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W. W. GORE

DUST SPRAYER

Filed July 10, 1922

Fig. 2.

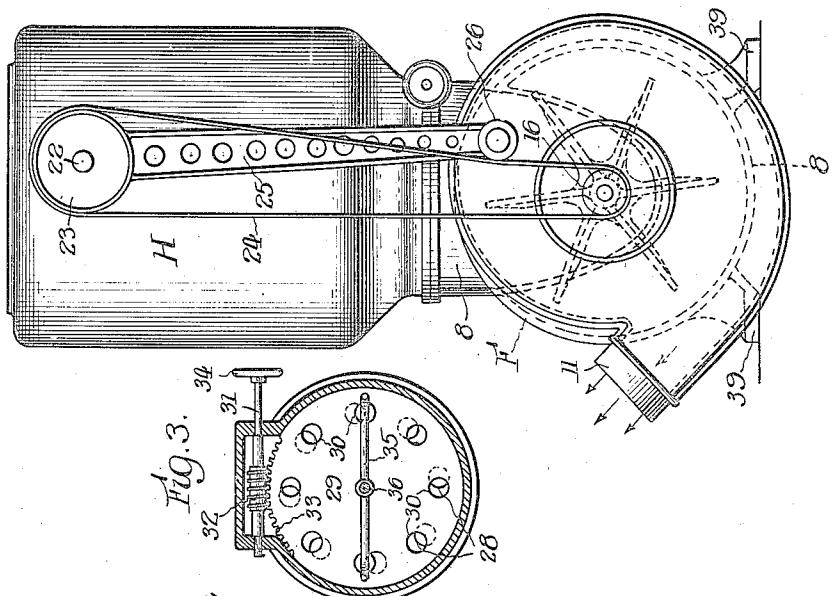
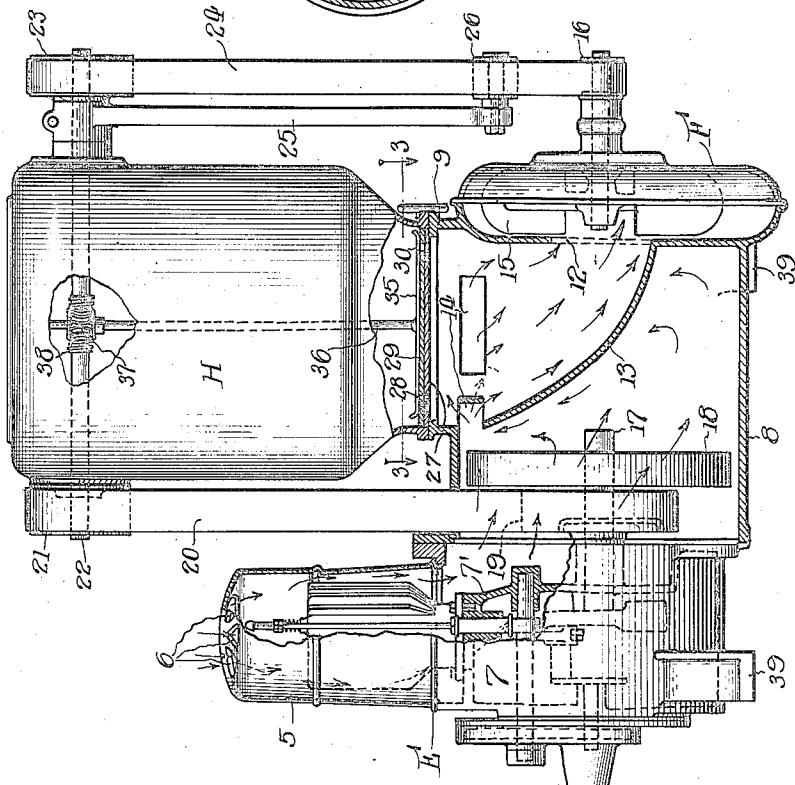


Fig. 1.



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UNITED STATES PATENT OFFICE.

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DUST SPRAYER.

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To all whom it may concern:

Be it known that I, WARREN W. GORE, a citizen of the United States, residing at Madison, in the county of Dane and State 5 of Wisconsin, have invented certain new and useful Improvements in Dust Sprayers, of which the following is a specification.

This invention relates to dust-spraying machines of that type which are designed 10 and adapted to spray vermin, fungus and insect-destroying powder on trees, bushes, shrubs and plants, through the use of a rotary fan or blower; the machine of the present invention being designed mainly for 15 dusting fruit trees and field crops.

