

In the Matter of

**CERTAIN INCLINED-FIELD  
ACCELERATION TUBES AND  
COMPONENTS THEREOF**

Investigation No. 337-TA-67

USITC PUBLICATION 1119

DECEMBER 1980

United States International Trade Commission / Washington, D.C. 20436



# UNITED STATES INTERNATIONAL TRADE COMMISSION

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Investigation No. 337-TA-67

COMMISSION ACTION AND ORDER

Introduction

The U.S. International Trade Commission conducted investigation No. 337-TA-67, pursuant to section 337 of the Tariff Act of 1930 (19 U.S.C. 1337), of alleged unfair methods of competition and unfair acts in the unauthorized importation and sale of inclined-field acceleration tubes and components thereof. On December 16, 1980, the Commission unanimously determined that there was a violation of the statute in the importation or sale of certain inclined-field acceleration tubes and components thereof that infringe claims 2-6 of U.S. Letters Patent 3,308,323 and that an exclusion order is the appropriate remedy. The Commission unanimously determined, however, that the public interest factors enumerated in subsection 337(d) of the statute preclude the imposition of a remedy.

Action

Having reviewed the record in this matter, the Commission has determined that--

1. There is a violation of section 337 of the Tariff Act of 1930 in the importation and sale of certain inclined-field acceleration tubes and components thereof that infringe claims 2-6 of U.S. Letters Patent 3,308,323, the effect or tendency of which is to destroy or substantially injure an industry, efficiently and economically operated, in the United States; and

2. Issuance of an exclusion order pursuant to subsection 337(d) of the Tariff Act of 1930 prohibiting the importation of certain inclined-field acceleration tubes made in accordance with claims 2-6 of U.S. Letters Patent 3,308,323 during the life of the patent, except under license, is the appropriate remedy for the violation of section 337; but

3. The effect of a remedy upon the public health and welfare, competitive conditions in the U.S. economy, the production of like or directly competitive articles in the United States, and U.S. consumers precludes the issuance of an exclusion order or a cease-and-desist order pursuant to subsection 337(d) of the Tariff Act of 1930.

#### Order

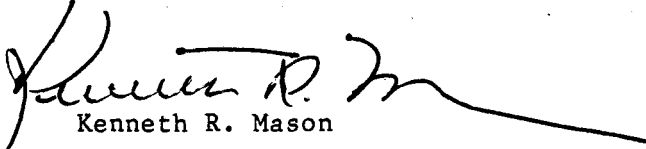
Accordingly, it is hereby ORDERED THAT--

1. Investigation No. 337-TA-67 is terminated as to all issues and all respondents;

2. The Secretary shall serve this Action and Order and the Commission Opinion upon each party of record in this investigation, and upon the U.S. Department of Health and Human Services, the U.S. Department of Justice, the Federal Trade Commission, and the U.S. Customs Service; and

3. The Secretary shall publish notice of this Action and Order in the Federal Register.

By order of the Commission.



Kenneth R. Mason

Secretary

Issued: December 29, 1980





UNITED STATES INTERNATIONAL TRADE COMMISSION  
Washington, D.C. 20436

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Investigation No. 337-TA-67

CERTAIN INCLINED-FIELD ACCELERATION )  
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COMMISSION OPINION

I. Procedural History

On May 17, 1979, complainant High Voltage Engineering Corp. (HVEC), a Massachusetts corporation, filed a complaint with the U.S. International Trade Commission alleging violation of section 337 of the Tariff Act of 1930, 19 U.S.C. 1337. The complaint was amended on June 20, 1979.

The Commission issued a notice of investigation, 44 F.R. 37567 (June 27, 1979), ordering that an investigation be instituted under section 337 to determine whether there is a violation of section 337(a) in the unlawful importation of certain inclined-field particle acceleration tubes and components thereof into the United States, or in their sale, because of the alleged infringement of claims 1-6 of U.S. Letters Patent 3,308,323 (hereinafter referred to as the '323 patent), the effect or tendency of which is substantially to injure an efficiently and economically operated domestic industry.

Five respondents were named: Dowlsh Developments Ltd., a British corporation that makes acceleration tubes, Peabody Scientific, the University of Rochester, the University of Pittsburgh, and the State University of New

York at Stony Brook. Peabody Scientific is the U.S. distributor for Dowlish. The three universities are purchasers of Dowlish acceleration tubes.

Dowlish filed a motion for summary determination of noninfringement which was approved and certified to the Commission on January 10, 1980. On May 6, 1980, the Commission denied the motion, remanded the investigation to the administrative law judge on all issues, and designated the investigation "more complicated" within the meaning of 19 U.S.C. 1337(b)(1). The statutory deadline for completion of the investigation was thus extended to December 27, 1980.

The Commission denied Dowlish's motion for reconsideration. Counsel for Dowlish withdrew on June 13, 1980. Although Dowlish was not represented by counsel at the hearing, one of the attorneys formerly representing Dowlish, Thomas J. Engellenner, filed a posthearing brief. On June 24, 1980, the Commission dismissed the University of Rochester as respondent and on August 13, 1980, dismissed the University of Pittsburgh.

The hearing was completed on July 19, 1980, and briefs were filed. The ALJ certified her recommended determination to the Commission on September 5, 1980. The investigative attorney filed exceptions to the recommended determination. Complainant and the investigative attorney filed written submissions on violation and the issues of relief, bonding, and the public interest. Written submissions on the public interest issue were filed by Brookhaven National Laboratory and Yale University in favor of complainant and Los Alamos Scientific Laboratory, the University of Rochester, the State University of New York at Stony Brook, and a research physicist at the

University of Pittsburgh in favor of respondent. No public interest statements were received from the government agencies that had been notified of the investigation, but the National Science Foundation, an independent government agency, filed a statement opposing exclusion of the Dowlish tubes.

