

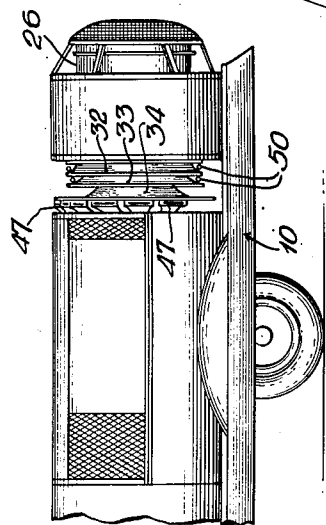
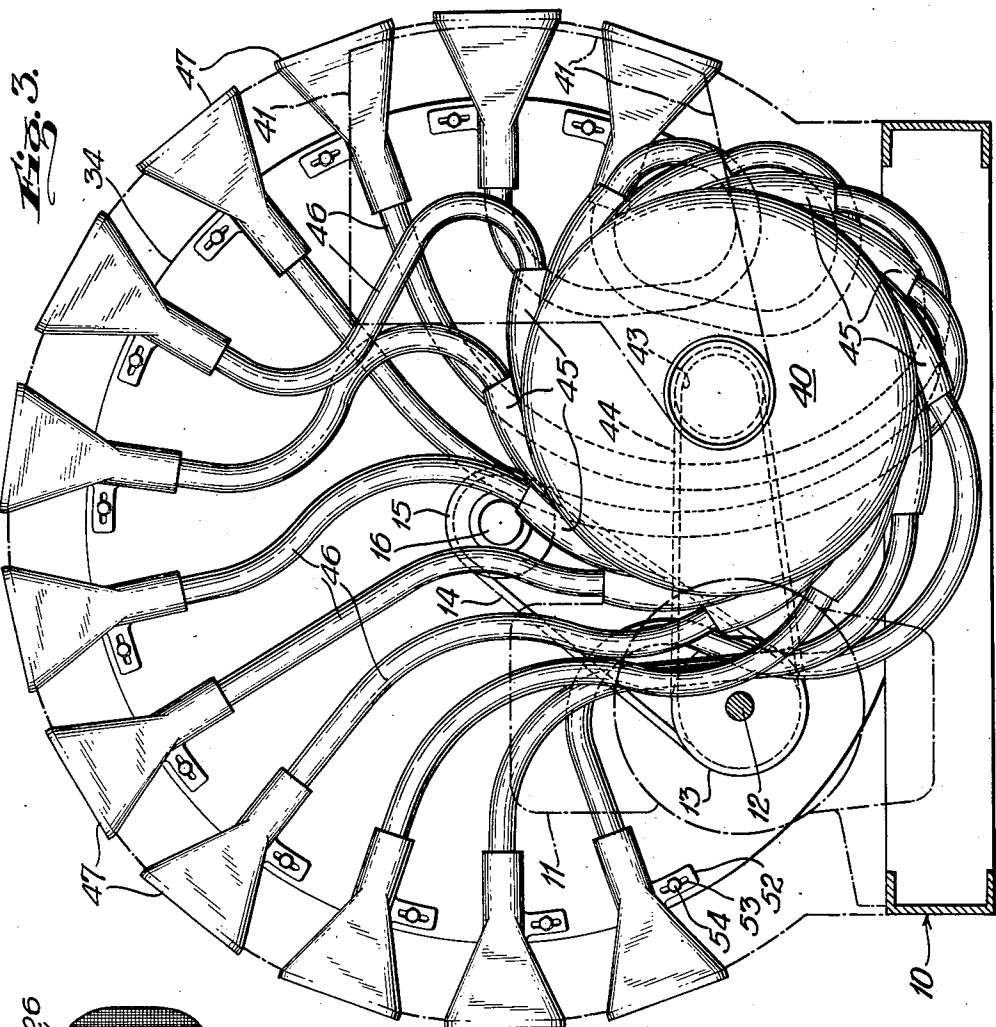
Sept. 9, 1952

