

Feb. 9, 1943.

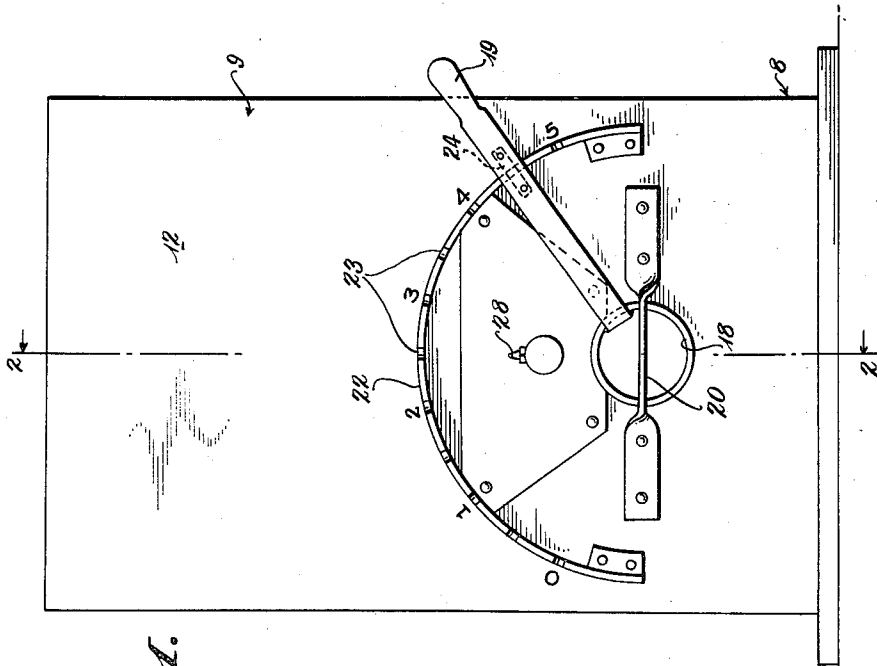
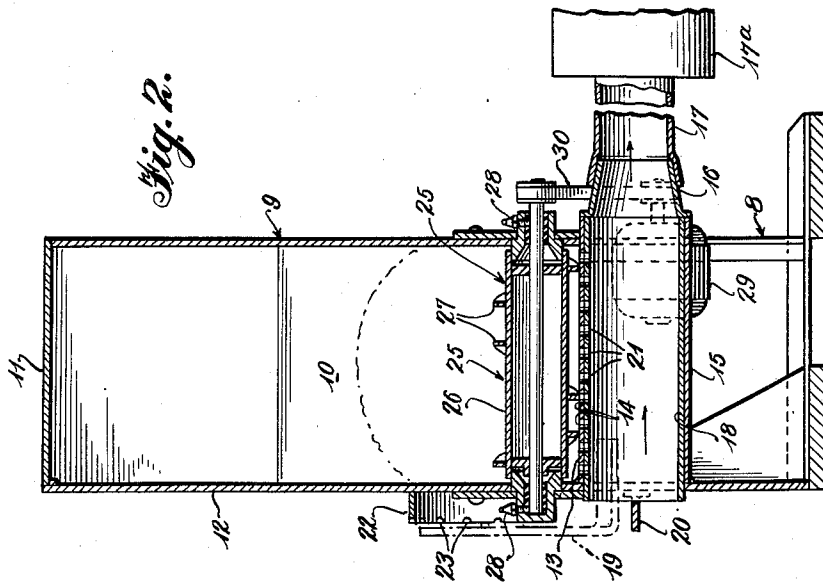
E. R. DYE

2,310,620

DUSTING MACHINE

Filed Sept. 26, 1941

2 Sheets-Sheet 1



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Fig. 3.