Oral argument before the Commission took place on November 25, 1980, for two purposes: First, the Commission heard argument by complainant and the Commission investigative attorney on the presiding officer's recommendation. Second, the Commission heard presentations concerning appropriate relief, bonding, and the public interest. Complainant and the investigative attorney were joined by an assistant attorney general for the State of New York who made a public interest presentation on behalf of respondent State University of New York at Stony Brook. Complainant and the investigative attorney filed postargument submissions in response to questions raised by Commissioners and staff.

## II. Violation

Having considered the record, including the presiding officer's recommended determination, the transcript of the oral argument before the Commission, and written submissions, we determine that there is a violation of section 337 in the importation and sale in the United States of certain inclined-field acceleration tubes, the effect or tendency of which is to destroy or substantially injure an industry, efficiently and economically operated, in the United States. We hereby adopt the findings of fact and conclusions of law of the administrative law judge, more fully discussed below, to the extent not inconsistent with this opinion. The reasons for our findings follow.

As a preliminary matter, the Commission investigative attorney argued that the recommended determination is invalid in that it does not meet the requirements of 19 CFR 210.53 and the Administrative Procedure Act because Complainant's findings of fact, which the recommended determination adopted, are not cited to the record. In his exceptions to the recommended determination, the investigative attorney listed fifteen findings that "should be disregarded since they are not to be found in the record." He listed another twelve findings that were "erroneous." Complainant subsequently submitted a supplementary brief containing citations to the record supporting each of the findings adopted by the presiding officer. Complainant's written submission (Oct. 30, 1980).

Complainant's proposed findings and the ALJ's recommended determination indeed do not comply with the Commission's rules requiring "adequate references to the record and authorities relied on" and "specific page references to principal supporting items of evidence in the record." 19 C.F.R. 210.52, 210.53(b). Reversing the presiding officer's determination solely on this technical basis, however, would be an unreasonable elevation of form over substance. Examination of the proposed findings, supplemental citations, and the portions of the record cited discloses that each of the fifteen findings alleged not to be found in the record is in fact supported by the portions of the record cited.

#### A. Validity of the Patent

An inclined-field acceleration tube is a device used by physical scientists in the study of nuclear structure to accelerate particles to high

speeds and energy levels for the bombardment of atomic nuclei. The following description of the appearance and function of acceleration tubes applies generally to both the High Voltage and Dowlsh devices:

(An) inclined-field acceleration tube . . . appears as a tubular structure having a length of the order of many feet and having a diameter of the order of many inches. It is entirely made up of a multiplicity of alternating insulating rings and apertured electrode disks, and from the outside it appears as a long cylinder made up of glass rings with thin metal disks sandwiched in between them. There is a metallic flange at each end of the tube . . . . (I)t appears that the insulating rings are separated by planar disks . . . . (T)hat portion of the apertured disks which is in the vicinity of the aperture (i.e., the central region) has been bent so that, although the part of the disk near the aperture is in a flat plane, that plane is at an angle to the flat plane defined by the outer regions of the disk.

. . . (A) high vacuum is maintained (in the tube) by suitable pumping equipment. An axial passageway is formed within the tube so that a beam of small particles may travel throughout the length of the tube . . . .

The electrical purpose of . . . the inclined-field acceleration tube is to establish a charged-particle accelerating electric field which is generally inclined to the tube axis, so that particles originating anywhere within the tube are given a substantial displacement transverse to the tube axis for capture by the tube wall, while particles with an energetic axial trajectory are accelerated as a beam through the total length of the tube.

Complainant's proposed findings of fact 10-12 (Aug. 8, 1980), adopted by the ALJ. One of the principal technical problems in the development of acceleration tubes was the limitation on size and power that results from the so-called total voltage effect. As the voltage applied to a tube is increased, generation of and lack of control over spurious secondary particles ultimately interrupts the coherence of the beam and prevents a comparable increase in output. The McKibben, Van de Graaff, and Allen tubes discussed below represent three successive approaches to the problem.

The patent in issue, the '323 patent to Dr. Van de Graaff, is owned by the complainant High Voltage Engineering Corporation. The patent covers high-voltage evacuated tubes in which the technical problem, the reduction of total voltage effect and suppression of secondary particles, is reduced by using electrode disks that have inclined surfaces. HVEC manufactures inclined-field acceleration tubes in accordance with the '323 patent.

Dowlish manufactures inclined-field acceleration tubes using electrode disks with inclined surfaces, but, unlike the HVEC tubes, the electrodes in the Dowlish tubes are set in a spiral along the length of the tube. The spiral reverses direction at least once. Dowlish manufactures its tubes in England in accordance with U.S. Letters Patent 3,363,125 to Allen, which is owned by the United Kingdom Atomic Energy Authority.

In 1969, Dowlish exported acceleration tubes to the Los Alamos laboratory in the United States. In the 1970's, Dowlish exported 24 more acceleration tubes to the United States that were sold to three purchasers--the University of Rochester, the University of Pittsburgh, and the State University of New York--as replacements for HVEC tubes.

1. Anticipation.

The investigative attorney argued that the '323 patent was anticipated by an acceleration tube developed by Dr. Joseph McKibben in the 1940s and is therefore invalid. McKibben used tilted electrode rings to create what he called a "zig-zag electric field." Recommended determination at 6-8 (hereinafter cited as R.D.). The investigative attorney stated that both the Van de Graaff and McKibben types of electrodes accomplish precisely the same

result--interception and suppression of secondary particles before they can be accelerated down the length of the tube, thereby circumventing electrical breakdown. Thus, he argued, the McKibben invention anticipated that of Van de Graaff. To be anticipated, however, all the elements in a claim must be present in the earlier invention. The ALJ properly found that the McKibben tilt rings are distinctly different in design from claim 2 of the '323 patent. 1/ Infringement cases have held that it is necessary for all the same elements to be found in the same situation and united in the same manner to perform the same function and all the anticipatory teachings must be present in a single prior art reference. R.D. at 11 (citing Walker v. General Motors Corp., 362 F.2d 56 (9th Cir. 1966); In re Marshall, 578 F.2d 301 (C.C.P.A. 1978)). The McKibben tilt rings were small attachments to the electrodes, but in the '323 patent the electrodes themselves are inclined.