G. W. DAUGHERTY
SPRAYING AND DUSTING MACHINE

2,609,635

Filed Sept. 12, 1946

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

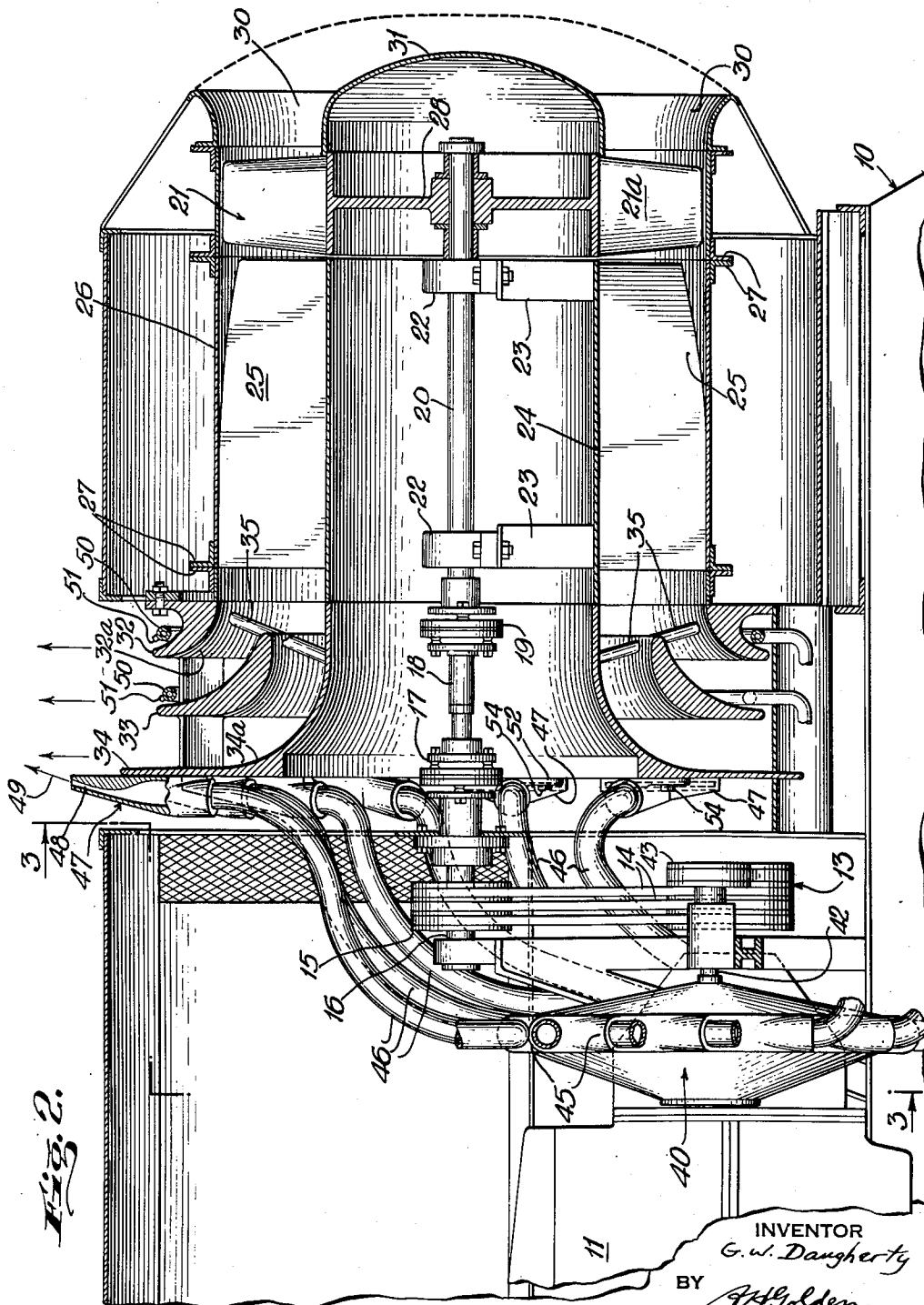


Fig. 2.

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SPRAYING AND DUSTING MACHINE

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11 Claims. (Cl. 43-148)

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This invention relates to a spraying and dusting machine of the type set forth in my Patent No. 2,220,082 dated November 5, 1940, and as more particularly set forth in my application, Ser. No. 639,949, filed January 9, 1946, now Patent 2,476,960.

In my application supra, I describe a spraying machine in which a ring of air is generated in a particular direction and is then deflected radially of the said direction toward the foliage to be sprayed. While I was able to adapt the said machine for use with a liquid insecticide whereby to contribute a spraying machine, I found it extremely difficult to develop a suitable apparatus to contribute a dusting machine. It is the object of the present invention to contribute apparatus for feeding dusting material into a ring of air radially deflected towards foliage or the like.

