Trashrack Rake

The debris that collects on the trashrack of the Wellton-Mohawk Pumping Plant No. 1 of the Gila Project, Arizona, consists largely of pondweed, as shown in Figure 189. A mechanical rake similar to that installed on other project facilities was provided for clearing the debris from the trashrack. In operation, however, difficulty was encountered in using the rake due to the type of debris. It collected on the trashrack and interwove into a homogeneous compact mass, forcing the wheels of the rake to ride over it. This in turn lifted the rake away from the trash bars. Modifications to improve operations were made as discussed below.

A drawing of the original trashrack rake is presented in Figure 190. The modification of the rake devised by the project forces is illustrated in Figure 191, and consists of a set of rake teeth or plows mounted just ahead of the wheels. The teeth clear a path through the debris so that the wheels are permitted to roll on the surface of the rack as designed, successfully removing the entwined mass.

The type of debris appears to have a bearing on the success of the rake in clearing trashracks. As now modified, the Gila Project is well satisfied with the rake in handling the debris, principally pondweed and moss encountered in the canal system. A view of the rake in operation is shown in Figure 192.

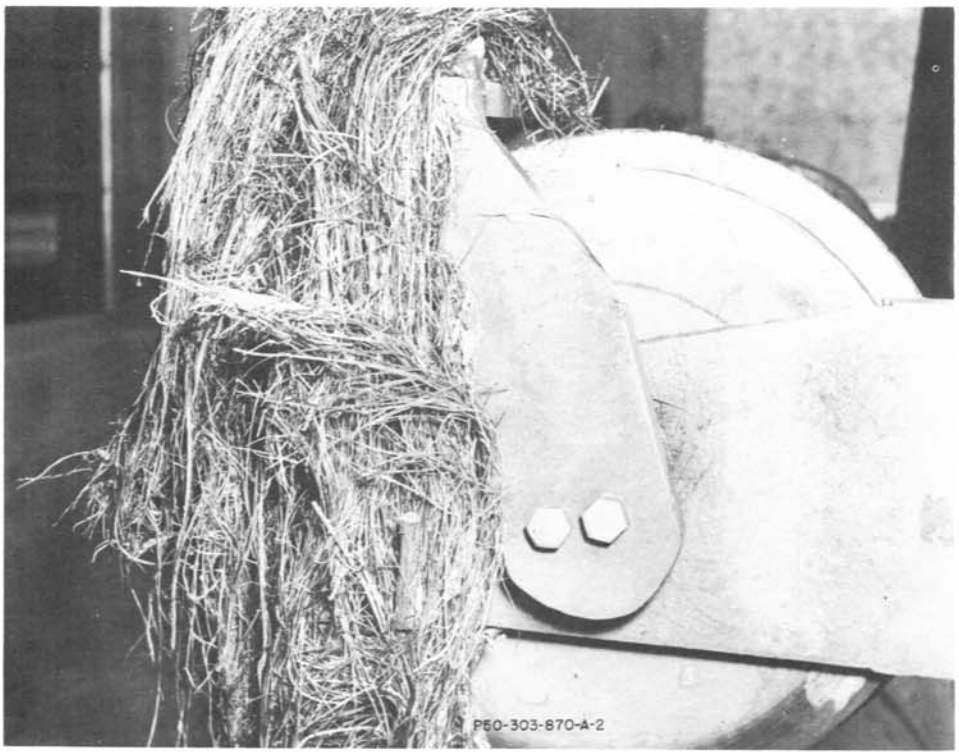


Fig. 189

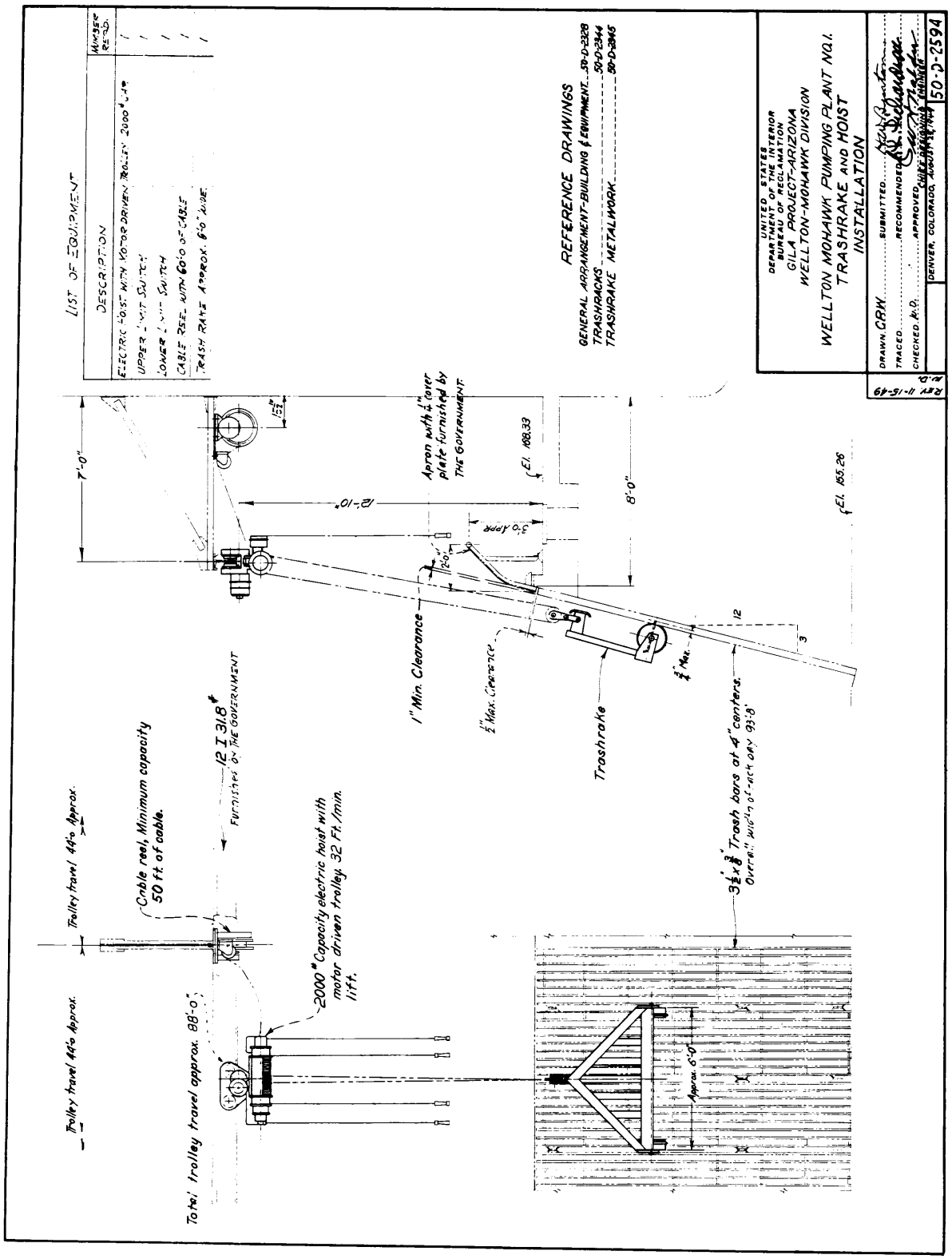

LIST OF EQUIPMENT
DESCRIPTION
ELECTRIC HOIST WITH MOTOR DRIVEN TROLLEY 2000# CAP.
UPPER LIMIT SWITCH
LOWER LIMIT SWITCH
CABLE REEL WITH 60'-0" OF CABLE
TRASH RAKE APPROX. 6'-0" WIDE
REFERENCE DRAWINGS
GENERAL ARRANGEMENT-BUILDING & EQUIPMENT...50-D-2328
TRASHRACKS...50-D-2344
TRASHRAKE METALWORK...50-D-2345
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GILA PROJECT-ARIZONA
WELLTON-MOHAWK DIVISION
WELLTON MOHAWK PUMPING PLANT NO.1
TRASHRAKE AND HOIST
INSTALLATION
DRAWN CRW
TRACED
CHECKED W.D.
SUBMITTED
RECOMMENDED
APPROVED
CHIEF ENGINEER
DENVER, COLORADO, AUGUST 14, 1944
50-D-2594
Trolley travel 44'0 Approx.
Cable reel, Minimum capacity 50 ft of cable.
12 I 31.8#
Furnished by the Government
2000# Capacity electric hoist with motor driven trolley 32 Ft./min. lift.
Total trolley travel approx. 88'-0"
1" Min. Clearance
Apron with 4" cover plate furnished by the Government
El. 108.33
El. 155.26
Trashrake
3½" x ⅜" Trash bars at 4" centers.
Approx. 6'-0"
8'-0"
12'-10"
7'-0"

