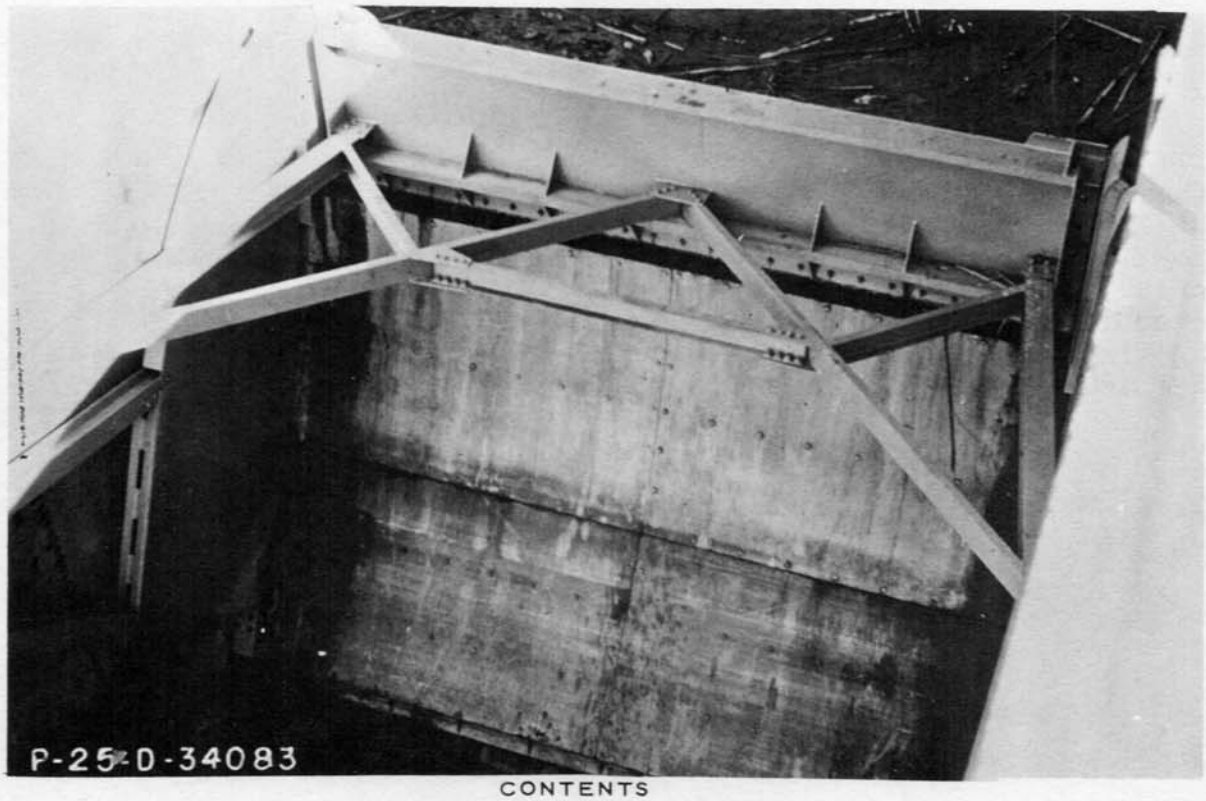
Department of the Interior
Bureau of Reclamation

OPERATION AND MAINTENANCE EQUIPMENT AND PROCEDURES

RELEASE NO. 42

October, November and December 1962



CONTENTS

Cover sheet. The photo on the front cover is a radial gate installed at Granite Reef Diversion Dam. It is really two gates one on top of the other. The upper portion of the gate can be raised independently of the lower section, and when so raised allows the water to flow over the lower gate. This opening allows debris that is floating on top of the water to be passed over the dam and be sent downstream. See Article on page 22. Photograph No. P-25-D-34083

OPERATION AND MAINTENANCE EQUIPMENT AND PROCEDURES
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INTRODUCTION

The Operation and Maintenance Equipment and Procedures release, published quarterly, is circulated for the benefit of irrigation project operation and maintenance people. Its principal purpose is to serve as a medium for exchanging operation and maintenance information. It is hoped that the labor-saving devices or less costly equipment developed by the resourceful water users will be a step toward commercial development of equipment for use on irrigation projects in a continued effort to reduce costs and increase operating efficiency.

This issue, Release No. 42, includes, page 1, an article on a telemeter unit which eliminates an 11-mile drive to obtain outflow data from a dam; on page 13, an article on fuel-tank care; page 22, a special skimmer gate in use on a diversion dam with considerable success and in addition several very useful devices developed by the resourceful operators of our projects.

To assure proper recognition of those individuals whose suggestions are published in the bulletin, the suggestion number as well as the person's name is given. All Bureau offices are reminded to notify their Suggestions Awards Committee when a suggestion is adopted.

ERRATA--There was included in Release No. 41 of the bulletin for July, August and September, 1962, beginning on page 18, the article "The Use of Low Pressure Gas for Remote Power Units." The underlined words were erroneously used as an amplification of the abbreviation "L. P." The correct amplification should have been "Liquified Petroleum." Please correct pages 18 and 19 of your issue of the bulletin accordingly.

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Division of Irrigation Operations
Office of Assistant Commissioner and Chief Engineer
Denver, Colorado

TELEMETER REPORTS OUTFLOW DATA

A telemeter unit installed in conjunction with a bubbler gage at the outflow station at Hugh Butler Lake with the control unit installed in the Reservoir Superintendent's Office at Red Willow Dam eliminates an 11-mile drive by the Superintendent to obtain outflow data from the dam. The bubbler gage, Photo No. 1, is similar to the ones in use in major locations in the Kansas River Projects Area, described in Operation and Maintenance Equipment and Procedures Release No. 35. The telemeter unit at the dam is shown to the left of the bubbler gage recorder.

The telemeter unit and the control unit are connected by a telephone pair on a leased basis from the local telephone company. The telemeter unit at the site of the gaging station is battery powered; therefore, no outside source of electrical power is required. The control unit, Photo No. 2, at the reservoir superintendent's office utilizes standard 110-volt current. The installation requires only a low-grade (0-15 cycle per second) telephone pair. As a result a more costly full-voice circuit (0-3,000 cycles per second) is not necessary. The monthly cost of a commercial installation with capability of a full-voice circuit would have been about $42.50 per month, as compared to the leasing of about 5-1/2 miles of telephone line at $4.00 per month for the present installation. The cost of the parts for the control unit was $26.00 and the labor for the assembly was $15.00.

The diagram on page 2 shows the schematic arrangement of the metering and control units. Telemeter installation connections at the gaging

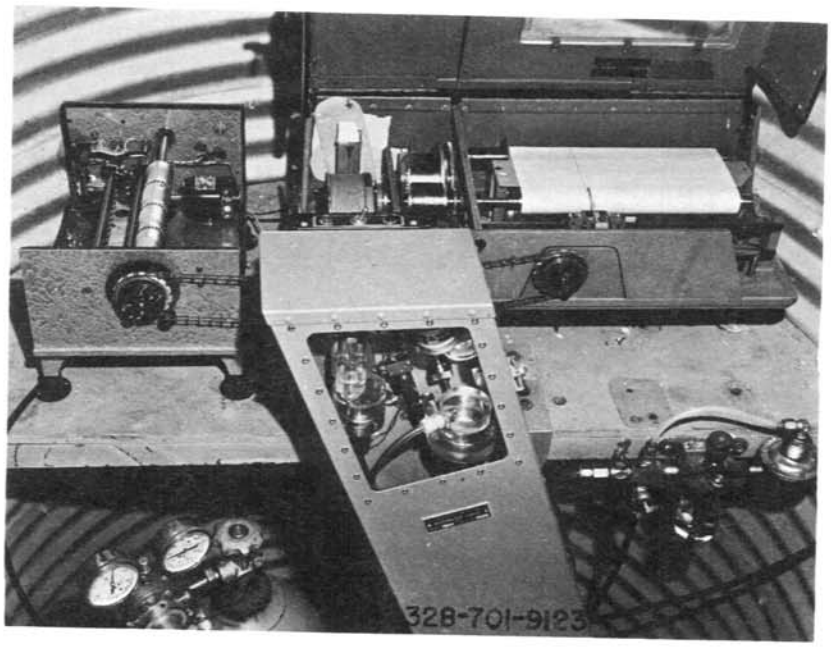
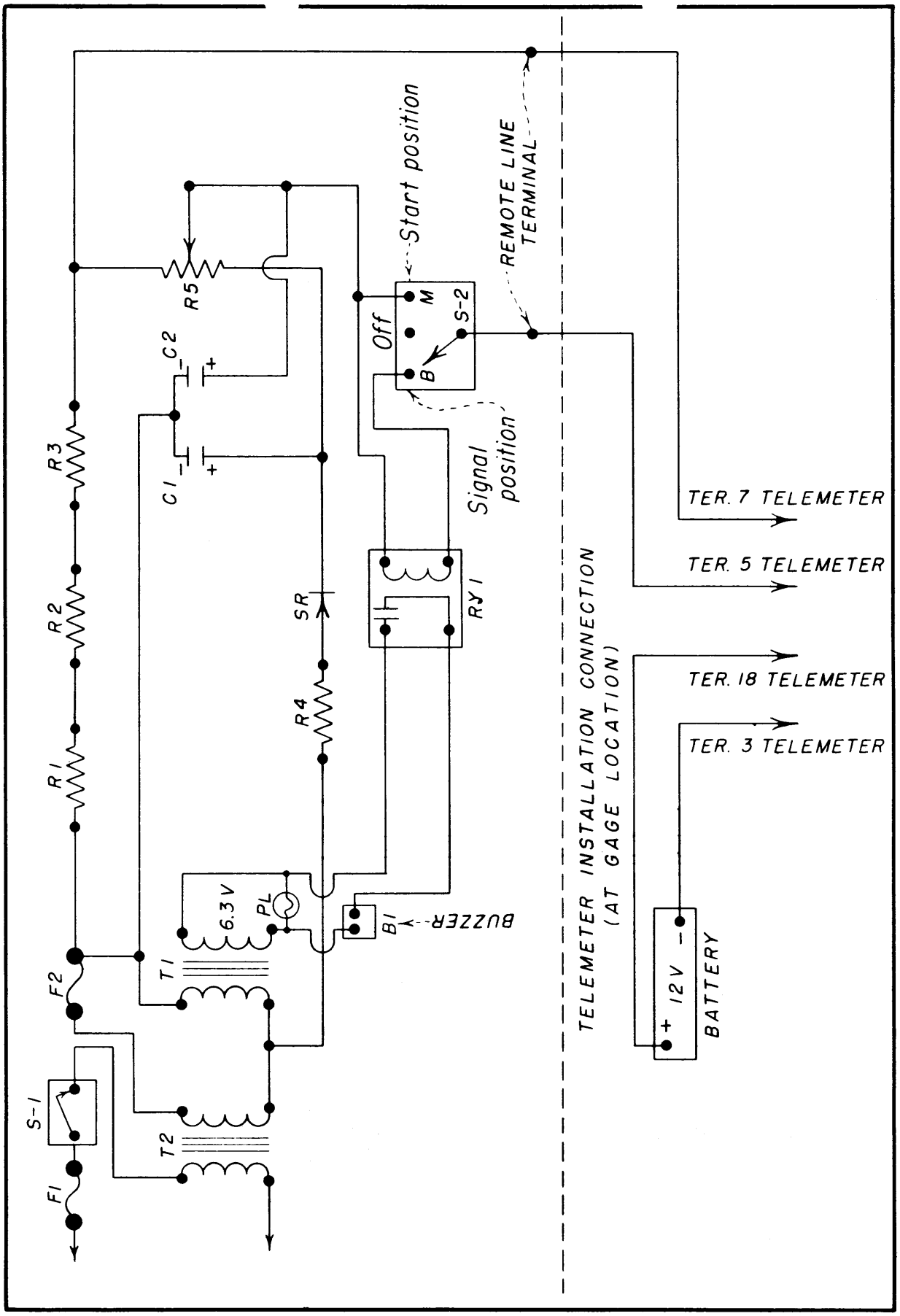