The investigative attorney also argued that the ALJ's conception of the doctrine of anticipation is overly narrow. In order to establish anticipation where there is an aggregation of elements old in the art, he argued, it is sufficient if the whole of the prior art considered together discloses all of the claimed elements and that no new functional relationship arises from their combination. Here it is the distinctive design and placement of the electrodes, rather than the sweeping concept of an inclined-field tube,

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1/ Claim 2 of the U.S. Letters Patent 3,308,323, which describes the arrangement of the electrodes, reads as follows:

An elongated high-voltage vacuum tube having a longitudinal passageway therethrough and comprising a multiplicity of alternating insulating rings and electrode disks having apertures so as to define said passageway; each of said electrode disks being bounded by flat conducting material and having lateral surfaces which are generally inclined with respect to a plane perpendicular to said passageway.

that is at the heart of the invention. The ALJ found that a new functional relationship of the components is established in the patent. We agree with this essentially factual determination.

2. Novelty.

The Commission investigative attorney argued that the invention disclosed by the '323 patent is not novel because it is substantially identical to the McKibben tube. He contends that the patent is therefore invalid.

The distinction between novelty and anticipation is subtle. Anticipation is the disclosure in the prior art of a thing substantially identical with the claimed invention. 1 Deller's Walker on Patents 237 (2d ed. 1964). An invention that is not patentable because of lack of novelty lacks invention; that is, it is not new in the eye of the law. Id. at 235. The investigative attorney's arguments are all based on prior art, however, so the distinction between novelty and anticipation is therefore meaningless in the context of this investigation.

The novelty issue was raised for the first time in the investigative attorney's brief submitted prior to oral argument; he did not address it before the recommended determination, nor did he include it in his proposed findings of fact and conclusions of law. The presiding officer did not discuss the issue in her recommended determination. To the extent that it is not identical with anticipation, the issue is thus not properly before the Commission.

3. Obviousness.

A patent is invalid if the "differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole



would have been obvious at the time the invention was made to a person having ordinary skill in the art . . . ." 35 U.S.C. 103. The ALJ found that the inclined-field acceleration tube would not have been obvious in 1961 to one with ordinary skill in the art, that is, one with working experience with acceleration tubes or with technical training as a physicist specializing in electrostatics or nuclear physics. The investigative attorney argued that the '323 patent is obvious, in part because the level of ordinary skill in the art was high in 1961. The invention of the patent, 2/ the radical design of the electrodes themselves, however, was not obvious to one skilled in the art. It was a significant improvement over McKibben's tilt rings--although not a major step forward--and resulted in a tube that achieved commercial success. Van de Graaff's colleagues apparently felt that his approach would not solve the problem. A development can hardly be described as obvious if its technical success is viewed as problematic at the time.

The investigative attorney argued that the improvement of the '323 patent over McKibben's tilt rings is marginal at best, and that the ALJ's emphasis on commercial success, a secondary consideration in the issue of obviousness, is misplaced. Part of the success was due to the fact that HVEC was the only commercial manufacturer until Dowlish entered the field in 1969. The

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2/ The ALJ stated that the invention of the '323 patent described in the abstract as a general solution to the problem of the total voltage effect exceeds the contribution of the inventor. Moreover, the prior art was inaccurately described. The investigative attorney argued that the ALJ's characterization of the overreaching of the abstract of the patent is faulty, because there was no abstract. The inaccurate description was an integral part of the specifications and must be considered in construing the patent. The prefatory language, however, has the same legal effect whether characterized as an abstract or not. Obviousness turns on the prior art and the invention of the patent as disclosed by the language of the claims.

investigative attorney argued that commercial success cannot ward off a finding of invalidity if the invention is unequivocally obvious, citing cases from six Federal Circuit Courts of Appeal. This assertion is not entirely helpful for two reasons. First, the invention here is not unequivocally obvious. Second, the CCPA recently held that secondary considerations such as commercial success do not merely "tip the scales in favor of patentability" in close cases, but must be evaluated in determining obviousness. Stevenson v. ITC, 612 F.2d 546, 553-54 (C.C.P.A. 1979).

"Obviousness is a legal conclusion based on factual evidence." Id. at 549 (quoting Graham v. John Deere Co., 383 U.S. 1, 86 (1966)). We find no factual error or flaw in legal reasoning sufficient to cause us to disregard the ALJ's finding. The patent is not invalid because of obviousness.

4. Adequate disclosure of the invention.

"The specification shall contain a written description of the invention and the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same . . . ." 35 U.S.C. 112. A patent claim not meeting statutory requirements for particularity is void. O'Reilly v. Morse, 56 U.S. 62, 120-21 (1853). The ALJ found that although the specification does not describe in detail how an inclined-field tube would be designed, it does describe in general terms how the electrodes are spiralled with sufficient specificity to render the patent valid. The investigative attorney's chief objection to the ALJ's finding is that the '323 patent does not teach one skilled in the art how to make an inclined-field acceleration

tube with the double-reversing electrode spiral characteristic of the Dowlish tubes. Dowlish's former attorney, who withdrew from the case, made the same argument in a posthearing brief. The contention is backed up by the testimony of Dowlish's expert witnesses.

The ALJ pointed out, however, that the double-reversing spiral is neither the essential invention of the '323 patent nor is it the feature that infringes it. She states:

One with ordinary skill in the art clearly would be aware that distortion of the main beam should be avoided, and that distortion had been reduced in the past by reversing the effect of the inclined fields through which the beam already has passed. . . .

If, however, the spiral design is a separate invention, as the Patent Office considered it to be, since it issued the Allen patent, there would be no need to teach in the '323 patent how the spiral design could be used.