Fig. 190

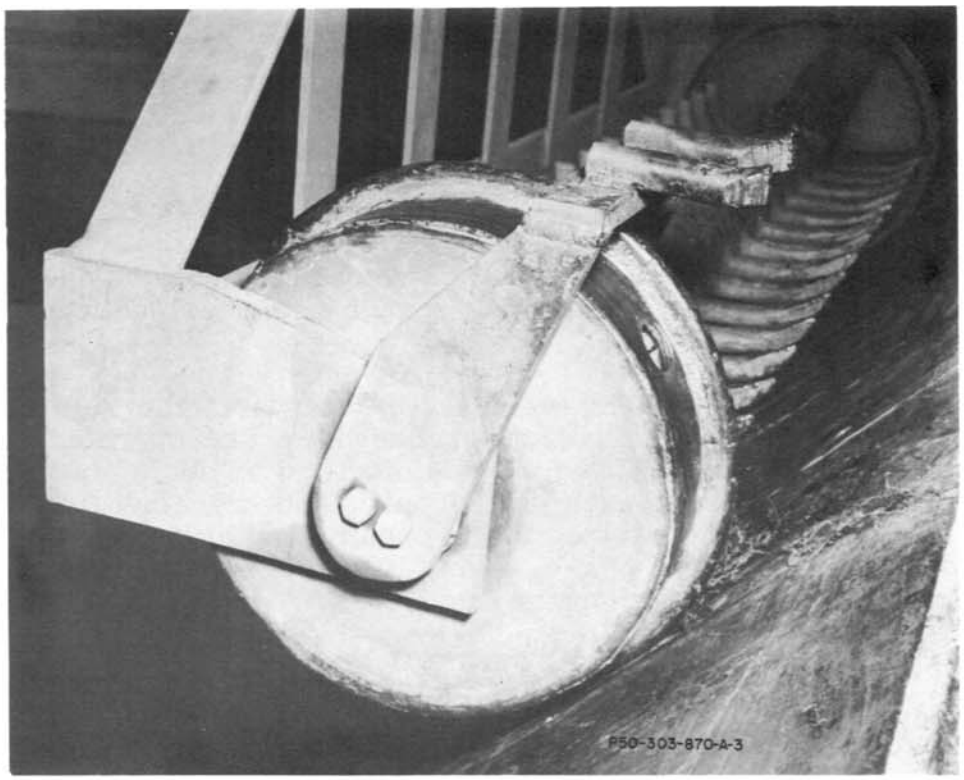


Fig. 191

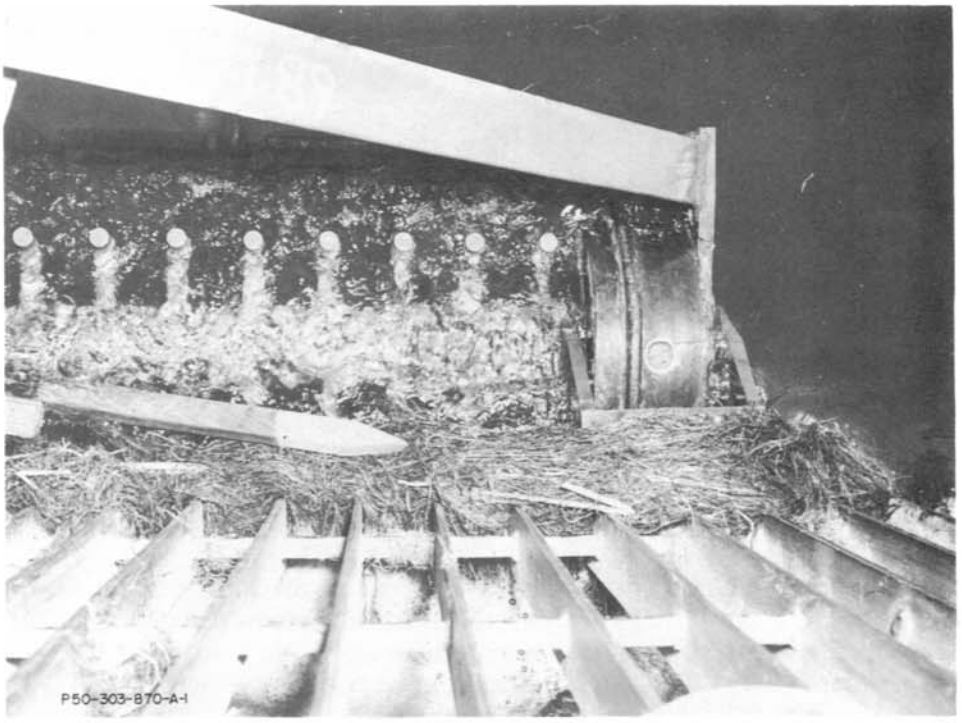


Fig. 192

Weed Forks

Several methods of weed control are in general use on the Klamath Project, California-Oregon, including the use of aromatic solvents, chaining, and dredging. Removal of dislodged moss and weeds that have floated downstream to pumps, culverts and siphons has in past years been done to quite an extent by hand labor at a relatively high cost. The savings, therefore, due to the use of the weed fork shown in Figures 193 and 194 is worth consideration by other projects with like problems.