Photo No. 1


Start position
REMOTE LINE TERMINAL
R5
C2
Off
M
S-2
B
C1
R3
Signal position
TER. 7 TELEMETER
TER. 5 TELEMETER
R2
SR
RY1
TER. 18 TELEMETER
R4
TER. 3 TELEMETER
R1
6.3 V
PL
BUZZER
B1
TELEMETER INSTALLATION CONNECTION (AT GAGE LOCATION)
F2
T1
12 V
BATTERY
S-1
T2
F1

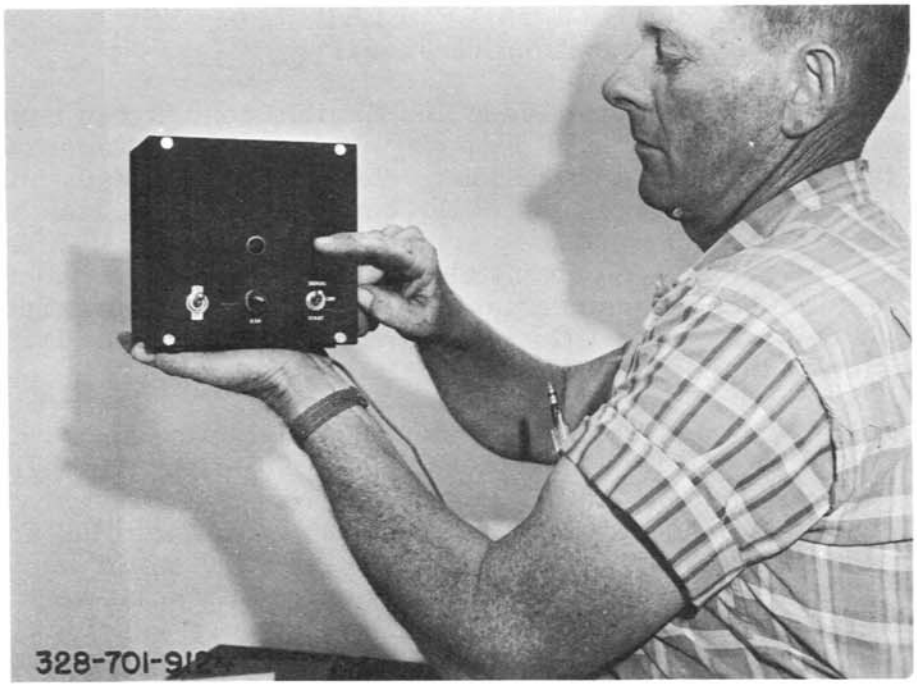


Photo No. 2

station shown on the diagram, are to a commercially available telem etering device modified to suit the specific operating needs.

The installed unit at Red Willow Dam is working very satisfactorily and each time the Reservoir Superintendent wishes the outflow data he activates the telemeter unit at the dam with the switch on the control unit in the "start" position, Photo No. 2, and then reads the gage height with the switch in the "signal" position. The cost of this type of installation was easily justifiable on the basis of the elimination of the vehicle mileage and time required for an 11-mile drive by the Reservoir Superintendent to obtain outflow data.

The installation at Red Willow Dam is similar to one being used by the Corps of Engineers at Kanopolis Dam in Kansas, and information and drawings have been supplied the U. S. Geological Survey at Topeka, Kansas, which plans to install similar devices at sites where the operating costs for a commercial telemetering installation were heretofore too expensive. The device might be of use on other Bureau projects to meet a problem similar to the one experienced at Red Willow Dam. For further information write the Chief, Irrigation Division, Kansas River Projects, Bureau of Reclamation, Post Office Box 737, McCook, Nebraska, Attention: K-410; or the Assistant Commissioner and Chief Engineer, Bureau of Reclamation, Denver Federal Center, Denver 25, Colorado, Attention: D-400.

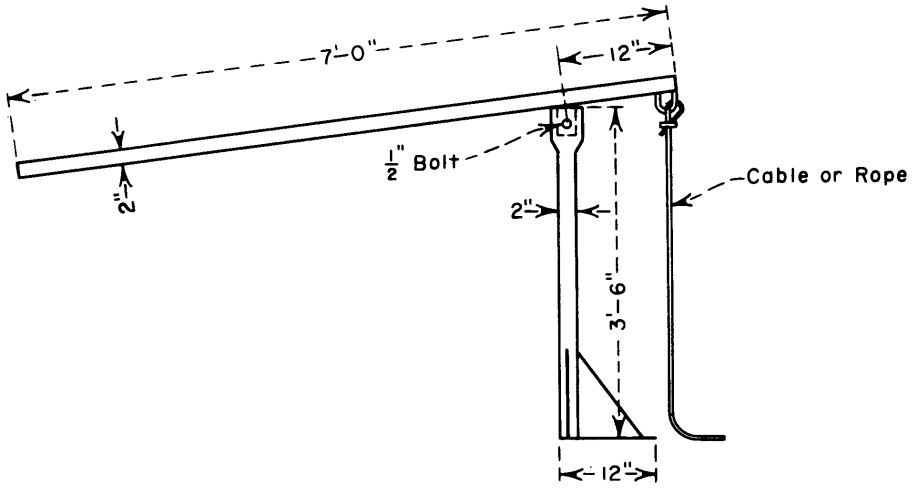
* * * * *

MOTOR LEAD PULLER
(Suggestion R1-62-41)

Considerable damage to motor leads and flexible conduit can result in the removal or reinstallation of deep well pumps unless some precautions are taken during field operations. With the motor leads pulled back into the conduit and portions of the conduit removed, less damage to these items occurs and they are out of the way of workmen and equipment. The remaining conduit also can be capped to prevent water from entering the conduit and damaging the electrical cable. Such a procedure is followed in rectification work on the North Side Irrigation Field Division of the Minidoka Project.

On long conduit runs and when large electrical cable is used, it is often impossible to pull the cable by hand. To facilitate the operation, Harvey E. Graves and Eugene P. Bye developed the device shown in the sketch below for pulling the electrical cable back into the motor controller and switch gear cabinet and for pulling the motor leads back into position for connection to the motor when rectification work has been completed.

The device is made of 2-inch pipe, with the upright section of pipe being 42 inches in height. A 12-inch-diameter semicircular base of sheet metal is welded to the bottom of the upright and reinforcement angles of the same sheet metal are provided for stability. The 2-inch-diameter pipe handle is 7 feet in length with the pivot point being 1 foot from one end. A ring is welded to this end so a cable or rope can be attached. The pivot consists of a 2- by 2- by 1/2-inch piece of sheet iron welded to the pipe. The top of the upright pipe is flattened to accommodate a 2- by 2- by 1/2-inch piece of sheet iron welded inside the pipe for a filler, so that the pivot piece welded to the pipe handle will slip down into it. A hole drilled through the pivot pieces accommodates a 1/2-inch bolt.



