

ARTICLES

A MACHINE FOR DIGGING NEW OR RECUTTING OLD SALT MARSH DITCHES IN CAPE MAY COUNTY (NEW JERSEY)

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Cape May County has over 50,000 acres of salt marsh and more than 10 million feet of salt marsh mosquito control ditches. The existing ditches should be recut periodically, and changes and additions should be made each year in the existing ditching system for best results. Much of this work was formerly done by hand labor. During the war years there was an acute labor shortage in this region, and the commission was unable to maintain a full schedule of ditch repair work. More recently, rising labor costs and a continued labor shortage have made it apparent that machinery must be utilized if the drainage system is to be returned to maximum efficiency at reasonable cost.

The commission was in possession of a machine which had been built several years previously for service in cleaning ditches only. This had never been used much because the tracks with which it was fitted were too narrow (24" wide) for satisfactory operation on the softer marshes in Cape May County, and the screw conveyor type excavating unit was not able properly to recut ditches that were almost completely grown over with new sod or were completely full of silt. At the request of the commission, a design was prepared for converting this machine to the same type as the experimental machine previously built by the New Jersey Agricultural Experiment Station (1) and tried out in Cape May County. The converted unit can be used for cleaning old ditches no matter how badly overgrown they may be, or for digging new ditches.

Anderson Machine Works of Wildwood, New Jersey, was employed to do the work under the direction of the authors. Figure 1 is a view of the original machine before the conversion was begun. Figure 2 is a view of the converted machine and Figure 3 shows the work done by the new unit.

The conversion required the following operations:

- (a) Discard old screw conveyors, troughs, and drives.
- (b) Move tractor engine, transmission and differential forward in chassis.
- (c) Rebuild crawler frames, eliminating yokes and forward portions of frame, which would limit the width of tracks which might be used. Build new front and rear attachment axles to suit rebuilt crawler frames.
- (d) Replace old track shoes, which were 24" long with new shoes 36" long, thereby increasing tread area by 50 per cent, and decreasing ground pressure in proportion, to allow operation on soft marshes.
- (e) Build and install entirely new ditch digging and cleaning unit, patterned after unit employed on experimental ditching machine previously developed by the New Jersey Agricultural Experiment Station.

Specifications of the new machine are as follows:

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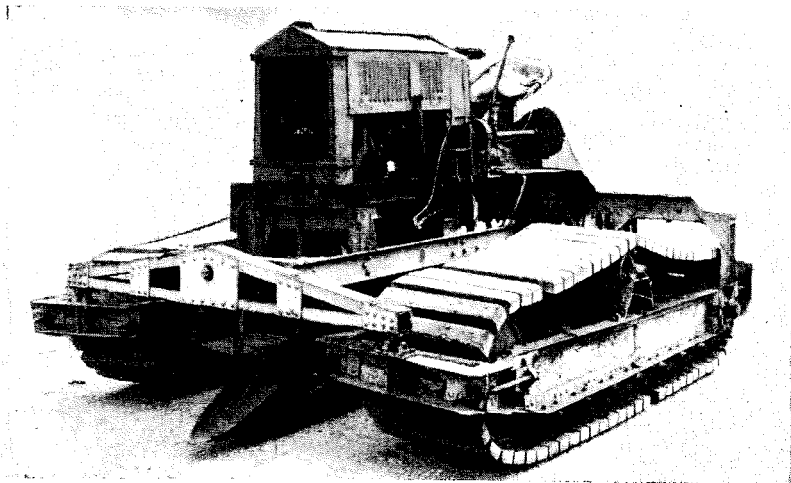


FIG. 1. Photo M 11-107. Cape May "Cletrac" ditch cleaning machine as originally furnished for ditch cleaning only.

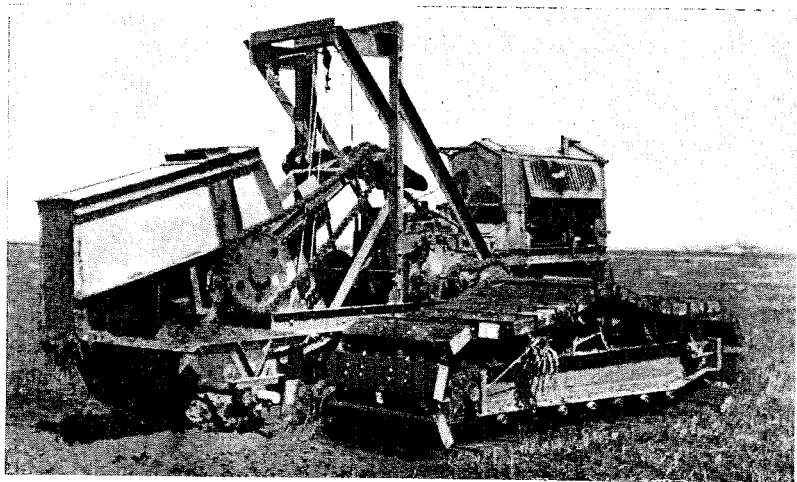


FIG. 2. Photo M. 11-122. Close up view of converted machine with digging unit in position to dig 20" deep ditch. Spoil is discharged on meadow surface back of near track.

Power plant—Cletrac tractor, Model B, gasoline.

Steering—by brakes in differential, foot pedal controlled.

Operating speeds—new ditching hard meadow, 20 feet per minute; new ditching soft meadow, or ditch cleaning, 40 feet per minute.