In an attempt to reduce the manpower used in this work, the Tule Lake Division of the Klamath Project purchased a crane-operated sugarcane grapple or fork. This fork was modified by adding two prongs and a heavy weight to each jaw. The weights were needed to give faster and more positive action in opening and closing. This fork was operated by a truck crane, giving it the required mobility to move around to various ditches as required.

Fig. 193

The weed fork shown in Figure 194 was designed and constructed for use on the W. C. Austin Project, Oklahoma, to remove weed growth which has been broken loose by chaining operations or to grab floating material. The use of the mechanical weed fork was found to be more effective than a dragline bucket as a larger payload

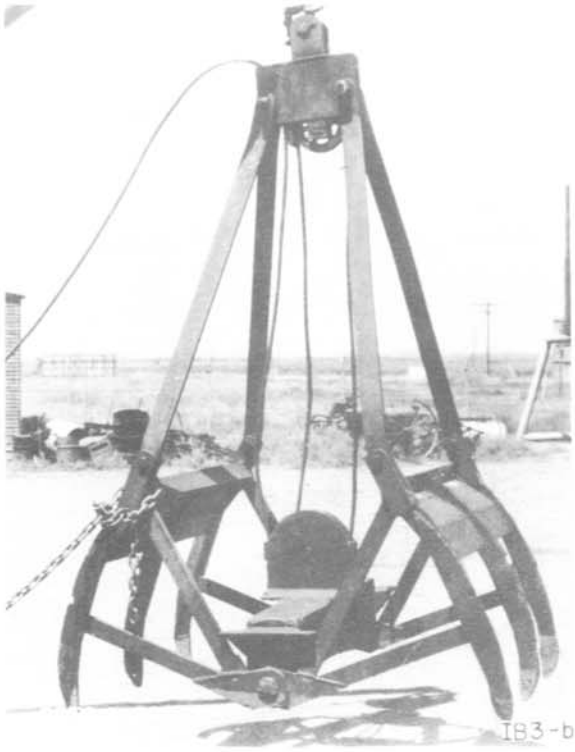


Fig. 194

could be carried and the water drained away freely when the debris was raised.

Sugarcane forks to which one or more tines can be added for this type of use are available commercially.

A fork-type attachment used on a commercially available truck-mounted unit has facilitated the removal of floating moss or other debris that accumulates in canals and drains on the Yuma Project, Arizona. The attachment developed by the Yuma County Water Users' Association, is shown in Figures 195 and 196.

When the dislodged debris amounts to so much that it

Fig. 195

cannot be floated through the turnouts with the irrigation water, the fork-type attachment has proved to be a very efficient unit for the performance of the work.

Fig. 196

Weed and Demossing Buckets

A bucket shown in Figure 197 was fabricated in the shops of the Salt River Valley Water Users' Association in Phoenix, Arizona, for use with the Association's fleet of excavators in expediting and facilitating the removal of moss from the canals and laterals of the irrigation system.

The bucket is shaped much like a 60-inch ditch cleaning bucket supplied by the excavator manufacturer. However, the Salt River bucket is 72 inches wide, has a serrated cutting edge, and the bucket plate has been perforated, as it is normally used under water.

The unit is shown in operation in Figure 198. A large amount of moss and silt can be removed with each pass of the bucket, demossing about 1 mile of ditch per day.

Cleaning of the canal or lateral while demossing also eliminates an additional pass through the ditch by hand crews at a later date.

On the Salt River Project, maintenance of the canal system is complicated by the proximity of many growing residential areas. Limited right-of-way, the presence of overhead power and telephone lines, and other residential problems. This made the equipment

ideally suited for the work. Demossing on the project in 1956 by the use of the bucket was being done for approximately $68.00 per mile. This is about one-half the cost of the conventional chaining and disking operation previously used, which involved catching the moss on grates placed in the waterway being cleaned and then hand forking the moss from the grates.