POWER AUGER MADE SAFE
(Suggestion R1-61-30)

The shutoff switch on a power auger used by Region 1 was located on the forward end of the engine. The two men who operate this equipment are usually at the rear and left rear of the machine in the immediate vicinity of the auger flights. The engine, drive mechanism, and auger flights were located between the shutoff switch and anyone working in the vicinity of the auger flights. If anyone was accidentally caught in the auger flights or drive mechanism that propel the flights, he would be unable to shut off the machine and the other person could be delayed in shutting off the engine.

Mr. Frank J. Smith of the Snake River Development Office suggested that a shutoff switch be wired through the main switch and be installed at the left rear of the auger machine, adjacent to the auger mast. At that location, the shutoff switch would be instantly available to either of the two men in the event of any emergency. Mr. Smith's suggestion was adopted by the Snake River Development Office and the switch has been installed.

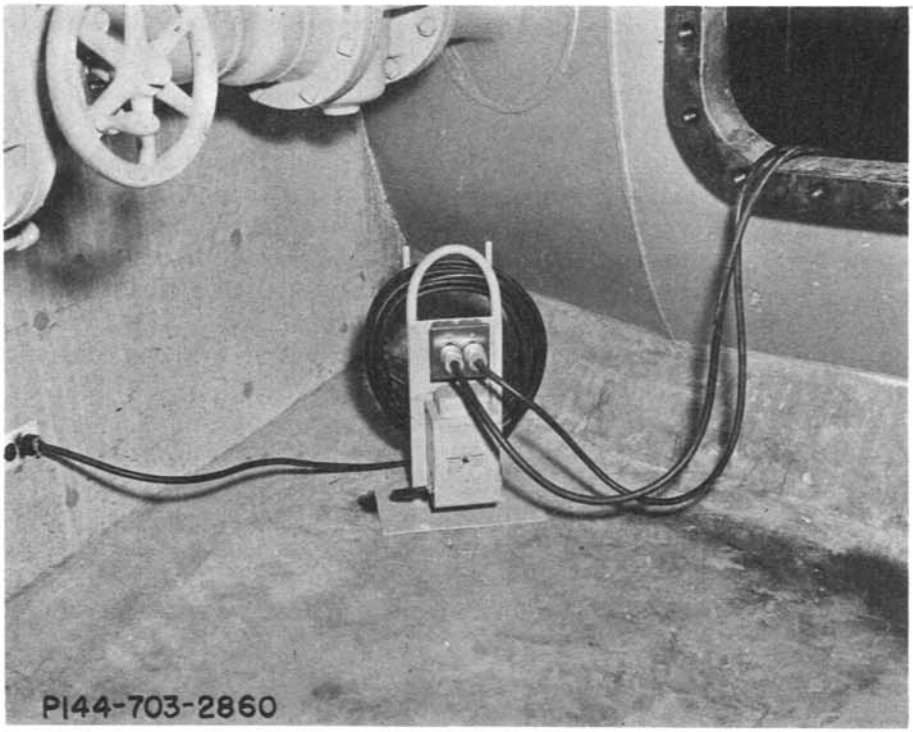
It is believed that other projects may be interested in this safety suggestion and may want to adopt it. If additional information is desired, write to Snake River Development Office, Bureau of Reclamation, 214 Broadway, Boise, Idaho; or to the Assistant Commissioner and Chief Engineer, Bureau of Reclamation, Denver Federal Center, Denver 25, Colorado, Attention: D-410.

* * * * *

32-VOLT LIGHTING SYSTEMS
(Suggestion R7-60-204-Gp)

The Power System Safety Handbook states in part, "When working in or inspecting scroll cases, draft tubes, and other enclosed damp locations, portable lighting equipment energized at not more than 32 volts nominal shall be used, except when special local conditions make this impractical * * *." There are available commercially 32-volt electrical systems, but a problem exists in procuring a system at reasonable cost that has sufficient capacity. Most commercial systems have a capacity of only 400 watts, while 1,000 watts or more are needed for lighting and the operation of power tools.

To overcome the above deficiencies in commercial 32-volt electrical systems the system shown in the photograph on the following page was designed to provide safe working conditions in closed and grounded-metallic areas, where a faulty cord or light socket could cause a potential of 120 volts to ground to be encountered. The system was designed and constructed by Charles R. Brandenburg, Electrician, and Joseph W. Hamm, Powerplant Foreman, Alcova Power Plant, of



the North Platte River Projects area. The system consists of a transformer, three 50-foot extension lights, one 250-foot extension cord, a supply cord to feed the transformer, and a complete set of plugs, connectors, and receptacles.

The diagram, page 7, shows the principal components of the system and their arrangement, except as shown in the photograph above, a rack for holding the supply cord is welded onto the frame of the portable unit. The complete cost of the material plus the labor to assemble the unit was $173.75. This did not include the cost of a circuit breaker which was added later in the secondary circuit to provide for over current protection, as required in the National Electrical Code. Cost of a circuit breaker suitable for providing adequate protection is estimated to cost about $7.00.

It has been pointed out that it is desirable that the unit be enclosed in a moisturetight, oil-resistant container, if the unit is to be subject to dampness or used within the moist confines of a penstock or located in a similar exposed condition. Sheet metal boxes, sufficiently insulated for such exposure are obtainable at a cost of about $25.00, although confinement of the unit in such a case may reduce the output of the system to some degree.

If further information is desired, please write the Director, Region 7, or the Assistant Commissioner and Chief Engineer, Bureau of Reclamation, Denver Federal Center, Denver 25, Colorado.

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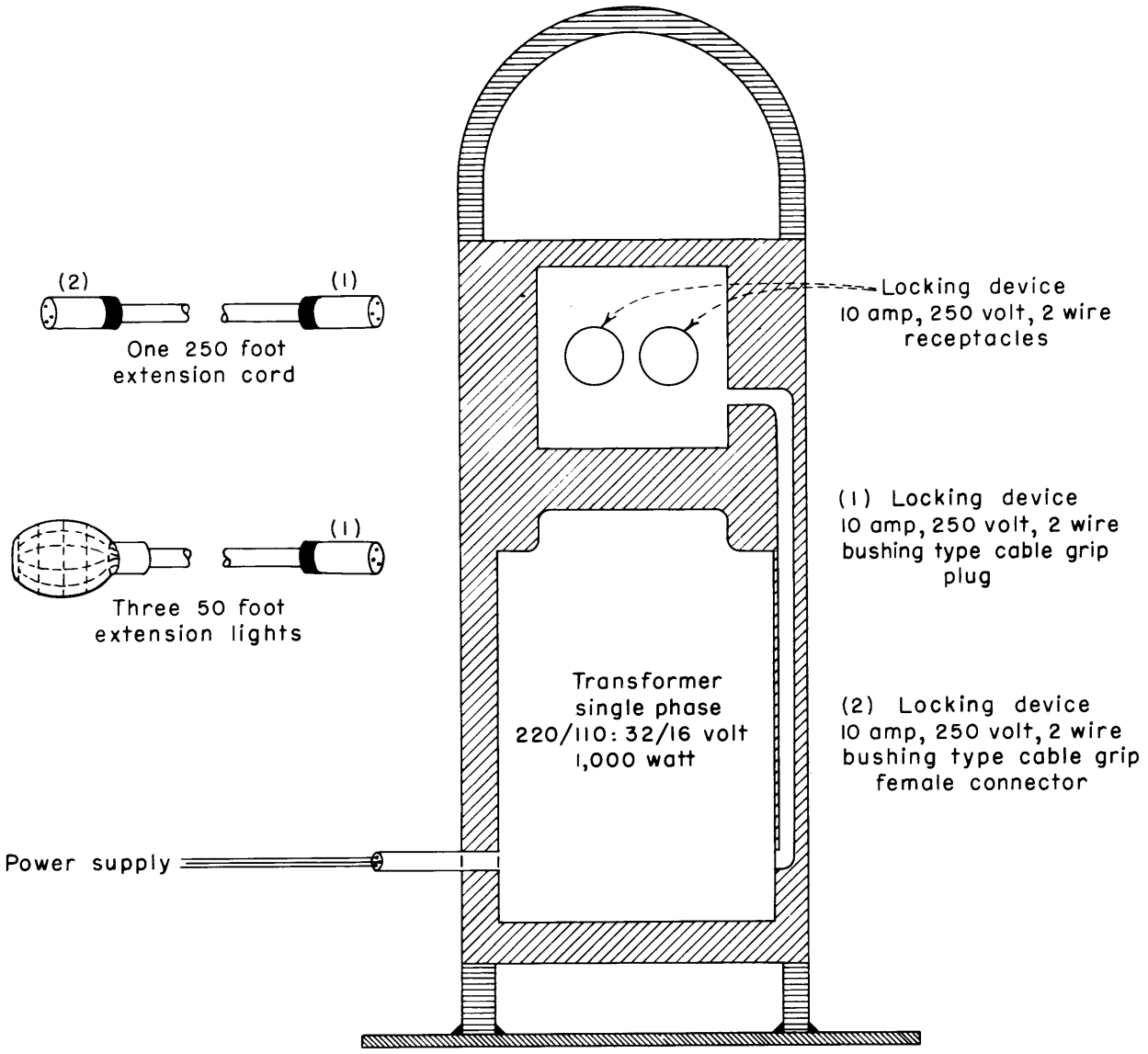
(2)
(1)
One 250 foot
extension cord
(1)
Three 50 foot
extension lights
Power supply
Transformer
single phase
220/110: 32/16 volt
1,000 watt
Locking device
10 amp, 250 volt, 2 wire
receptacles
(1) Locking device
10 amp, 250 volt, 2 wire
bushing type cable grip
plug
(2) Locking device
10 amp, 250 volt, 2 wire
bushing type cable grip
female connector

MARKING SHAFT, BEARING RACES AND HOUSINGS TO INDICATE UNDESIRABLE MOVEMENT
(Suggestion R1-62-67)

Sometimes the inner race of the bearing turns on the pump shaft causing considerable damage. This has resulted in the need for a complete dismantling of the pump and major repairs. Likewise, the outside bearing races have turned in the bearing housings causing damage and costly repairs.

