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*Oakley Gardie*

# ESSENTIALS OF A MULCH PAPER LAYING MACHINE

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By H. H. MUSSELMAN

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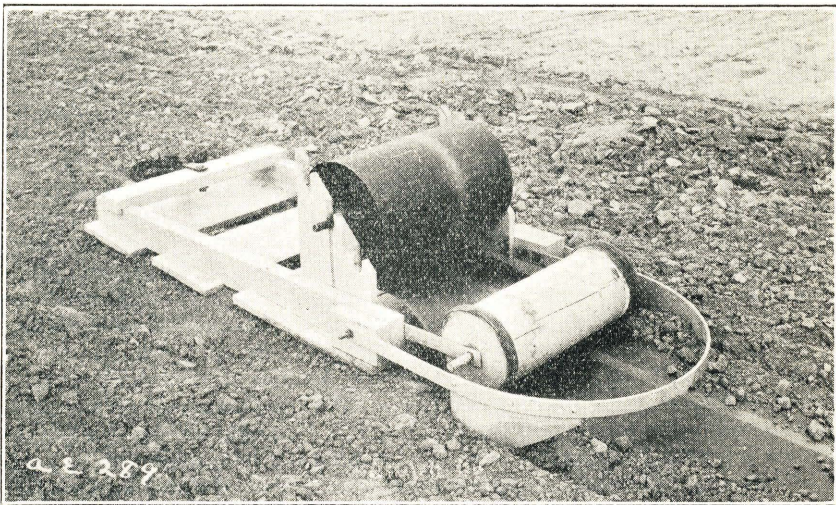


Fig. 1.—Mulch paper layer which rolls out paper, presses edges into grooves, and covers with earth.

AGRICULTURAL EXPERIMENT STATION

MICHIGAN STATE COLLEGE  
Of Agriculture and Applied Science

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AGRICULTURAL ENGINEERING SECTION

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East Lansing, Michigan

# ESSENTIALS OF A MULCH PAPER LAYING MACHINE

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By H. H. MUSSELMAN  
Agricultural Engineering Section

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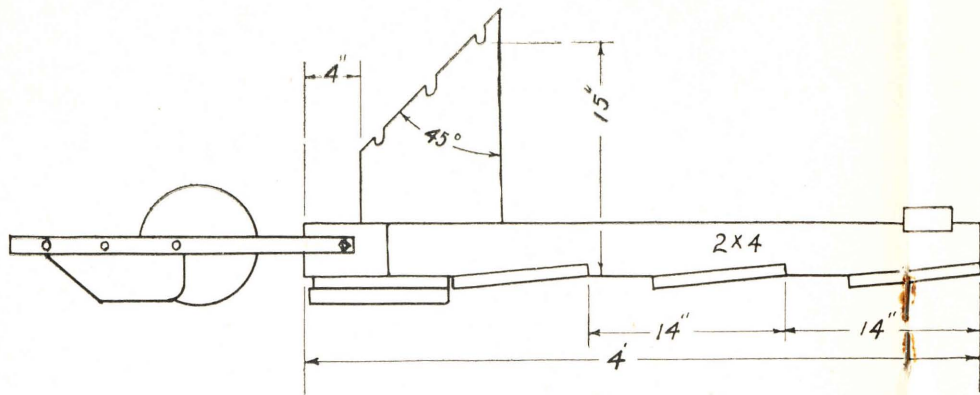
During the past year, much interest has developed in the use of mulch paper as a method of weed control and a means of increasing crop yields. Garden row-crops are planted through or between strips of tough, waterproof paper. If a considerable amount of paper is to be laid, the labor of laying and anchoring it against removal by wind is a large factor in the cost of using the paper. The essential features of a satisfactory machine for laying mulch paper have been worked out by the Agricultural Engineering Section at Michigan State College.