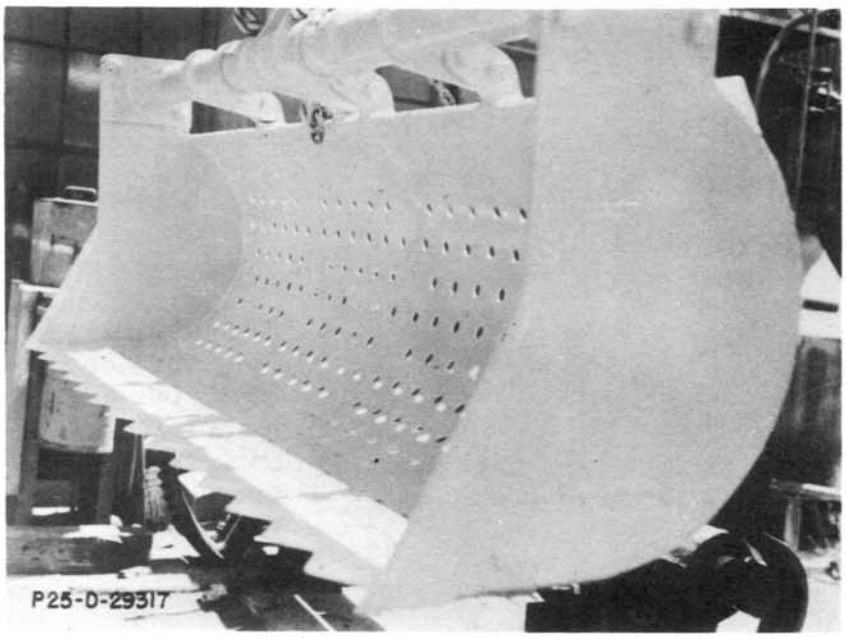


Fig. 197

Fig. 198

Fig. 199

The operation of a smaller weed bucket is illustrated in Figure 199. The trashracks can be cleared rapidly after a severe windstorm with this rubber-mounted equipment on the Columbia Basin Project, Washington. The dead tumbleweeds which accumulate on the trashracks are burned in place on the landing mat platform.

For use where bucket teeth may catch on rocky banks, the reinforced weed bucket shown in Figure 200, is used in weed removal operations on the Columbia Basin Project. The bucket is designed for mounting on a similar type rubber-mounted excavator as those previously shown.

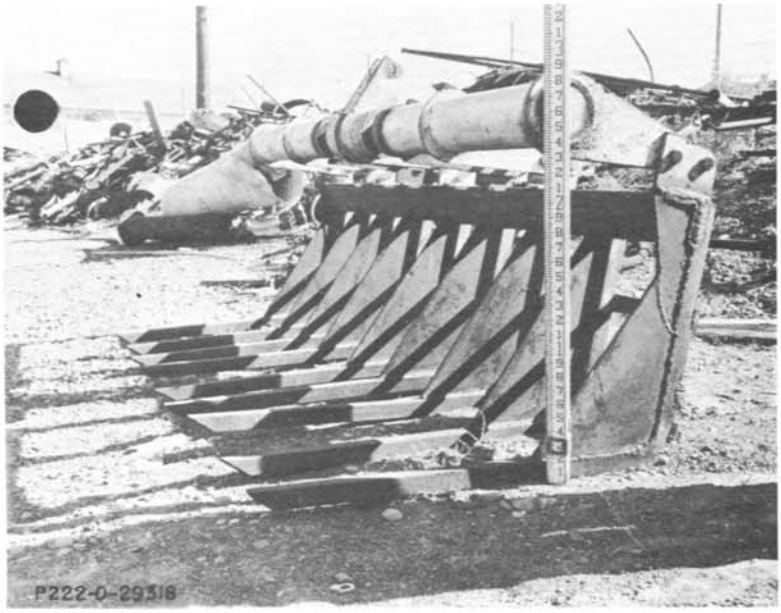


Fig. 200

The bucket shown in Figure 201 also was designed for use in removing tumbleweeds from channels where rocks or other projections will damage bucket teeth.

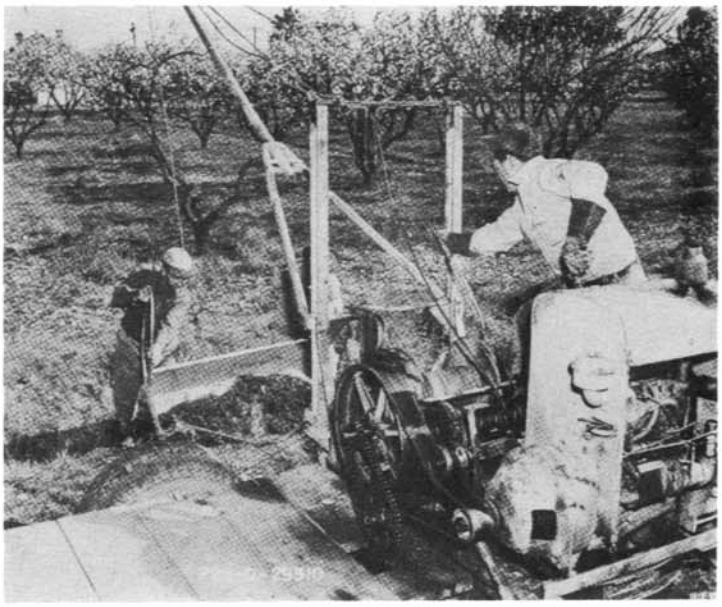
This bucket, also used on the Columbia Basin Project, Washington, was designed for use on a 3/4-yard dragline.