RD at 18-19. Expert witnesses for both sides acknowledged that the patent enables one skilled in the art to build at least a single-plane inclined field tube. They disagree about the specificity required to enable one to make a spiral tube. Whether a patent claim meets statutory requirements of particularity is a question of fact. Battin v. Taggart, 58 U.S. 74, 85 (1854). It is thus a matter of evidence, rather than of construction. Rohm v. Martin Dennis Co., 263 F. 388, 389 (3 Cir. 1920). The presiding officer's task is to observe the demeanor of witnesses, assess their credibility, weigh competing contentions, and resolve factual issues. The Commission accordingly attaches great weight to her findings. The investigative attorney has failed to establish that the ALJ's finding is erroneous. We therefore find that the '323 patent enables one skilled in the art to make an inclined-field acceleration tube using a spiral design.

5. Equitable defenses.

Congress has directed the Commission to consider equitable defenses:

"All legal and equitable defenses may be presented in all cases." 19 U.S.C. 1337(c). The investigative attorney argued that the equitable defenses of laches and estoppel should bar complainant from relief. <sup>3/</sup> The ALJ found that neither laches nor estoppel apply to the facts of this investigation. We agree.

The ALJ noted that the elements of laches are (1) knowledge of the facts giving rise to an available remedy; (2) inexcusable delay in the assertion of the remedy; and (3) intervening reliance by and prejudice to another. Herald Co. v. Seawell, 472 F.2d 1081, 1099 (10th Cir. 1972). Laches bars recovery where deferment of action to enforce claimed rights is prolonged and inexcusable and operates to defendant's prejudice. Van't Veld v. Honeywell, Inc., 440 F. Supp. 1020, 1021 (D.D.C. 1977). Estoppel arises "only when one has so acted as to mislead another and the one thus misled has relied upon the action of the inducing party to his prejudice." Id. (quoting Lebold v. Inland Steel Co., 125 F.2d 369, 375 (7th Cir. 1941), cert. denied, 320 U.S. 787 (1943)). Laches is not available if the infringer fails to prove any change in position by it in reliance on the patent owner's alleged inaction. Collison Surgical Engineering Co. v. Murray-Baumgartner Surgical Instrument Co., 230 F. Supp. 572 (D. Md.), aff'd 343 F.2d 162 (4th Cir. 1964). U.S. cert. den. in 382 U.S. 837.

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<sup>3/</sup> It is unclear whether the investigative attorney can assert the defense of laches on behalf of respondent if respondent fails to raise it itself. Laches is a personal defense and can be waived. Trico Products Corp. v. Delman Co., 199 F. Supp. 231 (E.D. Iowa 1961).

As the ALJ noted, knowledge of infringement may be imputed to a patent owner when he discovers the wrong, or through exercise of reasonable diligence could have discovered it. R.D. at 33-34. Complainant admitted actual knowledge of imports of the Dowlish tubes in 1972 or 1973, and could be charged with knowledge of the sales to Los Alamos as early as 1969. Id. The investigative attorney fails, however, to establish inexcusable delay and detrimental reliance by the respondent.

The investigative attorney argues that delay is presumed to be inexcusable after six years. Brief of investigative attorney at 42-43 (citing inter alia Siemens A.G. v. Beltone Electronics Corp., 407 F. Supp. 807 (N.D. Ill. 1975)). The issue is not so cut and dried, however. Mere passage of time is insufficient to establish laches; whether delay is inexcusable must be determined by the particular facts of the case. Maloney-Crawford Tank Corp. v. Rocky Mountain Natural Gas Co., 494 F.2d 401 (10th Cir. 1974). The Siemens case, relied on by the investigative attorney, held that laches barred recovery of damages for past infringement, but that estoppel must be established to bar an injunction against future infringement. The principal additional element required to prove estoppel is detrimental reliance. In Siemens, defendant spent nearly \$4 million on research and development in the intervening six years. 407 F. Supp. at 810. A section 337 exclusion order is more in the nature of an injunction against future infringement than an award of damages for past infringement. The burden of proof of establishing laches is on the infringer and failure to prove injury or damage to itself as a result of complainant's inaction is fatal to the defense. Shaffer v. Rector

Well Equipment Co., 155 F.2d 344 (5th Cir. 1946) (mere expansion of business on the profits of infringement not a prejudicial change of conditions). In Montgomery Ward & Co. v. Clair, 123 F.2d 878 (8 Cir. 1941), plaintiff was denied recovery for past infringement because he had actual knowledge for six years prior to filing suit and could be charged with knowledge ten years earlier, but was allowed to pursue an injunction. There was no proof of deceit or that the infringers altered their conduct to their prejudice on account of the delay. Here, the ALJ also found that Dowlish has not detrimentally relied on High Voltage's inaction. It sells tubes all over the world; a relatively small proportion of its sales are in the United States; and it has acquired no new facilities or employees to supply its U.S. customers. R.D. at 35. For all these reasons, we determine that a remedy for the violation of this investigation is not barred by equitable defenses.

6. Abandonment.

The question whether the '323 patent is invalid through abandonment was settled by a motion for summary determination. <sup>4/</sup> The issue of abandonment is thus not before the Commission.

B. Infringement

The ALJ properly found that the Dowlish tube infringes claim 2 of the '323 patent because it literally meets all of the elements of claim 2. By selling the tubes to purchasers, Dowlish actively induced infringement of

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<sup>4/</sup> Motion Docket No. 76-12 (Dec. 11, 1979); Commission Memorandum Opinion (May 14, 1980).

claims 3-6 of the '323 patent. Although claim 1 of the patent is mentioned in the complaint, HVEC did not seek a finding of infringement of claim 1 in its recommended findings.

1. Claim 2.

Claim 2 of U.S. Letters Patent 3,308,323 reads as follows:

2. An elongated high-voltage vacuum tube having a longitudinal passageway therethrough and comprising a multiplicity of alternating insulating rings and electrode disks having apertures so as to define said passageway each of said electrode disks being bounded by flat conducting material and having lateral surfaces which are generally inclined with respect to a plane perpendicular to said passageway.

