

THE OTTAWA DEBRIS PLOW AND SCALPER

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Because most of the remaining planting sites on the Ottawa National Forest were brushy, full of half rotted virgin pine stumps, and littered with partly decayed fallen trees and logs, a debris plow was needed in front of the planting machine. At first a light hydraulic-operated bulldozer blade was attached to the International TD-9 tractor that pulled the Lowther tree planting machine. This performed fairly well but had some serious faults such as keeping the operator too busy raising and lowering the blade. A V-shaped front-end plow that floated on shoes was mounted with hydraulic cylinders on the TD-9 tractor. A scalped area for the trees was considered necessary. The Lowther scalpers were not satisfactory in the heavy clay soil because they plugged with clay, roots, and sod. However, it was decided to put a scalper on the new debris blade. About this time it was noticed that the trencher part of the planter did not readily sink deep enough into the heavy clay soil to insure proper planting depth. To remedy this situation a device in the form of a breaker knife was added to the scalper point.

After about three planting seasons of experimenting and rebuilding in the field the present debris plow was developed (figs. 1 and 2). It works exceedingly well and performs the following tasks:

1. Pushes aside all down logs, brush, and trees and clears a strip of ground

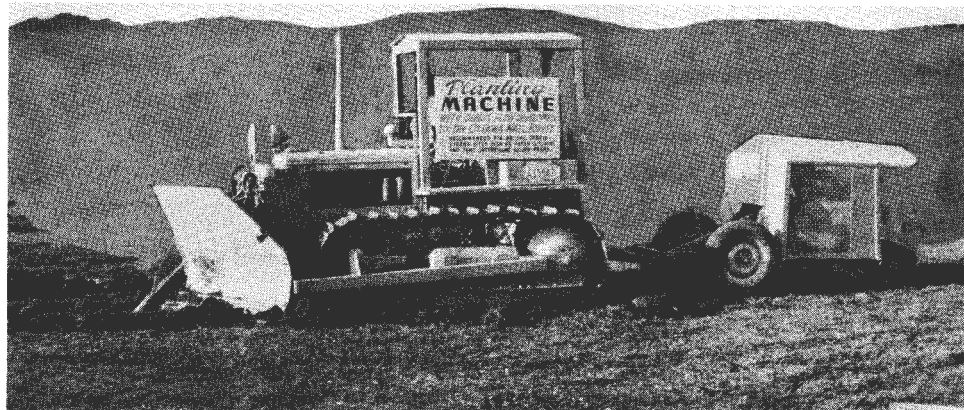


Figure 1. Debris plow and scalper ready for use in front of a planting machine.

about 6 feet wide

2. Knocks down all standing small trees to about a 4-inch diameter and all partly rotted pine stumps. Debris plow construction is such that trees do not fall back on the tractor but are pitched forward.

3. Uproots and pushes aside boulders up to 1 1/2 feet in diameter.

4. Makes a continuous scalp 20 inches wide and 3 inches deep.

5. Blade floats on ground so operator does not touch hydraulic control except for turning at end of furrow and for loading machine on trailer.

6. Beak on point of blade tears out roots and rocks and loosens soil so planting machine trencher sinks to proper depth.

7. Debris pushed out 3 feet on each side helps the operator maintain a 6 foot spacing of the furrows.

The main V part of the plow is made from the moldboard of a grader with the grader blade attached. Each half is 4 1/2 feet long and both pieces are welded together to form a V slightly blunter than a 45° angle. Its height is about 1 1/2 feet. Next two pieces of 1/4 inch plates each measuring 33 inches on top, 4 1/2 feet on the bottom and 28 inches wide are welded to the top of the moldboard slanting forward. This keeps trees from falling back into the tractor. On the bottom of the moldboard and blade, a shoe made of 1/4-inch plate 8 inches wide is welded so as to run the entire length of the V, in other words, 1 1/2 feet on each side. This prevents the blade from cutting into the soil and lets it float on top of the ground. On the point of the plow 2. scalping blades, of grader blade steel about 8 by 12 inches, are welded so that they cut 4 inches below the shoe. They cut out a strip of sod 20 inches wide and 3 inches deep. A spike or knife, also made of grader blades, is welded at the very point in such a manner that it will cut 4 inches deeper than the scalper blade, 8 inches below the shoe. This digs a slot, rock and root free so the planting machine trencher will sink deep enough to get proper tree planting depth.

The arms to lift the blade are made of 4-inch construction channel steel boxed with 3/16-inch sheet metal. The arms are raised by means of 2 hydraulic cylinders 3 by 16 inches mounted vertically to the front frame of the tractor. Two 3-inch top-guarded sheaves or pulleys are attached by pins to the top of the ram. These pulleys act on two 3/8-inch cables each 5 feet long. One end of the cable is attached to the plow and the other end is fastened to the mounting plate of the cylinder. When the cable is slack the plow blade will float on the shoe and follow the land contours without the hydraulic control being touched.

Total cost of materials used, including 2 cylinders, pump, cable, hose control valve and steel, is estimated at \$180. About 80 hours of mechanic's labor is involved.

Most of the mechanical ideas and details were developed jointly by Oscar Stabo, Ranger, Bergland District, and Theodore L. England, Shop Superintendent and Supervising Mechanic, both of the Ottawa National Forest.

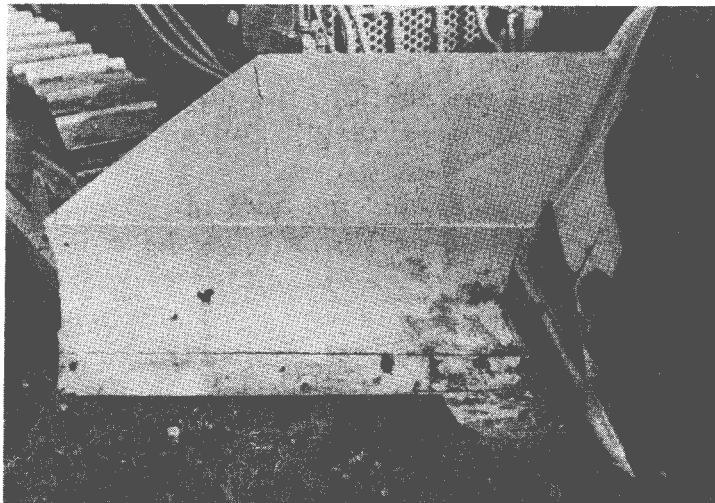


Figure 2. Debris plow with tree-throwing plates at top, shoe, scalping blades, and front spike.