Only limited tests have been made with the machine which is described because it has not been possible to use the device throughout an entire season to determine its practicability under all the varied conditions which must be met in practice. It is believed, however, that the design embodies enough of the essential features of a successful machine to warrant publication of a description at this time when prospective users may be wondering about an economical method of applying mulch paper. A machine to be satisfactory must unroll and lay paper, turn down the edges, and anchor against removal by wind.

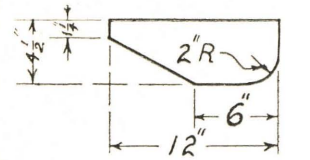
Those who wish to make use of these plans, may do so with reasonable assurance that satisfactory results will be obtained under all ordinary conditions of ground and laying. Very unusual conditions may call for slight modifications in the details of the machine. These changes may suggest themselves to the user and may easily be made in any case. The plans were worked out with an intention of stimulating interest in the development of this or a similar device. If mulch paper is to come into general use, the need for a device which will save labor costs in laying is so evident that little comment is necessary.

## Features of Design

The machine was designed to lay paper in strips. Where squares are used, hand work is necessary. In laying the strips of paper, it is desirable to lay them on an even surface to make the strip roll out smoothly and keep it in contact with the ground. The float, which carries the roll of paper and laying attachments, performs the leveling action. The paper is held to the ground surface by a light roller which also carries flanges for pressing the edges of the paper into grooves made by cleats on the bottom of the float. Metal sweeps, which follow closely behind the roller, draw earth over the turned down edges