Machines of this type now in use commonly employ a hopper to contain the powdered material, with a valve or measuring device to discharge the material into a blast 20 of air discharged from a fan. Some of these machines discharge the material from the hopper into the inlet of the fan. These dusting machine outfits are of various sizes and capacity. Some are driven by hand and 25 others by engine power. Some have a multiple discharge pipe to treat several rows of field crops or berry bushes, while others have a single charge discharge pipe to treat orchard and shade trees. Up to the present 30 time these outfits have been driven by standard types of engines with more or less remote and indirect belt or chain connections to the fan.

One object of the present invention is to 35 provide a dusting machine of this character characterized by greater simplicity and compactness of structure than any of the machines heretofore known. This object is attained by attaching the fan and hopper and 40 hopper discharge mechanism directly to a gas engine which drives the fan and the agitator or stirrer of the hopper, thus making practically a single unit convenient to mount upon a vehicle.

In machines of this character the powdered material used is sometimes hygroscopic and in damp weather forms lumps and cakes. Another object of the present 45 invention is to provide a machine which will 50 obviate this fault, and this is accomplished, when the machine is operated by an air-cooled internal combustion engine, by drawing the air induced by the fan and used in cooling the engine down over the cylinder 55 and crank case of the latter, the material

being discharged into and heated and dried by the heated air blast as the latter flows to the intake side of the fan or blower.

In order that my invention may be fully understood by persons familiar with this 60 art I have, in the accompanying drawing, illustrated a simple form of complete unit embodying my invention; and referring thereto—

Fig. 1 is an elevation partly in vertical 65 section, of the complete outfit;

Fig. 2 is a side elevation of the same, viewed from the right of Fig. 1; and

Fig. 3 is a sectional plan of the discharge valve and agitator of the dust hopper, taken 70 on the line 3—3 of Fig. 1.

Referring to the drawing, E designates as an entirety an air-cooled gas engine which may be of any standard and known make, the cylinder of which is surrounded by a 75 hood 5 having air openings 6 in its top and communicating with a hood 7 that partly surrounds the crank case 7', which crank case hood is open on one side (the right as shown in Fig. 1). To this open side of the 80 crank case hood 7 is secured a cylindrical horizontal casing 8 formed on its upper side with a short neck 9 on which is supported and secured the dust hopper H. On the right side of the casing 8 is attached or in- 85 tregrally formed a fan casing F having the usual tangential delivery spout or nozzle 11 to which is attached a hose or discharge pipe (not shown) for carrying the powder-laden blast to the immediate vicinity of the trees, 90 shrubs or field crops being treated. The fan casing F has a central suction opening 12 on its inner side, from which latter is led upwardly to the neck 9 of the casing an intake spout or funnel 13, which latter is 95 provided near its upper end with a series of openings 14 permitting the flow of heated air from the crank case hood of the engine and the interior of the casing 8 into the spout or funnel 13 and thence to the fan. 100 Within the fan casing is journaled a rotary fan 15, the outwardly extending shaft of which is equipped with a driving pulley 16. The crank shaft 17 of the engine extends within the casing 8 and carries a flywheel 18 and also a pulley 19, from which latter a belt 20 leads upwardly over a pulley 21 fast on a transmission shaft 22 that is journaled across the upper end of the hopper H. On the other end of the shaft 22 is 110

a pulley 23 which drives another belt 24 extending downwardly and around the drive pulley 16 of the fan. Suspended from the shaft 22 is an arm 25 carrying at its lower end a roller 26 lying against one side of the belt 24 and serving as a tightener for the latter.

The ports 14 which lead the heated air into the spout or nozzle 13 of the fan are located slightly below the throat and discharge mechanism of the hopper H. The present invention is not concerned with any particular structure or type of hopper discharge mechanism, but in Figs. 1 and 3 I have shown a simple mechanism for this purpose capable of being adjusted or graduated so as to vary the amount of dust supplied to the air blast. This mechanism comprises a lower valve plate 27 fitted across the throat of the hopper and formed with a group of equally spaced radial holes 28, and an identical superposed plate or disc 29 formed with holes 30 corresponding in number and location to the holes of the lower plate, so that when the upper plate is revolved the two series of holes can be brought into complete or partial registration or completely occluded. Any desired or convenient means for adjusting the plate 30 29 may be used, but I have herein shown a horizontal worm shaft 31 carrying a worm 32 in mesh with a worm wheel sector 33 forming part of the periphery of the disc 29; the shaft 31 being equipped with a hand wheel 34. To insure a continuous and uniform flow of the powder while the machine is in operation, an agitator or stirrer is preferably added to the hopper H, and this may conveniently take the form of a sweep 35 mounted directly above the valve plate 29 and driven by a vertical shaft 36 having at its upper end a worm wheel 37 driven by a worm 38 on the counter-shaft 22.

