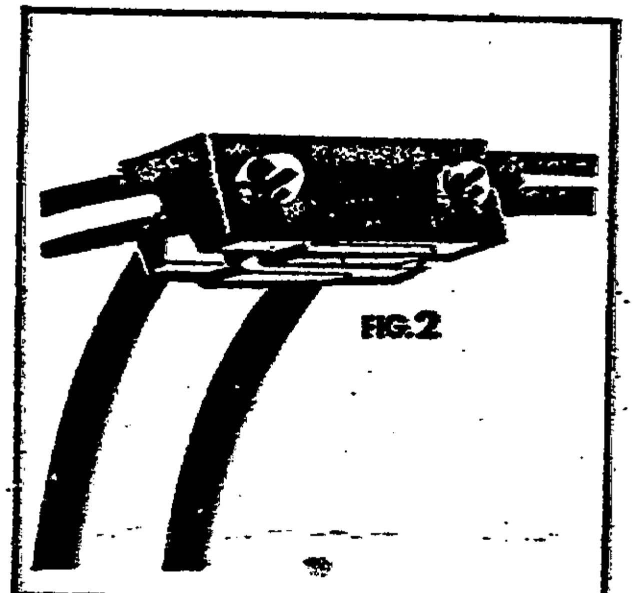
It is recommended that installation be performed by a qualified mechanic, who insures that the engine is in normal good running order.

STOP

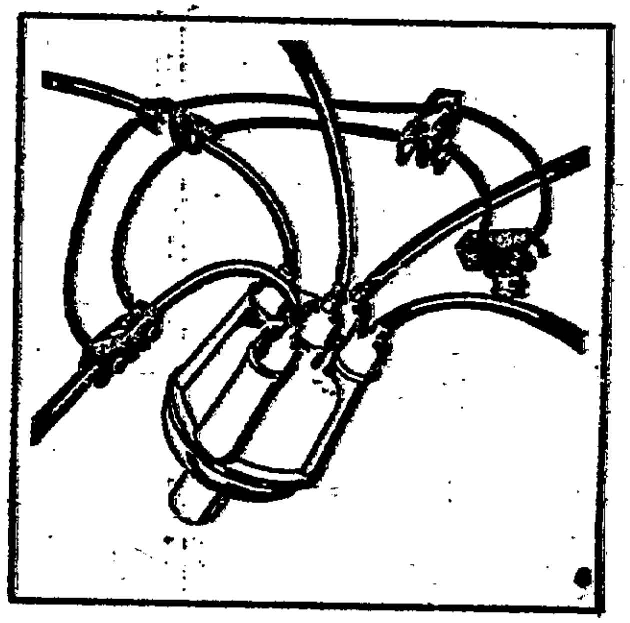
Read the Illustrated Instructions and Installation Tips completely before beginning the installation.



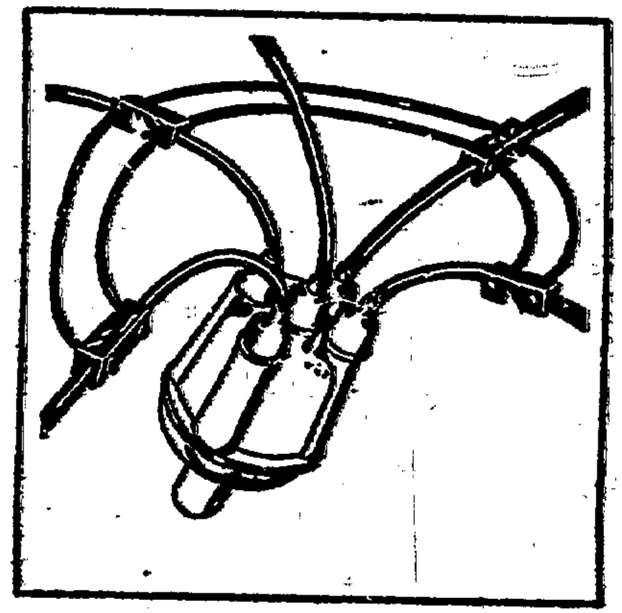
1 Locate the distributor cap and spark plug wires of your engine. Remove the Paser 500 from the packaging and notice that the Paser unit for your vehicle has one black plastic Induction Block for each spark plug wire on your distributor.



2 Starting with any convenient spark plug wire, press the first Induction Block onto the wire approximately two inches from the distributor cap. Then press the Locking Post on the Hinged Retainer into the Locking Orifice in the Induction Block. A correctly installed Induction Block will look like Figure 2.



3 Repeat the process for the other spark plug wires.



4 Completed installation should look like this.

PASER 500 HEI CONDITIONAL 90-DAY MONEY-BACK GUARANTEE

The manufacturer and selling Distributor guarantee to the retail customer that the PASER 500 will improve performance, increase mileage and reduce engine maintenance costs, provided that the PASER 500 is installed in accordance with the Installation Instructions on an engine in normal good running order and serviced in accordance with the After Installation Service recommended, and further provided that the Warranty has been registered with the manufacturer within thirty (30) days of original installation.

For several months during 1971, extensive testing of the Paser Magnum was conducted by General Testing Laboratories, Inc., an EPA-approved laboratory in Springfield, Virginia.

Four automobiles were driven 3,000 miles each and one stationary engine was mounted in a test cell and tested for 125 hours.

In October 1971, General Testing Laboratories, Inc. issued Test Report No. A 3833, documenting the test results in 210 pages of data.

The following is a summary of the test results. It provides proof of the claims that the Paser provides the following benefits when installed on an ignition-equipped internal combustion engine:

Increased gas mileage
Increased horsepower
Longer Engine Life
Longer Spark Plug Life
Longer Life of Oil and Oil Filters
Cooler Cylinder Head Temperatures
Lower Exhaust Emissions
Reduced Engine Carbon Deposits

GENERAL TEST LABORATORY REPORT SUMMARY

BY

HARLEY G. DEIHL

The writer of this summary was present and observed all tests performed on site at the Hartwood test facility on the four road vehicles and stationary engine equipped with the Paser engine economizer.

The first section of this summary is a copy of the test plan proposal and procedure for performing the "Performance and Exhaust Emission Test on the Paser" by General Testing Laboratories, along with excerpts from the report and identification by page number where original information is located in the report. This proposal explains the basic equipment used and the procedure followed to accumulate the test data.

You will note that tis test was performed to evaluate performance and vehicle benefits; and, in doing so, it was necessary to set up the test so that good and bad results could be evaluated in order to better understand the scientific function of the Paser.

The second section of ten pages contains the stationary engine test data.

The third section of five pages contains the road vehicle test data compiled from the original report submitted to REI Industries.

The original G.T.L. report contains 210 pages of written material and recorder sheets. To simplify analysis, pertinent figures were copies from the original report and are included in this summary.

The vehicles and stationary engine were selected by the personnel of G.T.L. and are accepted by the company as representing the typical vehicle found on our highways today. ?
No new vehicle was used because it was felt that the Paser would be able to show diversified results on vehicles that had deteriorated some from new condition.

SECTION I

GENERAL TESTING LABORATORIES
HARTWOOD DIVISION
HARTWOOD, VIRGINIA

TEST PLAN

FOR

PERFORMANCE AND EXHAUST EMISSION EFFECTIVENESS TESTING

OF

"PASER MAGNUM" ELECTRONIC ANTIPOLLLUTION ENGINE ECONOMIZER

June 15, 1971

TABLE OF CONTENTS

1. TEST EQUIPMENT

1. Dynamometer, Chassis
   Clayton Corporation
   Model: CT 400-200

2. Dynamometer, Engine
   Dynamatic Incorporated
   Model: 1519

3. Hydrocarbon Sampler
   Scott Corporation
   Model: 301

4. NDIR Exhaust Analyzer
   Beckman Instrument Corporation
   Model: 315A

5. Recorder
   Honeywell Corporation
   Model: Electronix 194

6. Torque Indicator
   BLH Incorporated
   Model: 8000

7. Torque Transducer
   BLH Incorporated
   Model: 17342

8. Thermometer
   Digitec Incorporated
   Model: 562N

9. Control Console
   Clayton Incorporated
   Model: CT-1540-04

TEST PLAN

II. **ENGINE EVALUATION**

General Testing Laboratories proposes to obtain a large block General Motors Corporation engine (A 1968, 330 cu. in. Oldsmobile engine) with a 9.7-1 compression ratio (or higher) in satisfactory condition to conduct the test. The test engine will be checked and put in manufacturers specified condition in regards to carburetor, distributor and wiring harness. The oil and filters will be changed prior to starting of the test. Spark plug, oil sump, coolant to the engine, coolant from the engine temperatures and barometric pressure data will be recorded at hourly intervals. The following tests will be conducted.

TEST SCHEDULE

(A) Conduct MBHP and Fuel Consumption Test at 3000 rpm, 2500 rpm, 2000 rpm and 1500 rpm. Load will be at 100%, 90%, 80%, 60%, and 40%. Smoke will be measured using the USPHS smoke meter. Ethyl gasoline will be used. The Paser will not be installed.

(B) Conduct Federal Exhaust Emission Test cycle for H.D. Engines.

(C) Install Paser 500.

(D) Repeat (A) and (B).

(E) Run 20 hours of Endurance Testing on the following schedule using ethyl gasoline:

Time Mins.	Load	Speed
30	90%	2500
30	80%	3000
15	0%	Idle
30	90%	2000
30	80%	1500
15	0%	Idle

Change oil and filter after 20 hour run.

(F) Repeat (D)

(G) Repeat (E)

(H) Repeat (D)

(I) Repeat (E) using regular gasoline

(J) Repeat (D)

Page 6 of 12

III. AUTOMOBILE EVALUATION

GENERAL

Four (4) automobiles have been selected for testing. The selection is intended to represent the typical car on the American Highway. A description of the four cars is presented in Table I.

TABLE I

Manufacturer	Year	Model	Engine	Mileage
Ford	1970	Maverick	200 CID	16,000
GMC (Oldsmobile)	1965	F85	300 Cu in V8	105,000
Chrysler (Plymouth)	1968	Belvedere	319 Cu in V8	37,000
Volkswagon	1968	1500	53 HP	55,000

Only cars owned and operated by General Testing Laboratories employees have been selected for this test program, to assure controlled test conditions. In order to obtain the cooperation of the car owners, they will:

1) Be reimbursed at a rate of 10¢ per mile for the 3000 mile test program.
2) Receive a free tune-up.
3) At their request receive the "Paser-Magnum" used on their car during the test program.

4) The owner will be insured for any damage which might occur to the test vehicles during dynamometer testing.

5) Free oil changes and chassis lubrication during the test program.

TEST SCHEDULE

Each of the four cars listed in Table I will be subjected to the following test sequence.

1. Initial Evaluation:

a) Spark plugs will be removed, photographed, gap measured, then reinstalled.

b) Cylinder compression will be measured and recorded.

c) Secondary ignition harness will be checked for continuity from plug center electrode to distributor terminal. (The spark plugs in these cars are not the Champion UJ series or other internal gap type plugs.)

d) Ignition timing and advance curve will be checked to assure normal characteristics.

e) Carburetor choke mechanism, and accelerator pump shall be checked to assure normal operation. Fuel/Air ratio will be measured to assure that an over rich condition does not exist.

f) Speedometer and odometer accuracy will be measured.

g) The odometer mileage will be recorded.

2. Base Line Tests:

a) Oil coloration will be noted and recorded. Then the chassis will be lubricated and the oil changed. A new oil filter will be installed.

b) DHEW Urban Driving Schedule will be performed. During this 1370 second test exhaust emissions will be measured in accordance with the procedure of the Federal Register, Volume 35, Number 219, dated 11-20-70, Subpart H.

c) Engine vibration levels will be recorded during the DHEW Urban Driving Schedule as an X-Y plot of g level versus time.

d) Fuel consumption will be determined during the 1370 sec. DHEW Urban Driving Schedule.

e) A California type road test measurement of HC and CO at idle and 2500 RPM (no load) will be performed, using the Beckman NDIR Analyzer upon completion of the DHEW Urban Driving Schedule.

f) The spark ionization voltage peaks will be measured and recorded for each of the cylinders.

g) Cylinder balance will be determined by sequentially disabling each cylinder and measuring drop in idle RPM.

h) Road horsepower will be measured at wide open throttle and 16" Hg manifold vacuum and 50 MPH.

3. Paser-Magnum Installation

a) The "Paser-Magnum" will be removed from it's box and examined for broken or missing components, cracks, etc.

b) Installation onto the test vehicle will be performed in accordance with the standard "Paser-Magnum" Installation Instructions.

4. After installation of the "Paser-Magnum" the item 2. "Baseline Test" will be repeated (except for oil and filter change and lubrication).

5. The owners will operate the cars normally for 1000 miles ± 200 miles. An accurate record of gasoline and oil consumption will be maintained during this period. Mileage accumulation will be performed using the grade of fuel appropriate for the individual vehicle.

6. Upon completion of the first 1000 miles of operation the item 2. "Baseline Test" operations will be repeated.

7. Item 5 will be repeated for the second 1000 miles of operation.

8. Upon accumulation of 2000 ± 100 miles the "baseline test" Item 2 will be repeated.

9. Item 5 will be repeated for a third and final 1000 miles of test operation.

10.

a. Upon accumulation of 3000 ± 100 miles of operation, the odometer mileage will be recorded.

b. The Item 2 "Baseline Tests" will be repeated.

c. Spark plugs will be removed and photographed, then the gap reset to 0.060 in. and the Item 2 "Baseline Tests" repeated.

d. The fuel will be connected to an external tank of Texaco regular grade gasoline, then the Item 2 "Baseline Test" repeated, except for oil and filter change and lubrication.

IV. TEST REPORTS AND DATA

Test Reports to include all test data recorded and calculated. Graphic Curves will be drawn to accurately portray the data. Included will be photographs of the test set up and spark plugs before and after test.

SECTION II

STATIONARY ENGINE TEST

The stationary cell test engine was a 1968 Oldsmobile 330 C.I.D. V-8 engine. As stated on page 5 and 7 of the test report, it was purchased at a salvage yard and has approximately 37,000 miles of vehicle service. The only maintenance performed on the stationary engine, as stated on page 7 of the report, was to replace the distributor, spark plugs, spark plug wires, carburetor, water pump, fuel pump, and filter. After a run-in period of approximately two hours to check instrumentation and engine condition, the tests were started.

For about thirty minutes of this time, the engine operated rough and the valve train was very noisy, but this condition cleared up before the end of the run-in period.

It might be noted here that after the tests were all completed and the engine was removed from the cell after approximately 125 hours of operation, the heads and intake manifold were removed by GTL personnel so that visible inspection of the engine could be made by the REI technical staff. This inspection revealed several important factors.

1. The engine had accumulated a large amount of loose carbon and sludge in the crankcase area, especially in the area just under the intake manifold. One of the claims for the Paser Magnum is a cleaning of carbon deposits from the engine over a driving period. There is a substantial accumulation of carbon particles loosened from this area and trapped in the dish shaped heat deflector below the intake manifold. A picture of this accumulation is available in my files.

2. Although there was still some carbon present in the firing chambers of the cylinders, some of the cylinders showed very little. To further substantiate this, an analysis of the exhaust discoloration as indicated by the smoke meter used indicated an eratic but diminishing coloration of the exhaust during the complete course of the test as indicated on pages 36, 39, 41, 43, 47, 50, 52, 57, 59, 61, and 63 of the test report. This would indicate the Paser Magnum was causing a desirable effect on the cleaning of the cylinders, as no other indications could be found to indicate any other condition of the engine that could simulate the same results on the smoke meter.

3. The valves on both heads showed no indication of burning or leaking even after operating the engine through one complete power curve cycle and endurance cycle of approximately 22 hours of high

torque load on regular fuel, and the ignition timing set to 10 degrees BTC, instead of the manufacturers spec of 7 1/2 degrees. This engine was designed by the manufacturer to operate on premium fuel instead of regular, however, the engine showed no signs of deterioration or overheating with the Paser Magnum installed while operating under these adverse conditions. REI Industries claims most cars can use a lower grade fuel after approximately 1,000 miles of Paser Magnum use. The above information should substantiate this claim.

4. To further point out the engine was not in perfect condition, it was revealed when the cylinder heads were removed, the cylinder walls on several cylinders still had marks indicating a substantial amount of rust accumulation on the cylinder walls from rain and moisture. The marks were still evident even after the 125 hours of operation. Photographs are available in my files to substantiate this condition.

The exhaust emission data on page 21, Table #1 of the GTL report (copy enclosed, page 22 of this summary) shows a definite indication of improvement in the CO and HC with a normal indication of the NO.

Note the first reading without Paser Magnum of 2.6% carbon monoxide, 451 PPM hydro-carbon and 1662 PPM Nitrous Oxide...followed by the second run with the Paser Magnum installed indicating a reduction of the HC to 407 PPM, CO 2.2%, and an increase of "NO" to 1817. The normal chemical reaction is for NO to increase if HC and CO decreases. In analyzing the balance of the information on page 21, it shows some fluctuation, but an average of more than 10% decrease in the CO and HC in the four check points following the installation of the Paser Magnum. The last item on page 21 was not a part of the basic test.

Table #2, page 22 of the report (copy enclosed, page 23 of this summary) shows the mean brake horsepower observed (MBHP-OBS) and the fuel consumption during the full throttle test at the 3000, 2500, 2000 and 1500 RPM speed during the complete cycle of tests. The maximum horsepower was not increased in every case, but there is a substantial percentage of increase through the various power settings. Comparison of the fuel consumption in BSFC-LB/HP-hr. (brake specific fuel consumption which means lbs. of fuel per brake horsepower and is computed by dividing the fuel rate by the HP) indicates a definite increase in power extracted from the fuel by the use of less fuel as indicated to produce the same or more horsepower as the case might be.

It should be noted on Table #2 (page 23 of this summary) the engine was operated on regular fuel and the timing advanced to 10% through a complete power cycle after the regular 20 hour endurance test, with the timing also, at 10% advance during the endurance test. The timing advance above manufacturer's specification is not recommended by REI in the field but was done only to evaluate technical information. As stated previously in this resume there was no indication of ill effect to the engine, and the maximum horsepower did not basically change. There was some change in the BSFC, lb/bhp-hr, but this does not necessarily reflect a decrease in fuel efficiency but probably a result of the change of timing. This run was not made to evaluate fuel efficiency, even though it was monitored, but to gather information of the engine performance with regular fuel. There was no significant difference in spark plug shell temperature or exhaust manifold temperatures noted during the runs using regular fuel and advanced timing.

An explanation of the last two entries on page 22, Table #2 (page 23 of this summary). After the first run without the Paser Magnum, it was the opinion of the REI observer that the flow meter method of measuring the fuel consumption could be improved on by adding the scale weight method along with the flow meter. For this reason at the end of the schedule of runs, another power curve cycle was run without the Paser Magnum exactly as the first run using both methods of fuel measurement. It is the opinion of the writer who was present and observed every test performed, that the second run labeled (without Paser Magnum - 60 hours) is the more accurate of the two runs without Paser Magnum in regard to fuel measurement. Also this before and after run should further prove the Paser Magnum increases vehicle efficiency by extracting more power from the fuel used.

The last figures in Table #2 (page 23 of this summary) labeled "with prototype Paser Magnum" was not a part of the basic test and should not be included in the summary. The device used during this test is not being marketed at this time.

Included in this summary on page 24 are listings of various temperatures measured in degrees fahrenheit during the runs:

1. Exhaust temperatures measured by thermocouple implanted in each exhaust manifold.
2. Spark plug shell temperatures of each front spark plug using a thermocouple ring between the plug and cylinder head.
3. Oil sump temperature.
4. Fuel lbs. per hour at each check point after a ten minute stabilization run.

All temperature readings were tabulated from a digital read out type instrument, using the degrees fahrenheit scale.

Across the top of the page is listed the engine RPM and the percentage of power during each test cycle. The readings were taken at 10 to 15 minute intervals. The left side of the page identifies the conditions, namely:

1. Without Paser Magnum
2. With Paser Magnum
3. After first 20 hours endurance run
4. After second 20 hour endurance run
5. After third 20 hour endurance run, using Regular fuel and 10 degree engine advance.
6. Without Paser Magnum, using flowmeter, and fuel scale by weight to measure fuel used.

The data on page 24 was compiled from the information found on pages 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 50, 51, 52, 53, 57, 58, 59, 60, 61, 62, 63, and 64 of the GTL final report.

There are five empty spaces in the line directly under 1500 RPM-100% power. Information not available in master report.