Fig. 201

Scrapers

Scrapers for Small Ditches

Removal of weed-infested berms and windblown or water-deposited soil from small ditches is a laborious task. To mechanize this operation, personnel on the Orland Project, California, have designed and constructed the trailer-mounted winch-scoop, shown in Figure 202, to rapidly clean small-sized ditches.



The main unit of the machine consists of a three-drum winch powered by a gasoline engine. Fixed upright standards are attached firmly to one end of the steel frame which is mounted crosswise upon a four-wheel trailer. The standards are used for the attachment and support of the light boom.

Fig. 202

Operation of the machine is similar to a dragline, except that the unit is mounted rigidly and will not swing. A light scraper with a fixed handle on each end is guided by two men in the ditch. The hoist line from one drum is used to dump and return the scraper, and a cable from the other drum serves as a dragline.

Water-propelled Scraper

The water propelled scraper shown in Figures 203 and 204 was devised to cut loose sediment and waterweeds from concrete-lined canals. Pressure of the water against the vertical plank wall, which is cut to fit the shape of the lining, pushes the scraper down the channel. If the water pressure is not sufficient, the scraper is pulled by a truck.

Fig. 203

Scouring action of the water rushing between the movable scraper blade wings and the lining effectively sluices free much of the debris that is not loosened by the bulkhead which is shaped to fit snugly against the walls.

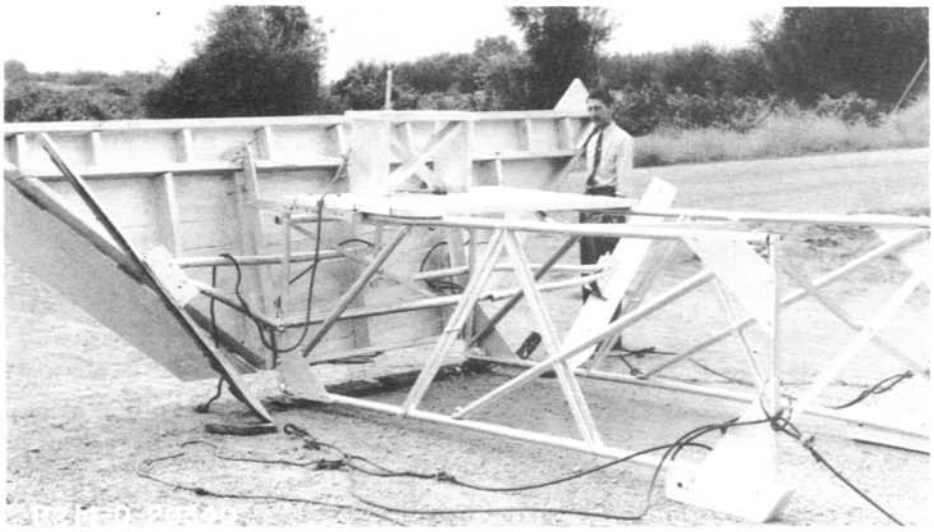


Fig. 204

The blade which serves as a runner for the scraper slices through and loosens the sediment on the bottom of the canal. Hinged extensions on each side of the scraper bulkhead have been added so that the unit can be used in ditches of different sizes.

The scraper was designed for use on the Contra Costa Canal by personnel of the Delta District, Central Valley Project, California.

Cutters and Mowers

The clearing of floodways and reservoir areas in projects in the southwest to reduce transpiration of water by woody plants and improve the flow characteristics in channels is a major undertaking. The problem in the Middle Rio Grande Project in New Mexico is illustrated in Figure 205. The view shown is a typical stand of salt cedar along the flood plain of the Rio Grande River.