The ALJ noted that the parties disagree about whether the dished electrodes--concave as opposed to planar electrodes--used in the Dowlish tubes are covered by claim 2's description of "electrode disks . . . having lateral surfaces which are generally inclined with respect to a plane perpendicular to (the tube's longitudinal) passageway." The investigative attorney argued on the basis of common sense and dictionary definitions that a dished electrode cannot be included in the literal language of the claim describing an "electrode disk". Although the patent does not explicitly refer to dished electrodes as part of the invention, dished electrodes nevertheless read on the claim language. Moreover, dished electrodes are explicitly referred to in one embodiment of the invention. Claims 2-6 neither refer expressly to planar electrodes nor require the electrodes to be flat. They only require electrodes with lateral surfaces that are generally inclined, language consistent with either dished or flat electrodes.

The ALJ also found that the spiral design of the Dowlish tube is irrelevant to the issue of infringement; the spiral feature is not part of the

claimed invention of the '323 patent and an unlicensed improver of the basic patent of another is nonetheless an infringer. Temco Electric Motor Co. v. Apco Manufacturing Co., 275 U.S. 319 (1927); Ziegler v. Phillips Petroleum Co., 483 F.2d 858 (5th Cir. 1973). The investigative attorney's argument that the Allen reversing spiral is a much greater improvement over the Van de Graaff design than Van de Graaff's improvement is over the McKibben concept is essentially irrelevant to the infringement issue. The Dowlish tubes do possess certain unique properties, <sup>5/</sup> but they nonetheless infringe the '323 patent.

2. Claims 3-6. <sup>6/</sup>

The ALJ properly found that claim 3 was infringed by the respondents in the investigation who purchased Dowlish tubes and used them in accelerator systems that had the means for releasing charged particles as described in the claim, even though the Dowlish tubes do not release charged particles directly. Active inducement of infringement by selling tubes to customers who take the final steps to incorporate them into a product that infringes a claim is also an infringement of that claim. 35 U.S.C. 271(b). Contributory infringement, "the intentional aiding of one person by another in the unlawful . . . using of the patent invention," Conmar Products Corp. v. Tibony, 63 F. Supp. 372, 374-75 (E.D.N.Y. 1945), may also consist of selling a product to a customer who takes the final step necessary to make the product covered by the patent. Peerless Equipment Co. v. W.H. Miner, Inc., 93 F.2d 98, 105 (7th

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<sup>5/</sup> See discussion of public interest factors infra.

<sup>6/</sup> The language of claims 3-6 is attached as an appendix.



Cir. 1937). Claims 4-6 are similarly infringed, in that Dowlish actively induced infringement by the purchasers, who incorporated the tubes into infringing accelerator systems.

C. The domestic industry--efficient and economic operation

The ALJ properly found that the domestic industry is that part of the business of HVEC devoted to development, production, design, rebuilding, servicing, and sale of inclined-field acceleration tubes covered by the '323 patent. HVEC has a highly trained staff of technicians and engineers who make or finish most of the parts of its acceleration tubes and who conduct research and development at the HVEC plant. HVEC has made a profit on all types of its tubes since 1975. We determine that the facilities devoted to the production of HVEC's inclined-field acceleration tubes are an efficiently and economically operated domestic industry.

D. Injury

In order to find a violation of section 337, we must determine that "the effect or tendency of (the patent infringement) is to destroy or substantially injure an industry, efficiently and economically operated, in the United States . . . ." 19 U.S.C. 1337(a). The ALJ found that there is substantial injury to the domestic industry, defined, as above, as that part of HVEC concerned with inclined-field acceleration tubes. The ALJ found that Dowlish has sold 24 tubes in the United States since 1969, sales that otherwise would have gone to complainant. Many of the other traditional indications of injury, such as price suppression, reduced profits or idle capacity, are absent. Nonetheless, we believe that the record establishes both present

substantial injury and a tendency toward further injury in the future. The injury is shown not by reduced total sales by HVEC, but by the loss of specific, profitable sales that went instead to Dowlish.

Because HVEC sells complete accelerator systems, using either linear acceleration tubes or inclined-field acceleration tubes, and Dowlish sells only replacement inclined-field acceleration tubes with a spiral design, it is only in the market for replacement tubes of the latter type that HVEC could be injured. R.D. at 28. The use of inclined-field acceleration tubes in the United States is limited and demand for replacement tubes is not likely to increase. At least four tubes were sold to the State University of New York at Stony Brook in direct competition with complainant. Complainant has stated that it would have competed with all the other sales and made bids had it known about them at the time. Because a customer's system must be modified to accept the Dowlish tube, it is unlikely that that customer will thereafter purchase a replacement from HVEC for a substantial period of time. R.D. at 30. Dowlish appears to be able to expand to meet demand for its replacement tubes.

Although HVEC is now operating at full capacity, its representative testified that it also can expand easily to meet demand for replacement tubes, which in any case is expected to be limited. R.D. at 31. The only other commercial source of acceleration tubes in the United States is National Electrostatics, which does not make tubes with an inclined field. R.D. at 28. The tubes are expensive and lost sales numbering from 4 to 20 are quite significant. The loss of sales is thus coupled with a threat of substantial

injury in the future, because of Dowlish's ability to expand its capacity to meet future demand for replacement tubes. Dowlish should have no difficulty maintaining its significant share of the domestic market.

The investigative attorney argued that the evidence shows that the sales "lost" by HVEC to Dowlish did not constitute "injury" within the meaning of section 337. He argued that HVEC charges excessively high prices for its inclined-field tubes, having become complacent as the only major producer of acceleration tubes in the United States. The high gross and net profits attained by HVEC are cited by the investigative attorney to support his conclusion that it charges monopoly prices.

The reward to the patentee for disclosing his invention under the patent system, however, is to give the inventor a limited monopoly, the right to exclude others from practicing the invention for seventeen years. It can be argued that a patent holder charging less than the market will bear is not operating efficiently and economically. Accordingly, we do not find that HVEC charges excessive prices for its tubes.