TABLE NO. I

EXHAUST EMISSION

	CO, %	NO, PPM	HC, PPM	FUEL	TIMING BTDC
W/O Paser Magnum	2.6	1662	451	Ethyl	7.5°
With Paser Magnum-0 Hrs.	2.2	1817	407	Ethyl	7.5°
With Paser Magnum-20 Hrs.	2.1	1888	395	Ethyl	7.5°
With Paser Magnum-40 Hrs.	2.4	1895	402	Ethyl	7.5°
With Paser Magnum-60 Hrs.	2.4	2182	417	Reg.	10°
With Paser Magnum-Prototype	2.6	1646	492	Ethyl	7.5°

TABLE NO. II

MBHP-FUEL CONSUMPTION

Engine Speed, rpm	3000	2500	2000	1500
	Fuel:	Ethyl	Timing:	7.5° BTDC
W/O Paser Magnum				
MBHP, OBS	142	118	92	65
BSFC, lb/bhp-hr	.542	.508	.565	.476
With Paser Magnum-0 Hrs.				
MBHP, OBS	141	120	94.0	66.5
BSFC, lb/bhp-hr	.531	.450	.457	.466
With Paser Magnum-20 Hrs.				
MBHP, OBS	139	119	93.0	67.0
BSFC, lb/bhp-hr	.532	.462	.516	.470
With Paser Magnum-40 Hrs.				
MBHP, OBS	139	122	96.0	68.0
BSFC, lb/bhp-hr	.531	.508	.552	.470
	Fuel:	Regular	Timing:	10° BTDC
With Paser Magnum-60 Hrs.				
MBHP, OBS	140	122	94.0	69.0
BSFC, lb/bhp-hr	.578	.581	.577	.565
	Fuel:	Ethyl	Timing:	7.5° BTDC
W/O Paser Magnum-60 Hrs.				
MBHP, OBS	141	118	93.3	66.5
BSFC, lb/bhp-hr.	.553	.514	.643	.610
With Prototype Paser Magnum				
MBHP, OBS	138	117	90.7	65.0
BSFC, lb/bhp-hr	.507	.461	.564	.573

RPM	3000	3000	3000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2000	2000	1500	1500	1500	1500	[illegible]
[illegible]	100%	90%	80%	60%	40%	100%	90%	80%	60%	40%	100%	90%	80%	60%	40%	100%	90%	80%	60%	40%
				LEFT BANK EXHAUST THERMOCOUPLE TEMPERATURE																
[illegible]	1572	1464	1443	1465	1347	1382	1372	1348	1369	1266	1261	1270	1250	1257	1134		1173	1154	1114	10[illegible]
[illegible]	1500	1478	1456	1476	1352	1400	1385	1364	1385	1273	1294	1285	1264	1258	1160	1200	1192	1166	1135	1036
[illegible]	1573	1498	1470	1476	1346	1404	1400	1378	1390	1268	1284	1274	1270	1266	1152	1206	1195	1162	1125	1025
[illegible]	1525	1484	1460	1476	1356	1393	1400	1382	1381	1275	1294	1294	1270	1276	1159	1206	1198	1166	1143	1046
[illegible]	1501	1472	1450	1474	1356	1390	1380	1354	1382	1273	1296	1282	1253	1255	1161	1205	1186	1154	1128	1059
[illegible]	1530	1496	1477	1485	1369	1410	1404	1382	1391	1285	1304	1290	1262	1265	1154	1220	1212	1172	1146	1041
				RIGHT BANK EXHAUST THERMOCOUPLE TEMPERATURE																
[illegible]	1464	1456	1437	1435	1352	1354	1370	1343	1365	1267	1252	1271	1245	1239	1128		1184	1164	1107	1027
[illegible]	1468	1478	1448	1448	1344	1372	1386	1360	1364	1276	1274	1286	1258	1238	1150	1202	1204	1196	1126	1024
[illegible]	1470	1492	1460	1426	1336	1379	1396	1365	1354	1264	1270	1292	1254	1233	1144	1196	1198	1165	1121	1026
[illegible]	1481	1479	1454	1438	1351	1373	1394	1379	1353	1271	1277	1296	1260	1250	1146	1198	1198	1164	1125	1022
[illegible]	1462	1474	1438	1430	1353	1366	1392	1355	1357	1258	1276	1284	1285	1232	1152	1181	1182	1149	1112	1034
[illegible]	1475	1492	1468	1453	1360	1374	1400	1374	1362	1269	1274	1288	1254	1240	1132	1185	1195	1160	1118	1015
				LEFT BANK SPARKPLUG THERMOCOUPLE TEMPERATURE																
[illegible]	379	354	345	351	329	365	333	324	329	308	325	309	324	306	292		297	274	281	264
[illegible]	366	340	332	338	318	356	328	320	330	308	326	306	302	312	294	294	281	276	281	265
[illegible]	362	334	323	334	320	346	324	313	322	302	312	298	293	300	290	283	272	266	270	264
[illegible]	372	346	336	348	326	356	342	329	340	314	329	309	308	308	296	292	278	276	280	266
[illegible]	372	342	334	346	324	356	332	320	334	309	328	302	300	308	296	290	278	272	282	269
[illegible]	356	328	319	328	311	344	315	311	322	298	314	294	288	296	282	280	269	267	292	256
				RIGHT BANK SPARKPLUG THERMOCOUPLE TEMPERATURE																
[illegible]	384	350	342	345	339	356	339	326	334	314	336	316	326	312	302		280	280	284	274
[illegible]	368	348	338	348	328	356	335	322	334	312	331	314	308	310	299	299	283	279	285	275
[illegible]	354	346	328	341	326	348	328	315	324	302	318	308	298	300	292	285	276	270	275	270
[illegible]	369	341	334	346	331	352	339	322	334	312	328	311	307	311	299	294	280	300	282	276
[illegible]	366	350	358	354	336	356	339	327	340	322	335	316	307	318	306	297	286	282	280	28[illegible]
[illegible]	359	328	329	342	329	342	323	312	324	310	316	300	294	302	294	287	276	273	282	27[illegible]
					OIL SUMP THERMOCOUPLE TEMPERATURE															
[illegible]	303	291	286	281	176	234	239	245	241	234	237	238	237	226	226		214	226	228	206
[illegible]	252	266	264	266	253	257	256	262	246	240	243	242	246	2[illegible]	224	225	224	202	219	218
[illegible]	240	261	261	256	250	254	252	247	241	234	238	235	232	226	221	220	218	213	210	202
[illegible]	272	267	261	260	250	260	254	250	246	238	239	257	237	230	226	222	220	218	212	210
[illegible]	257	268	265	256	252	250	255	254	245	212	239	244	239	236	230	225	223	220	210	215
[illegible]	252	259	256	254	247	249	250	247	240	234	234	238	230	228	218	217	216	213	210	204
								FUEL LBS PER HR												
[illegible]	77	63	56	43	31	60	51	43	33	28	52	45	33	24.2	20.4	31	27.8	25.5	18	15
[illegible]	75	61	54	40	27	54	44	39	30	20.2	45	38	34	25	21	31	29	27.6	19	15
[illegible]	74	67	56	41	29.5	55	49	42	33	22	48	40	34	24.5	20.5	31.6	27	24	18	14.5
[illegible]	79.5	61	57	59.5	34.5	62	57	42	35	30	53	39	30.5	24	20	32	30	27	24	18
[illegible]	81	68	64.8	42.5	28.2	71	62.2	53	31.5	24.5	54.5	45.3	42.5	24.2	20.1	39	30.6	27.3	19.4	15.6
[illegible]	78.7	70.9	64.3	44.8	31.8	61.3	62.2	52.2	31.6	26.9	59.8	45.8	41.9	20.3	24.2	40	35.2	29.8	19.6	14.8

SECTION III

ON THE ROAD VEHICLE EVALUATION

This portion of the report dealing with the information accumulated over a period of 3,000 miles of owner driving conditions is much more difficult, because of the wide variation of conditions encountered.

The engine cell test was completed in one week elapsed time. The road vehicle test time covered a period of three months. This brings into focus the problem of variation of:

1. Temperature
2. Humidity
3. Barometric pressure
4. Different vehicle operating conditions
5. Different blends of fuel
6. Start and stop driving
7. Operating engine below normal temperature
8. Vacation driving
9. Mountain driving
10. Ignition component deterioration

These variations are very evident by comparing the engine idle "cylinder balance" efficiency figures found on pages 121 through 197 of Appendix II of the final GTL report, which shows a considerable difference from test to test.

The peak plug voltage readings can not be accurately compared because the oscilloscope being used for this test had to be changed during the test period, and could not be certified for comparative accuracy.

There are some inexplainable inconsistencies in some of the data that might be traced to computer instrumentation error.

During the three months' time there was considerable building construction at the site of the test, causing wide power fluctuation and complete power interruption to the computer. The inconsistencies seem to be in the area the computer was involved in rather than the manual data.

Since the cell test engine could be closely monitored and held to close tolerance, it is the writer's opinion the data on page 21 and 22 of Appendix I (pages 22 and 23 of this summary) should be the most conclusive evidence of increased efficiency of emission, horsepower, and fuel economy.

There is also definite evidence of improved efficiency in the enclosed table of figures (page 28 of this summary) compiled from pages 121, 123, 125, 126, 129, 131, 142, 144, 145, 148, 150, 152. 164, 166, 168, 170, 172, 174, 187, 189, 191, 193, 195, and 197 of the final GTL report covering manual data of fuel consumption and oil coloration on the four road cars during the complete series of tests performed on the dynomometer using the federal driving cycle sequence.

The fuel figures were compiled by weighing the test fuel tank connected to the engine, before and after the federal driving cycle was run on the dynomometer. The driving sequence was timed and controlled by a pre-scribed recorder tape. The fuel figures are in pounds and fractions of pounds consumed for each driving sequence for the same driving condition, time and distance.

These figures show an increase of from approximately 10% to 30% in fuel efficiency overall on the different vehicles, and a definite improvement of oil coloration during the 3,000 mile period.

	MAV	OLDS	PLY	VW
Without Paser	3.75	4.19	4.76	3.12
With Paser	2.56	3.6	3.75	2.18
End of 1,000 Miles	2.87	3.25	3.12	2.28
End of 2,000 Miles	3.31	4.13	3.9	2.31
End of 3,000 Miles	2.75	4.25	3.8	2.31
[illegible]	2.81	3.9	3.7	2.5

OIL DISCOLORATION LIGHT METER READINGS

	MAV	MILEAGE	OLDS	Mileage	PLY	Mileage	VW	Mileage
Without Paser	0.2	16,699	0.9	106,284	4.1	39,452	4.3	57,039
With Paser	0.2	16,710	0.9	106,293	4.1	39,460	4.3	57,047
End of 1,000 Miles	0.2	17,676	0.9	107,246	4.4	40,726	4.1	58,049
End of 2,000 Miles	0.3	18,731	0.7	108,310	4.3	41,826	4.2	59,106
End of 3,000 Miles	0.3	19,611	0.6	109,311	3.9	42,426	4.0	60,119

The oil coloration data was compiled by placing a sample drop of engine crankcase oil on a filter disc and measuring the discoloration, using a Robert Bosch light meter. The lower the scale number, the clearer or lighter the sample.

From the information contained in this report on the stationary engine and the road vehicles, there is definite evidence of fuel economy that will be reflected in better gas mileage, quicker starting and smoother running.

Both the stationary engine and the road vehicles functioned efficiently on regular fuel with the Paser Magnum installed. (Refer to stationary engine data on the bottom of page 11 and the upper half of page 12 of Appendix I of the GTL report).

The spark plug gap was opened to .060 during the regular fuel run on the road vehicles to prove the proper function of the plugs under wide gap conditions.

The writer of this summary was present at all times and observed all tests during the full length of the tests.

Harley G. Deihl
Technical Advisor

WHERE TO FIND DATA IN THE GTL TEST REPORT TO SUBSTANTIATE ADVERTISING CLAIMS

1. GAS MILEAGE

Fuel economy figures for the stationary engine can be found at the bottom of page 24 of this summary. The first and last columns across are both without Paser. The first run was measured only with the flow-meter and it seemed this could be improved on by using the weight of fuel also, so the last run was made to confirm this. The fifth column contains the fuel figures using regular fuel and the ignition timing advanced to 10° BTC.

Fuel economy figures for the road vehicles compiled during the course of the Federal Driving Cycle on the dynomometer are on top of page 28 of this summary. These figures indicate the total amount of fuel consumed in pounds for each complete operating cycle. The first column across is without Paser. The balance of the figures are with Paser installed. All dynomometer runs were made with premium fuel except the last run using regular fuel and the spark plug gap increased to .060. The average gas mileage increase resulting from Paser Magnum operation was 20% on four vehicles driven 3,000 miles each and one stationary engine.

2. POWER INCREASE, FASTER ACCELERATION, HIGHER TOP SPEED

An analysis of the (M B H P - O B S) on Page 23 of this summary duplicated from page 22 of the GTL report indicates a hors power increase in the 1500, 2000, and 2500 RPM full throttle operation. The engine could not be operated above 3000 RPM because of operating limitation of the dynomometer.

The engine manufacturer's maximum horsepower is based on a figure above this range.

3. LONGER LIFE FOR ENGINE-SPARKPLUGS-OIL-FILTER

Lower average oil sump temperatures and sparkplug shell temperatures indicated on page 24 of the summary contribute to longer engine life.

More complete burning of fuel indicated by less fuel consumption causes less fuel blow by. Longer engine life.

Longer oil and filter life result from less oil contamination indicated by improved oil coloration readings page 28 of this summary.

Lower sparkplugs will operate satisfactorily on wider gap causing extended life usage. Road vehicles operated satisfactorily on regular fuel and plug gapped .060 as outlined in schedule on page 33 of GTL Test Report.

4. LOWER OCTANE REQUIREMENTS

The stationary engine was operated on regular fuel with timing advanced to 10° B T C through complete 20 hour endurance test and power curve test. No abnormal temperatures occurred (see data sheet page 11 of this summary).

5. LOWER EMISSIONS

Indicated on data sheet page 22 of this summary. Less fuel consumed per mile as indicated on stationary engine data, page 24, and vehicle data sheet, page 28 of this summary.

CLYDE M. ADAMS JR.
4576 NORTH LAKE DRIVE
MILWAUKEE, WISCONSIN 53211
414 - 332-7516

November 20, 1971

Mr. Eugene Irvin
President
R E I Industries, Inc.
3220 Lemmon Avenue
Dallas, Texas 75204

Dear Mr. Irvin:

I have reviewed in depth the document entitled <u>Report of Tests on Faser Magnum for REI Industries Incorporated of Dallas, Texas</u>, by General Testing Laboratories, Inc. The following paragraphs summarize the more significant findings of G. T. L.

Vehicle and stationary engine tests give clear indication that the Faser Magnum favorably influences engine performance, especially in reduced fuel consumption and also reduced emissions and increased horsepower.

The vehicle tests were performed on four automobiles representing the three principle American manufacturers and one foreign manufacturer. These vehicles were operated under ordinary driving conditions by their owners. The report presents the results graphically and in four summary tables, one for each automobile. Dynomometer and emission tests (Federal Driving Schedule) were run on each automobile before and after installation of the Faser Magnum and at intervals of 1000, 2000, and 3000 miles of normal driving with the Faser installed.

(1) The most striking and consistent result is the substantial reduction in fuel consumption, generally

CLYDE M. ADAMS JR.
4676 NORTH LAKE DRIVE
MILWAUKEE, WISCONSIN 53211
414 - 332-7516

more than 20 per cent.

(2) There is some increase in horsepower at 50 miles an hour, wide open throttle, with the Maverick and the Volkswagon. Horsepower tests on the Oldsmobile and Plymouth were inconclusive due partly to the passing gear in their transmissions.

(3) Road test type measurements of the carbon monoxide and hydrocarbon emissions were measured at idle and at 2500 rpm using a Beckman NDIR Analyzer. With the Maverick, Plymouth and Volkswagon there was a clear tendency for the emissions first to increase and then decrease as the vehicles acquired mileage with the Faser installed. The results on the Oldsmobile were inconclusive and the 3000 mile test on the Volkswagon exhibit unexplainably high emissions.

Stationary engine tests were performed on a 1968 Oldsmobile 330 cubic inch displacement engine.

(1) Horsepower and fuel consumption results are summarized for maximum torque conditions at various speeds in Table II of Part I of the Appendix. These show reduced fuel consumption at all speeds and increased horsepower at 1500, 2000, and 2500 rpm with the Faser and ethyl fuel. Fuel consumption was measured by two methods: (a) flow meter and (b) direct weighing. Only the last two tests shown at the bottom of Table II involved the more precise weighing method, and show substantial reduction in fuel consumption with the Faser.

(2) Emissions from the stationary engine tests are summarized in Table I. The first four entries in that Table show reductions the order of 10 per cent in carbon monoxide and hydrocarbon concentrations in the exhaust. If this information is coupled with that on fuel consumption,

CLYDE M. ADAMS JR.
4676 NORTH LAKE DRIVE
MILWAUKEE, WISCONSIN 53211
414 - 332-7516

(3)

comparisons can be made in total weight of carbon monoxide and hydrocarbon emissions per unit of energy (in horsepower hours) delivered by the engine. Compared in this way total emissions appear to be reduced the order of 20 per cent.

(3) Exhaust composition data can be processed by performing a chemical materials balance to get the overall compostition. This type of analysis reveals still another effect of the Paser, namely that the chemical reaction,

$$CO + H_2O = CO_2 + H_2$$

proceeds further to the right indicating the exhaust gases equilibriate to a lower temperature with the Paser.

Measurements of this kind on as multi-variant a device as an automobile or internal combustion engine are difficult to make under controlled conditions. General Testing Laboratories has done a workmanlike job and the results are mixed, with some evidence of the type of scatter to be expected in executing this type of program. Nevertheless, careful scrutiny and analysis leaves little doubt the Paser is exerting desirable effects to varying degrees on engine performance. The simplest and most significant of these is the repeated and reliably measured indication of markedly reduced fuel consumption.

Very truly yours,

C Mel Adams

C. Mel Adams
Pelton Professor of
Materials Engineering

CMA:tu

AMERIMEX INDUSTRIES, INC.

May 14, 1980

Director
Emission Control Technology Division
U.S. Environmental Protection Agency
2565 Plymouth Road
Ann Arbor, MI 48105

Dear Sir:

I am writing for your assistance and advice.

I am the inventor and patent holder of a device which increases combustion efficiency in an internal combustion engine. Among the benefits derived are increased mileage and reduction in exhaust emissions.

We have conducted in depth testing of this device at General Testing Laboratories in Springfield, VA, using four cars and one stationary engine. We accumulated 210 pages of testing data. Included in the testing procedures was the use of the standard EPA test cycle.

On October 23, 1979, the Federal Trade Commission published "Facts For Consumers" on gas saving devices. In that publication it was stated that the Environmental Protection Agency had tested our device and found that it had no effect upon engine performance. The product in question was originally manufactured under the trade name "Paser Magnum" and is now being marketed under the trade name "Paser 500".

I am naturally chagrined that the EPA tested our device without asking for our imput. However, the purpose of my letter is to ask your guidance on how we can arrange to meet with the appropriate people in your agency to show them our testing data and other product credentials. We would be most happy to meet personally with whatever person or persons who are empowered to take an open-minded look at our credentials with a view to accepting our testing data and removing this stigma from our product.

I eagerly await your guidance. If I can be of any further service, please consider me at your disposal.

Very truly yours,

AMERIMEX INDUSTRIES, INC.

Eugene Irvin, Jr.
President

EI/jk

8720 EMPRESS ROW, DALLAS, TEXAS 75247 (214) 631-7500
CABLE ADDRESS: PASERHQ

July 9, 1980

Mr. Eugene Irvin, Jr.
AmerImex Industries, Inc.
8720 Empress Row
Dallas, TX 75247

Dear Mr. Irvin:

In response to your correspondence of May 14, 1980 regarding the procedures to be used to obtain an EPA evaluation on the "Paser Magnum"/"Paser 500", I am forwarding the following documents:

1. EPA Retrofit and Emission Control Device Evaluation Policy

2. Federal Regulations covering Fuel Economy Retrofit Devices

3. Section 511 Application Format.

As you are already aware, the EPA has tested your product previously. If your firm wishes the EPA to re-evaluate your product because of some technological improvements in the device or new data, it is recommended that you complete all the requirements contained in the above documents and submit an application for evaluation under Section 511 of the Motor Vehicle Information and Cost Savings Act. Such an application can be handled by mail so that a personal meeting will not be required.

It is hoped that your inquiry has been satisfied. If you have any questions or require further assistance, please contact my office.

Sincerely,

F. Peter Hutchins, Project Manager
Test and Evaluation Branch

Enclosures

ECTD:TEB:BURGESON:dkz:X259:2565PlymouthRd:7/2/80

AMERIMEX INDUSTRIES, INC.

July 17, 1980

Mr. F. Peter Hutchins
Project Manager
Test and Evaluation Branch
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Ann Arbor, MI 48105

Dear Mr. Hutchins:

Under Section 511 of the Motor Vehicle Information and Cost Savings Act, we hereby make application for evaluation of our retrofit device. Attached is the required application format furnished to us by your office.

In Paragraph 13 of this format you asked for the "Effects on Vehicle Emissions (non-regulated)" and in Paragraph 15 of this format you asked for "Test Results (Regulated Emissions and Fuel Economy)": the Paser was evaluated at General Testing Laboratories on five engines using EPA procedures. The evaluation was also used to document the effect of the Paser on engines in various non-standard configurations. A total of 210 pages of test data was accumulated. These data are difficult to evaluate, as presented in the test report, without explanations by company technicians. A summary of the test report is included in the data submitted. As part of this evaluation, it is requested that EPA personnel meet personally with company technicians. At this time the complete 210 page test report will be presented.

In your letter of July 9, 1980, you indicated that the EPA had tested the Paser previously. I would appreciate hearing from you where the Paser was procured. We had problems in the past with illegal copying of our device. I would also appreciate an opportunity to inspect the Paser tested to insure that it was a properly operating device and one that was manufactured by us. Since I knew nothing of this testing, we were unable to give any manufacturer's input. It is my understanding that the procedures for evaluating a device required testing on four vehicles. My information is that your previous testing was done on only one vehicle. However that may be, the Paser Magnum has undergone 18 improvements in material specifications and part tolerances since the original Paser Magnum was introduced into the market in April of 1970.

As part of this evaluation, I would request that the products tested be furnished to you directly from our offices and that company technicians be allowed to brief testing personnel on the peculiarities of our product and that we be allowed to observe the testing.

8720 EMPRESS ROW, DALLAS, TEXAS 75247 (214) 631-7800
CABLE ADDRESS: PASERHQ

7-17-80
Mr. F. Peter Hutchins
Project Manager
Test and Evaluation Branch
United States Environmental Protection Agency
Page 2

Thank you for your consideration in this matter. I shall await your reply.

Very truly yours,

AMERIMEX INDUSTRIES, INC.

Eugene Irvin, Jr.
President

EI/jk

Attachments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ANN ARBOR, MICHIGAN 48105

Attachment K

December 24, 1980

OFFICE OF
AIR, NOISE AND RADIATION

Mr. Eugene Irvin, Jr.
AMERIMEX Industries, Inc.
8720 Empress Row
Dallas, TX 75247

Dear Mr. Irvin:

The EPA Engineering Group has completed a review of your application for evaluation of the Paser Magnum/Paser 500/Paser 500 HEI under Section 511 of the Motor Vehicle Information and Cost Savings Act. This review indicates that additional information/clarification is needed in several areas of the documentation submitted by you prior to further processing of your application. These areas are as follows:

- EPA sent you the Section 511 documents July 9, 1980 and pointed out the need for information on technological improvements or the availability of new data to enable EPA to reevaluate your device. Please submit details of the technological improvements made in your device. Also, please identify and provide detailed current data supporting these claims.

- The Application covered the Paser Magnum, Paser 500, and Paser 500 HEI. However, the data submitted was only for the Paser Magnum and was for testing performed in 1971. Most vehicles now use some type of high energy ignition system. Current data is needed for each type of ignition system.

- Need data submitted to be for current FTP and HFET not 1370 second FTP (i.e. 1970 test procedure).

- Detailed information, installation procedures, and operating instructions are needed for Paser Magnum.

- Paser Magnum and Paser 500 are apparently basically the same device. Are they the same? What is the difference between them? Do they perform the same? If not, what is the difference? Please submit data.