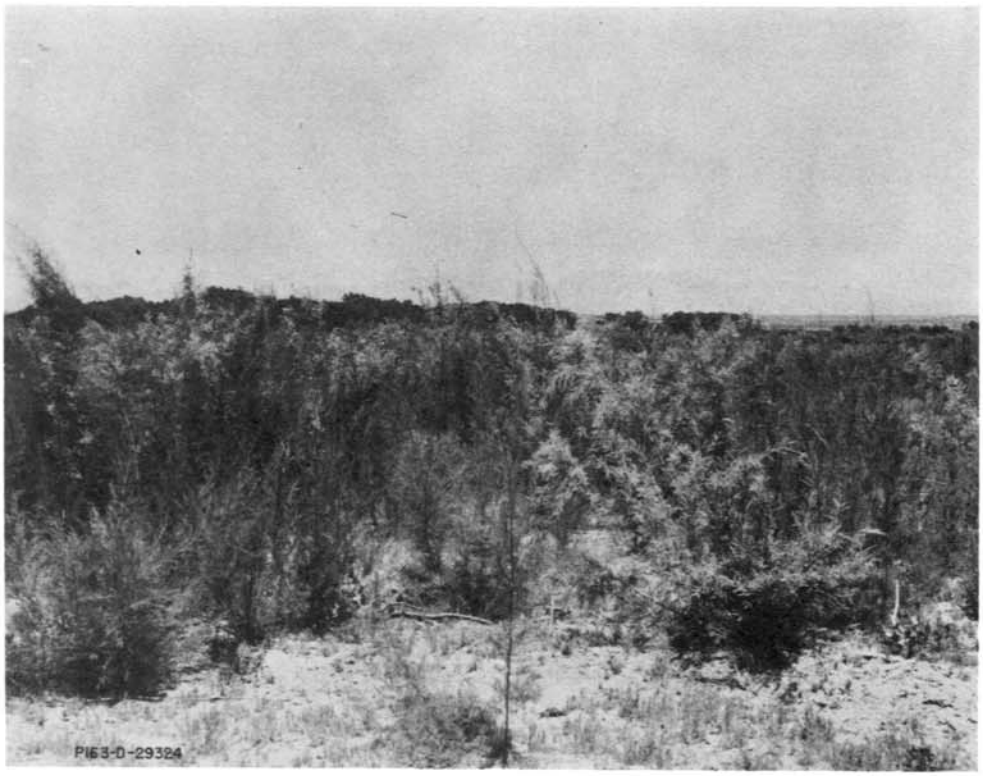


Fig. 205

Root Cutters

Large equipment has been used in the clearing work on the Middle Rio Grande Project. Figure 206 is a rear view of a root cutter used in removal of the woody vegetation. The rooter, powered by a heavy-duty tractor shown, cut 860 acres of the woody plant

Fig. 206

regrowth at an average cost of $9.00 per acre. As shown in Figure 207, the cutter blade normally operates between 12 and 18 inches below the surface of the soil.

Fig. 207

Rotary Cutters

In the Caballo Reservoir area on the Carlsbad Project, New Mexico, 84-inch rotary cutters similar to that shown in Figure 208 have been used effectively. Salt cedar up to about 2 inches in diameter is cleared with the wheel-type tractor and mower. The mower was also used for cutting the woody regrowth after the initial clearing.

Fig. 208

On 1,574 acres cleared by this method, the average cost was $6.24 per acre. The cutting of regrowth has averaged about $1.60 per acre on the 5,160 acres that have been controlled.

One cutting per year has been required for adequate control.

Weed and Brush Rakes

Numerous devices have been developed by the operators of irrigation projects to bunch and move weeds and brush in disposal operations. Most of the larger ones developed are tractor mounted. The rake shown in Figure 209 is used on the Columbia Basin Project, Washington, for bunching dry weeds prior to burning.

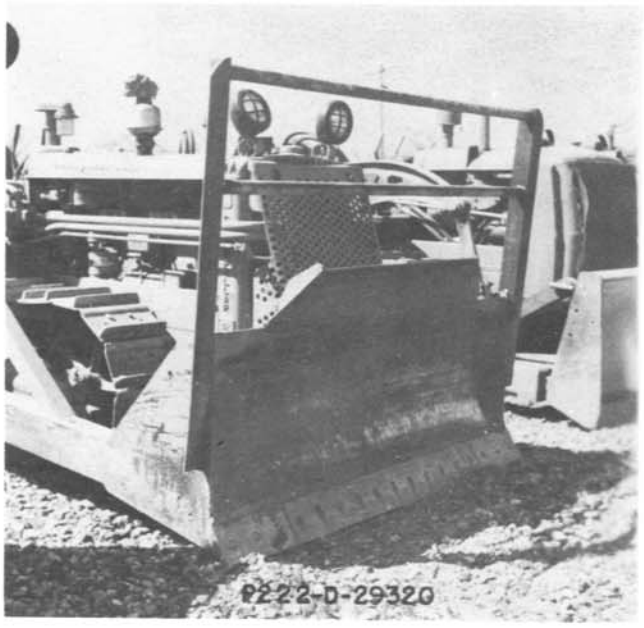


Fig. 209

It consists of a standard bulldozer blade equipped with a frame to prevent the weeds or brush from overriding the blade and falling upon the tractor. The slight overhanging lip constructed on the upper part of the dozer blade also contributes to easier handling of bulky weeds and brush.

Rock Rake

The rock rake shown in Figure 210, mounted on a large crawler tractor, has been used for clearing salt cedar growth in the Caballo Reservoir area, Caballo Project, New Mexico. The rake pulls many trees up by the roots. Woody plant growth removed is then stacked and burned.