Ditch size—10" wide, 12" to 24" deep, vertical banks.

Weight—6 tons.

Length of contact of track on ground—98".

Width each track—36".

Track area in contact with ground—7,956 sq. in.

Bearing pressure on ground—1.7 pounds per sq. in.

Type digging unit—continuous conveyor chain with digging buckets.

Speed—400 ft. chain, 600 buckets, per minute.

Buckets—Type C, 10" long x 5" wide x 4" deep. Each bucket cuts a slice of meadow sod only 1/2" thick, so the spoil is finely ground rather than in chunks.

Bucket chain—conveyor chain, pintle type, No. H124, malleable iron with steel pins.

Discharge—by centrifugal force at top of flight of buckets, into cross conveyor, screw type.

Conveyor—10" dia. screw, 200 r.p.m., operating in flared trough.

The machine was placed on the marsh in May of 1946. After a few weeks of operation, during which all design specifications were met, it was laid aside during the mosquito breeding months while all personnel of the Commission was engaged in summer work. Since the close of the mosquito flight season, the machine has been used to good advantage for both new ditching and recutting, much of the service being under unusually severe conditions in marshes near the seashore where the sod contains a high proportion of sharp sand and is generally underlain at a depth of 18 to 24 inches with solid sand. Because of the severe operating conditions, wear in the bucket chain and the buckets and the bearings in the digging column has been unusually great; nevertheless, the machine has given very satisfactory service, and has shown the ability to cut as much as 1,200 linear feet of ditch per hour and to recut old ditches at twice that rate. Under reasonably good working conditions, where there is not too much idle travel from ditch to ditch, detours around streams and impassable holes, etc., it is possible to dig a mile of ditch per day with the machine and a crew of men. This is equivalent to the

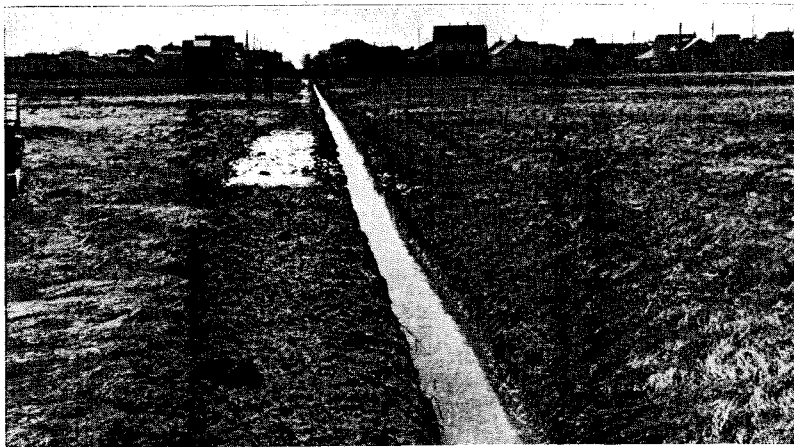


FIG. 3. Photo M 11-125. Work done by converted machine. Ditch cleaned, widened, and deepened.

work of a hand labor crew of about 25 men working under 1946 conditions.

(Note—A new design for a machine based on the same principles but employing sealed roller and ball bearings, hydraulic lift, enclosed chain drives and other improved features has been prepared, and the design has been approved by the special Machine Committee of the Associated Executives of Mosquito Control Work in New Jersey. A machine

based on the new plans is now under construction for the Ocean County Mosquito Extermination Commission for trial and use beginning in the spring of 1947.)

Reference

- (1) A Further Development in Machinery for Digging and Cleaning Salt Marsh Ditches. (Proceedings of the 29th Annual Meeting of the New Jersey Mosquito Extermination Association, held at Atlantic City, New Jersey, on March 11, 12 and 13, 1942.)

PRE-HATCHING APPLICATIONS OF DDT LARVICIDES ON FLOODWATER *Aedes* MOSQUITOES

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The Columbia River is bordered by extensive areas that are flooded by the annual rise of this river. These areas produce large numbers of *Aedes vexans* (Meig.) and *A. lateralis* (Meig.) mosquito larvae. The amount of low land covered and the time the flood crest is reached varies from year to year. In some years the rise is gradual, whereas in others it is rapid, or there may be several rises and recessions before the crest is reached. The highest stage usually comes in May or June, but often the several rises cause large numbers of larvae to hatch earlier than this. These variations cannot always be forecast with certainty, and an effective pre-hatching treatment must be of such a nature that it can be applied several days or weeks before the land is flooded. It must withstand considerable rainfall and weathering and still be lethal to the emerging larvae.

The application of various materials to the ground seeded with eggs prior to

hatching has been tried on floodwater *Aedes* mosquitoes in the Columbia River area in previous years without success. This paper gives the results of field tests made with DDT in an oil solution and in an emulsion.

A few preliminary tests were made in 1944 and 1945 with 5 per cent of DDT in Diesel oil. In 1946 more extensive tests were made, using both types of preparations. The emulsion was prepared by diluting a stock containing 25 per cent of DDT, 68 per cent of xylene, and 7 per cent of Triton X-100 (an aralkyl polyether alcohol) with seven parts of water. Two plots were treated with this emulsion. The sprays were applied with either a hand compressed-air sprayer or a knapsack sprayer. Most of the areas were covered with low brush or grass, or dead rank vegetation of the previous year's growth; in some places there was considerable ground litter of stumps, logs, and dead branches.