- Paser 500 HEI is claimed to develop 40% more potential than prior state of art including previously patented device. Does this mean Paser 500 HEI develops 40% more potential than both the Paser 500 and the Paser Magnum? Separate data should be submitted on the Paser 500 HEI.

- The Paser 500 HEI was apparently invented for use on ignition systems that do not have distributor covers with individual sockets extending from surface into which the ignition wires are plugged. However, since the Paser 500 HEI is claimed to develop 40% more potential and should readily connect to the wiring, can it be used on distributors with sockets? With both conventional and electronic ignition systems?

- The information submitted with the application claims both immediate and long term (after 1000 miles) benefits for the device. Please submit data to document the immediate and long term benefits.

- Theory of Operation was submitted for Paser 500. Is the theory the same for both the Paser Magnum and Paser 500 HEI? If not, please provide theory of operation for Paser Magnum and Paser 500 HEI.

- Paser 500 instructions/warranty information provides warranty registration cards. Are similar cards provided with Paser Magnum and Paser 500 HEI?

- What is the cost of the units?

Please provide a detailed description of each test vehicle, the test conditions, and device configuration (baseline or device installed) with the data you submit.

If, after review of the above requested information, the EPA requires additional information or confirmatory testing at this facility, EPA will contact you. If EPA deems it appropriate to conduct confirmatory testing at this facility after completing the review, a test plan will have to be developed and agreed upon.

Your cooperation in this matter and rapid response are appreciated. I look forward to receipt of the requested information so that we can continue processing your application for evaluation. If you require any further information or assistance, please feel free to contact my office (313-668-4299).

Sincerely,

Merrill W. Korth

Merrill W. Korth, Device Evaluation Coordinator
Test and Evaluation Branch

cc. F. P. Hutchins
E. A. Barth

Attachment L

AMERIMEX INDUSTRIES, INC.

January 12, 1981

Mr. Merrill W. Korth
ENVIRONMENTAL PROTECTION AGENCY
2565 Plymouth Road
Ann Arbor, MI 48105

Dear Mr. Korth:

I am writing to summarize my understanding of the agreement and plan of action which was agreed upon during our visit with you and Messrs. Stahman, Hutchins, and Barth on January 6, 1981.

The first step is that I was to send you an answer to your letter dated December 24, 1980, asking for additonal information.

The second step is that we were to submit to you written verification that the test procedures used by the Mexican Government's equivalent to the EPA (Sub-Secretaria De Mejoramiento Del Ambiente) were the same as the current U.S. Federal Testing Procedures.

The third step is to send you a copy of the original tests done by the Mexican Government's EPA, rather than the transcript that was furnished to you during our visit.

The fourth step is for Mr. Adolph Canales, our attorney, to contact you during the week of January 12th to see on what basis the 1970 and 1971 tests of the Paser Magnum by the HEW predecessor to your agency could be reconsidered in view of the additonal information given to you during our visit.

The fifth step is that you and the EPA Staff are to evaluate our test reports with a view to accepting our test data. This evaluation would take approximately two to three weeks. In this regard, let me repeat that we are more interested in the effect of the Paser on fuel consumption than on emissions. The only judgement that I consider critical with reference to emission is that the Paser does not have an adverse effect.

8720 EMPRESS ROW, DALLAS, TEXAS 75247 (214) 631-7800
CABLE ADDRESS: PASERHQ

1-12-81
Mr. Merrill W. Korth
ENVIRONMENTAL PROTECTION AGENCY
Page 2

If this is your understanding of the plan which we agreed upon, then we shall proceed as outlined. Please give us your thoughts as soon as possible.

Very truly yours,

AMERIMEX INDUSTRIES, INC.

Eugene Irvin, Jr.
President

EI/jk

cc: Dr. C. Mel Adams
Adolph Canales, Esq.
Mr. Harley Deihl

Attachment M

Received 1-15-81
MWK

AMERIMEX INDUSTRIES, INC.

January 13, 1980

Mr. Merrill W. Korth
Device Evaluation Coordinator
Test and Evaluation Branch
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Ann Arbor, MI 48105

Dear Mr. Korth:

I am writing to furnish you with the information which you requested with reference to the 511 evaluation of the Paser 500 in your letter of December 24, 1980. The paragraphs listed below correspond to the paragraphs of your December 24 letter.

• The Paser 500 is the same device as the Paser Magnum. There are no technological improvements. The improvements are in the production area. The Paser 500 uses neoprene instead of natural rubber insulation on the interconnect wire. The lower connector has been redesigned and is now plated. The locking of the two plastic parts and the humidity seal have been improved. The Paser 500 HEI uses the same principle as the Paser 500; only the method of installation has been modified to allow connection to the redesigned distributor caps.

• Since the Paser 500 and Paser 500 HEI represent merely production improvements of the Paser Magnum, the performance data for the Paser Magnum apply. The additional tests performed by the Mexican EPA and Department of Public Works (SAHOP), the Japanese tests performed by the National Defense Academy, Auto Mechanic Magazine and Consumer's Report, plus the U.S. tests performed on five engines at General Testing Laboratories show the beneficial effects of Paser installation.

• The tests performed by the Mexican EPA used current U.S. testing procedures. A transcript was delivered to you during our meeting on January 6, 1981. A true copy will be forward to you as soon as we receive it.

• The Paser Magnum has not been manufactured since 1972. The name "Paser Magnum" was used in our 511 application to identify the item as contained in your files and provide a transition to the improved versions.

• See answer to the first question, above.

• The Paser 500 induces approximately 1/3 of the firing voltage into the non-firing cylinders. The Paser 500 HEI induces approximately 7/15 of the firing voltage into the non-firing cylinders. The relative voltages result from the inductive relationship designed into the unit's circuits.

• The Pasar 500 HEI can be used with both female and male connectors on the distributor cap. It can be used with either point-condensor and electronic ignitions.

• As we discussed during our visit to your offices of January 6, 1981, the electro-static bombardment of the combustion chamber atmosphere which the Paser generates creates an ionized atmosphere that not only results in more complete fuel combustion, but also causes erosion of the carbon deposits which are present. As a result, during the first 1,000 miles after Paser installation, the combustion chamber is cleaned. Some of the carbon gets into the oil, so that the oil becomes very dirty and thick during the first 1,000 mile "purging period". Additionally, the increased combustion efficiency caused by the Paser makes the idle speed increase. The purging period lasts approximately 1,000 miles. At that point, the After Installation Service must be performed; this service consists of changing oil and oil filter and adjusting the idle speed to normal. The test results from General Testing Laboratories show the immediately and long term benefits of Paser installations.

• The Theory of Operation for all versions of the Paser is the same.

• The Paser Magnum is no longer manufactured. Warranty Cards are provided with all Paser 500's and Paser 500 HEI's.

• The suggested retail price of the Paser is $49.95.

Trusting that this information, coupled with the information hand delivered to you during our January 6 visit, will suffice for your evaluation, I remain.

Very truly yours,

AMERIMEX INDUSTRIES, INC.

Eugene Irvin, Jr.
President

EI/jk

cc: Dr. C. Mel Adams
Adolph Canales, Esq.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY Attachment N

ANN ARBOR, MICHIGAN 48105

OFFICE OF
AIR, NOISE AND RADIATION

January 19, 1981

Mr. Eugene Irvin, Jr., President
AMERIMEX Industries, Inc.
8720 Empress Row
Dallas, TX 75247

Dear Mr. Irvin:

After your meeting with EPA in Ann Arbor on 1/6/81, Tony Barth inspected an old Paser Magnum device that has been at our laboratory for many years. This could be the one evaluated by John Thomson back in 1970 and 1971. The box containing the Paser Magnum unit also contained a sheet of installation instructions taped to the underside of the box insert.

During our meeting on 1/6/81, you asked that EPA discontinue our distribution of the Thomson reports on the Paser Magnum and essentially publicly disavow the reliability of EPA Reports, Numbers 71-6 and 71-31. Your primary reasons were:

1. There is no evidence that the continuity of the ignition wires were checked.

2. The conditioning period after the device was installed was only 250 miles, rather than 1000 miles as prescribed in the installation instructions, and

3. One of the vehicles used in the testing was modified (used a GM retrofit kit).

In reviewing the installation instructions (copy enclosed) found with the Paser Magnum unit in the EPA lab, we find no instructions to the purchaser to check the continuity of his ignition wires or to expect the device's effectiveness to increase over a period of as much as 1000 miles of initial operation. Therefore, we doubt that Mr. Thomson nor Paser Magnum purchasers during the early 1970's were aware of a 1000 mile breakin requirement. As a result, we do not feel that Mr. Thomson used poor test procedures, considering the information that was available to him at that time.

Likewise, we do not think that the use of the GM retrofit kit on the 1963 Chevrolet Impala would nullify the effectiveness of the Paser Magnum device. This vehicle modification should not discount the validity of Mr. Thompson's conclusions.

Mr. Thomson may not have checked the continuity of the ignition wires since the device instructions did not warn him to do so. However, since two cars were involved, each with eight ignition wires, it is not likely that enough of the wires were discontinuous to nullify the effectiveness of the Paser Magnum device.

After seriously considering your criticism of John Thomson's evaluation of the Paser Magnum, we can not agree that there is reason to doubt the conclusions drawn in his reports. These reports are now public information and there is no reason for us to withhold their distribution.

Your company has applied for another EPA evaluation of the Paser devices under Section 511 of the Motor Vehicle Information and Cost Savings Act. If the EPA Engineering Evaluation Group decides that the more recent data and information you have submitted warrants further EPA evaluation of your device, we will do so. In replying to our letter of December 24, 1980, please send us all of the test data that is available to you.

The results of the possible reevaluation will be publicly announced in the Federal Register and through our other channels of information distribution. If at that time our findings suggest that our earlier Paser Magnum reports are no longer valid, we will also make that clear.

Sincerely,

Merrill W. Korth

Merrill W. Korth
Senior Project Manager
Test and Evaluation Branch

cc: Adolph P. Canales
C. Gray
P. Hutchins
T. Barth
511 File

CONGRATULATIONS, you have purchased the first major advance in automotive ignition systems in decades — the PASER MAGNUM harnesses the millions of volts of wasted energy generated by your engine every mile you drive and puts this energy to work to make your engine function more efficiently and save you many dollars every year in operating costs.

Here's how —

The engine in your car is a device for converting chemical energy in gasoline to mechanical energy at the wheels. The problem is that present engines only burn 50-65% of the fuel injected into them. So much of the chemical energy in the fuel you pay for is wasted because of incomplete combustion inside your engine. The residual raw gas, carbon and smog pollute your […], pollute the air and cost you hundreds of dollars in extra operating costs.

Detroit s[ees] this problem cannot be solved without costly, power-robbing change[s. It] may be years before Detroit is forced to give you a better, clean burning, economical engine.

Through the miracles of space-age science — the PASER MAGNUM is here today!

Using the principle of electro-magnetic induction, the circuits of the PASER MAGNUM tap electro-static energy from the firing spark. This energy is directed to the non-firing cylinders, where it bombards the fuel molecules with radiation, preparing the mixture for more complete combustion.

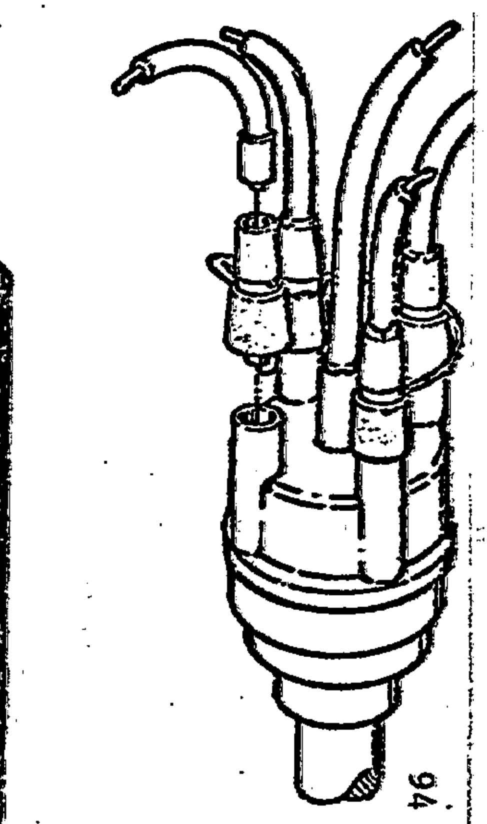
As a result more of the fuel burns and your car has more power — more acceleration — better mileage. You get better performance and save $$.

Thank you,

REI INDUSTRIES
Dallas, Texas 75207

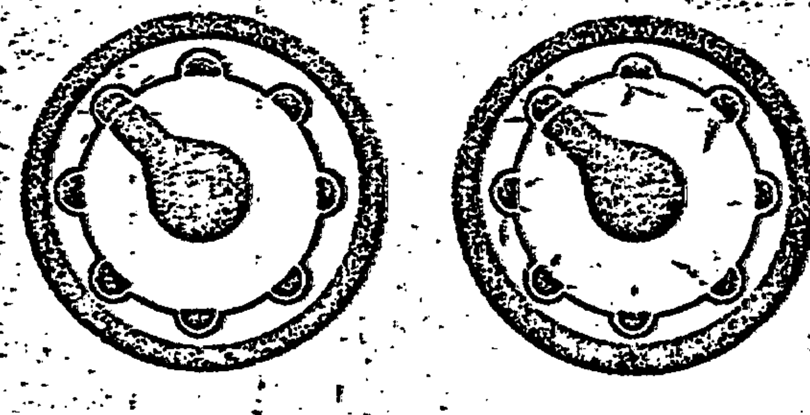
Simple One Minute Installation:

1. Remove any spark plug wire from the top of the distributor.
2. Plug that wire into the top of one of the PASER MAGNUM sleeve assemblies.
3. Plug that sleeve assembly into the spark plug receptacle on the distributor cap.
4. Continue steps 1, 2 & 3 for the other spark plug wires.



Eight Cylinder Distributor Diagram

Using the principle of electro-magnetic induction, the circuits of the PASER MAGNUM tap electro-static energy from the firing spark. This energy is directed to the non-firing cylinders, where it bombards the fuel molecules with radiation, preparing the mixture for more complete combustion.



WITHOUT PASER MAGNUM   WITH PASER MAGNUM

AMERIMEX INDUSTRIES, INC.

February 10, 1981

Mr. Merrill W. Korth
Senior Project Engineer
Test and Evaluation Branch
United States Environmental Protection Agency
Ann Arbor, Michigan 48105

Dear Mr. Korth:

I am writing in answer to your letter of January 19, 1981. On reading your letter, we had some additional questions and responses that we feel are very important. They are submitted for your consideration. The following format has been chosen for the sake of clarity:

Paragraph #	Your Letter	Our Reply
1.	"...Tony Barth inspected an old Paser Magnum device that has been at our laboratory for many years. This could be the one evaluated in 1970 and 1971."	Was this the device tested or not? Where was it procured? What condition is it in now? What condition was it in when tested?
2.	Listed were three of the reasons we submitted to you when we asked that the previous tests of the Paser Magnum be disavowed.	In addition to the three reasons listed, we submitted the following on 1-6-81: a. Only two vehicles were tested. The test parameters published at the time required that four vehicles be tested. b. The test parameters published at the time required input from the manufacturer of the device tested. We offered input; our offer was ignored. c. Additional valid test data has been submitted by us. Our tests at General Testing Laboratory used current federal test procedures on five engines. The analyses of the Paser by Dr. Mel Adams, formerly of MIT, of

8720 EMPRESS ROW, DALLAS, TEXAS 75247 (214) 631-7500
CABLE ADDRESS: PASERHQ

Merrill W. Korth, Feb 10, 1981, page 2.

		Dr. Carlos Coon, formerly of SMU, of Dr. J. Martin Hughes, of Texas A & M, of the Japanese "Auto Mechanic" magazine, of the Japanese "Consumers' Report", of the Japanese Defense Academy, of the Department of Public Works of the Mexican Government, and of the Mexican Government Environmental Protection Agency were submitted to you.
3.	"...we find no instructions...to check the continuity of his ignition wires or to expect the device's effectiveness to increase over a period of as much as 1000 miles..."	The instructions of which you sent a copy are similar to the initial instructions used from April to July 1970. In August of 1970 new instructions were included with the Paser which stipulated the requirement to check the continuity of the secondary circuit and to drive through the "purging period" of approximately 1000 miles, then performing the After Installation Service. If the Paser Magnum was tested in September 1970 and May 1971, then the test was not conducted in accordance with the instructions current at that time. John Thomson would have known these facts if had not chosen to ignore the offer we made to brief him completely on the peculiarities of the Paser, as stated in our letter to him on April 22, 1971, a copy of which was furnished to you on 1-6-81.
4.	"...we do not think that the use of the GM retrofit kit on the 1963 Chevrolet Impala would nullify the effectiveness of the Paser Magnum..."	Why do you think this? Are you sure? Would you accept a test from us run on a modified engine? The vehicle tested was seven years old. What checks were made to insure that the engine was in normal good running order?

5.	"...Thomson may not have checked the continuity of the ignition wires since the device instructions did not warn him to do so."	If the instructions you sent were used, they were outdated at the time of the tests. If Thomson had not ignored our offer of input, he would have known.
	"...It is not likely that enough of the wires were discontinuous to nullify the effectiveness of the Paser Magnum..."	In the early 1970's most of the spark plug wires were of the compressed carbon type. Many of these were discontinuous when new. The probability is greater that they were discontinuous.
6.	"...we can not agree that there is reason to doubt the conclusions..."	We have not been presented with a reason to support Thomson's test procedures and conclusions. How can the previous testing be supported when the evidence shows that the testing did not allow for the peculiarities of the product, although such information was offered. We believe that the public has been misinformed and that there are very serious reasons for withholding future distribution of the tests as well as disavowing the previously distributed false information.
7.	"...Your company has applied for another EPA evaluation of the Paser devices ..."	This is not a request for another evaluation, but rather for the first ever. Neither REI, nor AmerImex Industries, nor I, the inventor, ever requested an evaluation before or furnished the EPA with a Paser. As soon as the test report from the Mexican Government Environmental Protection Agency is received by us, I will forward a copy to you. This test, together with the numerous other tests which we have furnished to you, should establish that the Paser does have a beneficial effect on fuel economy and, at least, does not have an adverse effect on emissions.

Merrill W. Korth, Feb 10, 1981, Page 4.

We believe that the additional information submitted to you is sufficient evidence of the efficacy of the Paser 500 and should obviate the need for further testing. It is our understanding that you will consult with Dr. C. Mel Adams (phone 513/281-4825) for additional data or clarifications needed.

In view of what has been said above and during our meeting on January 6, 1981, I repeat my request, which we believe is more than reasonable, that you make a statement to the Federal Trade Commission and others who have received the previous tests that there are serious questions about them.

May I hear from you at your earliest convenience.

Very truly yours,

Eugene Irvin, Jr.
President

EI/ci

cc: C. Mel Adams, Adolph Canales, Peter Hutchins, Tony Barth, Ralph C. Stahman, Harley Deihl

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ANN ARBOR MICHIGAN 48105

March 3, 1981

OFFICE OF
AIR, NOISE AND RADIATION

Mr. Eugene Irvin, Jr.
AMERIMEX Industries, Inc.
8720 Empress Row
Dallas, TX 75247

Dear Mr. Irvin:

EPA has received your letters dated January 12, 1981 and January 13, 1980 (1981?). EPA is incorporating the applicable information in the 511 Evaluation of the Paser device.

Your January 13, 1980 (1981?) letter makes several apparently conflicting statements about the Paser Devices. The letter claims in effect that the Paser 500 and Paser 500 HEI give the same performance. However, the letter also states the Paser 500 induces 1/3 the firing voltage while the Paser 500 HEI induces 7/15 the firing voltage. Therefore, the operation of these devices in a vehicle is clearly different - unless the observed effects on emissions or fuel economy are the same. Please clarify these points by March 31, 1981.

Your January 13, 1980 (1981?) letter replying to EPA's December 24, 1980 letter stated "The Paser 500 HEI can be used with both female and male connectors on the distributor cap. It can be used with either point - condenser and electronic ignition systems." This conflicts with the information provided in the discussion of the device during your January 6, 1981 visit to EPA. At that meeting, AMERIMEX stated that the Paser 500 was for conventional ignition systems and the Paser 500 HEI was for electronic ignition systems. Therefore, in order to resolve these seeming inconsistancees, please answer the following questions by March 31, 1981.

1. For conventional ignition systems with sockets in the distributor cap, which is the recommended Device, Paser 500 or Paser 500 HEI?

2. For conventional ignition systems with sockets in the distributor cap, would there be any benefit to using the Paser 500 HEI instead of the Paser 500?

3. For electronic ignition systems with sockets in the distributor caps, which is the recommended Device, Paser 500 or Paser 500 HEI?

4. For electronic ignition systems with sockets in the distributor cap, would there be any benefit to using the Paser 500 HEI instead of the Paser 500?

As noted in the application information EPA previously sent you, the current Federal Test Procedure (FTP) is the only EPA recognized test for emissions. The current FTP and Highway Fuel Economy Test (HFET) are the only EPA recognized valid tests for fuel economy. All testing should be conducted using current vehicles that are representative of the vehicle population.

Any data you submit will be reviewed in the EPA evaluation of the Paser device. However, other types of supplemental test data submitted will not be considered to be in lieu of valid FTP/HFET test results obtained by testing the Paser at one of the independent laboratories currently listed on the EPA list of acceptable laboratories and using representative current vehicles.

To be of use, supplemental data must be sufficiently detailed so that all test procedures, conditions, and results are clearly shown (i.e. in sufficient detail so that an automotive test laboratory could reasonably be expected to be able to duplicate the testing and obtain similar results without additional information). The data are required from the test vehicles in both baseline (all parameters set to manufacturer's specifications), and modified forms (with device installed). With respect to supplemental testing:

> Your January 12, 1981 letter references the testing done by the Mexican Government's EPA equivalent organization. EPA is still waiting for these test results. Please insure that the test procedures, conditions, and results are adequately detailed. Please provide the needed information by March 31, 1981.
>
> The testing performed by General Testing Laboratories has been reviewed by the EPA Engineering Group. No vehicle emission data was submitted. The baseline fuel economy appears low compared to similar vehicles EPA has recently tested (see Attachment). Therefore, the four test vehicles were considered to be unrepresentative of vehicles in satisfactory mechanical condition and properly tuned to manufacturer's specifications. Since the Device instructions specify "...in normal good running order," the data is judged to not support conclusions that the Paser device improves fuel economy. A more detailed summary is attached.
>
> The engine testing performed by General Testing Laboratories was also reviewed. Post test inspection of the engine revealed evidence of a ". . . substantial amount of rust accumulation on the cylinder walls from rain and moisture." Therefore, the initial condition of the engine was really unknown and it can not be considered to be a representative engine. Therefore, due to the adverse condition of the engine, the data cannot be used to substantiate any claims for the Paser device.
>
> The remaining supplemental data submitted was either not sufficiently detailed and/or used relatively uncontrolled test procedures.