Our determination of injury in this investigation is consistent with previous cases. As in Certain Automatic Crankpin Grinders, Inv. No. 337-TA-60, USITC Pub. No. 1022 (1979), where lost sales were important to the injury determination, the import penetration ratio is significant, and the unit cost of the patented devices is high. In two other recent cases, complainant relied principally on a showing of lost sales because other indications of injury were largely absent. Certain Combination Locks, Inv. No. 337-TA-45, USITC Pub. No. 945 (1979), resulted in a determination of no injury because

the domestic industry was healthy and the Commission found that the record did not show any loss of customers. In Certain Surveying Devices, Inv. No. 337-TA-68, USITC Pub. No. 1085 (1979), in which complainant also was essentially healthy and relied principally on a showing of lost sales, the Commission was divided on the injury question. Surveying Devices is clearly distinguishable from the present investigation in that the import penetration ratio in that case was substantially lower and the unit price of the domestic and infringing articles was low enough that loss of an individual sale was insignificant. Furthermore, the dissenting opinion argued that the evidence of lost sales was "less than convincing" and did not establish that lost sales had occurred. Id. at 42-44 (dissenting opinion of Commissioners Alberger and Stern). There is no evidentiary problem here; complainant bid on several of the lost sales and was the only domestic producer able to compete for the others. The loss of each sale denies complainant thousands of dollars in profit. Finally, in none of the three cases was there the additional factor of a virtually assured replacement market once customers switched to the imported product.

### III. Remedy

Although the complaint asked only for an exclusion order, complainant added a request at the oral argument for a cease and desist order directed at the State University of New York at Stony Brook to prevent its use of infringing Dowlish tubes already imported into the United States. Failure to raise the issue earlier hampered efforts of the other parties to respond and prevented full development of argument on the question. Moreover, complainant

has not made an adequate showing of need for the order. We believe that the hardship that would result from forcing Stony Brook to cease use of its Dowlish tubes is disproportionate to the injury to complainant from the loss of sale of four tubes. The imported tubes are not interchangeable and accelerators require considerable modification to accommodate a change in tubes. In the past, we have treated the cease and desist order as an extraordinary remedy to be used only where an exclusion order is ineffective to redress completely the wrong or is insufficiently precise in its coverage. Therefore, if public interest factors did not preclude relief, we believe that an exclusion order would be the appropriate remedy in this situation.

#### IV. Public Interest

This investigation raises significant public interest issues--pure scientific research and the advancement of knowledge. <sup>7/</sup> Subsections 337(d)-(f) of the Tariff Act of 1930, which detail the remedies for violation of the section, provide for an exclusion order, exclusion under bond, or a cease and desist order "unless, after considering the effect of such (remedy) upon the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers . . ." the Commission finds that there should be no remedy.

Public interest considerations, where they are present in section 337 investigations, are not meant to be given mere lip service. On the contrary,

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<sup>7/</sup> The only previous section 337 investigation in which public interest factors were determined to preclude a remedy was Certain Automatic Crankpin Grinders, Inv. No. 337-TA-609, USITC Pub. No. 1022 (1979).

"public health and welfare and the assurance of competitive conditions in the United States economy must be the overriding considerations in the administration of this statute." S. Rep. 93-1298, 93d Cong., 2d Sess. 197 (1974) (emphasis supplied). No remedy should be imposed if "the Commission find(s) that issuing an exclusion order would have a greater adverse impact on the public health and welfare . . . than would be gained (sic) by protecting the patent holder . . . ." Id. Thus, there are two issues in any consideration whether public interest factors preclude imposition of a remedy for a section 337 patent violation. The threshold question is whether there is a public health and welfare interest in the invention, that is, whether a remedy under section 337 would have an impact on the public health and welfare. Once that is established, the Commission must balance the damage to the patent holder's rights against the adverse impact of the remedy on "the public health and welfare and the assurance of competitive conditions in the United States economy." Id.

A. Basic Science Research and the Public Interest

We believe that basic scientific research, such as the nuclear structure research conducted with inclined-field acceleration tubes, is precisely the kind of activity intended by Congress to be included when it required the Commission to consider the effect of a remedy on the public health and welfare. The relative merits of pure and applied research have been the subject of debate for many years. The benefits to public health and welfare

of pure research are indirect and perhaps more difficult to demonstrate, but they are nonetheless there. Although there are few indications in the record of practical applications for nuclear structure physics, it shows that the tubes at Los Alamos are used for nuclear weapons development and the University of Arizona uses them as mass spectrometers for carbon 14 dating, essential to paleontological and archaeological applications. 8/ Many scientists would argue, of course, that basic research is intrinsically beneficial regardless of immediate practical application. The support of universities and public agencies is ample support for that proposition.

Much basic research--and nuclear structure study in particular--is conducted with government support. Van de Graaff, McKibben, and others in the field have worked with varying degrees of government affiliation.

Finally, the President and the Congress have issued declarations of support for basic science research. The National Science Foundation Act, which supports with grants much of the research done with both the domestic and imported tubes, is codified in title 42, United States Code, which is entitled Public Health and Welfare. Although title 42 is devoted principally to such matters as civil rights, mental health, environmental quality, and social security, it also includes the National Aeronautics and Space Act, the National Research Act, and more than one Atomic Energy Act.

Congress authorizes and directs the National Science Foundation

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8/ Letter from Richard Woods, Group Leader, Van de Graaff Accelerator Operations, Los Alamos Scientific Laboratory, New Mexico (Oct. 24, 1980); Brief of investigative attorney on public interest at 6 (Oct. 31, 1980).

to initiate and support basic scientific research and programs to strengthen scientific research potential and science education programs at all levels in the mathematical, physical, medical, biological, engineering, social, and other sciences, by making contracts or other arrangements (including grants, loans, and other forms of assistance) to support such scientific and educational activities and to appraise the impact of research upon industrial development and upon the general welfare.