On 3,578 acres cleared by the means described, the average cost has been about $13.75 per acre, which includes all field costs except burning.

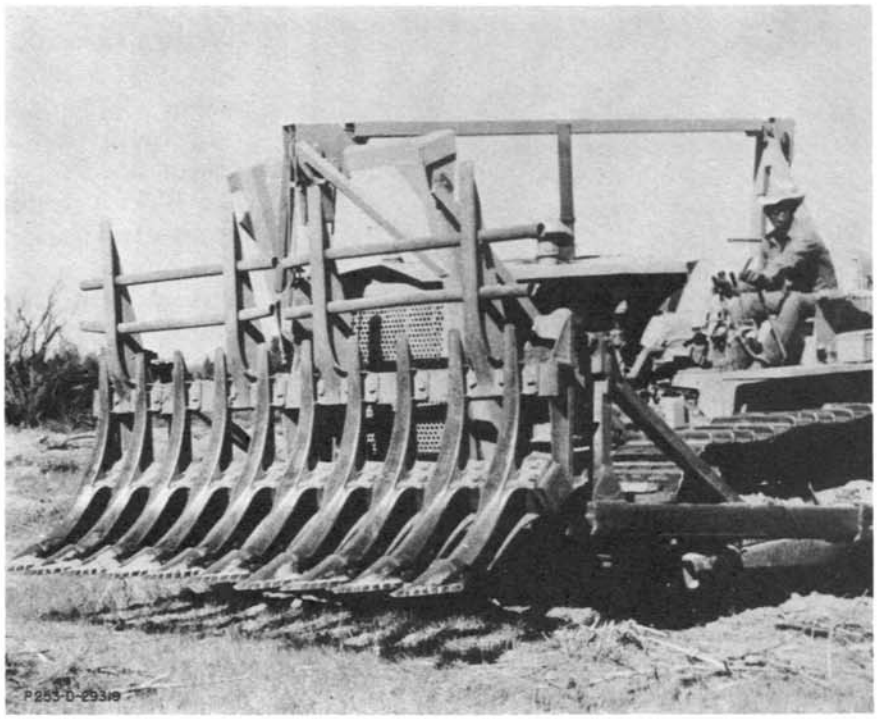


Fig. 210

APPENDIX

Weed Control Handbook

Weed Control Equipment operators have needs for guidelines which are accurate for their project and which are available on the job. Such a handbook was devised by E. G. Cakin, Irrigation Agriculturist, Tracy Operations Field Branch, Tracy, California. The following illustrations from his manual show the type of data which may be assembled.

The looseleaf format permits assembly of a comprehensive manual which may be updated each year by adding revisions as well as new subjects. Less complete handbooks could be completely reprinted with revisions added each year.

Weed prevention and disposal data could be included in the same handbook, or as separate instructions. Seeding data would include species, limitations, dates and rates of seeding, and adjustment and operation of equipment.

GPO 850862

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

REGION 2

WEED CONTROL HANDBOOK

Prepared
by
E. G. CAKIN

TRACY OPERATIONS FIELD BRANCH
TRACY, CALIFORNIA

CONTENTS

INTRODUCTION

A weed is a plant out of place. Generally speaking when a plant in a particular situation lacks economic or aesthetic value or is injurious it becomes a weed

Weed control is the practice of reducing a weed population at a cost commensurate with acceptable standards, beyond which additional expenditures are warranted for weed eradication.

Ever since man first became interested in managing his environment he has been concerned with the control of undesirable plants Few of the old tools he developed to aid him in this effort are no longer in our present day tool kit. Handpulling, hoeing, mowing, discing, burning, grazing and smothering are practices we still follow in varying degrees.

Research in weed control was greatly stimulated following the introduction of 2, 4–D As a result, we now have considerable knowledge on which to base a modern program of weed control, adding the tools of chemistry to our tool chest of older practices.

The rules that govern the proper use of tools applies to the use of chemicals. One must therefore know their limits and use the right ones with care to be safe The effectiveness of chemicals can be increased through a knowledge of their characteristics and the techniques of application

Such factors as toxicity to weeds and crops, man and other forms of life; types of weeds and their environment; means of application and costs; plus local regulations are to be considered in the right chemical for a given job. Information on these and other factors can be gleaned from numerous sources but it becomes a time consuming chore This handbook presents, in condensed form most of the pertinent material for ready use by supervisory personnel and field crews engaged in chemical weed control work.

While this handbook was designed for use by the field crews of the Tracy Operations Field Branch of Region 2, any of the specific data can be revised by pages, if required for use in other areas. Reference is made easier by printing on the front face of each page, thus leaving the reverse face for notes or revisions of the subject.

The use of commercial and trade names in this book does not constitute an endorsement of these products by the Government.

October 1960