Thus, the data submitted has been judged to not adequately support your claims for the Paser device. A valid test program to obtain the supporting data would as a minimum consist of two representative current vehicles tested (duplicate FTP and HFET) both with and without each device (Paser 500 and Paser 500 HEI). In order to minimize the costs to you of testing, these tests may be hot start rather than cold start. In addition, if you feel either the Paser 500 or the Paser 500 HEI would equally show a benefit, only one of these devices need be tested. EPA will be glad to work with you in developing an acceptable test plan for conducting independent testing in a timely manner.

Please notify EPA by March 31, 1981 whether or not you plan to undertake the suggested testing. If you plan to test, please inform EPA of the test start and end dates and the name of the testing laboratory. If you do not choose to undertake the suggested testing, EPA will finalize the evaluation and publish the results based on the information that has been provided.

Please bear in mind that, if you choose not to conduct this testing, there will be no valid data to support the fuel economy claims for the device and the EPA report will state that the data submitted by the Applicant was not sufficient to demonstrate a fuel economy benefit.

Please provide EPA the requested information by March 31, 1981.

Again I wish to emphasize if you undertake additional testing, EPA will work with you in developing an acceptable test program; however EPA must complete the evaluation in a timely manner. Please contact me (phone (313) 668-4299) if you have any questions or require additional assistance.

Sincerely,

Merrill W. Korth, Device Evaluation Coordinator
Emission Control Technology Division

Attachment - Preliminary Evaluation of GTL Data
Submitted in Paser 511 Application

The vehicle test data, contained in the General Testing Laboratory Report Summary contained test data for the four vehicles tested with the Paser Magnum installed. The vehicles were tested in 1971 using the 1370 second cold start Federal Test Procedure (FTP) then in effect. No emission test results were provided. The fuel economy results are summarized below:

Vehicle Fuel Economy, MPG

	1970 Maverick 200 CID	1965 Oldsmobile 300 CID	1968 Plymouth 318 CID	1968 Volkswagen 1500 CC
initial baseline without Paser	12.3	11.0	9.7	14.8
initial with Paser	18.1	12.9	12.3	21.2
Paser after 1000 miles	16.1	14.2	14.8	20.3
Paser after 2000 miles	13.7	11.2	11.9	20.0
Paser after 3000 miles	16.8	10.9	12.2	20.0

The current EPA test procedure, the '75 FTP, repeats the first 505 seconds of the cold start cycle after a 10 minute hot soak. Therefore, data obtained using the '75 FTP can be compared with the tests above by using the fuel economy data for the first 1370 seconds of the current FTP.

EPA recently conducted tests on a group of 1970-71 vehicles as part of a study on the effects of temperature on vehicle emissions, "Effects of Ambient Temperature and Driving Cycle on Exhaust Emissions, EPA-460/3-80-012". These vehicles selected for testing were verified to be in good mechanical condition and properly tuned. A group of these vehicles similar to the preceeding is given below with fuel economy calculated for the same 1370 second driving cycle.

Vehicle Fuel Economy, MPG

Maverick 200 CID	Chevrolet 307 CID	Dodge 318 CID	Plymouth 318 CID	Volkswagen 1500 CC
18.0	13.4	14.4	13.9	23.1

When the fuel economy of this group of vehicles is compared to those submitted in the application, the data suggests that the baseline fuel economy for the GLT fleet was too low for the vehicles to be considered representative of vehicles in satisfactory mechanical condition and properly tuned to manufacturer's specifications.

Since the application specifies in the instructions that the vehicle's engines must be ". . . in normal good running order," the application data is judged to not support the conclusions that the Paser Device improves fuel economy.

Attachment Q

AMERIMEX INDUSTRIES, INC.

March 11, 1981

Mr. Merrill W. Korth
Device Evaluation Coordinator
Emission Control Technology Division
United States Environmental Protection Agency
Ann Arbor, Michigan 48105

Dear Mr. Korth:

Enclosed please find a copy of the original test report from the Mexican Government Environmental Protection Agency.

In addition you will find a letter from the head of Mobile Sources Division of the Mexican EPA establishing the Paser 500 as an accredited device in Mexico.

It is our hope that the addition of this test data, which was performed using US standards will suffice in your evaluation of the creditability of the Paser 500.

May I hear from you on this matter at your earliest convenience.

Very truly Yours,

Eugene Irvin, Jr.
President
AmerImex Industries, Inc.

EI/ci
Encl.

104

SECRETARIA
DE
SALUBRIDAD Y ASISTENCIA

Av. Chapultepec 284-1, México 7, D.F.

DEPENDENCIA SUBSECRETARIA DE MEJORAMIENTO DEL AMBIENTE. DIRECCION GRAL. DE SANEAMIENTO ATMOSFERICO. DIRECCION DE

SECCION FUENTES MOVILES.

MESA

NUMERO DEL OFICIO 4072/

EXPEDIENTE 158

No. 009/FM

ASUNTO: Se concede autorización.

México, D.F.,

PARDI, S. A.
Centeno No. 422 Letra "C"
México 8, D.F.

At'n.: Ing. Jorge Vargas López

Con relac n a su solicitud de dictámen técnico sobre el dispositivo PASER 50(. para reducción de emisiones contaminantes producidas por los vehículos automotores, me permito comunicar a usted, que con base a las pruebas realizadas en el laboratorio de emisiones por el personal técnico de esta dependencia, no existe ningún inconveniente por parte de esta Subsecretaría, para considerar su dispositivo PASER 500, como una ayuda en la reducción de emisiones contaminantes provenientes de los vehículos automotores, tanto para vehículos de 4, 6 y 8 cilindros.

Atentamente,
SUFRAGIO EFECTIVO. NO REELECCION.
El Director de Fuentes Móviles.

Ing. Gaspar García Martínez.

AL CONTESTAR ESTE AVISO CITENSE LOS DATOS CONTENIDOS EN EL CUADRO DEL ANGULO SUPERIOR DERECHO.

GGM:com*

T. G. N.

United States of Mexico

Secretariat of Health and Welfare

Subsecretariat of Improvement of the Environment. Department of Atmospheric Health. Department of Mobile Sources

Official Letter 4072/

File 158

No. 009/FM

SUBJECT: Granting of Authorization

Mexico, D.F.

PARDI, S.A.
Centeno No 422 Letter C
Mexico 8, D.F.

Attn: Engineer Jorge Vargas Lopez

In answer to your request for an official technical opinion concerning the Paser 500 device for the reduction of contaminating emmissions produced by internal combustion engines, I advise you that, on the basis of the tests conducted in the emmission laboratory by technical personnel of this department, there is no impediment by this Subsecretariat for considering your device, the Paser 500, as a help in the reduction of contaminating emmissions produced by vehicles with internal combustion engines of four, six and eight cylinders.

Attentively,

The Director of Mobile Sources

/s/ G. Garcia M.
/t/ Engineer Gaspar Garcia Martinez

106

SECRETARIA
DE
SALUBRIDAD Y ASISTENCIA

... Subdirección de Fuentes Móviles.

022-I 6...

México, D. F., a 8 ... 1980

PARDI, S. A.,
Centeno # 422 Letra C,
México 8, D. F.

At'n. Ing. Jorge Vargas López.

En atención a las pruebas de Emisiones Contaminantes y Consumo de Combustible solicitadas por usted, en vehículos de fabricación Nacional, con y sin el uso del dispositivo "Paser 5 00 ., informo a usted que la reducción de Emisiones de Monóxido de Carbono obtenidas fueron del 38%, así mismo, las Emisiones de Hidrocarburos alcanzaron una reducción del 30%. En lo referente a Consumo de Combustible el rendimiento aumentó en un 11%.

Vale la pena aclarar que estas variaciones se encontraron durante un lapso de 3,000 kms. de recorrido y siguiendo las Normas Oficiales Mexicanas NOM-AA-11-1980, "Evaluación de Gases por el Escape de Vehículos Automotores que usan Gasolina como Combustible" y NOM-150-1979 Método de Prueba para la Determinación de Consumo de Combustible en Vehículos de hasta 2,727 kgs. de Peso Bruto Vehicular.

S. M. A.
DIRECCION ...
DIC. 8 1980
DIRECCION FUENTES MOVILES

A t e n t a m e n t e .
SUFRAGIO EFECTIVO. NO REELECCION.
El Jefe del Dpto. de Des. Tecn.

ING. MARIO TURRENT.

c.c.p. C. Ing. Gaspar García Martínez.- Subdirector de F.M.

MTA/mgs.

(TRANSCRIPTION)

SUB-SECRETARIA
DE MEJORAMIENTO DEL AMBIENTE
DIRECCION GENERAL DE SANIAMIENTO ATMOSFERICO
SUB-DIRECCION DE FUENTES MOVILES

En atención a las pruebas de emisiones contaminantes y consumo de combustible solicitado por ustedes en vehículos de fabricación nacional con y sin el uso del dispositivo Paser 500 informo a ustedes que la reducción de emisiones de monóxido de carbón obtenida fueron del 38%. Así mismo las emisiones de hydrocarburos alcanzaron una reducción del 30%. En lo refirente al consumo de gascolina el rendimiento aumentó en un 11%.

Vale la pena aclarar que estas variaciones se encontraron durante un lapso de 3000 Km de recorrido y siguiendo las normas oficiales mexicanas NOM-AA-11-1980, "Evaluación de Gases por el Escape de Vehículos Automotores que usan Gasolina como Combustible" y NOM-150-1979, "Método de Prueba para la Determinación de Consumo de Combustible en Vehículos de Hasta 2727 Kilogramos de Peso Bruto Vehicular."

SS/ Ingeniero Mario Turrent

(TRANSLATION)

SUB-SECRETARIAT

OF IMPROVEMENT OF THE ENVIRONMENT

DEPARTMENT OF ATMOSPHERIC HEALTH

DEPARTMENT OF MOBILE SOURCES

WITH REFERENCE TO THE TESTS OF EXHAUST EMISSIONS AND FUEL CONSUMPTION REQUESTED BY YOU ON VEHICLES MANUFACTURED IN MEXICO WITH AND WITHOUT THE USE OF THE PASER 500 DEVICE BE INFORMED THAT THERE WAS A 38% REDUCTION IN CARBON MONOXIDE AND A 30% REDUCTION IN HYDROCARBON EMISSIONS. WITH REFERENCE TO FUEL CONSUMPTION THERE WAS AN 11% INCREASE IN MILEAGE.

IT SHOULD BE NOTED THAT THESE DIFFERENCES WERE MEASURED AFTER 3000Km OF USE AND USING THE OFFICIAL MEXICAN TEST PROCEDURES, SPECIFICALLY, NOM-AA-11-1980 "ANALYSIS OF EXHAUST GASES ON GASOLINE POWERED AUTOMOTIVE VEHICLES", AND NOM-50-1979" TEST METHOD FOR MEASUREMENT OF FUEL CONSUMPTION ON VEHICLES WITH MAXIMUM GROSS VEHICLE WEIGHT OF 2727 KILOGRAMS.

SIGNED/ Mario Turrent, Engineer
Chief of the Department of Technical Investigations

ENVIRONMENTAL PROTECTION AGENCY

OF THE MEXICAN GOVERNMENT

(SUB-SECRETARIA DE MEJORAMIENTO DEL AMBIENTE)

CONDUCTS IN-DEPTH TEST OF THE PASER 500
TO DETERMINE EFFECTS ON
CARBON MONOXIDE, HYDROCARBONS AND MILEAGE
ON VEHICLES MANUFACTURED IN MEXICO

THEIR TESTS SHOWED THAT THE PASER 500:

REDUCED CARBON MONOXIDE BY 38%

REDUCED HYDROCARBONS BY 30%

INCREASED GAS MILEAGE BY 11%

A transcription of the Mexican Government report and the English translation are attached.

Attachment R

AMERIMEX INDUSTRIES, INC.

March 24, 1981

Mr. Merrill W. Korth, Device Evaluation Coordinator
Emission Control Technology Division
United States E.P.A.
Ann Arbor, Michigan 48105

Dear Sir:

I am writing in answer to your letter of March 3, 1981.

It is the intent of AmerImex Industries to pursue this matter until your agency has enough favorable data to substantiate that the Paser 500 has a favorable effect on fuel economy and, at least, does not have an adverse effect on exhaust emissions.

We had hoped that the data submitted to you would suffice for such a ruling. The testing performed at General Testing Laboratories using the prescribed FTP and HFET on five engines showed the favorable effects of the Paser. The testing performed by the Mexican Government EPA shows the favorable effects of the Paser. However, your rulings are that this data does not suffice.

In view of our respective positions, a deadline of March 31, 1981 is not realistic. Please realize that we not only have many other duties, but the cost of any further testing which might be decided upon must be budgeted. May we ask that you allow us until June 30 to do the research, coordinating and budgeting necessary to complete this project. We will, in the meantime, be in touch with your agency to coordinate this matter.

Very truly yours,

Eugene Irvin, Jr.
President

EI/bd

cc: Ralph C. Stahman, Peter Hutchins, Dr. Mel Adams

8720 EMPRESS ROW, DALLAS, TEXAS 75247 (214) 631-7500
CABLE ADDRESS: PASERHQ

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ANN ARBOR, MICHIGAN 48105

Attachment S

OFFICE OF
AIR, NOISE AND RADIATION

April 7, 1981

Mr. Eugene Irvin, Jr.
AMERIMEX Industries, Inc.
8720 Empress Row
Dallas, TX 75247

Dear Mr. Irvin:

As we interpret your letter of 3/24/81, AMERIMEX Industries, Inc. is not in a position to obtain independent laboratory data on the Paser 500 at any time in the near future. Our 3/3/81 letter asked that you "please notify EPA by 3/31/81 whether or not you plan to undertake the suggested testing". We do not think that was an unreasonable deadline. Now, your latest letter seems to say that you can not tell us when the data will be available until 6/30/81. You also did not answer the general questions that we asked about the operation of the Paser 500.

EPA attempts to complete its device evaluations under Section 511 of the Energy Policy and Conservation Act as quickly as possible. When administrative problems drag out the evaluation (as in this case), the public is likely to erroneously assume that active EPA testing is taking place and expect a report on the device's effectiveness to be published soon. In the past, some device manufacturer's have advertised, during a prolonged EPA evaluation, that their device was being evaluated by EPA.

Since we don't seem to be progressing on the EPA evaluation of the Paser 500, we feel it is best that we complete our present Section 511 application at this time. If at a later date, your company is in a position to expeditiously obtain the required data from a recognized independent laboratory, we will welcome your new application for an EPA evaluation.

In completing our evaluation of the Paser 500 under the provisions of the Motor Vehicle Information and Cost Savings Act, EPA is now required to prepare a report on the device, and publish notice in the Federal Register that we have completed our evaluation. We are presently preparing such a report.

Please contact me immediately if you do not understand this course of action. My phone number is (313) 668-4299.

Sincerely,

Merrill W. Korth

Merrill W. Korth
Device Evaluation Coordinator
Test and Evaluation Branch

cc: P. Hutchins
T. Barth
511 File (Paser 500)

Attachment T

UNITED STATES OF MEXICO

FEDERAL GOVERNMENT

Secretariat of Human Resources and Public Works

General Directorate of Machinery and Transportation

Technical Department

Central Park Department

Technical feasibility study on the economics to acquire the electronic economizer Paser Magnum for gasoline vehicles.

May 1980

Office of Studies

SUMMARY

The present study was conducted with the purpose of acquiring the electronic economizer Paser Magnum for vehicles of 4, 6, and 8 cylinders with gasoline engines, which will provide a savings of 20% in gasoline consumption, longer engine life, spark plugs, oil, less air pollution (contamination).

Required Investment For Automobiles of	Unit Cost
4 cylinders	$1,295.00
6 cylinders	$1,495.00
8 cylinders	$1,695.00

Longevity of economizer	Ten Years

Amortization of the investment: In regards to the savings in gasoline consumption in the 4 cylinder engine it will amortize after running 25,900KM or in 431 days, running 60KM per day. The 6 cylinder engine will amortize after running 5,750 KM or 93 days, running 61.4KM per day.

CONTENTS

The internal combustion engine is that in which the fuel burns inside the engine and converts chemical energy to mechanical energy.

Today's internal combustion engines burn only 50 to 65% of the fuel consumed. It follows that a large percentage of the potential energy is lost due to incomplete combustion.

The residue of unburned fuel, the carbon and gases, damage the engines poisoning the atmosphere and increasing the maintenance and operating cost of same.

The solution to this problem is to burn a larger percentage of the gasoline that fuels the engine. That is why now the preoccupation to eliminate contaminants and save fuel brings forth new technologies to eliminate and reduce these problems as such is the case with the electronic add-on device to eliminate pollution, Paser Magnum that is being launched in the market place by the company, Dipar.

II. TECHNICAL DATA OF THE ELECTRONIC ECONOMIZER DESCRIPTION OF THE COMPONENTS

1. The ignition harness mounting head serves as a mounting for ignition harness; designed to seal the ignition harness against moisture and dust.

2. The upper connector provides the electrical connection between the spark ignition harness and the Paser circuits.

3. The secondary circuit provides capacitive and inductive coupling between the primary circuit and the secondary circuit harness.

4. Dielectric stem serves as mounting base for the lower connector and provides dielectric insulation to prevent arcing from the primary circuit.

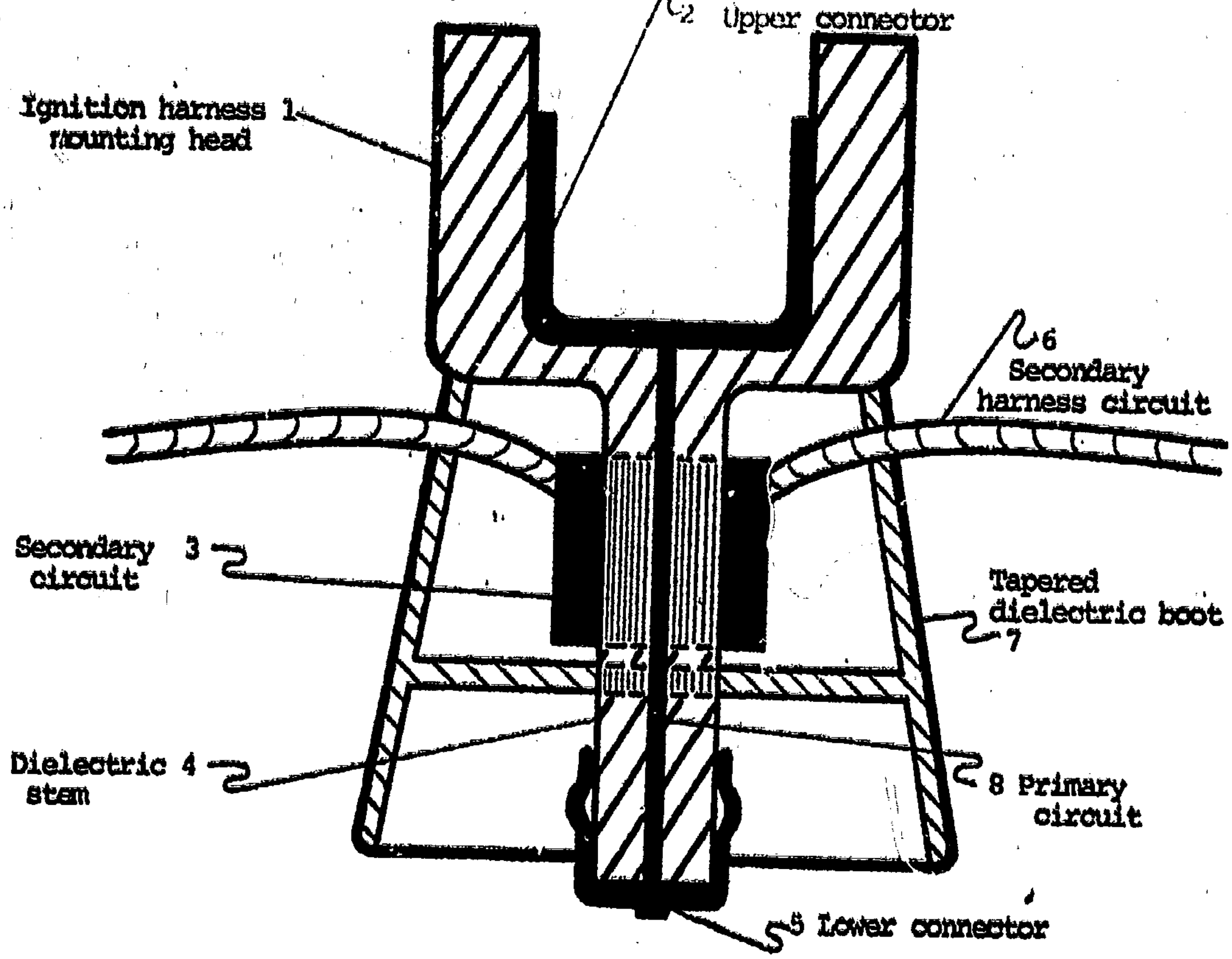
5. Lower connector provides electrical connection between the primary circuit and the distributor cap.

6. Secondary circuit harness transmits induced voltage from the firing cylinder to the non-firing cylinders.

7. Tapered dielectric boot provides base for mounting of the Paser to the distributor cap; inner chamber provides electricl isolation of the secondary circuit

8. Primary circuit provides electrical connection between the distributor and the ignition harness; transmits high voltage pulses to the spark plug when the cylinder fires and low voltage pulses when the cylinder is not firing.

The following figure shows the described components:


2 Upper connector
Ignition harness 1
mounting head
6
Secondary
harness circuit
Secondary 3
circuit
Tapered
dielectric boot
7
Dielectric 4
stem
8 Primary
circuit
5 Lower connector

A. OPERATION

The Paser Magnum enhances the conditions in which the fuel is burned, resulting in fuel economy and reducing the damages brought about incomplete combustion.