In order to readily detect the above condition, Mr. Loren C. Pruett of the North Side Irrigation Field Division, of the Minidoka Project, suggested that a vibrator-type electric etcher be used to mark certain points on bearings, races, shafts and bearing housings on electric motors and pumps. The shaft and inside bearing race on the pumps should be marked in corresponding locations and the outside bearing race should be marked in a like manner to aline with the bearing housing as shown in the upper sketch on page 9. It will then be possible to determine, by visual inspection, if the inside bearing race has turned on the shaft, or if the outside race has turned in the housing.

It is Mr. Pruett's opinion that if the corresponding marks are put on the races, housings and shafts that slippage could be detected readily and major damages be prevented. The inspection of these markings could be a part of the annual maintenance program, or be inspected more frequently if bearing trouble is suspected.

Each year a measurement is taken of the air gap between rotor and stators on the electric motors to determine bearing wear. By placing marks at certain locations on the bearing housings and shafts, as shown on the lower sketch, page 9, the measurement can be taken in the same place each year, rather than at various points on the rotor. The rotors are not uniform (measurements in thousandths of inches) and therefore bearing wear is not accurately determined until it is badly worn. By taking the measurement at the same point, the bearing wear is determined immediately. This will give sufficient warning for replacing the bearings in off season shutdown, thus avoiding a possible breakdown during the irrigation season.

If additional information is desired, it may be obtained by writing to the Regional Director, Bureau of Reclamation, Post Office Box 937, Boise, Idaho; or the Assistant Commissioner and Chief Engineer, Bureau of Reclamation, Denver Federal Center, Denver 25, Colorado, Attention: D-410.

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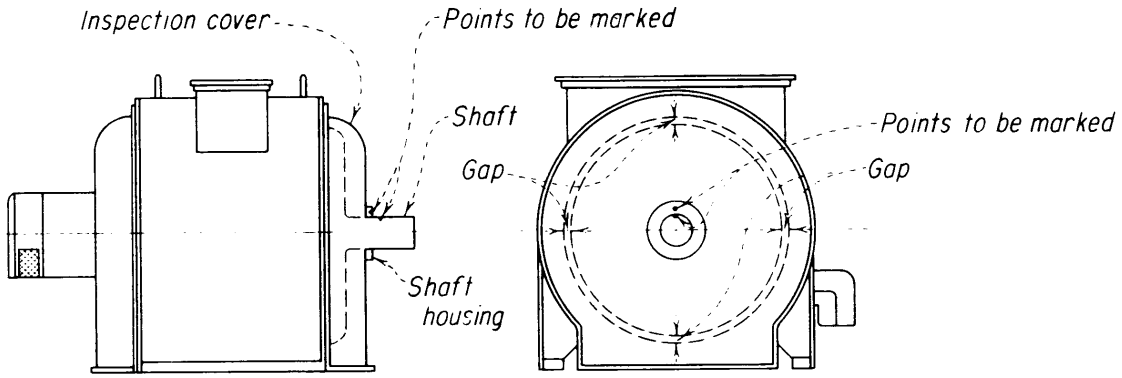
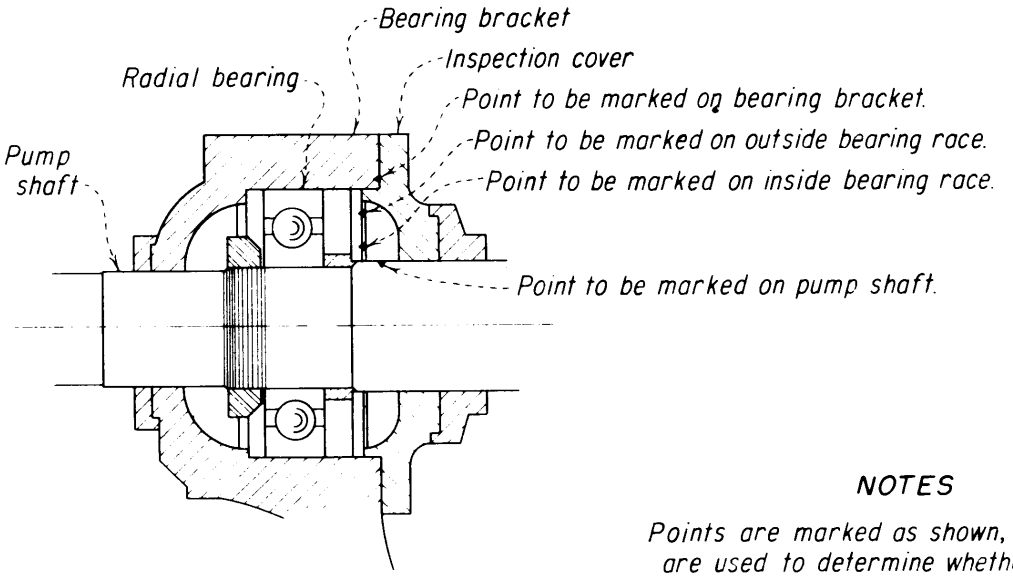


MOTOR

NOTES

Gap is measured as shown in four places between the stator and rotor to check for bearing wear.

Points on shaft and shaft housing to be marked so they can be lined up then measurements can be taken at the same place each time.



SECTION THRU PUMP SHAFT AND BEARING

NOTES

Points are marked as shown, these points are used to determine whether or not bearing races have turned on the pump shaft.

All bearings on pump shaft marked in the same way

MAKING BOUNDARY LINES CLEARER
(Suggestion R7-61-60)

In the Estes-Marys Lake area on the Colorado-Big Thompson Project, encroachment on Bureau land has been a problem frequently. In order to make it easier to point out the boundary of Bureau land, Mr. George G. Adamson of the Estes-Marys Lake Section of the Colorado-Big Thompson Project suggested driving a steel fencepost, painted red and white, at all angle point markers. He felt this would help cure the encroachment problem and would assist in pointing out the boundary to persons owning land adjoining or to parties interested in obtaining easements or rights-of-way, etc.

Mr. Adamson's idea was carried out, and it has proved to be very satisfactory and time saving, because many of the older markers were hidden by grass, brush, and trees and could not be seen readily.

* * * * *

WEED DIVERTER IMPROVEMENT
(Suggestion R1CB-61-27)

One of the main problems to be solved on the weed diverters on the Royal Field Branch of the Columbia Basin Project was to keep the weeds from hanging up at the wire support posts. Previously many variations of the diverter principle were tried, but they all involved supporting the wires which created a place where weeds could accumulate. The diverters were installed to facilitate quick, efficient weed removal at a few known places where equipment could be made readily available for their removal from canals. Otherwise, weed jams might occur at inconvenient and inaccessible locations.

Mr. William M. Savage of the Irrigation O&M Royal Field Branch suggested that a baffle-type effect be created to decrease the water velocity near the support posts. The sketch, page 11, shows the application of Mr. Savage's suggestion. Actual field tests of this suggestion have shown that a weed sliding along the wire will move out away from the wire, as it passes the post and then will return to slide along the wire to the next post or storage area (bypass channel) as shown. The information gained from these tests helped determine the proper angle of the installation as well as the size of the baffle.

Should personnel on other projects be interested in obtaining additional information about Mr. Savage's suggestion they should write to the Project Manager, Columbia Basin Project, Post Office Box 368, Ephrata, Washington; or the Assistant Commissioner and Chief Engineer, Bureau of Reclamation, Denver Federal Center, Denver 25, Colorado.