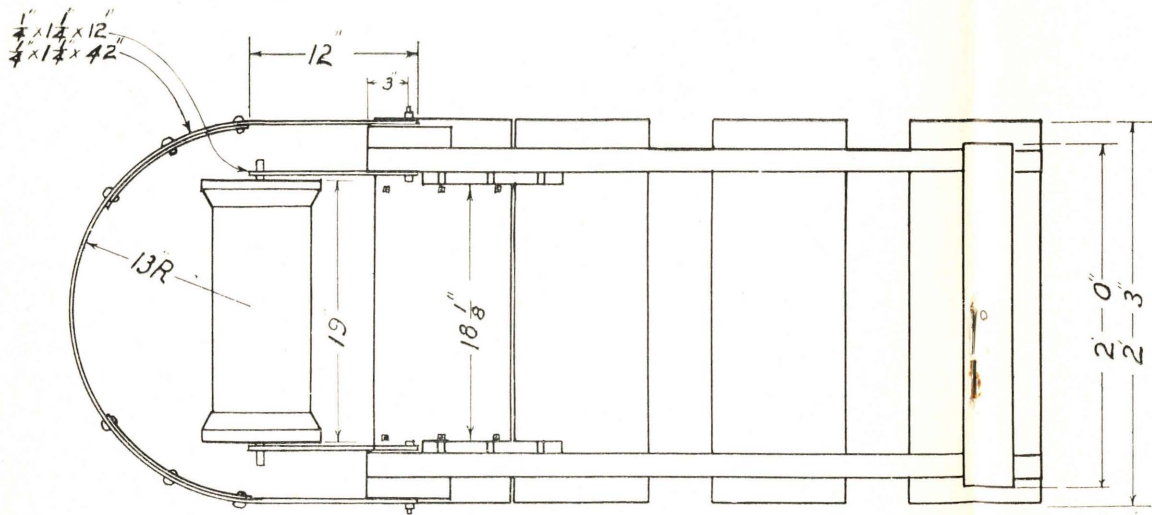


SIDE VIEW

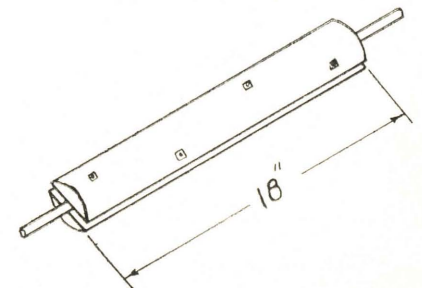
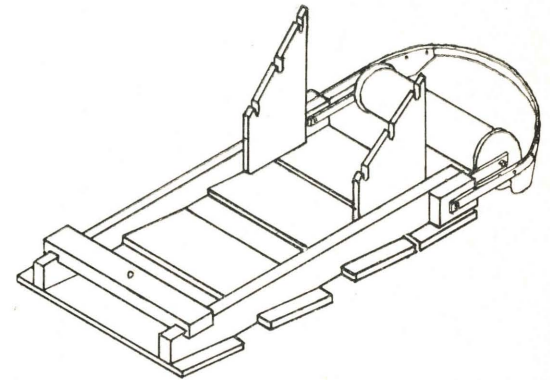


Detail of Shovel  
2 Rea.

BILL OF MATERIAL	
2x4 x 12	Yellow Pine
1x10 x 12	Yellow Pine
1/4 x 1 1/4 x 7-6	Black Iron
1/2 x 1 1/2 x 1-8	Black Iron
4 1/2 x 2	20 Ga. Galv. Iron
3/8 x 4 1/2	Mach. Bolt 2 Rea.
5/16 x 2 1/4	FH. Stove Bolt 6 Rea.
1/4 x 3	Carr. Bolt 4 Rea.
1/2 x 4-6	Round Iron
Roller, Nails & Washers	



TOP VIEW



PAPER ROLL HUB

Fig. 2.—Cut shows dimensions, details of construction, and material required for paper layer.

of the paper. This provides anchorage against the wind and permits water to run off the paper. The machine has notched posts for carrying a spindle on which is mounted the roll of paper.

The device may be built in any width desired. In some cases, it may be desirable to lay the strips with the edges close together. No convenient way has been found to adapt the covering device to these con-



Fig. 3.—Paper should be laid evenly with the edges covered with earth for anchorage against wind.

ditions. Perhaps, improvements can be suggested which will accomplish this.

The most difficult part of laying paper mechanically is to do so without tearing it. Tearing may be due to uneven motion of the float, too heavy a roller, or uneven unrolling of the paper. The construction shown should not give trouble in this respect.

### Construction

The construction for a device of this kind does not call for unusual skill, but a few suggestions about the care necessary in certain details may enable the builder to secure more satisfactory results. The hitch for the roller should be sufficiently flexible so that the roller will follow the irregularities of the ground. A heavy roller or a rigid attachment of the roller to the frame tends to concentrate too much pressure on the paper, which causes it to tear. The use of too heavy a roller will also cause the paper to creep away from the end of the roll as the roll is being started. Since the roller tends to run off the strips when the machine is not pulled in a straight line, it is necessary to have the roll of paper held with minimum end play between the posts. As the roll is reduced in size, it should be placed closer to the roller.

Since the paper can be laid better in a straight line, it is desirable that the float be long enough to prevent abrupt turns or shifts as the paper is being laid. The depth to which the sweeps will dig depends upon the weight of the sweeps and the bar which carries them; so, in hard ground, it may be found necessary to weight the sweeps to enable them to secure earth for coving the edge of the paper. More satisfactory work in covering the edges of the paper can be done if the surface of the soil is worked until it is loose and in a pulverized condition.

In constructing the device, it is also important that care is taken to get a roller which will run true and lay the paper straight without difficulty. Both the spindle which carries the roll of paper and the pressing roller should be at right angles to the direction of motion of the float. The cleats on the bottom leveling board should have their outside edges one-half inch outside of the edge of the paper. The hub for the roll of paper is made by clamping two boards three or four inches wide to a five-eighths inch rod and trimming them to fit the hole in the paper roll. The roller may be made from a solid block of wood, preferably turned true on a turning lathe, or it may be made of six inch galvanized iron pipe with round wood discs for ends and flanges. The diameter may be from six to 18 inches. If a wider machine is needed, the only changes necessary would be to increase the width by using longer bottom pieces, roller, and sweep bar.

The machine will do its best work when drawn in a straight line at a moderately slow speed on soil uniformly fine and level, free from large stones, sticks, or plant debris.