The complete structure is conveniently supported on the floor of a vehicle by means of feet 39, one pair of which are formed on the engine crank case hood 7 and the other pair on the lower portion of the casing 8.

The operation or functioning of the apparatus will be quite evident from the foregoing description of its structure. The advantages reside partly in the simplicity and compactness of the structure, and partly in the means provided for preheating the air 55 which forms the vehicle for the powder or dust as the latter is carried to the points of application. By attaching the dusting machine directly to the engine and driving the fan from the latter in the manner shown, the drive is more efficient, the entire machine constitutes a single unit making it convenient to mount on a vehicle or other carrier and less apt to get out of alignment, while the simplicity, compactness and 60 economy of space effected also reduce the

total weight. The structure also enables the heated air drawn down over the cylinder of the engine to be most effectively used for introducing dry heated air to the dust which has a marked effect in reducing any moisture in the latter. This feature is highly important, since the effect of this dusting depends entirely upon having the dust ground very fine so that it will adhere to the foliage and the stems of the plants, and as a considerable part of the material used very readily absorbs moisture, some of it being deliquescent, the heated air will absorb any moisture contained in the dust discharging the latter in a more finely divided condition and better adapted to its purpose.

I claim—

1. In a dusting machine, in combination, an engine, a fan, a casing between and rigidly connecting said engine and fan and having an air intake, a dust hopper mounted on said casing, a dust conduit between said hopper and fan air-ported to said casing, and driving connections from said engine to said fan.

2. In a dusting machine, in combination, an engine, a fan, a casing between and rigidly connecting said engine and fan and having an air intake, a dust hopper mounted on said casing, a dust conduit between said hopper and fan within and air-ported to said casing, a counter-shaft mounted on said hopper, a drive from said engine to said counter-shaft, and a drive from said counter-shaft to said fan.

3. In a dusting machine, in combination, an engine, a fan, a casing between and rigidly connecting said engine and fan and having an air intake, a dust hopper mounted on the said casing, a dust conduit between said hopper and fan within and air-ported to said casing, a counter-shaft journaled in and across the upper portion of said hopper, a belt and pulley drive from said engine to one end of said counter-shaft, and a belt and pulley drive from the other end of said counter-shaft to said fan.

4. In a dusting machine, the combination of a gas engine having a hood open at its upper end for directing a flow of air over the cylinder and crank case thereof, said hood having an open side opposite said crank case, a casing secured to and communicating with the open side of said hood, a fan secured to the opposite side of said casing with its suction opening communicating with the latter, a dust hopper mounted on and delivering dust into said casing, and driving connections from said engine to said fan.

5. In a dusting machine, the combination of an air-cooled gas engine having a hood open at its upper end for directing a flow of air over the cylinder and crank case thereof, said hood having an open side opposite said

crank case, a casing secured to and communicating with the open side of said hood, a fan secured to the opposite side of said casing, a dust hopper mounted on said casing, a dust conduit air-ported to said casing and connecting the delivery mouth of said hopper with the intake of said fan, and driving connections from said engine to said fan.

6. In a dusting machine, the combination 10 of an air-cooled gas engine having a hood open at its upper end for directing a flow of air over the cylinder and crank case thereof, said hood having an open side opposite said crank case, a casing secured to and communicating with the open side of said hood, a fan secured to and communicating on its suction side with the opposite side of said casing, a dust hopper mounted on said casing and equipped with an adjustable dust delivery mechanism, a dust conduit within and air-ported to said casing and connecting the delivery mechanism of said hopper with the intake of said fan including a transmission shaft 20

journalized in and supported by said hopper.

7. In a dusting machine, the combination 25 of an air-cooled gas engine having a hood open at its upper end for directing a flow of air over the cylinder and crank case thereof, said hood having an open side opposite said crank case, a casing secured to and communicating with the open side of said hood, a 30 fan secured to and communicating on its suction side with the opposite side of said casing, a dust hopper mounted on said casing and equipped with an adjustable dust delivery mechanism, a dust conduit within and air-ported to said casing and connecting the delivery mechanism of said hopper with the intake of said fan including a transmission shaft 35 40 .

WARREN W. GORE.