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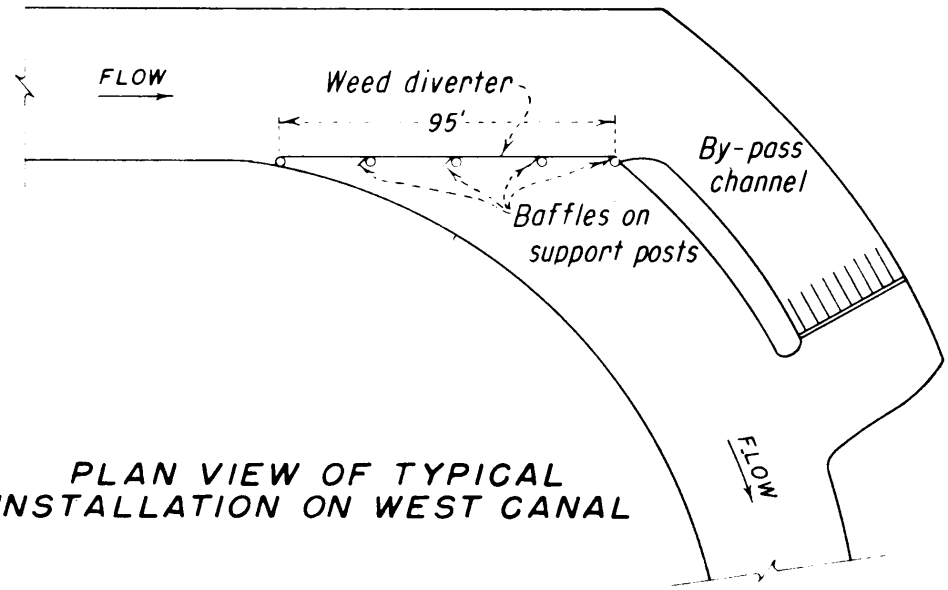
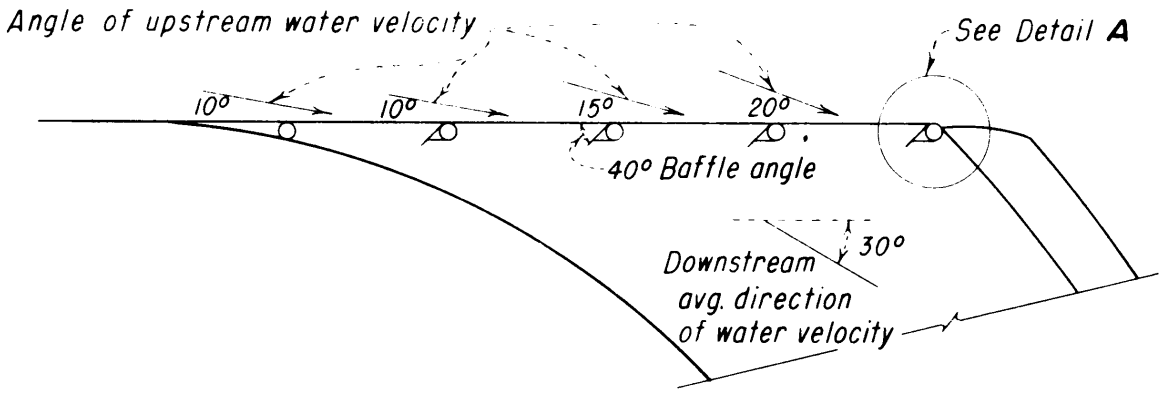
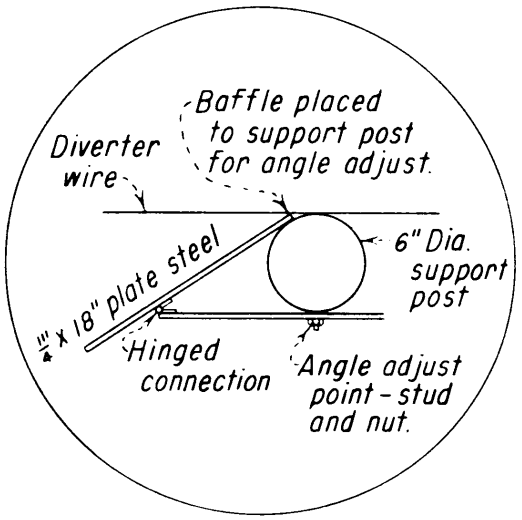


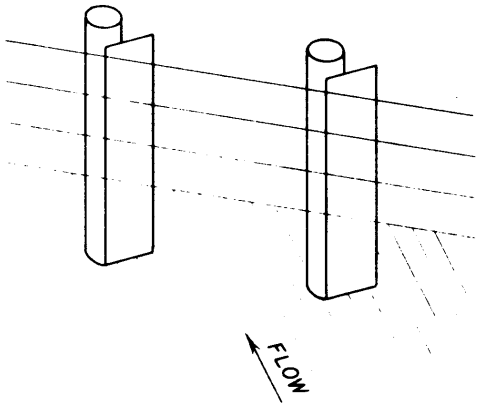
PLAN VIEW OF TYPICAL INSTALLATION ON WEST CANAL



DETAIL OF WATER VELOCITY DISTRIBUTION



DETAIL A



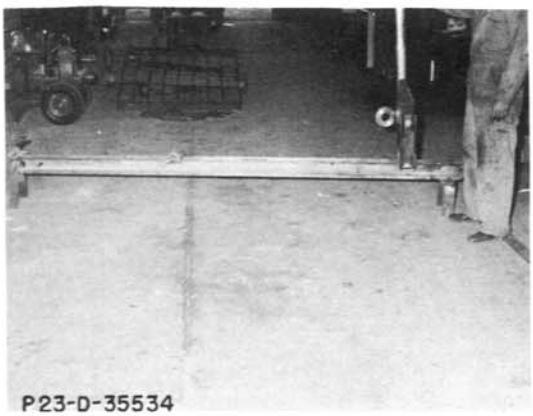
WEED DIVERTER IMPROVEMENT

MECHANICAL PRESS USED TO STRAIGHTEN CHECK GATE GUIDES
(Suggestion R5RG-61-7)

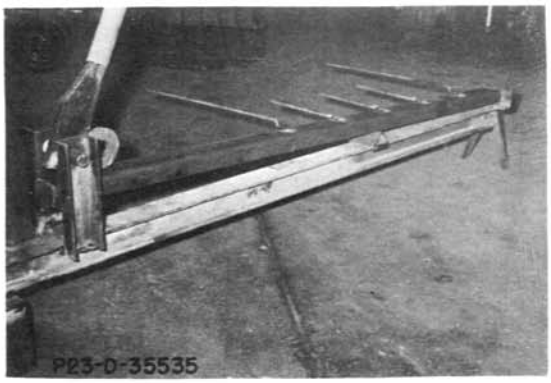
Cold-rolled structural-steel channels are sometimes used for the gate guides on checks. When they are, it is necessary to weld reinforcing bars to the back side of the channel in order to tie it to the concrete. This welding operation can cause the channel to buckle and change its original form. A shop hydraulic press usually used to straighten the channels is awkward for this operation and requires the services of two men.

Mr. Robert P. Marin, Machinist of the Rio Grande Project, made a mechanical press to straighten these channels. The press is made out of a piece of railroad rail, a lever, and an eccentric as shown in photographs below. Mr. Marin claims this press does a good job of straightening the channel and only requires the services of one man.

Mechanical press for straightening check gate guides.



Mechanical press with lever in vertical position.



Mechanical press with check gate guides in press.

Applying pressure to check gate guide to straighten.

It is thought that other projects may have a similar problem and may want to use Mr. Marin's idea. For additional information about his mechanical press, write to the Project Manager, Rio Grande Project, 211 U.S. Court House, El Paso, Texas, or to the Assistant Commissioner and Chief Engineer, Denver Federal Center, Denver 25, Colorado.

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DOES YOUR FIRM'S PREVENTIVE MAINTENANCE PROGRAM COVER FUEL-TANK CARE?

(Reprinted from the August 1962 issue of CONTRACTORS and ENGINEERS with the permission of the Editor)

Do you perform any preventive maintenance on the fuel tanks in the equipment you own or operate? Do you realize that an improperly maintained fuel tank can result in poor performance, downtime, and expensive replacement of engine components?

Engineers of a diesel engine manufacturer suggest that you give some thought to the matter of fuel-tank maintenance. To begin with, see how you or your service crew would answer the following questions:

1. Do you use only the proper grade of fuel oil as prescribed in the manufacturer's fuel-oil selection chart?

2. Do you keep the fuel tank filled when the unit is not operating, thereby reducing condensation to a minimum?

3. Do you drain off any water or sediment from the bottom of the fuel tank every 500 to 15,000 miles?

4. Do you service the oil filters at periodic intervals as recommended in the manufacturer's manual?

Obviously, for correct maintenance of fuel tanks, your answers to the above questions should be yes. Here are the reasons:

A great deal of laboratory and field testing time has gone into gathering the information contained in the manufacturer's fuel-oil selection chart. The use of this chart will eliminate guesswork. Purchasing and using the fuel oil recommended by the chart is a big step in the direction of preventing poor performance

The fuel tank should always be kept full when the unit is shut down. This is especially true when the machine will be inoperative during an extended period during cold weather. When the fuel tank is full, very little condensation will take place.

Water in the fuel will harm the close-fitting, precision working parts in the fuel system, and result in premature wear.

Every 500 to 15,000 miles you should drain off water and sediment accumulations from the bottom of the tank. The removal of the sediment from the tank will increase the service life of your filters.

The preventive maintenance required by the fuel tank is simple, and in most applications can be easily performed by the operator or a mechanic. Far from being an optional item, it can be one of the really important parts of your overall preventive-maintenance program.

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SURGE ARRESTER SIMPLIFIES WATER MEASUREMENT WITH CONSTANT HEAD ORIFICE
(Suggestion R1CB-60-130)

Sometimes the water in the well between the gates of a constant head orifice turnout is turbulent, making the gage hard to read. Mr. Harold W. Beavers of the Columbia Basin Project suggests placing a metal box around the gage to quiet the water in that area. This device, as shown in sketch, page 15, consists of a metal box 7 by 15 by 28 inches for the installation in the Columbia Basin Project, for which Mr. Beavers made his suggestion. The dimensions will vary with the various installations, since the top should be about 0.4 foot above the control water surface.

The two-sided box is made of 1/8-inch sheet metal and has a 1/2-inch hole in the bottom to allow water to enter. It is bolted by the ears to the two sides of the concrete wall of the turnout well by 1/4- by 2-inch bolts, which can be shot into the wall with a nail gun. On the Columbia Basin Project installation, the metal is protected by using the same kind of a paint as is used on the large canal gates.