The Paser Magnum utilizes the chemical principle known as "corona" that implies the use of electricity as a chemical catalyzer. This principle is utilized in electrolysis of water in which electric energy is used to decompose the water molecules (H2O) obtaining the atoms of hydrogen and oxygen.

The Paser Magnum uses the magnetic field from the firing spark plug and induces it to the non-firing cylinders (those which are not in the combustion cycle).

This radiation from the Paser Magnum bombards the air fuel molecules in the cylinders. This initiates the breakdown of the hydrocarbon molecules. This action also ionizes the atmosphere in the combustion chamber.

To understand this action let us return to fundamentals. A molecule is composed of atoms that are interlocked with a corvalant bond; in other words they share an electron in their outer orbits.

If the electrons are the energy holding the atoms together in molecular form and if the definition of electricity is a flow of electrons, then in a way the energy that keeps the atoms together in molecular form is electricity. The shared electron holding atoms together is knocked from the orbit by the discharge of electrons. This breaks the bond between the atoms and the molecular division begins.

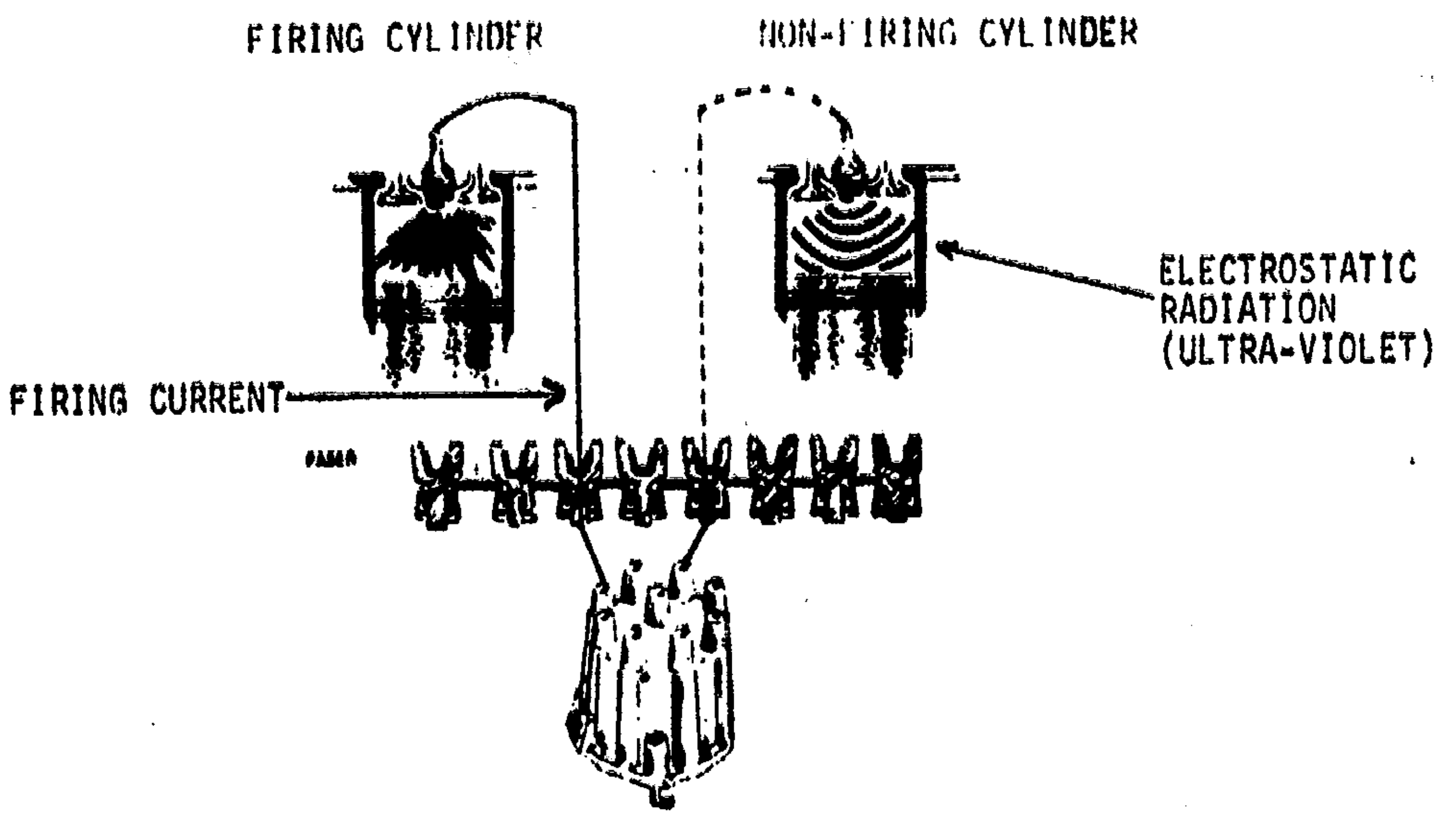
The action initiating this molecular separation also causes ionization of the atmosphere in the combustion chamber. The negative shared electron is separated from the outer orbit of the atoms.

The loss of the negatively charged electron leaves two postively charged ions. The negative charged electron traveling at the speed of light combines with another group, creating a negatively charged ion. This process, taking place at the speed of light creates ions throughout the combustion chamber. This is significant if one understands the ion theory. This theory states that electricity travels along charged particles called ions. Ions can be positive or negative charged. It is known that ions reduce the resistance to electrical current flow. As a result of the ionization in the combustion chamber, the space between the spark plug electrode is ionized and the spark jumps more easily, requiring less voltage than normal.

The result of the partial separation of the hydrocarbon molecules, the increased oxygenation (homogeneity) of the air and fuel mixture and the ionization of the space between spark plug electrodes make possible a more complete combustion. All of the benefits derived from using the Paser Magnum are the direct result of burning more of the air-fuel mixture.

The following figure explains the sequence of operation

OPERATION


FIRING CYLINDER
NON-FIRING CYLINDER
ELECTROSTATIC RADIATION (ULTRA-VIOLET)
FIRING CURRENT

b) INSTALLATION

1. Check timing and ascertain that the spark plug gap conforms to manufacturer's specification

2. Check the continuity in the spark plug wire. Usually worn cables have an open circuit. The Paser 500 will not operate properly with an open circuit in the secondary circuit. Replace spark plug wire cables if necessary, to eliminate an open circuit.

3. Check air-fuel mixture in the carburetor. The Paser Magnum operates more efficiently with a normal mixture

4. Check the carburetor air filter and replace if necessary

5. Check the automatic choke in the carburetor for better performance.

INSTALLATION OF THE PASER

a) Locate the distributor cap and the spark plug wire cables. Remove the Paser 500 from its box and notice the complete Paser unit for your vehicle has one black plastic sleeve for each spark plug wire on your distributor.

b) Remove one spark plug wire from your distributor. Grasp the dust boot. Do not pull on the spark wire itself as damage could result.

c) Insert the Paser sleeve in the place of the disconnected wire

d) Be sure the Paser sleeve is pushed firmly into the distributor cap

e) Insert the spark plug wire previously removed into the top of the installed Paser sleeve

f) Be sure the spark plug wire is pushed firmly into the Paser sleeve and that the connection is tight and sealed by the dust boot of the spark plug wire.

g) Now, repeat the aforementioned process with the other induction sleeves. Make certain all the connections are tight and insulated.

III. TECHNICAL TESTING ACCOMPOLISHED

The tests were undertaken at the Central Motor Pool for machinery with the Sun 200/Computer.

The tested units were:

1977 Datsun pick-up truck P15-4796, license # 5572-AW 4 cylinders

1974 Chevrolet pick-up truck, license # P13-100 6 cylinders

1972 Ford Galaxie 8 cylinders

The mileage of each vehicle was recorded at the beginning of the test.

The tests were as follows:

1. Emission readings of carbon monoxide (CO) and hydrocarbons (HC) were taken at different RPM's without the electronic economizer
2. Immediately thereafter the same readings of carbon monoxide (CO) and hydrocarbon (HC) were taken with the electronic economizer

3. After running the vehicles for 2000 KM a third test was undertaken, taking new readings of the emission of carbon monoxide (CO and hydrocarbons (HC) with the electronic economizer, Paser Magnum.

IV. RESULTS OF TECHNICAL TESTING

The following was observed in the Chevrolet pick-up truck P13,100 6 cylinders:

1. At low speed, 600 RPM a reduction of Carbon Monoxide (CO) and hydrocarbons (HC) was noted
2. At intermediate speed, 1500 RPM, there was also a reduction in Carbon Monoxide (CO) and Hydrocarbon (HC)
3. At high speed, 2500 RPM, a major reduction in carbon monoxide (CO) was observed. In Hydrocarbons (HC) there was an increase.

In the Datsun P15-4796 the following was observed:

1. At low speed, 600 RPM, there was an increase in Carbon Monoxide (CO) and Hydrocarbons (HC).
2. At intermediate speed, 1500 RPM, the increase was greater in Carbon Monoxide and less in Hydrocarbons (HC).

3. At high speed, 2,500 RPM, there was a reduction in Carbon Monoxide (CO) and Hydrocarbon (HC).
4. We consider that the add-on Paser reaches its best efficiency in high speed in 4 cylinder engines and in 6 cylinder engines the efficiency is maintained in low, medium and high speed.

The 8 cylinder unit was not able to be tested due to a major engine overhaul.

5. As far as the gasoline consumption, we have the following:

   In the Chevrolet pick-up P13-100 6 cylinders

   With a run of 564 KM without the Paser Magnum it had a consumption of 159 Lts, yielding 3.5 KM/LT.

   Presently with the Paser Magnum, after being drive 3,019 KM it had a consumption of 591 Lts, yielding 5.1 KM/LT.

Giving an increase of 1.6 KM per litre

For the Datsun P15-4796 4 cylinders the following was obtained:

With a run of 1,762 KM without the Paser Magnum it had a consumption of 183 Lts, yielding 9.6 KM/LT.

Presently with the Paser Magnum, after 2744 KM it had a consumption of 235 Lts, yielding 11.6 KM/LT.

Giving an increase of 4 KM per litre.

Following we have comparative graphs of the tests conducted in which the differences of emmissions of Hydrocarbons and Carbon Monoxide are shown before and after the installation of the Paser Magnum.

RESULTS OF THE TEST OF THE PASER MAGNUM 500 ECONOMIZER WITH

THE SUN 2001 COMPUTER

DATSUN YEAR 1977. LICENSE# 5572 AW 4 CYLINDERS

	DATE: MARCH 25, 1980		Km. 108467				DATE: APRIL 17, 1980	Km. 111211		
	1st TEST		2nd TEST				3rd TEST		Km. RUN	
	WITHOUT PASER 500		WITH PASER 500		RESULTS		WITH PASER		RESULTS- 1st TEST COMPARED TO 3rd TEST	
EMISSIONS	Co%	P.P.M. Hc%	Co%	P.P.M. Hc%	Co%	P.P.M. Hc%	Co%	P.P.M. Hc	Co%	P.P.M. Hc.
R.P.M. 600	4.30	44[illegible]	4.53	[illegible]	+5.34	+636	4.53	453	+7.67	+5.22
R.P.M. 1400	2.33	344	2.[illegible]	[illegible]	-14.18	+0.58	4.03	345	+72.95	+0.58
R.P.M. 2500	0.90	250	1.[illegible]	27[illegible]	+15.56	+8.4	0.85	227	-5.55	-9.2

RESULTS OF THE TEST OF THE PASER MAGNUM 500 ECONOMIZER WITH

THE SUN 2001 COMPUTER

P13-100 PANEL CHEVROLET YEAR 1974 LICENSE# 2299 AH 6 CYCLINDERS

DATE: MARCH 25, 1980				Km. 84136		DATE: APRIL 17, 1980		Km. 85922	
1st TEST		2nd TEST				3rd TEST		KM RUN 1786	
WITHOUT PASER 500		WITH PASER 500		RESULTS		WITH PASER 500		RESULTS 1st TEST COMPARED TO 3rd TEST	
Co%	P.P.M. Hc	Co%	P.P.M. Hc	Co%	P.P.M. Hc	Co%	P.P.M. Hc	Co%	P.P.M. Hc
R.P.M. 750									
3.33	235	3.33	332	0	+40.6	2.10	126	-36.93	-46.6
R.P.M. 1500									
2.40	1060	2.85	748	+18.75	-29.43	[illegible].73	556	-27.9	-47.5
R.P.M. 2500									
0.55	645	0.80	884	+45.45	+37.05	0.15	682	-72.72	+5.73

133

RESULTS OF THE TEST OF THE PASER MAGNUM 500 ECONOMIZER WITH

THE SUN 2001 COMPUTER

FORD GALAXIE 1972   8 CYLINDERS

DATE: MARCH 25, 1980   Km. 332

THE THIRD TEST WITH THE PASER MAGNUM 500 WAS NOT CONDUCTED BECAUSE OF VEHICLE PROBLEMS WHICH REQUIRED LENGTHY REPAIRS

	1st TEST		2nd TEST			
	WITHOUT PASER 500		WITH PASER 500		RESULTS	
[illegible]	Co%	P.P.M. Hc	Co%	P.P.M. Hc	Co%	Hc
R.P.M. 500	0.83	310	0.55	454	-33.73	+46.45
R.P.M. 1500	0.50	103	0.58	84	+16	-18.44
R.P.M. 2500	1.25	103	1.08	88	-13.6	-14.56

DEPTO. TECNICO

134

V. CONCLUSIONS AND RECOMMENDATIONS

Taking into account the increase in mileage the analysis follows:

The 1974 Chevrolet pick-up truck #P13,100, 6 cylinders, according to the gasoline consumption records prior to installation of the Paser Magnum was getting an average of 3.5 KM/LT. The "Nova" gas has a cost of $2.80 (pesos) per liter. The cost per kilometer traveled resulted at

$$\frac{\text{2.80 cost of liter Nova gas}}{\text{3.5 KM/LT}} \qquad \$0.80$$

With the installation of the Paser Magnum the increase went to 5.1 KM/LT according to the following calculations:

At the beginning of the test the unit odomoter read 84,136 KM at the end of the test the odometer had 87,155 KM or 3,009 KM traveled.

The following refueling was performed:

25 March	60 liters
28 March	38 liters
2 April	35 liters
8 April	40 liters
10 April	34 liters
11 April	24 liters
15 April	46 liters
23 April	28 liters
25 April	44 liters
28 April	34 liters
6 May	49 liters
9 May	34 liters
12 May	45 liters
Extra refueling outside	80 liters
TOTAL	591 Liters

Hence, we have:

$$\frac{\text{3009 KM Traveled}}{\text{591 Liters}} = 5.1 \text{ KM/LT}$$

The actual cost per kilometer traveled is:

$$\frac{\text{Cost per liter of gasoline}}{\text{present KM/LT attained}} = \frac{\$2.80}{5.1} = 0.54$$

If before the cost per kilometer traveled was $0.80 the following savings is obtained:

PRIOR COST	PRESENT COST	SAVINGS
$0.80	$0.54	$0.26

The cost of the Paser Magnum for 6 cylinders is $1,495.00

Based on the present savings of $0.26 per KM traveled as calculated, the investment will be amortized as follows:

$$\frac{\text{Cost of the Paser Magnum}}{\text{Savings in KM}} = \frac{1495}{0.26} = 5750$$

In other words to amortize the investment it is necessary to travel 5750 KM.

If according to the test from 25 March to May 12 (49) days, 3009 KM was traveled.

This results in a daily average of 61.4 KM traveled per day. Thus dividing the KM needed to travel to amortize the investment by the daily distance traveled we determine that

$\frac{5750}{61.4}$ = 93 days to amortize the investment

In which it is completely feasible to purchase the unit if the life of the Paser Magnum is compatible with the life of the car

Analysis of the 1977 Datsun pick-up truck #P15-4796 4 cylinders

Using the same parameters as above we have

The average mileage before installing the Paser Magnum was 9.6 KM/LT

The expense of traveling a KM was

$\frac{\$2.80 \text{ cost of liter}}{9.6 \text{ KM/LT}}$ + 0.29

With the installation of the Paser Magnum the increase went to 11.6 KM/LT thus the following:

Having traveled with the Paser Magnum 2744 KM and using 235 LT we have the following:

$$\frac{\text{2744 KM Traveled}}{\text{235 LT}} = \text{11.6 KM/LT}$$

The actual cost per KM traveled is:

$$\frac{\text{Cost of gasoline (LT)}}{\text{actual KM/LT}} = \frac{\$2.80}{11.6} = 0.24$$

If before, the cost per kilometer traveled was $0.29 the following savings is realized:

PRIOR COST	PRESENT COST	SAVINGS
$0.29	0.24	0.05

The cost to purchase the Paser Magnum for 4 cylinders $1,295.00
Calculating the amortization of the investment based on savings per kilometer the following is realized

$$\frac{\text{COST OF THE PASER MAGNUM}}{\text{Savings per kilometer}} = \frac{1295}{0.05} = 25{,}900$$

In other words, to amortize the investment one has to travel 25,900 KM traveling 60 KM per day, in 431 days the investment would be paid.

RECOMMENDATIONS

Prior to initiating a massive purchase of the add-ons (Paser Magnum) additional tests are being conducted on other vehicles with the purpose of verifying the results of the initial (prior) test. We are also continuing to record benefits on the units with which the initial test were conducted with the purpose of analyzing its behavior (results).

At present vehicles of the Technical Department are being evaluated with the same procedures.

If the results are satisfactory, instructions will be given to the Maintenance Shops to purchase the Paser Magnum, sending them information of the technical studies conducted.

CONSUMER'S REPORT

of Japan

(Toku-Sen-Gai)

Rates the PASER 500 TOPS!!!

In Fuel Saving Devices

With An Unbelievable City Mileage Improvement Of

42.9%

"TOKU - SEN - GAI" (CONSUMERS' REPORT)

A Monthly Magazine Which Selects the Best Merchandise for Everyday Living

TEST REPORT OF THE BEST IN FUEL CONSERVATION DEVICES FOR AUTOMOBILES - 13 DEVICES TESTED

To insure impartial comparison, the test drives were conducted with the same car, the same driver, on a specified course under the same weather conditions. The test car was a Datsun Bluebird with automatic transmission and an 1800 cc engine with NAPA-Z electronic fuel injection and dual ignition.

Tests measured gas mileage and emissions of carbon monoxide and hydrocarbons before and after installation of the devices tested.

The city mileage test course was 5.44 Km in length. Five to six test runs were made. Mileage was computed for each trip. The highway mileage test course was 28.3 Km in length. Gas mileage was measured with a ZT Driving Computer manufactured by GEMCO, Inc. of the U.S.A.

Prior to testing, the vehicle was driven for 300 Km to determine current gas mileage, to which data for the previous year was added to arrive at an average base-line mileage of 8.92 Km city and 11.69 Km highway.

PASER 500 RESULTS:

The Paser 500 consists of cone shaped sleeves which are installed into each of the spark plug wire terminals in the distributor cap. The sleeves are connected with a single wire. Since the test car has eight spark plugs, a Paser 500 with eight connected sleeves was used. Once the Paser sleeves are installed into the distributor terminals, the spark plug wires are connected to the Paser sleeves. With the engine in operation, the Paser 500 directs electrostatic energy to the non-firing cylinders, ionizing the fuel, making it readily combustible and allowing up to 95% combustion. An additional benefit claimed is that it removes carbon deposits from the combustion chamber.

Installation is simple; however, there are several conditions which must be met to insure full effectiveness, such as, (1) replace spark plugs used over 5,000 Km, (2) insure that spark plug wires do not overlap, (3) insure that the wire from the coil to the distributor is not touching metal, (4) insure that the ground electrode of the spark plugs is not facing the intake valves.

(Note from manufacturer: The conditions listed above were evidently stated by the Japanese distributor of the Paser 500. The manufacturer does not consider these conditions necessary for the proper functioning of the Paser 500.)

In complying with the above, considerable work was involved in wrapping each spark plug wire with rubber tubes, tieing down the wire from the ignition coil, and checking the positions of the spark plug electrodes. However, these precautions may have helped, because there was a distinct improvement in acceleration immediately. In city driving, acceleration from slow speed was unbelievable. Also, the engine ran noticeably smoother.

City mileage showed an unbelievable improvement of 42.9%, from ~~8.92 to~~ 12.75 Km. Highway mileage improved 5%, from 11.69 to 12.75 Km. ← Same?

Although the other twelve devices tested showed a greater improvement in highway mileage, one must conclude that the Paser 500 is the most effective device for improving general city driving.

MASANORI KITANO, Dr. Eng.
PROFESSOR OF MECHANICAL ENGINEERING
NATIONAL DEFENSE ACADEMY

1-10-20, HASHIRIMIZU
YOKOSUKA, KANAGAWA
239 JAPAN

TEL: (0468) 41-3810
EXT. 2329

BENCH TEST REPORT: PASER 500

I. INTRODUCTION

Today, one of the primary concerns relating to automobile engines is how to obtain a lower rate of fuel consumption; in fact, this has become an important subject of research.

This test report illustrates the importance of maintaining optimal conditions in the ignition system in order to enhance the engine's combustion efficiency. The way this efficiency and a lower rate of fuel consumption has been achieved is by means of a device used to increase the engine's power and improve its mileage by keeping the sparkplug's electric discharge at an optimal level.

II. SPARKPLUGS AND THE PASER 500

It is well known that the burning of fuel in the internal combustion engine is caused by an induced electric discharge from the sparkplug, which ignites the fuel and air mixture in the combustion chamber. While conventional research has focused on ways to improve this combustion, little attention has been paid to the optimal nature of the sparkplug's electric discharge. Nonetheless, the sparkplug is one of the engine's most important components. Such factors as the fuel's composition, the temperature inside the combustion chamber and the insulation of the high voltage, all affect the induction of the instant spark discharge. The high temperature at the tip of the insulation head may cause pre-ignition; likewise, the insulation of the sparkplug is hampered by the accumulation of particles between the electrodes, a condition which may also cause pre-ignition or misfiring. Because high voltage

FIG 1. The PASER 500

sparks are required, attention must be given to the sparkplug's physical conditions, in order to achieve the optimal spark. Consideration must also be given to providing higher capacity wires in the secondary circuit and to upgrading the distributor's durability to accept high voltage.

When called on, the sparkplug must be capable of providing a high voltage spark. Figure 1 illustrates the device designed to check the leakage of the secondary voltage and to provide an effective high voltage by acting as a condensor and resistor in the sparkplug's secondary circuit.