As a particular feature of the present invention, I apply a series of dust feeding nozzles in position to direct dust toward and into a stream of air while the nozzles themselves do not in any way hinder the flow of air or its direction of flow.

I have thus outlined rather broadly the basic feature of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized by those skilled in the art as a basis for the designing of other structures for carrying out the several purposes of my invention. It is important, therefore, that the claims to be granted me shall be of sufficient breadth to prevent the appropriation of my invention by those skilled in the art.

Referring now to the drawings, Fig. 1 is an elevation of the rear end of a machine embodying my invention. Fig. 2 is a vertical section of the rear part of Fig. 1. Fig. 3 is a section taken along lines 3-3 of Fig. 2.

As I have already indicated generally, my machine utilizes as one effective operating part thereof an air blast generating apparatus of the type disclosed in my application supra. Thus, my machine comprises a wheeled chassis 10 on which is supported an internal combustion engine 11 having secured to its power transmission shaft 12 a pulley 13 that through a series of belts 14 rotates a pulley 15 secured to a shaft

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16. Shaft 16 is in turn secured through a coupling 17 to a short shaft 18. This short shaft 18 is in turn secured through a flexible coupling 19 to the drive shaft 20 of a propeller designated generally by reference numeral 21. Those skilled in the art will fully appreciate that the several shafts so far described may be supported in any suitable way by structural frame mechanism mounted on the wheeled chassis 10. For a more detailed description of the construction of the parts so far described and hereinafter to be described, reference may be made to my earlier application supra. It may be well at this point to indicate, however, that the propeller shaft 20 is itself mounted in bearings 22 carried by brackets 23 secured to a tubular member 24. The tubular member 24 is in turn supported by a series of guide vanes 25 welded in spaced relation circumferentially about the said tubular member 24, and similarly welded to an air tunnel 26. This air tunnel 26 is formed from sheet metal and is reinforced by a series of angle members 27 through which it is secured to the wheeled chassis 10.

The propeller 21 of my machine is formed with a hub portion 28 whereby it may be keyed or otherwise secured to the drive shaft 20. The hub portion 28 carries the several blades 21a of the propeller 21, the blades being co-extensive with the space between the tubular member 24 and the inner surface of the tunnel 26. It is, therefore, the function of the propeller 21 through its blades 21a, to generate a blast of air in the ring-like space defined by the tunnel 26 and the tubular member 24. It is the function of the vanes 25, in addition to maintaining the tubular member 24 securely centered within the tunnel 26, to guide and straighten the blast of air generated by the propeller blades 21a. For facilitating the inward movement of the air to the propeller, the end of the tunnel 26 is flared out as indicated at 30, and a dome-shaped guide member 31 is secured to the propeller.

Three ring-like deflectors 32, 33, and 34, preferably formed in sections as described in my earlier application, are suitably secured as by bolts or welding to the tunnel 26 and the tubular member 24. The deflector ring 32 has its inner surface 32a formed as a curved extension of the inner surface of the tunnel 26 so that the air moves past the surface 32a and then radially of the tunnel 26 in accordance with the several arrows shown in Fig. 2. The deflector 34 is formed with its surface 34a as an extension of the outer surface of the tubular member 24 and

serves also to guide or deflect the air radially of the axis of the tunnel 26. A series of struts 35 secure to the deflectors 32 and 34 the intermediate deflector 33 formed so as to be extremely efficient in guiding the air radially of the air tunnel axis and toward the foliage to be sprayed. All of this structure is, of course, fully set forth and is claimed in my earlier application.

Positioned just to the right of the internal combustion engine 11 is a dust blower 40 in suitable communication with a dust containing hopper 41. The drive shaft for the dust blower 40 is designated by reference numeral 42 and has secured thereto a pulley 43 for a suitable belt 44 extending between the said pulley 43 and the pulley 13 secured to the drive shaft of the internal combustion engine 11. The dust blower 40 is actuated to accept dust from the hopper 41 and to feed it into a series of outlets 45 in communication through pipes 46 with dusting nozzles 47. As shown, there are a considerable number of these dusting nozzles 47, and they are positioned about the periphery of the deflector 34 and on that side of the deflector 34 away from the air blast developed by the propeller 21. Therefore, the several dust nozzles 47 will not be in the path of the air blast, the said blast being turned and directed radially by the several deflectors without any interference from the plurality of the nozzles 47.