Mr. Beavers states that this means of turbulence or surge control has been used on several constant head orifice turnouts on the George Watermaster Section of the Columbia Basin Project for the past 2 years, and it has been found to be very effective. Other projects may have similar trouble reading the gages in the wells of the constant head orifice turnouts and may want to use Mr. Beavers' suggested remedy. If additional information is desired, write to Regional Director, Bureau of Reclamation, Box 937, Boise, Idaho, or to the Assistant Commissioner and Chief Engineer, Bureau of Reclamation, Denver 25, Colorado, Attention: D-410.

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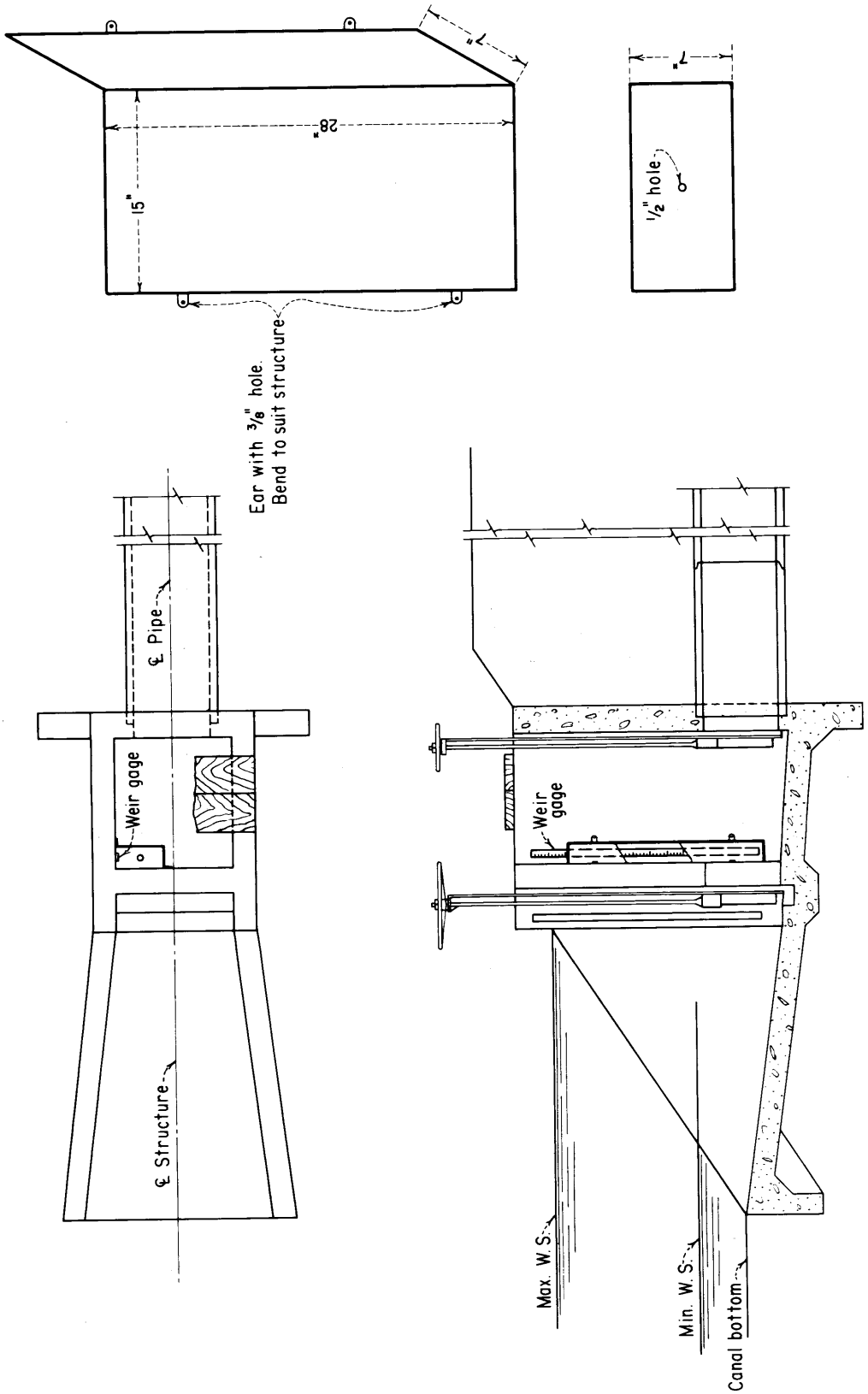

7"
28"
15"
7"
½" hole
Ear with 3/8" hole.
Bend to suit structure
℄ Pipe
Weir gage
℄ Structure
Weir gage
Max. W.S.
Min. W.S.
Canal bottom

LIFTING CLAMPS FOR 55-GALLON METAL DRUMS
(Suggestion R1-61-68)

Mr. Floyd R. Culley and Mr. Marion O. Smith of the North Side Irrigation Field Division, Minidoka Project, Rupert, Idaho, suggested the use of the clamp shown in the photograph at left for lifting 55-gallon metal drums.

The clamp consists of a spreader bar with a lifter ring welded to the center for low overhead clearance. Lifting chains are welded to each end of the spreader bar and to the compression band. The compression band is a steel band, which can be contracted by a lever similar to a chain binder, and can easily be operated by one hand.

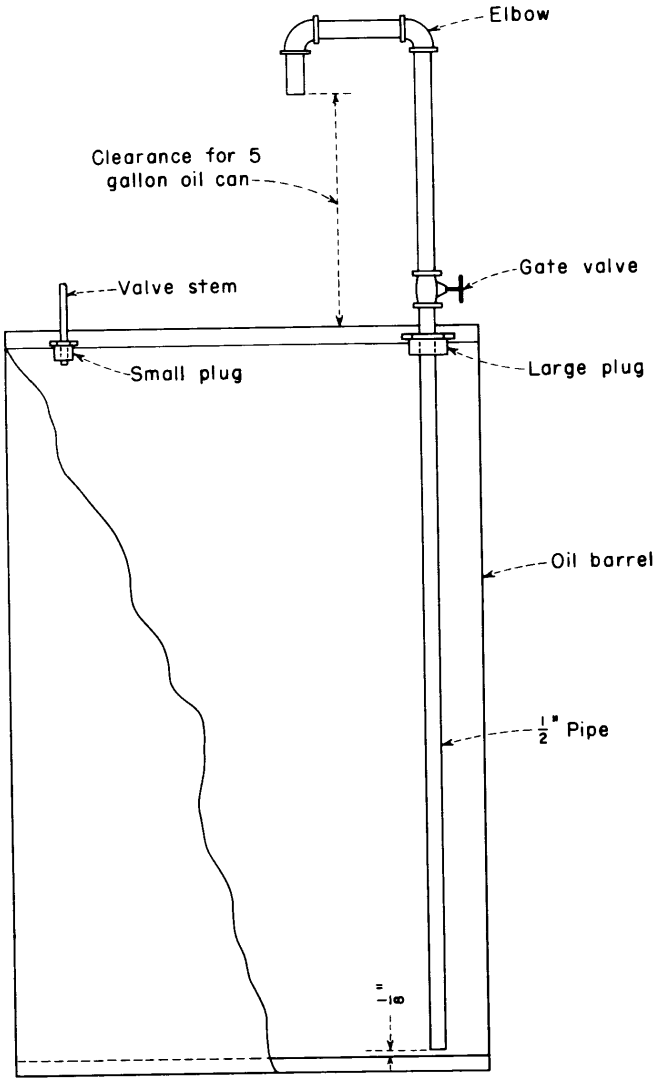
When open, the compression band drops easily over the drum, and is in correct position just below the top ring of the barrel when the spreader bar rests upon the top of the drum. Mr. Culley and Mr. Smith say that this device does not damage a drum, even the nonreturnable ones, which are easily bent and broken when filled with extra heavy contents. The device also protects returnable drums which sometimes become bent in handling, reducing their value from $6.00 to nothing.

Using this lifting clamp, one man and a hoist can load or unload full or partially full drums. It also eliminates the dangerous practice of personnel handling drums in limited space, on slick steel truck beds, concrete floors, and in pickups.

* * * * *

AIR PRESSURE FORCES LIQUIDS FROM BARRELS
(Suggestion R1-61-59)

On the North Side Irrigation Field Division of the Minidoka Project, a large amount of oil is used in the drip pots to lubricate the shafting of the deep well pumps and it is the ditchrider's job to be sure the drip pots are kept filled. A rack was used to hold the oil drums, but often the drum would be left empty on the rack or it would not contain quite enough oil for the ditchrider's needs. Then the ditchrider would need



to handle a full drum alone. It was decided to try something else.

Barrel pumps were tried and were an improvement. However, the barrel pumps broke down occasionally, and sometimes oil was spilled on the floor. Mr. Robert N. Weibel then suggested a way to dispense with the oil pumps by using air pressure, to force the oil out of the barrel.

As shown in the sketch at left, a valve stem from an old inner tube was found and a hole was drilled in a small oil drum plug slightly larger than the valve stem. The valve stem was placed in the hole and brazed in the plug to make the joint airtight. Similarly a hole was drilled and a half-inch pipe was brazed in the large plug. The length of the pipe was such that the end inside the barrel was one-eighth inch from the bottom of the barrel and the other end protruded through the plug a sufficient length to permit a 1/2-inch gate valve to be placed on it. Two short pieces of pipe, two elbows, and a short nipple completed the piping assembly as shown. The arrangement of pipes screwed into the gate valve must be of proper dimensions to allow clearance for a 5-gallon oil can to be placed on top of the barrel under the nipple as shown in the drawing. The elbow between the horizontal pipe and nipple need not be tightened any more than hand tight. This allows it to be turned upward to stop any oil from dripping from it.