The device shown in Figure 1 is inserted between the distributor cap and the sparkplug wires. It should be noted that other devices based on similar principles have been studied and tested in commercial use; this particular device, however, represents an improvement insofar as it acts as a condensor and a resistor, and prevents the leakage of high voltage, thus increasing the engine's efficiency.

III. PURPOSE OF THE TEST

By improving the sparkplug's discharge, the device aims at producing a more favorable combustion rate, or in other words, improving the gas mileage (Km/liter). The PASER 500 was bench tested to measure its effectiveness.

IV. TEST METHOD

The test method is illustrated in Figure 2. A small gasoline engine and a dynamo-meter were used to measure and evaluate engine performance and fuel consumption, both with and without the installation of the PASER 500.

FIG. 2. The dynamo-meter and the engine used for the bench test.

Engine load tests - The engine loads were rated from 1/4 to 4/4, with respective engine rotations at each load.

FIG. 3. Close-up of the engine

FIG. 4. The fuel consumption gauge

FIG. 5. Bench test instruments and specifications

Robin EY80-2A - Air cooled - 4 cycle - 2 cylinders horizontal
Cylinder stroke: 2 - 85 mm^2 x 70 mm
Total engine stroke capacity: 794 cc
Compression ratio: 6.0
Output power: 15 Ps (18 PS)/3600r
Maximum torque: 4.2 Kg/2400 rpm
Valves: side valves
Rate of fuel consumption: 330 g/psh - 13 PS/sec

(These specifications correspond to the engine illustrated in FIG. 4)

FIG. 6. Position of measuring instruments

Measurement of high voltage discharge

Measurement of combustion chamber pressure

Measurement of sparkplug temperature

Measurement of cylinder head temperature

Measurement of exhaust temperature

Measurement of fuel consumption

Measurement of engine RPM

Measurement of engine load

V. TEST RESULTS AND EVALUATIONS

The PASER 500's test results are given in Diagrams 1 through 6. Compression figures are given in Diagrams 1 through 4, and are based on measurements obtained with and without the installation of the PASER 500.

Table 7 shows the fuel consumption rates obtained with and without the PASER 500. With the PASER installed, there was a 5.2% decrease in fuel consumption with a 1/4 engine load. For engine loads of 2/4, 3/4 and 4/4, fuel consumption decreased by 4.2, 2.67 and 3.34% respectively.

On the average, then, fuel consumption was reduced by 3.85% when the PASER 500 was installed, in comparison to other tests run without the PASER 500.

V.1. Combustion Chamber Pressure

Photographs 1 to 14 show the changes recorded in combustion chamber pressure and the measurements of the discharge voltage which resulted from the installation of the PASER 500.

By comparing the waves of the combustion chamber pressure in FIG. 7, it can be seen that the combustion chamber pressure increases sharply when the PASER is installed; on the other hand, without the PASER, the measurements of chamber combustion pressure show brisk pulsating movements prior to ignition and prior to stalling. FIG. 7 also shows the combustion chamber pressure in relation to the position of the cylinders. It confirms that pressure in the combustion chamber is higher when the engine is equiped with the PASER 500.

The waves in FIG. 7 reflect the engine's power output: note particularly the increase betwenn c and c. Also, b-c and e-f in FIG. 7 show how the valves are affected by the process of intake and exhaust and the resulting loss of working energy.

FIG. 7. Measurement of combustion chamber pressure and relation to cylinder position

VI.2. The High Voltage Discharge of the Sparkplug.

The quality of the sparkplug's high voltage discharge was an important aspect of the test.

FIG. 8 shows a comparison of the electrical discharge waves with and without the PASER 500.

FIG. 8(a) shows that when the PASER was installed, the discharge pressure dimished drastically immediately after the discharge.

FIG. 8(b) on the other hand, shows no diminishing after the discharge.

FIG. 8. Comparison of electric discharge waves

FIG. 8(a) Discharge waves with the PASER 500

FIG. 8(b) Conventional discharge wave pattern

The voltage generated shows a sharp increase at the moment of discharge, and no leakage is detected. This should provide a reliable discharge at the time of combustion and preclude mis-firing; thus, there should be no accumulation of erosions in the distributor or the mechanical contact breakers and result, therefore, in the prolonged life of the parts.

VI.3. Temperature

DIAGRAM 5 shows the effects on temperature with a full engine load (4/4). It can be seen that the PASER 500 improves temperature conditions at full engine load, as compared to the conditions observed in the absence of the PASER 500.

Because too high a temperature in the sparkplug's electrode center can cause pre-ignition, or cause the engine to knock, it is necessary to keep the electrode's temperature within the following range: $500^{\circ} < TP < 800^{\circ}C$, where TP represents the electrode center's temperature. The sparkplug's temperature was measured in the location designated by TW in FIG. 9.

The measurements obtained were then used to calculate the temperature at the electrode's center by applying the following formula:

$$TP = TW - \frac{Q}{l \times A \times \lambda}$$, where:

Q = thermal volume in a unit of time (Q Kcal/h)

l = length of thermal volume passage (cm)

λ = ratio of thermal volume passage (Kcal/mhc)

A = cross section (cm^2)

(illegible)

temperature at TW

coolant

coolant

temperature at TP

thermal volume from combustion chamber to electric (illegible)

FIG. 9. Relation between sparkplug and thermal movement.

Using the small engine's Q, l, A and λ, the formula yielded an electrode center temperature ranging from 453° to 489°C when the small test engine was equiped with the PASER 500; in other words, a temperature which would not cause overheating problems for the sparkplug.

It must be noted that the small test engine has a compression ratio of 6.0, small in comparison with the 8 to 8.5 ratio of automobile engines. This may have contributed favorably to the low temperatures observed. It was necessary, therefore, to evaluate the extent of the PASER's effect on temperature by installing it in an automobile engine with a comparatively higher output capacity, since the temperature factor is directly related to both the power output and the life of the parts.

V.4. Fuel Consumption in an Actual Run.

Based on the rates of fuel consumption obtained in the bench test, the following formula can be used in estimating the fuel consumption in an actual run. In other words, a = the distance in Km the automobile will run on one liter of fuel.

$$a = \frac{\gamma \cdot N_t \cdot 10^3}{f_i} \cdot \frac{\left(1 + \frac{\phi}{K}\right)}{\frac{G \cdot S_e + \mu_e \cdot A \cdot V_a^3}{75 \times 3.6} + \frac{5}{2.7\pi} \frac{i}{D} \left[\left(C_0 + \phi\, P_e - \Delta P_s\right) + C_1 \frac{5}{3\pi} \frac{i}{D} V\right]\left(\frac{V\pi}{1000}\right)}$$

where:

γ : Fuel ratio of 0.753 g/cm^3

N_t : Power transmission efficiency ratio of 0.9

F : Amount of fuel consumption. Taken from the measurement results as shown in the diagram, namely: 355.9 g/psh in engine at 2000 RPM with PASER, and 362.6 g/psh without the PASER 500

G : Weight of the vehicle - 1000 Kg

Se : $S_e = \mu_e + (1+\phi)\frac{b}{g}$ Run at normal speed on a smooth paved road. 0.015

μ_e : Air resistance coefficient - 0.0035

A : Area of shadow in front of car, projected by car - 1.5m^2

V_a : Velocity of air current against car

i : i = 1.0 in top gear

D : effective diameter of tire while running - 60 cm

K, Ø : K = 10.0, Ø = 0.6

Pe, Ps : Pressure loss of the intake and exhaust valves - 1.1 Kg/cm^2 and Ps = 0.1 Kg/cm^2, respectively

C_1, C_0 : Coefficient of the opening of the valve - C_1 = 0.4
C_0 = 0.8

V : Cruising speed of the car (Km/hour)

Vn : Cylinder capacity - 794 cm^2

When the above variables are computed, the formula shows that the PASER 500 extends the actual running distance by 2.2%. However, in view of the fact that Diagrams 1 through 4 show that the efficiency curves reveal an increase in power and torque against the same engine load and opening of the valve, the formula can be modified as follows, to take into account the maximum torque and engine rotations:

$$P_{meo} = (P_{meo})_{max} \left\{ 1 - \frac{(Ne - Neo)^2}{(Ne^* - Neo)(3Ne^* - Neo)} \right\}$$

where:

$(P_{meo})_{max}$ = 10 Kg/cm^2

Neo = 2700 RPM (maximum torque rotations as per Diagram 4)

Ne* = 3350 RPM (maximum rotations at the maximum engine load, Diagram 4)

Therefore,

$$k^* = \frac{a \cdot N_f \cdot P_{meo} \cdot V_n \cdot i}{D \cdot G}$$

$$Ne = \frac{5}{3\pi} \cdot \frac{i}{D} \cdot V \times 10^3$$

$$Se^* = \frac{k^*}{2\pi} - \frac{\mu_e \cdot A}{G} Va^2$$

By computing $Se^* \div Se$ from the above formulas, the actual rate of fuel consumption can also be calculated, as a complement to the earlier formula. By taking into consideration the power and torque adjustments, there is an additional improvement of 2.8% in the rate of fuel consumption, for a total improvement of about 5% when the PASER 500 is used.

It should be noted, again, that these equations are based on several hypotheses and assumptions. Also, it should be repeated that the test engine was not an automobile engine, but a smaller one. These facts must be considered in an overall evaluation.

Nonetheless, the PASER 500 can be expected to produce a 2 to 5% improvement in the rate of fuel consumption. The PASER also improves conditions, including temperature, around the sparkplug, and will prolong the life of the parts.

Diagrams and photographs

Table 7. 155

Effective of Passer 500

Engine R.P.M	with in/with out Fuel Consumption Ratio		Engine R.P.M	with in/with out Fuel Consumption Ratio	
990	91.70	(1/4)	2994	93.99	(1/4)
	93.40			95.80	
1038	93.98	(2/4)	3004	93.43	(2/4)
	91.78			96.65	
1024	99.87	(3/4)	3000	96.13	(3/4)
	99.51			96.13	
1008	94.04	(4/4)	3002	96.76	(4/4)
	94.53			97.04	
1502	96.38	(1/4)	3196	95.66	(1/4)
	96.97			94.30	
1511	94.88	(2/4)	3198	96.78	(2/4)
	95.00			97.13	
1507	95.41	(3/4)	3199	97.19	(3/4)
	96.04			96.86	
1492	96.07	(4/4)	3201	96.54	(4/4)
	95.33			96.85	
2003	92.20	(1/4)	3526	104.01	(1/4)
	91.28			103.06	
2004	97.42	(2/4)	3496	97.74	(2/4)
	96.80			96.98	
1999	97.13	(3/4)	3490	96.75	(3/4)
	96.62			96.75	
1999	96.30	(4/4)	3499	97.80	(4/4)
	97.37			98.45	
2497	97.55	(1/4)			
	98.41				
2506	96.78	(2/4)			
	95.89				
2513	98.91	(3/4)			
	99.28				
2496	99.52	(4/4)			
	96.60				

* ( ) Engine load ratio

Fig 1. Engine Performance Curve

Test Condition ; Engine load 4/4

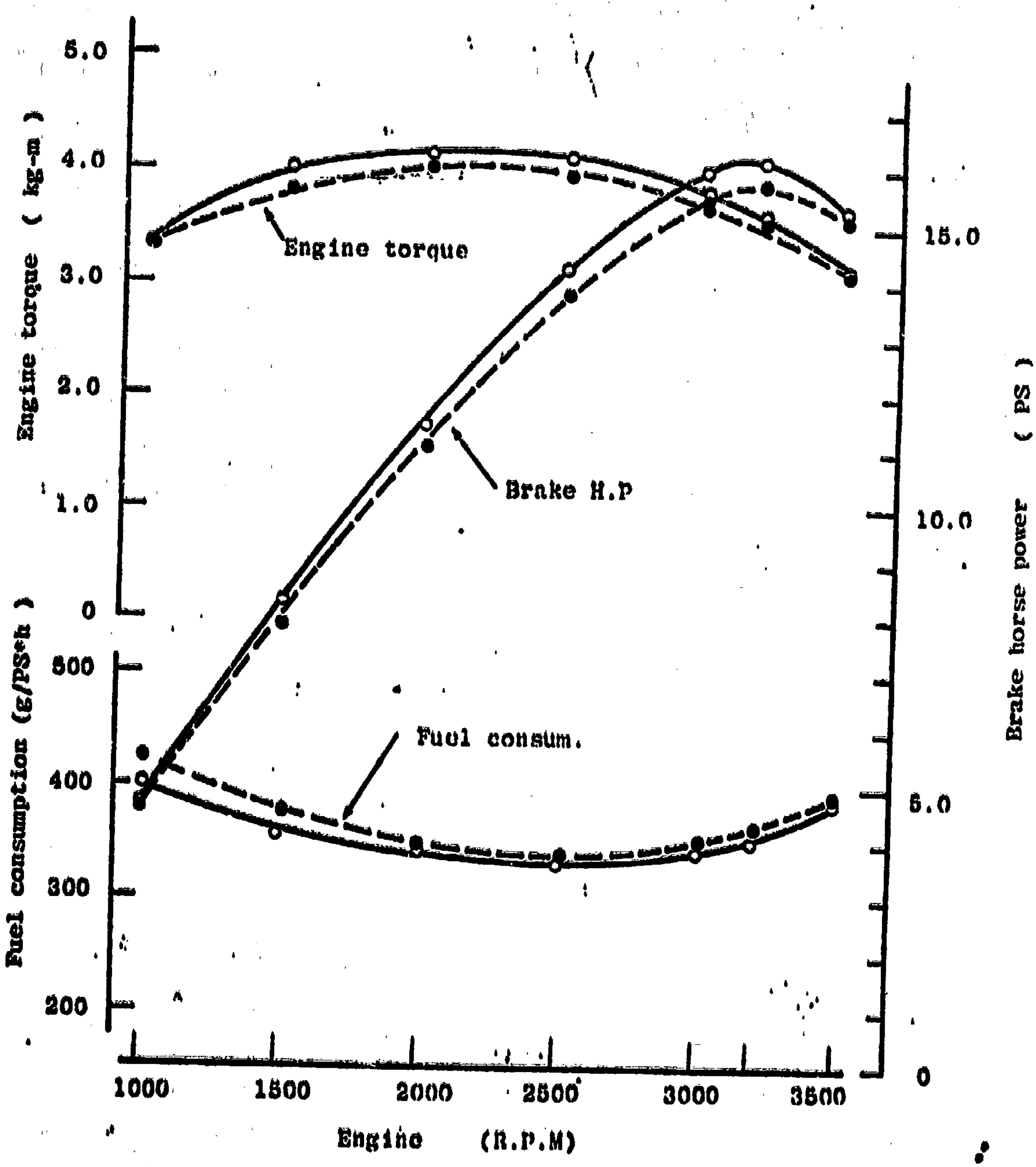


Fig 2 Engine performance curve

Test condition ; Engine load 3/4

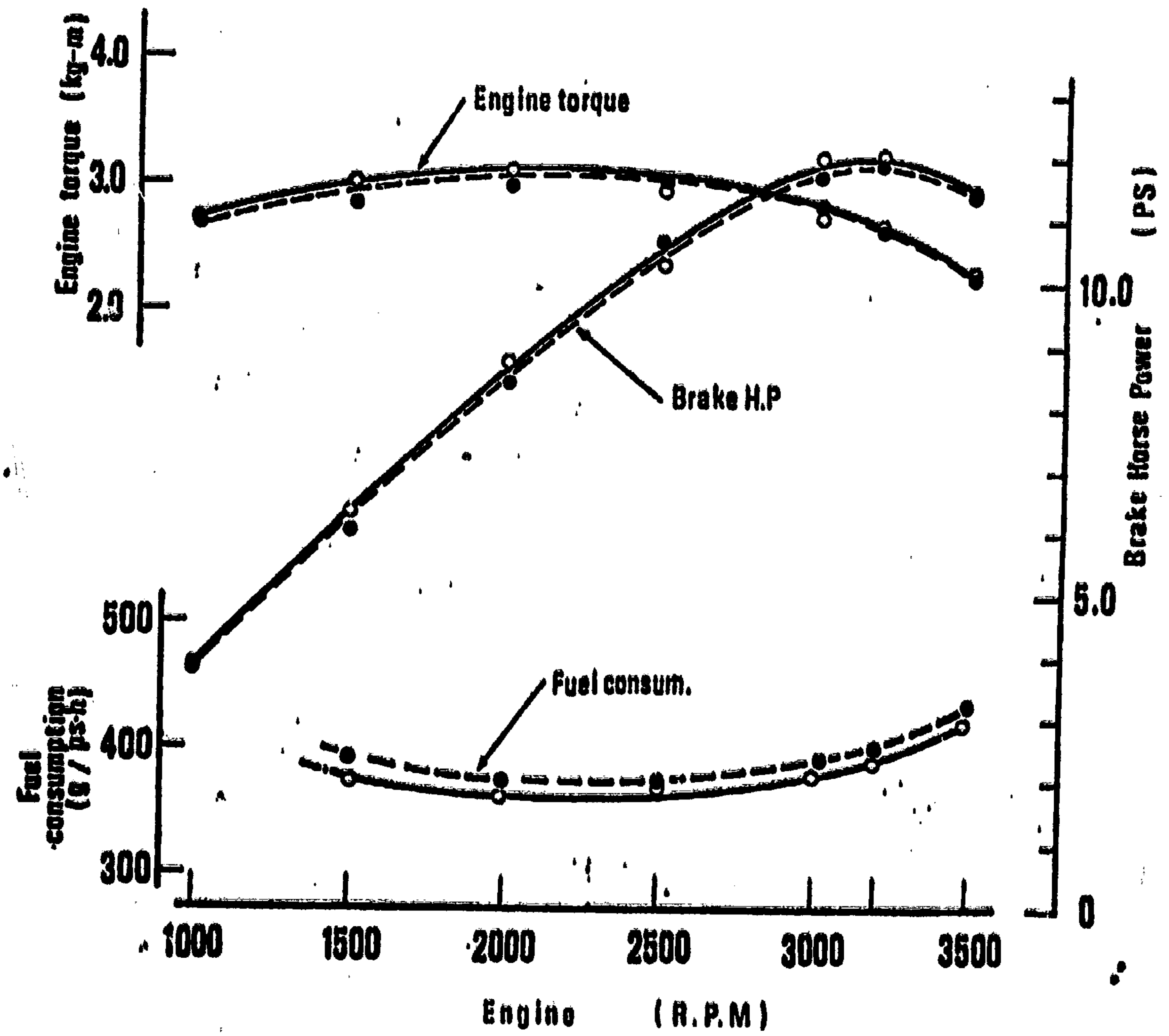
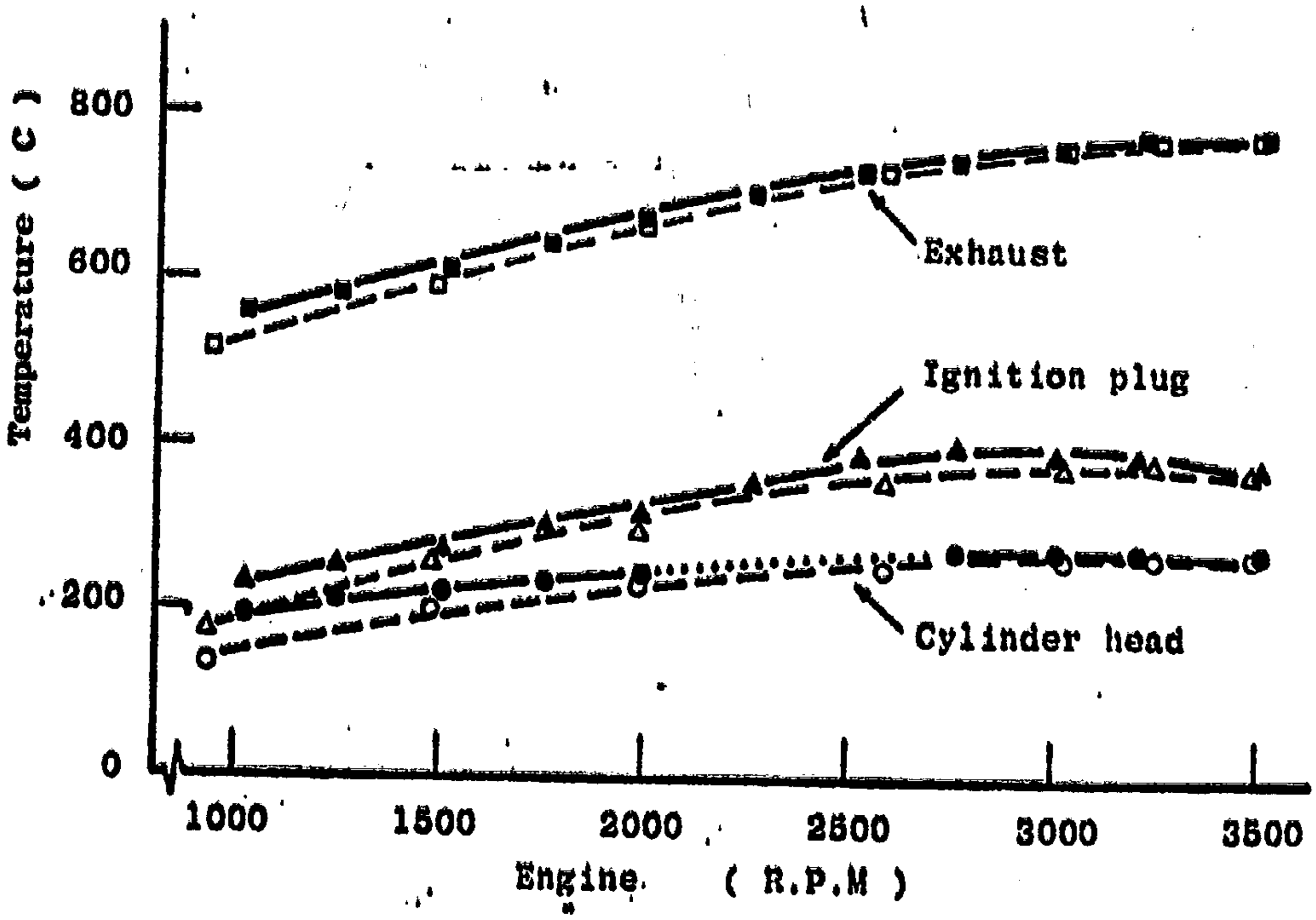