The nozzles 47 are so shaped that their mouths 48 feed the dust angularly in the direction of the arrow 49 toward the air blast. Because of this relationship of the several nozzles 47 to the air blast, the air blast will act to pull within itself the dust from the nozzles and thereby assist in the movement of the dust outwardly of the nozzles. This will all be done without the nozzles interfering with the movement of the air.

I have found that under many conditions it is necessary for the dust to be coagulated so as to form relatively large particles in order that it may adhere satisfactorily to foliage. Therefore, I attach to the machine circular spray feeding pipes 50 positioned as best illustrated in Figs. 1 and 2, the said pipes 50 being equipped with spray feeding nozzles 51. To these pipes 50 I feed spraying material in a manner fully set forth in my earlier patents. It will now be appreciated that the blast of air generated by propeller 21 will first accept the spray from the nozzles 51, and will then accept the dust from the dusting nozzles 47. The spray contained in the air will strike the dust and will form it into small particles considerably larger than the dust particles leaving the several dusting nozzles 47. This action is extremely desirable and can be regulated quite successfully by regulating the amount of spray that will be fed to the air blast.

For adjusting the position of the several dusting nozzles 47, each of the nozzles may be equipped with a bracket 52 slotted at 53 whereby through a bolt 54 to be secured in adjusted relation to the deflector 34 at that side thereof away from the blast of air. For the purpose the side of deflector 34 is formed flat, and the nozzles 47 are equipped with complementary flat surfaces.

I believe that those skilled in the art will now appreciate just how the ring-like blast of air generated within my air tunnel 26 is adapted to receive and to accept the dust particles fed by the dust blower 40 without in any way affecting the direction imparted to the air blast by the several deflectors.

I now claim:

1. In a machine of the class described, a tunnel, an air propeller, means mounting said propeller for rotation in an axis longitudinal and substantially central of said tunnel for developing a flow of air longitudinally through said tunnel, a ring deflector having a curved surface positioned at the end of said tunnel for directing the air substantially radially of said tunnel toward foliage, a dust containing hopper, a series of pipes terminating at the periphery of said ring deflector on that side of the said ring deflector away from the side thereof against which the blast of air is directed, and means for feeding dusting material from said hopper through said pipes.

2. In a machine of the class described, a tunnel, an air propeller having a central hub portion and a series of blades, means mounting said propeller for rotation in an axis longitudinal and substantially central of said tunnel for developing a flow of air longitudinally through said tunnel, a cylindrical shell substantially the same in diameter as the hub portion of said air propeller secured in said tunnel coaxially with said propeller and forming with said tunnel an annular passage for the flow of the air blast generated by the blades of said propeller, a ring deflector forming substantially a continuation of the exhaust end of said cylindrical shell and curved radially outwardly to deflect the ring of air flowing through said annular passage radially and outwardly of said passage toward the foliage to be sprayed, a dust containing hopper, a series of pipes terminating at the periphery of said ring deflector on that side of said ring deflector away from the air blast, and means for feeding dusting material from said hopper through said pipes whereby the blast of air will pick up said dust emerging from said pipes.

3. In a machine of the class described, a tunnel, an air propeller having a central hub portion and a series of blades, means mounting said propeller for rotation in an axis longitudinal and substantially central of said tunnel for developing a flow of air longitudinally through said tunnel, a cylindrical shell secured in said tunnel coaxially with said propeller and forming with said tunnel an annular passage for the passage of the air blast generated by the blades of said propeller, a deflector assembly secured relatively to the shell and tunnel at the exhaust end of said tunnel, said deflector assembly having curved deflector surfaces for directing radially and outwardly the ring of air generated by said propeller blades and flowing between said shell and tunnel, a dust containing hopper, a series of pipes terminating at the periphery of one of said deflector surfaces on that side of said deflector assembly away from the air blast, and means for feeding dusting material from said hopper through said pipes whereby the ring-like blast of air will pick up said dust emerging from said pipes.

4. In a machine of the class described, a wheeled chassis, a dust containing hopper for a dusting insecticide or the like adjacent one end of said chassis, a tunnel at the other end of said chassis, an air propeller, means mounting said propeller at said other end of said chassis for rotation in an axis longitudinal and substantially central of said tunnel for developing a flow of air longitudinally of said tunnel toward the dust containing hopper, a deflector assembly in a space between said tunnel and said dust containing hopper, for directing the air flow radially out-

wardly toward foliage, a series of pipes terminating at angularly spaced intervals on the periphery of said deflector assembly on that side of said deflector assembly away from the air blast, and means for feeding dust material from said hopper through said pipes whereby the blast of air will pick up said dust emerging from said pipes.