National Science Foundation Act of 1950, sec. 3(a), 42 U.S.C. 1862(a). The Foundation is further "authorized to initiate and support specific scientific activities in connection with matters relating to international cooperation, national security, and the effects of scientific applications upon society . . . ." Id. sec. 3(b). There is no indication in the record of this investigation that the Foundation has initiated nuclear structure research but there is ample evidence of its support. It filed a comment urging the Commission on public interest grounds not to restrict the importation of Dowlish tubes. The Board and Director of the Foundation are directed to "recommend and encourage the pursuit of national policies for the promotion of basic research and education in the sciences." Id. sec. 3(d). The President has underscored the importance of the field by directing the Foundation to recommend to him from time to time "policies for the promotion and support of basic research and education in the sciences." Exec. Order No. 10,521, 3 C.F.R. 183 (1954-58 Compilation), reprinted in 42 U.S.C. 1862 note.

Complainant stated in its post-recommended-determination brief and at oral argument that nuclear structure physics research of the kind conducted with particle accelerators using inclined-field acceleration tubes is not flourishing, but is in a state of decline. The vigor both with which complainant prosecuted the investigation and with which users of both imported



and domestic apparatus approached the public interest question, however, belies that argument. Even so, interest in a field of knowledge can rise and fall with developments and still be important to the public health and welfare.

Complainant's representations of the state of health of the field at the hearing were equivocal at best. The postargument brief, however, discusses the question in some detail. Dr. Cornelius Brown, Program Officer for Nuclear Physics at the National Science Foundation is quoted as saying:

Well I've heard statements (that the field is in a state of decline) made from time from to time, not only about nuclear physics but about many other areas, physics and other areas of science. I think historically you can see that many times very shortly after such a statement has been made there's been a new discovery in a field and there's been a real renaissance.

And I know there are many people now that feel that nuclear physics is one of those phases where there's lots of new exciting work on the horizon.

Complainant's posthearing brief at 25. Complainant goes on to say that there have been no major breakthroughs since 1965, but the level of research activity has been relatively constant. Dowlish's witness testified that it is not a growing business, but that there is a steady market for replacement tubes. Id. at 26-27. We remain convinced that basic nuclear structure physics research is an activity that benefits the public health and welfare.

B. Balancing--Relative Impact on Public Interest and Patent Holder's Rights

Once it is established that nuclear structure physics research lies clearly within the range of activities that Congress intended the Commission to consider in administering the statute, we must determine whether the adverse impact on research that would result from excluding the tubes would be

weightier than the benefits of protecting the patent holder's monopoly. If so, Congress intends that no remedy should be provided.

1. Impact on research.

The public interest argument of the users of Dowlish tubes has two major components--cost and performance. First, the High Voltage tubes are substantially more expensive, thus raising the cost of research to an unacceptable level. 9/ An exclusion order would force researchers either to convert to the High Voltage tubes or to obtain a license for subsequent purchases of Dowlish tubes. The Dowlish tubes provided "greater performance per dollar." 10/ Moreover, the tubes are not interchangeable. The Dowlish tubes achieve their electron suppression through a different field configuration; the different geometries have different focusing effects on the ion beam. Because four tube sections in a tandem accelerator are matched to achieve the desired overall beam optics, a single bad tube section would necessitate changing a complete set of four sections and recalibration of the accelerator. 11/ The increase in costs resulting from an exclusion order is an important consideration, but insufficient in itself to outweigh the patent owner's rights. One purpose of the patent monopoly is to enable the inventor to charge enough to recover research and development expense and provide a financial reward for the innovation.

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9/ Submission of Linwood Lee, Director, Nuclear Structure Laboratory, SUNY at Stony Brook (Oct. 31, 1980).

10/ Submission of H.E. Gove, Director, Nuclear Structure Research Laboratory, University of Rochester (Oct. 20, 1980).

11/ Stony Brook submission.

Second, and more importantly, the enhanced suppression of secondary particles achieved by the double-reversing spiral electrode design makes it essential to the users' research programs. 12/ If they are forced to switch to High Voltage tubes, their research programs would have to be modified and some may have to be dropped. 13/ The users consider the Dowlish tube to be greatly superior in performance to the High Voltage tube--not to mention substantially less expensive--and therefore indispensable to their research efforts. 14/ The tubes provide the greater stability of operation and more consistent results essential for accurate research.

Counsel for complainant stated at oral argument and in written submissions that it could make spiral-field tubes of the Dowlish type if customers required them, but it would depend on obtaining a license under the Allen patent. Los Alamos indicated, however, that "over the last two decades" High Voltage had shown "very little interest" in building inclined, spiral-field tubes for them. 15/ The National Science Foundation stated that High Voltage "did not take the initiative in developing spiral field tubes and therefore they have not had any for sale." 16/ High Voltage tubes employing

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12/ Although the double-reversing spiral field is the feature that results in greater suppression of secondary particles, the infringement finding is not undercut, because, as noted above, it is the configuration and shape of the electrode hardware itself that infringes the '323 patent.

13/ Los Alamos submission at 3.

14/ Submission of William Rodney, Program Director for Nuclear Physics, National Science Foundation (Oct. 28, 1980); Personal submission of Tillman Saylor, III, University of Pittsburgh; Los Alamos submission, Rochester submission.

15/ Los Alamos submission at 2.

16/ National Science Foundation submission.

the spiral configuration and matching the Dowlish performance characteristics would, of course, be more expensive than the Dowlish tubes now available.

2. Impact on patent owner's rights.

Complainant argued that there were no public interest factors of sufficient weight to justify overriding its rights as owner of the '323 patent. Complainant's submission on public interest 14-18 (Oct. 31, 1980). Drawing on language from previous investigations, complainant argued that acceleration tubes, like plastic display devices and molded golf balls, are not essentials of life. Furthermore, there would be no other effect on competitive conditions in the United States than that dictated by the patent laws. Finally, complainant argued that the considerations precluding a remedy in Crankpin Grinders are absent here.