Fig 5. Temperature Characteristic

Test condition ; Engine load 4/4
2 Cylinder Paser 500



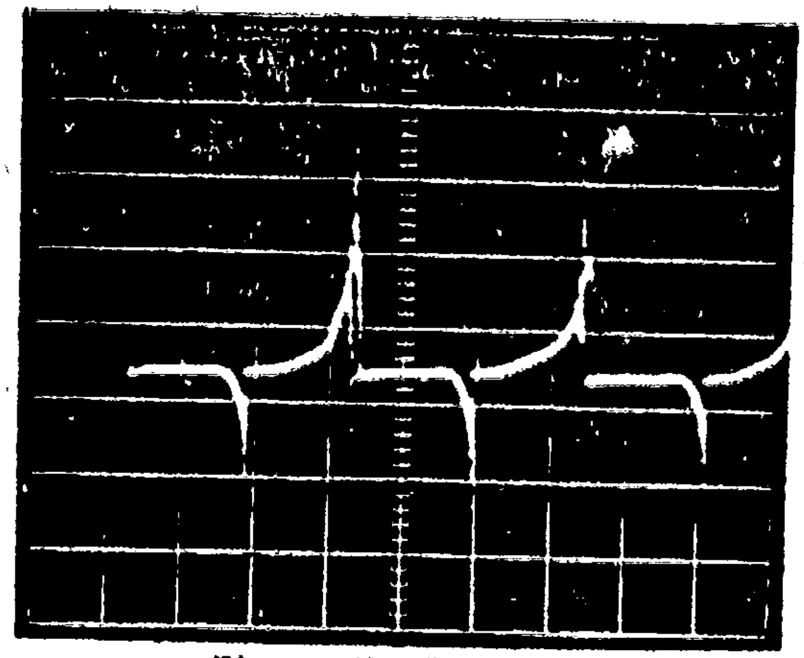


Photo No.1
Engine R.P.M 1008
Ignition Spark Volt

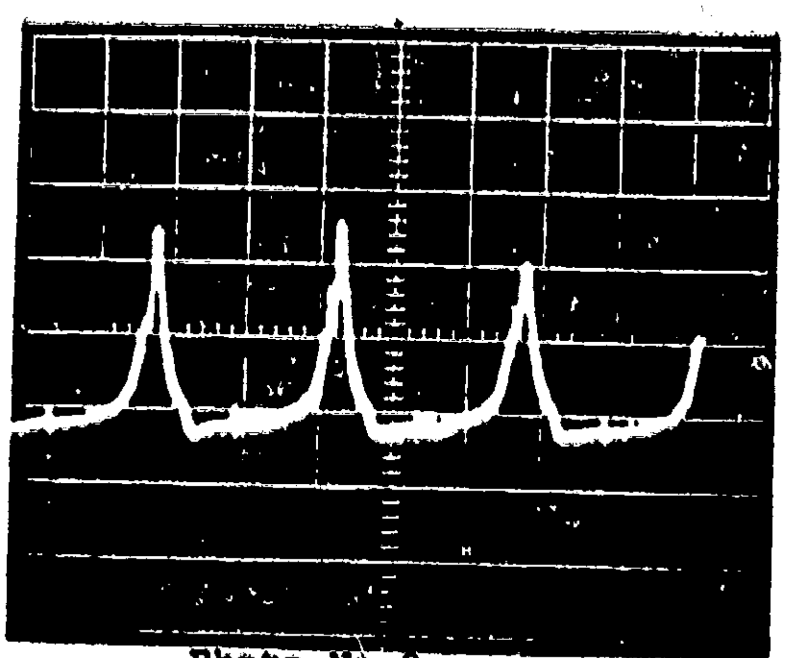
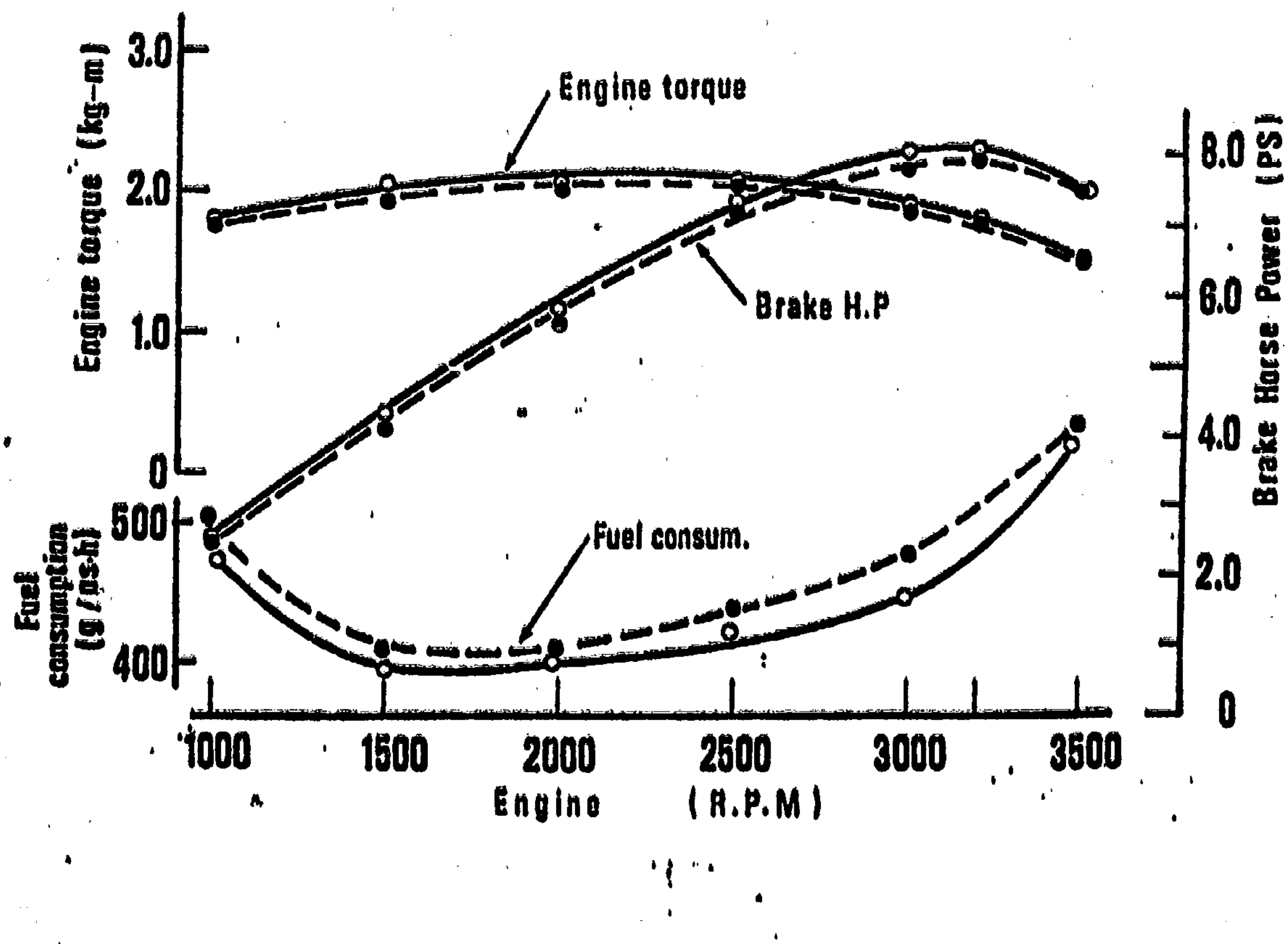