5. In a machine of the class described, an air tunnel, an air propeller adapted to develop a blast of air through one end of said tunnel, a deflector system at the end of said tunnel for directing the flow of the air blast radially from the end of said tunnel toward foliage to be dusted, a dust containing hopper, a series of pipes terminating in open ends spaced angularly about the periphery of the said deflector system at that side of said deflector system opposite that side against which the blast of air is received, and means for feeding dust from said hopper through said pipes for acceptance by said blast of air.

6. In a machine of the class described, an air tunnel, an air propeller adapted to develop a blast of air through one end of said tunnel, a deflector system at said one end of said tunnel for directing the air blast radially from the end of said tunnel toward foliage to be dusted, a dust containing hopper, a series of pipes terminating in open ends spaced angularly about the periphery of said deflector system, means for feeding dust from said hopper through said pipes and into said blast of air as directed by said deflector, and means for feeding spraying material into said blast of air in advance of said dust whereby said spraying material coagulates said dust into particles effective for adhering to foliage.

7. In a machine of the class described, an air tunnel, an air propeller adapted to develop a blast of air through one end of said tunnel, a deflector system at the end of said tunnel for directing the flow of the air blast from the end of said tunnel, a dust containing hopper, a series of pipes terminating in open ends spaced about the periphery of said deflector system, means for feeding dust from said hopper through said pipes for acceptance by the air blast as directed by said deflector system relatively to said open ends, and means for feeding spraying material into said blast of air in advance of said dust whereby said spraying material coagulates said dust into particles effective for adhering to foliage.

8. In a machine of the class described, a tunnel, an air propeller, means mounting said propeller for rotation in an axis longitudinal and substantially central of said tunnel for developing a flow of air longitudinally through said tunnel, a ring deflector having a curved surface positioned at the end of said tunnel for directing the air substantially radially of said tunnel toward foliage or the like, a dust containing hopper, a series of pipes terminating at said ring deflector, means for feeding dusting material from said hopper through said pipes, and means for feeding spraying material into said blast of air in advance of said dust whereby said spraying material coagulates said dust into particles effective for adhering to foliage.

9. In a machine of the class described, a tunnel, an air propeller, means mounting said pro-

peller for rotation in an axis longitudinally and substantially central of said tunnel for developing a flow of air longitudinally through said tunnel, a ring deflector having a curved surface positioned at the end of said tunnel for directing the air substantially radially of said tunnel toward foliage or the like, a dust containing hopper, a series of pipes terminating at the periphery of said ring deflector on that side away from the side against which the blast of air is directed, means for feeding dusting material from said hopper through said pipes, and means for feeding spraying material into said blast of air in advance of said dust whereby said spraying material coagulates said dust into particles effective for adhering to foliage.

10. In a machine of the class described, a dust containing hopper for an insecticide or the like, a tunnel, an air propeller, means mounting said propeller in said tunnel for rotation in an axis longitudinal of said tunnel for developing a blast of air longitudinally of said tunnel, a deflector assembly in spaced relation to the end of the tunnel for directing the flow of the air blast radially of said tunnel toward foliage, a series of pipes terminating at angularly spaced intervals on the periphery of said deflector assembly on that side of the deflector assembly away from the air blast, means for feeding dusting material from said hopper through said pipes, the ends of said pipes directing the dust angularly toward the radially directed air blast, and spray feeding pipes positioned in advance of said dust feeding pipes for feeding spray material into said air blast adapted to coagulate said dust.

11. In a machine of the class described, a tunnel, an air propeller having a central hub portion and a series of blades, means mounting said propeller for rotation in an axis longitudinal and substantially central of said tunnel for developing a flow of air longitudinally through said tunnel, a shell secured in said tunnel coaxially with said propeller and forming with said tunnel an annular passage whereby the air blast generated by the blades of said propeller will be in the form of a ring of air, air guide means forming substantially a continuation of the exhaust end of said shell and terminating in a peripheral portion to deflect the ring of air flowing through said annular passage, a dust containing hopper, a series of pipes terminating at the periphery of said air guide means on that side of said air guide means away from the air blast, and means for feeding dusting material from said hopper through said pipes whereby the ring-like blast of air will pick up said dust emerging from said pipes.

GEORGE W. DAUGHERTY.

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2,423,008	Daugherty	June 24, 1947
2,476,960	Daugherty	July 26, 1949