A HOPPERDOZER FOR ROUGH GROUND.

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During the last few years a large part of New England has been subjected to a series of extremely dry summer seasons. This climatic condition is favorable to the development of locusts or "grasshoppers" in itself, and at the same time diminishes the ravages of fungous diseases which tend to hold them in check, and stunts the vegetation on which they feed. As a natural consequence several species have multiplied to such an injurious extent, at least locally in parts of Vermont, New Hampshire, and Maine, that it is wise to consider means of artificial control.

Of the various methods of fighting grasshoppers which become locally injurious, two are of especial importance:—viz., 1st, plowing of the breeding-grounds before they hatch (or immediately thereafter), thereby burying and destroying them; and 2nd, destruction of the young before they have done much injury or are able to travel far.

Where the breeding-grounds are not now known, or an extended watch cannot be kept at hatching-time and immediate action taken, the first method cannot be considered available for the coming season. Or again, the breeding-grounds may be of such a character that plowing of them is impracticable, either by reason of their stoniness, steepness, location, or the injury which would result from washing by rains.

The second method of control—destruction of the young—may be effected under some circumstances by poisoning the vegetation in and near the hatching grounds, with arsenicals, or by the use of poisoned baits such as bran-mash or dried horse-droppings, both of which are attractive to the young 'hoppers. The use of arsenicals in pastures, however, is impracticable, and it is probable that by far the larger part of the New England breeding-grounds are used for that purpose. Another very effective method of destroying the young is by the use of "hopperdozers," long, flat, shallow pans containing kerosene or kerosene and water, which are drawn by horses over the infested fields and into which the young locusts leap and are destroyed. These, however, can be used effectively only on relatively level ground and have the disadvantage of imparting to the forage a flavor decidedly repugnant to stock. A hopperdozer to be of use in New England

should be free from this defect and should be of such construction as to allow it to be used on very uneven ground.

Freedom from repugnant odor can be secured by substituting for the coal-oil pan a piece of sheet-iron or other flat surface smeared with a suitable adhesive substance of which we have at hand an excellent one in what is known as "Tree Tanglefoot," largely used to prevent caterpillars of the gypsy-moth and canker-worms from ascending trees. A young grasshopper falling upon a surface coated with this preparation is there to stay.

The second need — adaptability to an uneven surface — may be secured by constructing the machine in sections, say two-and-a-half

or three feet long, hinged so as to be freely movable on each other, thus allowing a much closer approximation to the surface of uneven ground than is possible with a rigid pan or plate ten or twelve feet in length. The following sketches illustrate such a device, made of No. 24 galvanized sheet iron in four sections, with iron or steel runners,