Photo No.2
Engine R.P.M 1008
Indicater diagram

Fig 3. Engine Performance Curve

Test date 1980.4.28 to 5.1
Test condition;Engine load 2/4



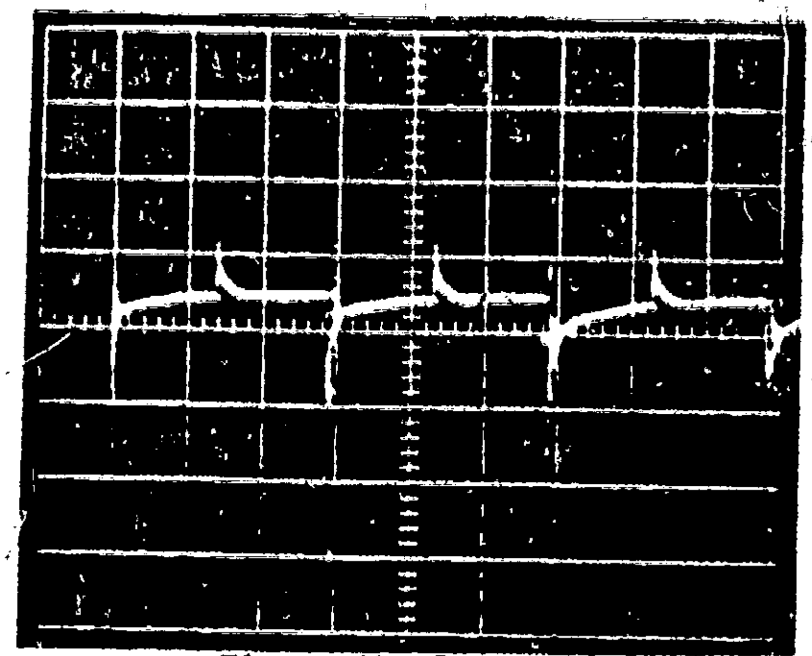


Photo No.3
Engine R.P.M 1024
Ignition Spark Volt

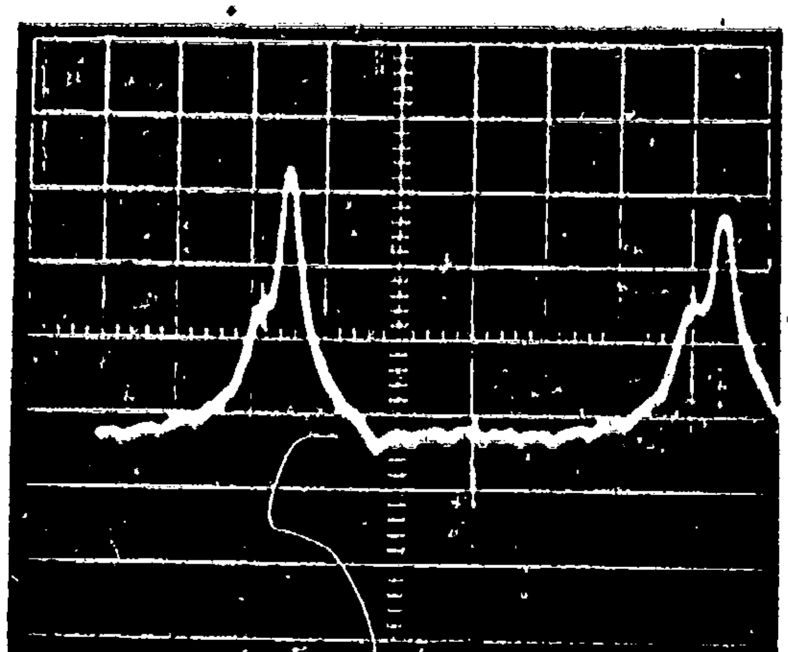


Photo No.4
Engine R.P.M 1024
Indicater diagram

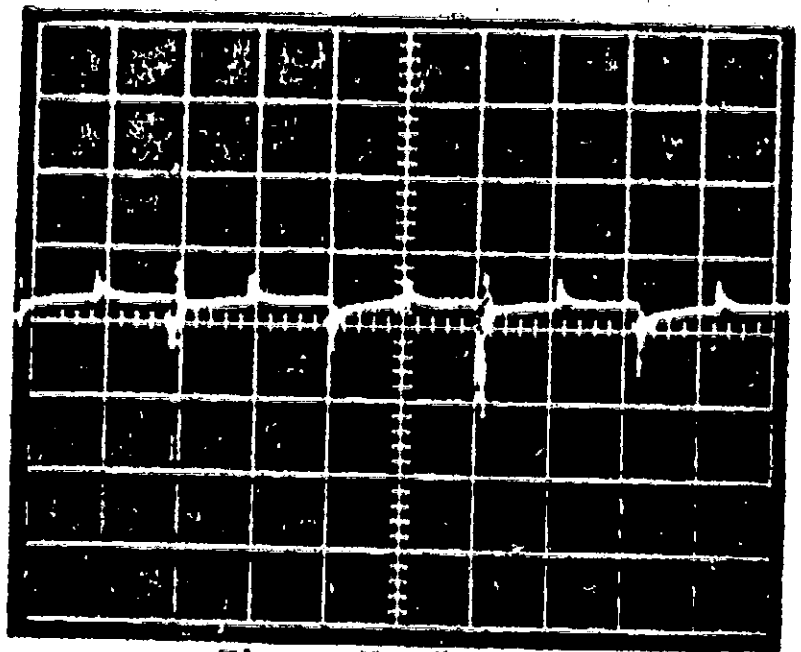


Photo No.5
Engine R.P.M 1492
Ignition Spark Volt

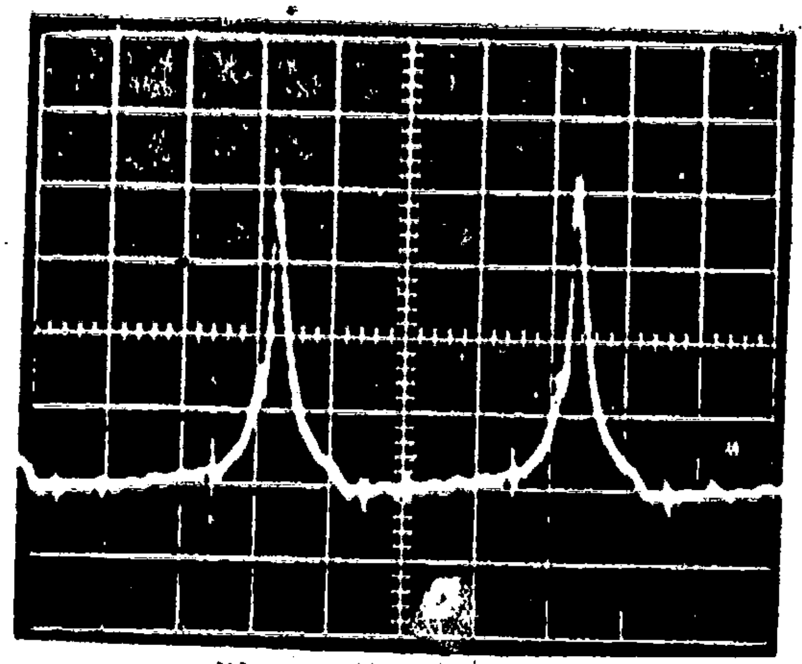


Photo No.6
Engine R.P.M 1492
Indicater diagram

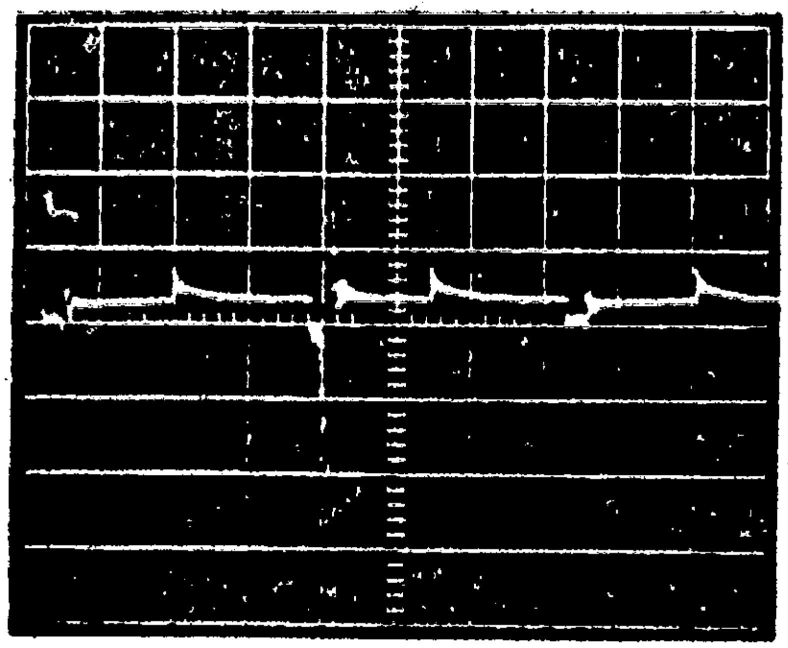


Photo No.7
Engine R.P.M 3499
Ignition Spark Volt

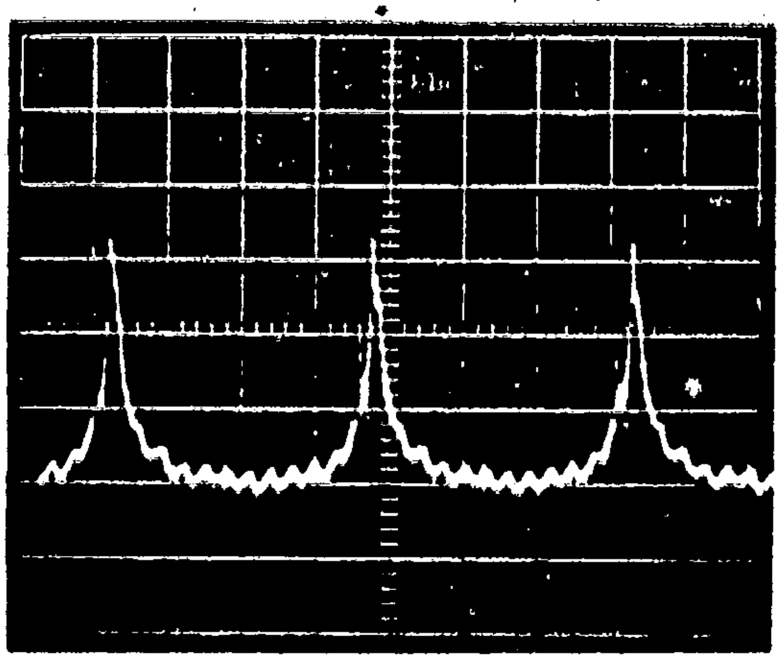


Photo No.8
Engine R.P.M 3499
Indicater diagram

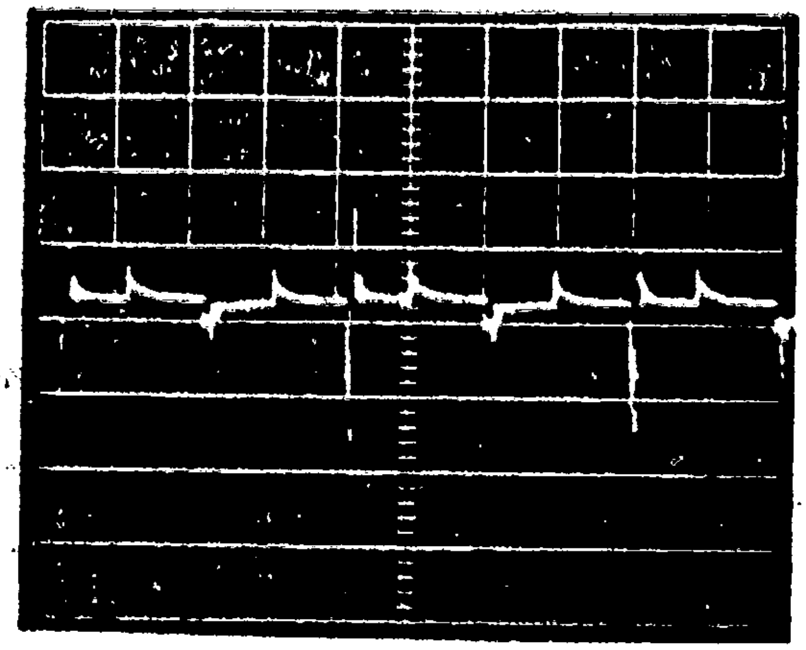


Photo No.9
Engine R.P.M 3201
Ignition Spark Volt

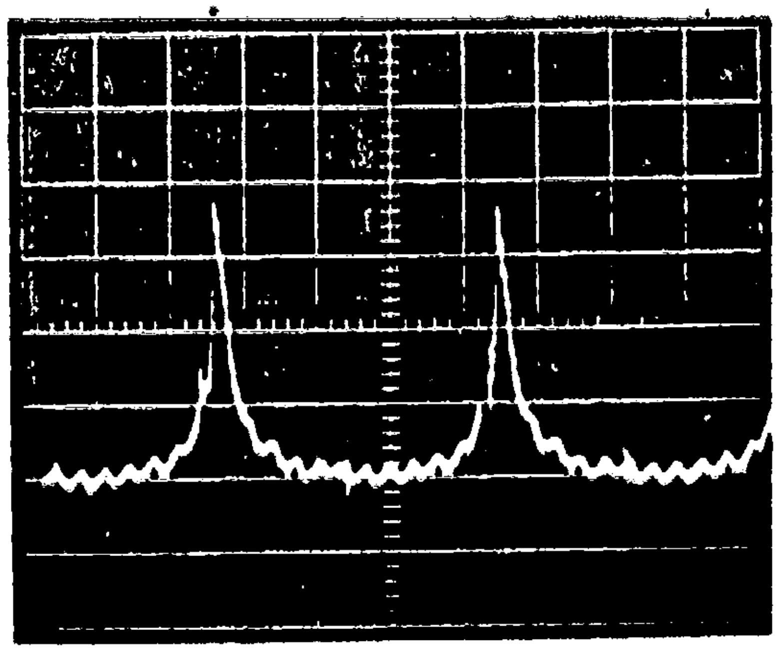


Photo No. 10
Engine R.P.M 3201
Ingicater diagram

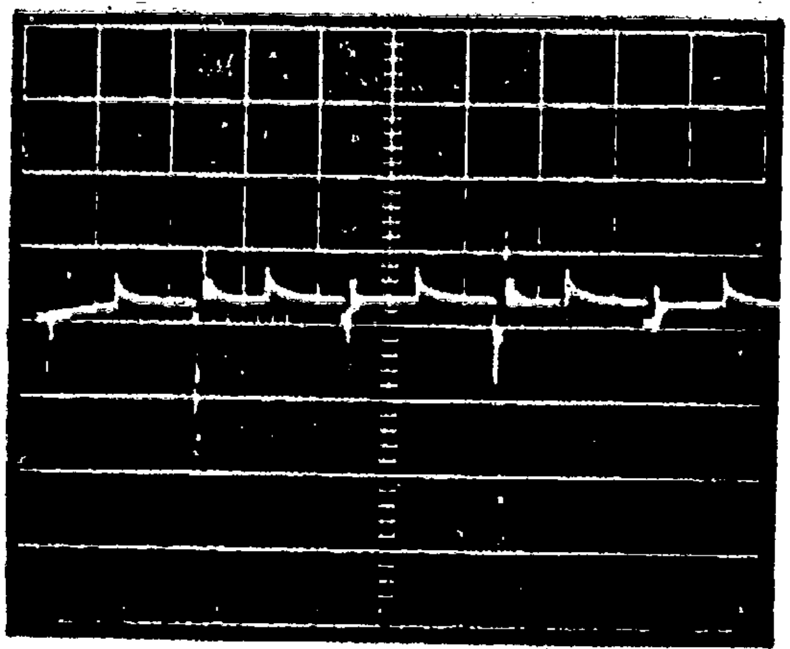


Photo No.11
Engine R.P.M 3002
Ignition Spark Volt

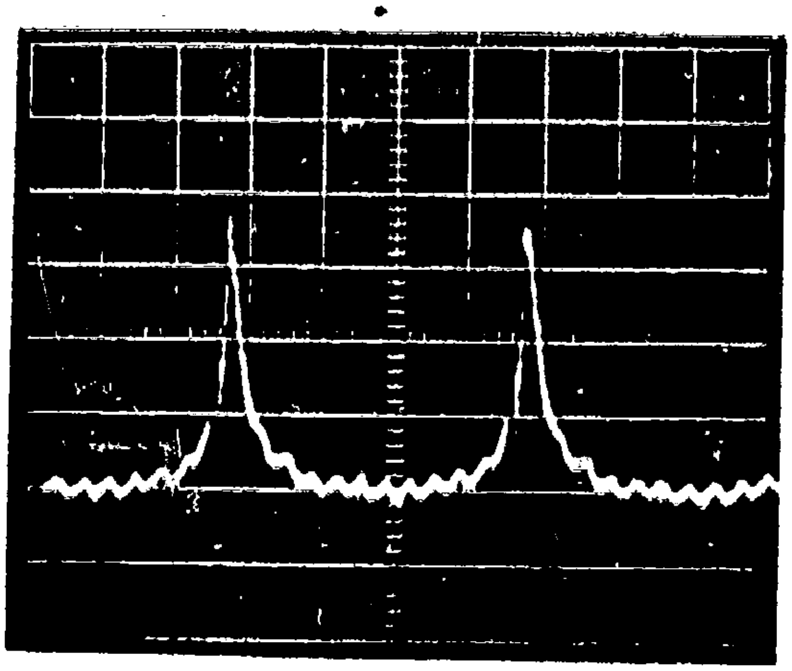


Photo No.12
Engine R.P.M 3002
Indicater diagram

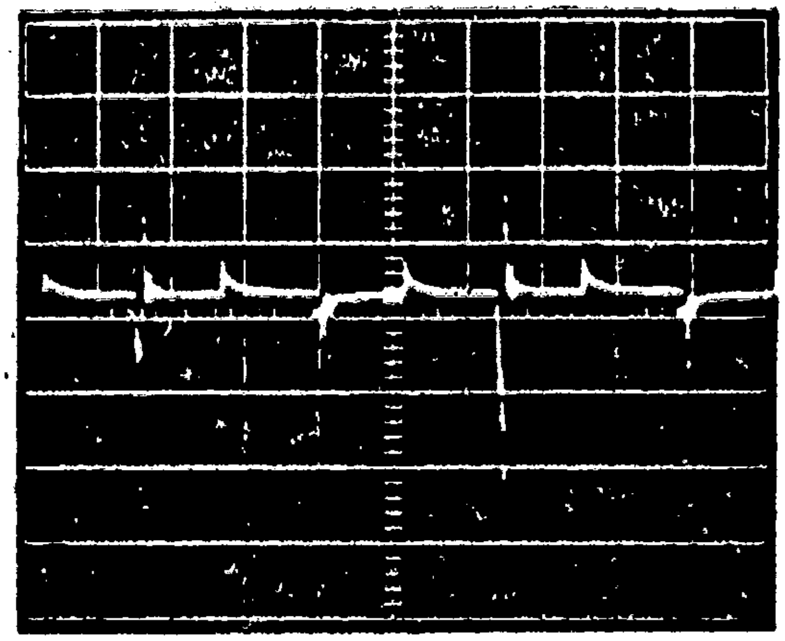


Photo No. 13
Engine R.P.M 2497
Ignition Spark Volt

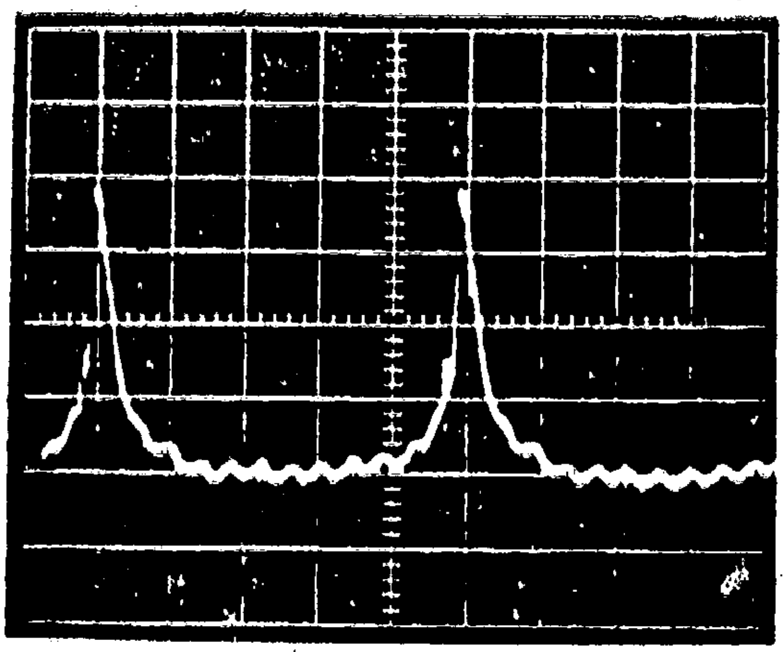


Photo No. 14
Engine R.P.M 2497
Indicater diagram

W H A T D O T H E J A P A N E S E K N O W ,

T H A T W E A R E J U S T S T A R T I N G

T O L E A R N ? ? ? ?

T H E M A G A Z I N E " A U T O M E C H A N I C "

I S T H E A U T O M O T I V E B I B L E

O F J A P A N

This Magazine tested the Paser 500 and six other fuel-saving devices. It compared acceleration and mileage improvement of the seven devices.

THE PASER 500 WAS RATED T O P S !

The following pages show the report in Japanese, followed by an English translation.

TRANSLATION OF ARTICLE IN THE APRIL 1980 ISSUE OF "AUTO MECHANIC" MAGAZINE OF JAPAN, SHOWING THE RESULTS OF TESTS PERFORMED ON THE PASER 500 AND SIX OTHER FUEL-SAVING DEVICES.

PASER 500

THE THEORY BEHIND THE PASER 500

The mechanism's construction is quite simple. Induction sleeves equal in number to the cylinders, and similar in shape to the distributor cap terminals, are attached in series on a lead wire. This lead wire and the secondary circuit of the ignition system are electrically insulated.

The composition of the lead wire is not known to us; however, we counted 65 strands of wire, each having a diameter of 0.1 mm.

This is the second test this Magazine has run on the Paser. Compared with the subject of our first test, the new model shows an improvement in the shape of the lower connector. Otherwise, there seem to be no changes.

The theory behind the Paser 500 is rather difficult for the amateur to understand. What follows is the gist of the Owner's Manual:

The Paser 500 taps a source of induced electricity occuring in the secondary circuit of the ignition system. The build-in mechanism of the Paser directs this energy through the secondary circuit to the spark plug and into the fuel and air mixture by means of electro-magnetic induction (the phenomenon is known as "corona discharge").

Unlike other devices which boost the voltage of the ignition system, the Paser 500 does not alter the amount of electricity produced by the ignition system; rather, it is merely a device which ionizes the fuel and air mixture to enhance combustion. The mechanism itself, therefore, does not wear out and does not produce any effects on the ignition system.

A SIMPLE INSTALLATION PROCEDURE

Unplug the spark plug wire from the distributor cap. After attaching the Paser to the cap, connect the spark plug wire to the Paser 500. Listen for the click to insure that the Paser is properly plugged in. Do not force it by twisting if you find it difficult to plug in.

The effect on performance is noticeable immediately after installation. Best performance is obtained after a run of about 1,600 Km. the reason being that this much operation is required to completely remove carbon accumulation inside the combustion chamber. Since this carbon accumula-

"AUTO MECHANIC" TRANSLATION, PAGE 2.

tion will dissolve into the lubrication system, the manufacturer recommends changing oil and oil filters after 1,600 Km. Subsequently, the combustion chamber will remain clean and it will not be necessary to change the oil as often as before.

Due to time constraints, this Magazine conducted its tests immediately after installation, measuring fuel cost and the Paser's effect on acceleration.

The manufacturer also recommends that the plugs be gapped an additional 1mm or so, in order to obtain more effective results; this, however , was not done in our tests, in order to maintain uniform test conditions.

WHAT RESULTS WERE OBTAINED

At idle speed the fuel consumption time for 50cc was 4 minutes, 30.8 seconds, or an improvement of 27.4 seconds. At an average speed of 40 Km/hour, the engine showed a mileage of 16.9 Km/liter. At a speed of 80 Km/hour, mileage was 14.5 Km/liter.

In our acceleration tests, the Paser reduced the time required to accelerate from 20 to 60 Km/hour by 0.2 seconds. In accelerating from 60 to 100 Km/hour, the improvement was 0.5 seconds.

The ionization voltage at idle speed was as low as 8.96KV, which is probably due to the improved combustion resulting from ionization.

ELECTRICALLY CONTROLLED COMBUSTION EFFICIENCY

The Magazine posed the following question to Nihon Paser, the Japanese distributor:

"How is combustion efficiency improved by merely attaching the Paser 500 to the spark plug wires?"

Answer: "As you can see, the Paser 500 induction sleeves are connected by a wire. When any spark plug fires, static electricity created by the flow of current through the spark plug wire travels through the interconnecting wire to the other cylinders. In a way, the Paser 500 acts as a condensor.

This low intensity electrical discharge into the non-firing cylinders, ionizes the fuel/air mixture prior to ignition. Thus the fuel particles become negatively ionized. These ionized particles repel each other vigorously, thereby making combustion more complete.

This corona energy is discharged into the cylinders during all strokes of the firing cycle. It causes the carbon accumulated in the combustion chambers to become ionized. Just as the ionized fuel and air particles combust more readily, so the ionized carbon deposits react and erode from the combustion chamber, some of it collecting in the oil. The engine is thus cleansed, further insuring more complete combustion.

"AUTO MECHANIC" TRANSLATION, PAGE 3.

For this reason, the engine oil will become rather dirty after a run of about 1,600 Km or 90 days after initial installation of the Paser 500 . Once the dirty oil is changed, there will be less carbon build-up, be - cause of more complete combustion, and the oil will remain clean longer.

IDLE ADJUSTMENT IS IMPORTANT

A Paser 500 was installed on a CORSER (a car model). As has been mentioned before, the installation procedure is simple.

Disconnect a spark plug wire from the distributor. Connect the Paser into the distributor, then plug the spark plug wire into the Paser. In the case of the CORSER, the spark plug wire is rather short and some maneuvering was necessary in plugging the spark plug wire into the Paser once the Paser was installed.

One important point to remember is that the idle speed will increase due to improved combustion efficiency of the ionized gas mixture. When the idle speed increases, it should be reduced to normal.

The Owner's Manual suggests adjusting the idle speed after 1,600 Km. However, due to the time constraints in our test, the idle speed was adjusted after 120 Km to 600 rpm, after increasing from a normal of 700 rpm to a high of 900 rpm.

TEST RUN FROM MANAZURU TO TOKYO

No unusual acceleration response was evident. Fuel consumption was 17.38 Km/liter, or an improvement of out 5.4%. On the highway, mileage increased 11.8%. The engine ran more smoothly, and acceleration was quicker. Fuel economy on congested roads was one of our primary concerns. "Stop and goes" were repeated on busy streets, which means increased idling and increased fuel consumption. The Paser 500 increased mileage by 7.9%

FIGURE 1.

A. Details of the Paser 500
B. Insert the spark plug wire
C. Lead wire
D. Metal ring
E. Rubber ring
F. Lower connector
G. Plug into the distributor cap
H. (Lead wire is secured)

FIGURE 2.

Tests / Model	Average Acceleration Time (Seconds)		Voltage	RPM at which engine stalled
	2nd gear 20 to 40	4th gear 60 to 100		
Normal	4.5	10.6	9.10	330
Paser 500	4.3	10.1	8.96	310

FIGURE 3.

Tests / Model	Fuel Consumption at Idle: Time/50 cc	Steady speed (40 Km/hr)			Steady speed (60 Km/hr)		
		Consumption Km/liter	Vacuum Pressure	Cruising Time	Consumption Km/liter	Vacuum Pressure	Cruising Time
Normal	4 min. 3 sec.	15.6	420 mmHg	2:20:05	13.5	370 mmHg	1:01:07
Paser 500	4 min. 30 sec.	16.9	435 mmHg	2:32:06	14.5	380 mmHg	1:06:06

RAC

THE ROYAL AUTOMOBILE CLUB

REPORT ON TRIAL NO.890

(Under the Code Sportif of the FIA and the General Competition Rules of the RAC)

PASER MAGNUM FUEL ECONOMISER

MAY 1974

Entrant - William James Jones, 4A Ongar Road, Fulham, London SW6 1RJ. Phone (385.1824)

Object of Trial - The object of the trial, as declared by the entrant, was to test the claim that a saving of fuel is made when the Paser Magnum Economiser is fitted.

Trail No. 890 cont.

Description of Device Submitted for Trail

The Paser Magnum is described as an electronic anti-pollution engine economiser which, the manufacturers claim, increases the combustion efficiency of the internal combustion engine. The device is similar in appearance to a radio supressor and is fitted to the high tension leads in a similar manner, one to each cylinder at some point between the distributor and the spark plug. Standard method of fitment recommended by manufacturers is directly into the distributor cap.

No information of a technical nature is available to indicate how the device functions or to explain the theory of operation. Manufacturer's literature, however, places emphasis on the claim that it is not a voltage booster or a spark intensifier.

Description of Car -

Model	Ford Cortina 1300 L MK. III
Registration Number	UYN 11M
Type of body	Saloon
Number of Cylinders	4
Bore and Stroke	81mm x 63mm
Cubic Capacity	1298cc
Unladen Weight	2084 lb (946kg)
Weight Carried	490 lb (222kg)
Total Running Weight	2574 lb (1168 kg)
Grade of Fuel Used	3 Star

Description of Trial - Two comparative test runs were carried out over a route of approximately 90 miles distance, (144.84km) embracing a combination of urban, rural and trunk road driving conditions. The vehicle was driven in a normal manner, within prevailing speed limits, and was not permitted to coast down hills.

cont/...

Trial No.890 cont.

Results of Trial -

1. In Standard Condition

Average Speed	27.90 mph	(44.89kph)
Fuel Consumption	29.47 mph	(10.43kpl)

2. With Paser Magnum Economiser Fitted

Average Speed	29.30 mph	(47.14kph)
Fuel Consumption	32.79 mph	(11.61kpl)

Improvement with economiser fitted 11.27%

Throughout the whole period of the trial the vehicle was under the continual surveillance of an official RAC Observer.

L. Webb, O.B.E., C.Eng., M.I.Mech.E
Chief Engineer

Ref: ET/LW/OF/7.5.74

SOUTHERN METHODIST UNIVERSITY

INSTITUTE OF TECHNOLOGY
THERMAL AND FLUID SCIENCES CENTER
DALLAS, TEXAS 75222

12 April 1973

Mr. Eugene Irvin, Jr.
Amerimex Industries, Inc.
P.O. Box 11125
Dallas, Texas 75223

Dear Mr. Irvin:

Attached are my comments on the results of performance tests with the Paser 500, including those tests conducted by a commercial laboratory as well as those which I personally observed.

My comments as an individual, but not as a representative of Southern Methodist University, may be quoted so long as the context of each statement is preserved.

Sincerely,

Carlos W. Coon, Jr., Ph.D.,P.E.
Associate Professor

CWC/bh

Mr. Eugene Irvin, Jr.
Amerimex Industries, Inc.
P.O. Box 11125
Dallas, Texas 75223

12 April 1973

Dear Mr. Irvin:

I would like to take this opportunity to summarize the results of my examination of several perforamance tests conducted with the Paser 500.

I have examined the comprehensive report submitted to you by General Testing Laboratories of Springfield, Virginia. The test report may be analyzed in two parts, since both stationary engine tests and road tests were performed.

During the stationary engine test runs for which the type of fuel and the ignition timing were consistent, the data indicate that lower values of brake specific fuel consumption were measured. In general, low values of specific fuel consumption indicate that less fuel is being used for the same power output; results of this type are quite desirable. In addition, the exhaust emission data for the same sequence of stationary engine test runs indicate that lower concentrations of carbon monoxide and unburned hydrocarbons were observed when the Paser 500 was installed.

The road test sequence, during which exhaust emissions were measured according to the Federal Test Procedure for each of four vehicles, is also documented in the report. The data in this case are not conclusive, since the vehicles appeared to respond differently to installation of the Paser 500. The results are generally favorable, and further testing in this area should be encouraged. It appears that some engine operation or device installation variables have an as yet undetermined effect on the overall performance.

In addition to the review of the above mentioned test report, I have also had an opportunity to observe performance tests conducted on a chassis dynamometer. The dynamometer was equipped for measurement of road speed and road horsepower; additional equipment was provided for measurement of the time required for consumption of a given mass of fuel, the engine speed, the manifold vacuum, the temperature of the air entering the engine, the fuel temperature, the atmospheric humidity, the air-fuel ratio, the exhaust hydrocarbon concentration, and the exhaust carbon monoxide concentration. The test vehicle was a 1968 Buick Skylark equipped with a 400 cubic inch engine and a four barrel carburetor. Two pairs of test runs were conducted. All runs were conducted at a road speed of 50 miles per hour; runs with and without the Paser 500 were conducted at manifold vacuum levels of 12 and 15 inches of mercury.

Mr. Eugene Irvin, Jr., 12 April 1973, page 2

The horsepower and fuel consumption measurements indicated that the installation of the Paser 500 resulted in reduced specific fuel consumption. This implies improved overall engine performance, which may be manifested as better gas mileage or increased power output.

Measurements of the concentration of carbon monoxide and hydrocarbons in the exhaust were f the same magnitude as the instrument uncertainty, therefore the numerical values are not reliable. Qualitatively, however it was observed that the concentrations decreased as a result of the installation of the Paser 500.

My impression, as a result of examination of the test results and personal observations, is that the Paser 500 does have a favorable effect on overall engine performance. These effects manifest themselves in varying ways and to different degrees on different vehicles, but one or more of the following results can usually be expected: (1) increased power output, (2) increased fuel economy, (3) reduced emissions of unburned hydrocarbons and carbon monoxide. My investigation indicates that the Paser 500 does show promise as an accessory for enhanced engine performance or economy. I would encourage you to continue with your testing program in an effort to quantify the effects and certify the device.

Sincerely,

Carlos W. Coon, Jr.

Carlos W. Coon, Jr., Ph.D., P.E.
Associate Professor

CWC/bh

BOYCE & HUGHES
ENGINEERING ASSOCIATES
P.O. DRAWER BA
COLLEGE STATION, TEXAS 77840

M.P. BOYCE, Ph.D., P.E.
TEL. 713-846-3704

J.M. HUGHES, Ph.D., P.E.
TEL. 713-846-8298

April 11, 1973

Mr. Eugene Irvin, President
Amerimex Industries, Inc.
P. O. Box 11125
Dallas, Texas 75223

Dear Mr. Irvin:

Congratulations on the exciting performance of the PASER 500 during chassis dynamometer tests during my recent visit to Dallas. The data taken during the tests showed a significant maximum horsepower increase when we installed the PASER 500. Calculations with the data revealed that the percentage road horsepower increase with the PASER was essentially the same as the percentage reduction in fuel consumption. In other words, the PASER 500 has the capability of extracting more energy from less fuel.

The maximum horsepower delivered with a PASER 500 installed was 138 which compared favorably with the 128 horsepower delivered without the PASER. This represents an increase of 8%. Another way to look at this is that a smaller engine equipped with a PASER 500 can produce the same performance from a car as a larger engine without the PASER. Since it is well known that cars with smaller engines get better gas mileage, this is a case where one can have his power from that added by a PASER and thoroughly enjoy it by not having to stop to buy gasoline so often.

Even though additional tests using your 1973 PASER would give us additional engineering results, the information now available is sufficient to motivate me to try to come up with a way to use two PASERS on my cars instead of one.

Sincerely,

J. Martin Hughes, Ph. D., P. E.
Director of Engineering

JMH:jh

(DR. HUGHES IS A PROFESSOR OF ENGINEERING AT TEXAS A & M UNIVERSITY)

WAYLAND BAPTIST COLLEGE

Plainview, Texas 79072

Department of Chemistry

May 30, 1972

Ameri-Kox Industries, Inc.
Box 11125
Dallas, Texas 75223

Sirs:

I certify that samples of exhaust gas from a 1966 Chrysler New Yorker 8-cylinder automobile showed the following results (all sampling and testing done by me according to standard methods):

Samples of Exhaust Gas:	Before "Paser 500" Installed	After "Paser 500" Installed
Hydrocarbons	0.18% (by weight)	0.06% (by weight)
Carbon Monoxide	0.30% (by weight)	0.04% (by weight)

I certify that samples of exhaust gas from a 1971 Chevrolet Impala automobile showed the following results (all sampling and testing done by me according to standard methods):

Sample of Exhaust Gas:	Before "Paser 500" Installed	After "Paser 500" Installed
Hydrocarbons	0.19%(By weight)	0.10% (by weight)
Carbon Monoxide	0.17% (by weight)	0.05% (by weight)

My research shows that the installation of "Paser 500" leads to a considerable reduction in the amount of hydrocarbons and carbon monoxide in exhaust gas from automobiles.

Yours very truly,

James O. Cox, Jr.

James O. Cox, Jr.,
B.S., M.S., Ph.D., LL.B.,
Professor of Chemistry

(DR. COX SERVED AS A PROFESSOR CHEMISTRY AT THE U.S. NAVAL ACADEMY, ANNAPOLIS, MARYLAND FOR FIVE YEARS)