Pressure to operate this device is furnished by a tire pump through the valve stem in the small plug. Mr. Weibel recommends that one should be careful about the amount of air pressure used. If the man operating this arrangement will place his oil container under the spout and open the gate valve, and then start pumping air into the barrel, excessive air pressure will not be developed. He should stop pumping air into the barrel when the oil starts flowing into the oil can.

* * * * *

PARTS WASHER
(Suggestion R5-RG-61-25)

The sketch on the following page is a device suggested by Mr. J. V. Williams, Equipment Operator on the Rio Grande Project, El Paso, Texas, for washing and cleaning oil, grease and foreign substances from automotive and other mechanical parts. The washer consists of a washing pan with the nonflammable washing liquid being circulated through the pan and a filter for removing the oil, grease, and other foreign matter. The device was suggested as a means of avoiding the use of more flammable cleaning fluids such as kerosene, etc., and of using nonflammable cleaning fluids to better advantage.

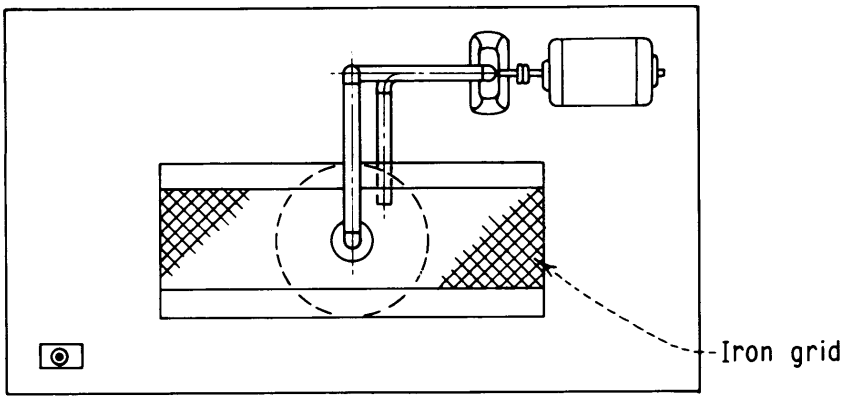
The washer is composed of two 100-pound grease drums; several lengths of 3/4-inch pipe and fittings, an automobile water pump, a small electric motor and foot switch, and two metal racks mounted on a movable base. One drum is cut lengthwise and serves as a removable washing basin. A metal grid placed in this basin serves as a rack on which the parts to be cleaned can be placed. The second drum serves as the base for the basin and the top of this drum is cut to fit the removable basin. In the bottom of the drum which serves as a base, a second metal grid is placed to serve as a rack to support cotton mill wastes which in turn serve as a filter for the removal of oil, grease and other foreign materials from the cleaning fluid. The remaining assembly consists of the piping and installation of the pump, motor, and necessary electrical and piping connections.

The washing and cleaning device was constructed in the project shops using for the most part, scrap and discarded materials. The cost of construction, primarily for the labor involved, was about $40.00. The device discourages the use of flammable material which is a hazard to men, equipment, and buildings, and makes it possible to do a better job of cleaning parts with greater ease and in less time.

* * * * *

OPERATING DECK AND VALVE HANDWHEEL MODIFICATION FACILITATE OPERATIONS
(Suggestion R1-62-27)

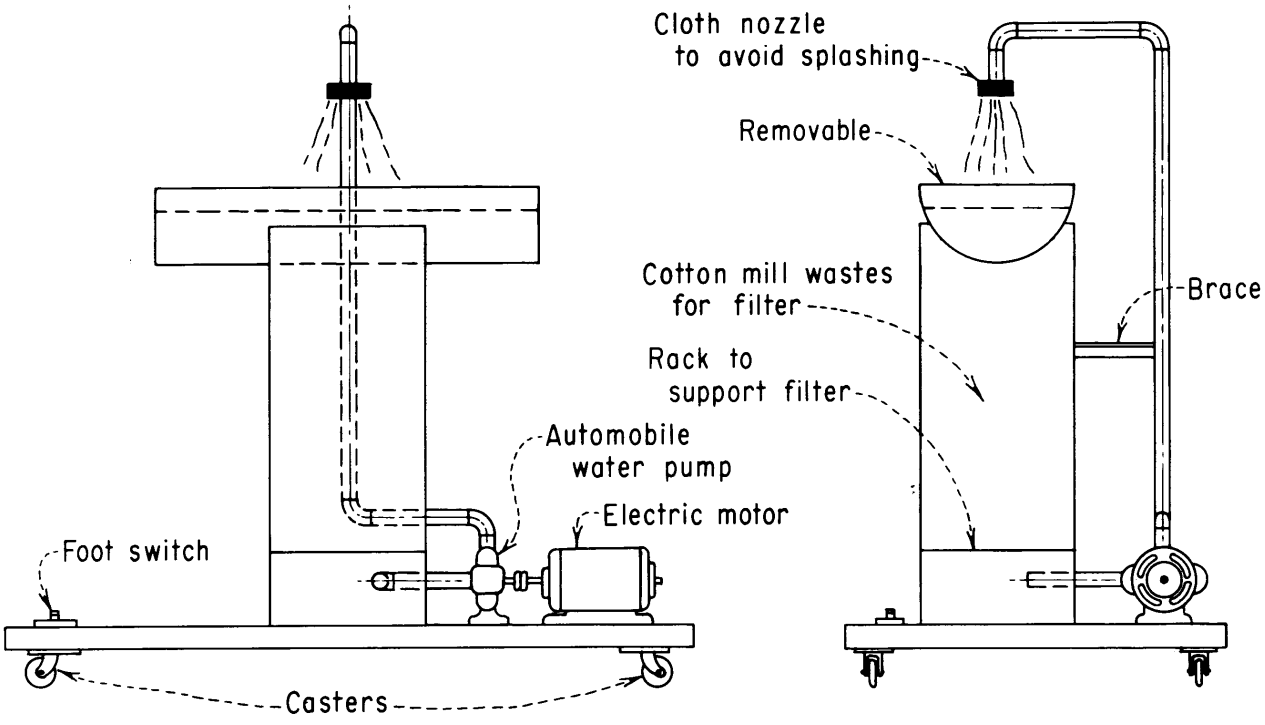
The present method of opening and closing 18-inch valves, located in the outlet tunnel and the power tunnel in Palisades Dam requires three or four men working in relays of two in order to operate the valves against the pressure of the water in the reservoir. Mr. Chester A. Warwick, Assistant Powerplant Operator at Palisades, suggested that the hazards could be eliminated by the installation of a small deck upon which the operator could stand safely and solidly while turning the valve handwheels, and the addition of spokes to the outside of the valve handwheels to permit more efficient use of the operator's energy.



PLAN

NOTES

All pipe is $\frac{3}{4}$-inch.
Drums are 100 lb. grease drums or equivalent.



ELEVATION

PARTS WASHER

Pressure in the pipe varies from 58 to 110 pounds per square inch depending on headwater elevation. Turning the valve handwheels required considerable effort to be expended while standing in an extremely awkward and hazardous position, that is, standing on the 18-inch pipe (usually wet) using one hand to move the handwheel and the other to maintain balance. Potential injuries include strained muscles from exerting considerable force while in an awkward position, head injuries from slipping and head striking the concrete wall, and leg and ankle injuries from slipping from the pipe to the sump floor.

Mr. Warwick's suggestion, as shown in detail below, has made operation of the valves by two men possible. One man alone could probably now operate the valves, if necessary.

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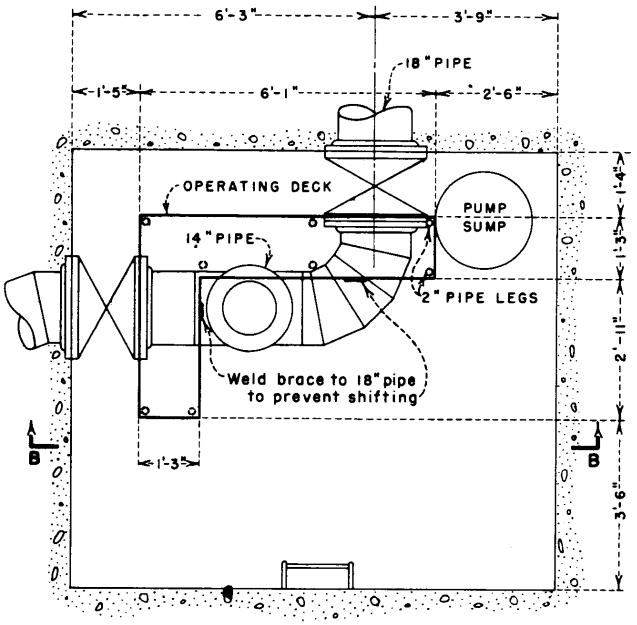


SECTION A-A

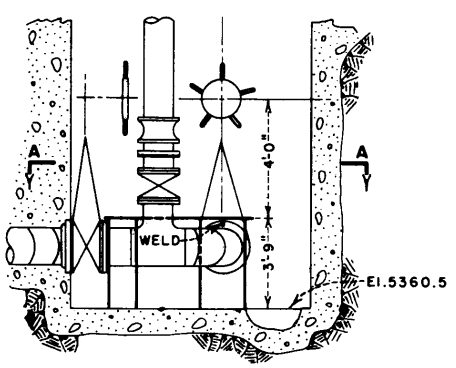
NOTES

Deck as drawn would not interfere with sump pump or other piping.