Public interest comments from laboratories in favor of exclusion emphasized the importance of protecting complainant's patent rights. 17/ Yale University and the Brookhaven National Laboratory expressed a desire to rebut claims of the superior performance of Dowlish tubes. High Voltage's "large stainless tubes outperform any other kind of acceleration tube currently in use in MP accelerators anywhere in the world." 18/ They fear that "unless High Voltage Engineering Corporation's patent rights in the matter of the inclined field tubes can be protected, there is very real danger that they will cease production . . . (and leave us) at the uncertain mercy of a foreign

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17/ Submission of H. E. Wagner, Brookhaven National Laboratories, Upton, New York (Nov. 19, 1980); submission of D. Allen Bromley, Director, A. W. Wright Nuclear Structure Laboratory, Yale University (Nov. 14, 1980).

18/ Brookhaven submission at 2.

supplier no matter how friendly the country in which that supplier may be located." 19/

The issue here is not, however, which tubes perform better in a given application, but whether the superior performance at lower cost of the Dowlish tubes in some applications justifies overriding the patent owner's rights. We are not persuaded that High Voltage will withdraw from the field if no exclusion order is issued. The patent has but two years to run; High Voltage is reasonably assured of replacement sales to the overwhelming majority of U.S. installations that still use its tubes, not to mention its substantial overseas market.

3. The balance.

Once the importance of basic research in nuclear structure physics is established, we are faced with a difficult balance--the impact of a remedy on users of the imported device versus the impact of the violation on the owner of the patent. After weighing these considerations, we determine that public interest factors preclude a remedy in this investigation.

Complainant argues that the integrity of the patent system is at stake here. That overstates the issue. Our decision not to issue an exclusion order in spite of the violation of section 337 should not encourage others to infringe patents. This is a narrow factual situation--the imported tube infringes a valid U.S. patent, but a noninfringing feature offers significant operational advantages, at lower cost, to some users. The infringing tube makes further, significant progress toward a solution of the technical problem that the invention of the patent was designed to solve.

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19/ Yale submission at 3.

Contrary to complainant's assertion, our determination is consistent with the public interest finding in Crankpin Grinders, in which the infringing device was needed by U.S. automobile manufacturers to make parts for fuel-efficient engines. The public interest importance of the invention was demonstrated in part by the Energy Policy and Conservation Act, 42 U.S.C. 6201-6422, and implementing regulations requiring auto manufacturers to meet fleet fuel economy standards in phases. Producers are under some pressure to comply. Like the National Science Foundation Act, the Energy Policy and Conservation Act is codified in title 42, Public Health and Welfare. The Commission determined that the importance of enforcing the patent monopoly was outweighed by the engine producer's needs and the inability of the domestic producer quickly to supply them. The competing interest was not the individual consumer's need for a cheaper, more efficient auto, but the public interest in fuel conservation.

The competing interest here is the continued availability of tubes essential to research programs affecting the public health and welfare. As the director of the Stony Brook laboratory pointed out, "In situations like this competition is clearly healthy and the entire nuclear research program benefits from the improvements and reasonable prices induced by this competition." Although the financial return from a patent is a reward, we are not convinced that it is the only motivation to engage in the development of basic science research apparatus. As we have noted, there is considerable encouragement by the government for research, a necessity in view of the lack of immediately profitable commercial application of the results and the

prohibitive expense of the equipment needed to carry it out. Researchers, we believe, are not motivated solely by expectation of a profit in the way that holders of more conventional product and process patents are.

Another way to view the balance is this: the patent encourages scientists like Dr. Van de Graaff to develop the basic device; declining to issue an exclusion order on public interest grounds encourages scientists working with the devices by providing them with the option to use either the domestic or imported tubes. The Commission's determination, then, balances research conducted with the apparatus against the research that developed the apparatus. It denies part of the rewards of having conducted that research in the past, but broadens the benefit to the public now by permitting research with a wider range of devices.





## APPENDIX

Claims 3-6 of U.S. Letters Patent No. 3,308,323 read as follows:

3. An elongated high-voltage acceleration tube comprising an evacuated enclosure, a multiplicity of apertured electrodes axially spaced along the length of said tube, means for distributing the high voltage applied to said tube among said electrodes, whereby said electrodes define an electric field configuration within said tube, means for releasing charged particles at one end of said tube within said electric field configuration, the apertures in said electrodes being located along the trajectory of said charged particles as they are accelerated by said electric field configuration, said electrodes being not symmetric with respect to said trajectory, but said electrodes being tipped with respect to said trajectory so that the electric force on an electric particle, either beam or secondary particle, is inclined to the direction of said trajectory at that point.

4. An elongated high-voltage acceleration tubing comprising an evacuated enclosure, a multiplicity of apertured conductive barriers aligned along the length of said tube so that the apertures form a passageway, means for distributing the high-voltage applied to said tube among said barriers, and means for directing a charged-particle beam along said passageway on a trajectory which is inclined with respect to the electric field substantially throughout its length said apertures being sufficiently small so that secondary charged particles are intercepted by said barriers.

5. An elongated high-voltage acceleration tube comprising an evacuated enclosure, a multiplicity of barriers axially spaced along the length of said tube, means for distributing the high voltage applied to said tube along its length so as to produce an electric field configuration within said tube, means for releasing charged particles within said electric field configuration, whereby said charged particles are accelerated by said field as a beam along a trajectory, said electric field configuration being such that the electric field at points on said trajectory is generally inclined thereto, said barriers being sufficiently close to said trajectory so as to allow said beam to pass but to limit the passage of secondary charged particles through the barriers to only a few barriers.

6. Apparatus for accelerating charged particles comprising in combination, a source of high voltage, a first electrode and a second electrode connected across said source, means defining an evacuated region therebetween, means for emitting charged particles at said first electrode, a succession of apertured metal sheets spaced between said first electrode and said second electrode at successive potentials, successive apertures each being so placed that particles emitted from said first electrode are allowed to pass through it in a trajectory to said second electrode, the intermediate sheets being so placed that electrically charged particles in the immediate region of the particle trajectory are in general subjected to an electrical force in approximately the same direction which is at an angle to the direction of the beam trajectory at that point.

Recommended determination at 22, 24-25; Amended Complaint.