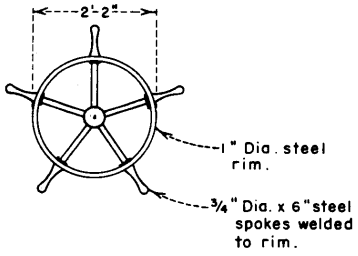
Ample clearance to permit addition of 6" spokes to valve handwheels.

Suggested Construction:
DECK - ¾" plywood or ¼" steel plate.
DECK FRAME - 2"x2" angle iron.
LEGS - 1½" or 2" iron pipe, braced as required.

Note: Valve in 14" pipe may be easily operated from the sump floor.



SECTION B-B



DETAIL C
VALVE HANDWHEEL

REINFORCING STEEL BENDER
(Suggestion R5-RG-61-5)

The Rio Grande Project manufactures concrete piling for use on the project in which rings of reinforcing steel are used. It is required that these rings have an overall diameter of 6-5/8 inches with two legs 2 inches long and 5-1/2 inches apart as shown in Figures 1 and 2. These rings are very difficult to bend by hand because of their small diameter and of the two legs sticking out from the side of the ring.

Mr. Robert P. Marin, Machinist, on the Rio Grande Project, solved the problem by making a roller-type reinforcing-steel bender which is shown in Figures 3 and 4. Mr. Marin states that his bender permits one man to make one of these rings in 1 minute. Should the personnel of any project be interested in getting more information about this device, it is suggested that they write to the Project

Fig. 1--Re-bar ring made with bender.

Fig. 2--Re-bar ring made with bender.

Fig. 3--Bender mounted on pipe support and initial position of re-bar before bending.

Fig. 4--Bender in final position after bending bar.

Manager, Rio Grande Project, 211 U.S. Court House, El Paso, Texas, or to the Assistant Commissioner and Chief Engineer, Bureau of Reclamation, Denver Federal Center, Denver 25, Colorado, Attention: D-410.

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SKIMMER GATE AT GRANITE REEF DIVERSION DAM

When the Granite Reef Dam on the Salt River Project was rehabilitated in 1958, a novel arrangement to skim off the floating trash and debris was installed in the sluiceway. Radial gates were installed as sluice gates on both sides of the dam, and one gate on each side was equipped with a "skimmer gate."

The radial gate, see photograph on front cover page, is really two gates, one on top of the other. The upper portion of this gate can be raised independently of the lower section, and when so raised allows the water to flow over the lower gate. This opening allows the debris that is floating on top of the river to be passed over the dam and be sent downstream. When the skimmer gate is closed, the radial gate is the same height as the other gates in the sluiceway.

As shown in the sketch on page 23, the skimmer gate is a radial gate with its hinge in the pin plate of the bottom portion. When it is desired to sluice the structure by raising the gates, the whole gate can be raised by a hoist attached to the bottom sector. When "skimming" only is required, the upper portion of the gate only is raised by the smaller downstream hoist.

The Salt River Project is very well pleased with this type of gate as it removes the debris from the river without loss of very much water as would be the case if the radial gates of the sluiceway would be opened to sluice the floating debris downstream. If additional information is desired, contact the General Manager, Salt River Valley Water Users' Association at Tempe, Arizona, or to the Assistant Commissioner and Chief Engineer, Bureau of Reclamation, Denver Federal Center, Denver 25, Colorado.

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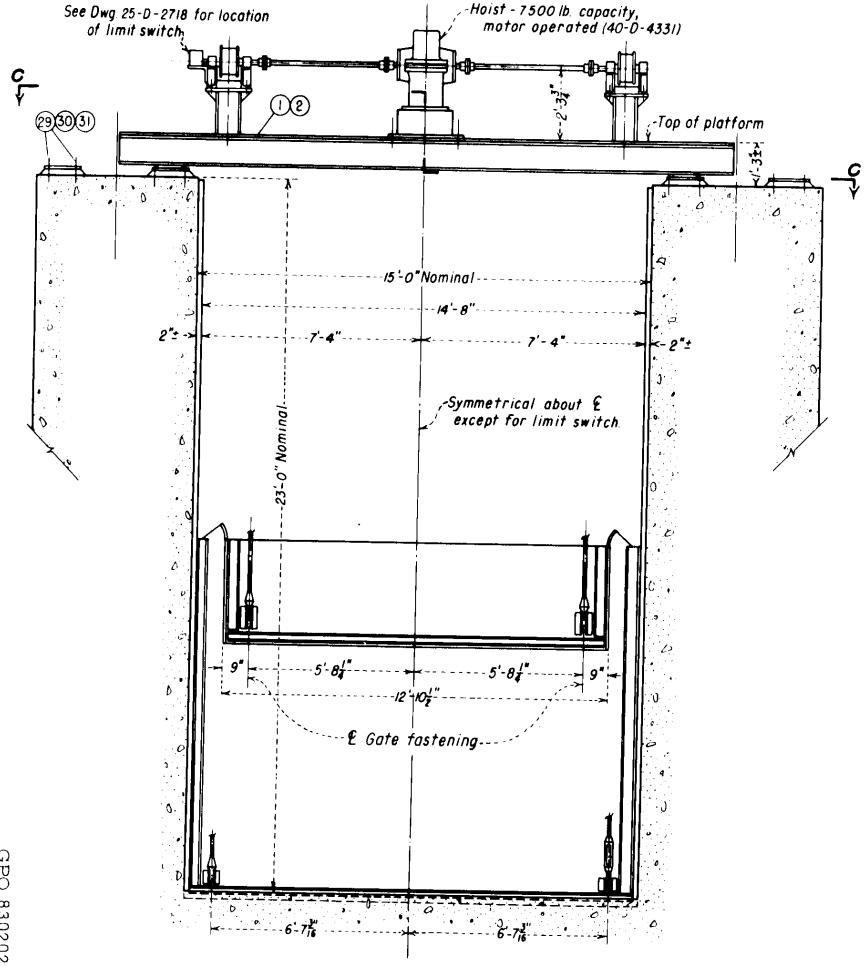
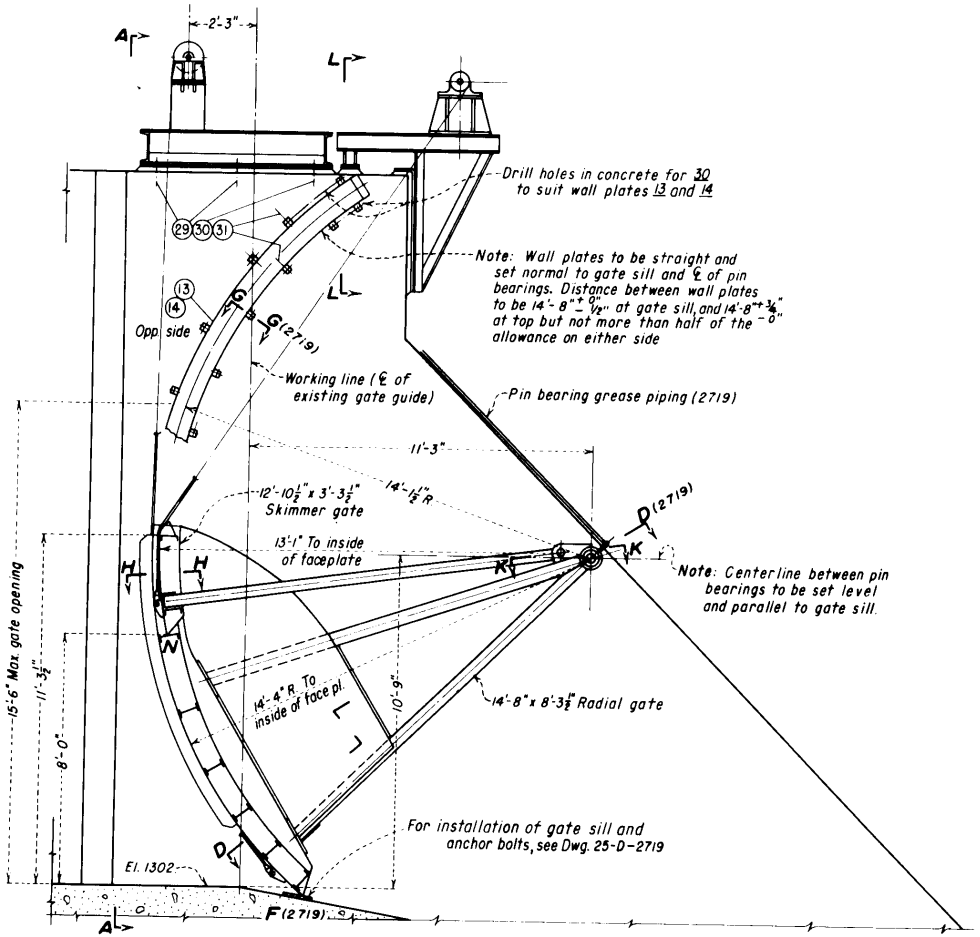


SECTION A-A



SECTION B-B (2718)

GPO 830202