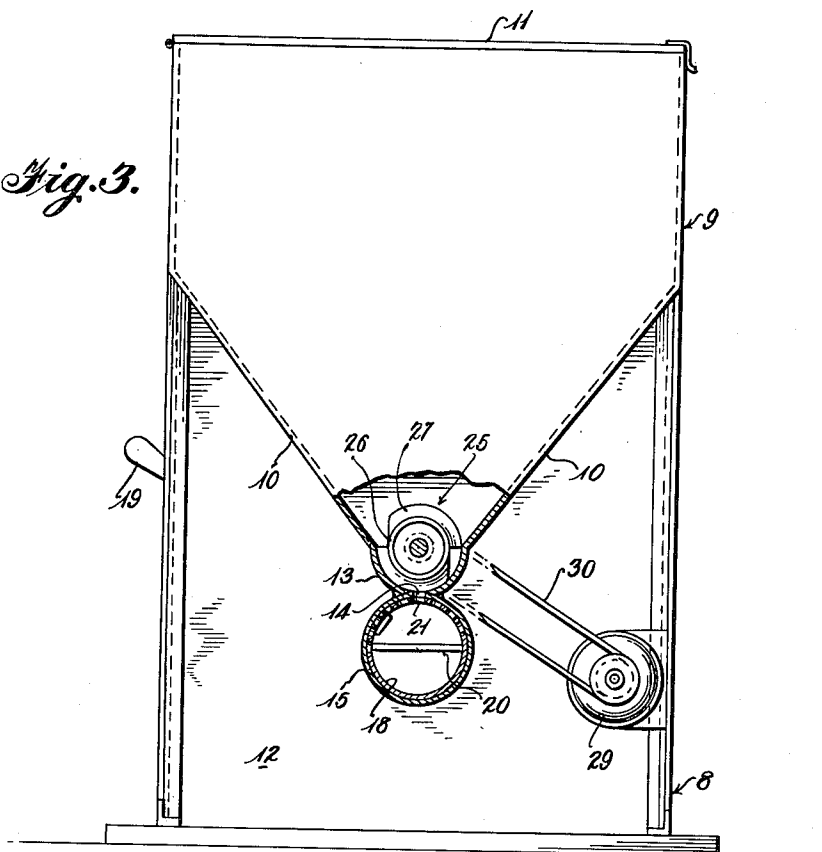


Fig. 4.

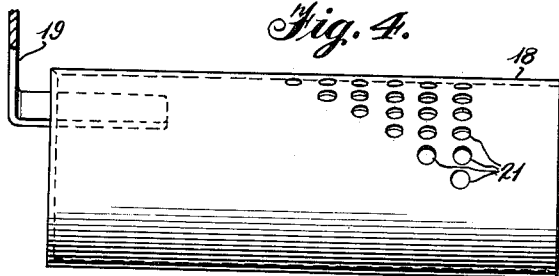


Fig. 5.

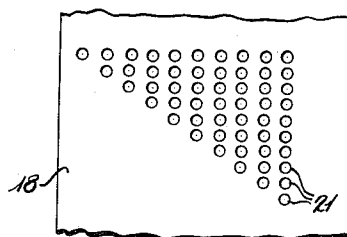


Fig. 6.

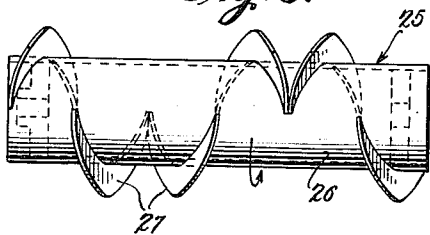
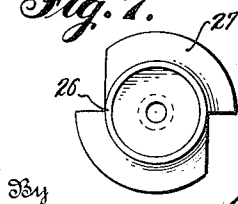


Fig. 7.



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UNITED STATES PATENT OFFICE

2,310,620

DUSTING MACHINE

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Application September 26, 1941, Serial No. 412,513

2 Claims. (Cl. 43-148)

This invention relates to improvements in dusting machines and more particularly to improvements in insecticide dust blowing equipment.

In insecticide dust blowing equipment a calibrated dust feed is necessary to secure economical use of the insecticide. For advantageous results it is highly essential that there be a uniformity of dust feed for any selected calibration. It is also important that the dust feed be positive, that is non-clogging, and that the dust discharge be easy to start even after packing of the insecticide as a result of transportation of the equipment. In dusting equipment the dust is conventionally discharged into an air stream and it will be easily understood that it is also important to secure a uniform distribution of dust in all portions of the air stream. The insecticide used in such equipment is conventionally in the form of a very fine powder and it is not uncommon for the particles to range from one-thousandth to fifteen one-thousandths millimeters in diameter. The difficulties incident to the use of such fine dust in prior dusting equipment have been numerous and to the best of my knowledge the dusting machines heretofore known have not been capable of functioning to accomplish the results heretofore mentioned as desirable.

It is the primary object of my invention to overcome the objections heretofore experienced in dusting equipment and to provide a dusting machine having a calibrated feed which is positive and uniform not only as to the amount of dust discharged at any given calibration but also as to the uniformity of distribution of dust through the air stream. According to my invention I also provide an arrangement wherein the dust feed starts easily regardless of packed conditions of the dust.

An important feature of my invention resides in the provision of an agitator combined with a novel feed valve to eliminate the necessity for relative rotation between the various elements of the feed valve during normal operation of the dusting machine.

Other objects and advantages of my invention will be obvious while others will be specifically referred to hereinafter.

In the accompanying drawings I have shown what I believe to be the preferred embodiment of my invention. In these drawings:

Figure 1 is a front elevational view of a portion of a dusting machine embodying my invention;

Figure 2 is a vertical sectional view taken along the line 2-2 of Figure 1;

Figure 3 is a view partly in rear elevation and partly in section;

Figure 4 is a side elevational view of a hollow cylinder which forms a portion of the dust feed valve;

Figure 5 is a view showing a development of a portion of the surface of the hollow cylinder shown in Figure 4 but on a somewhat reduced scale;

Figure 6 is a side elevational view of the agitator and

Figure 7 is an end elevational view of the agitator.

The reference numeral 8 designates generally a support for that portion of the dusting machine which embodies my invention. Mounted upon support 8 is a hopper 9 having sloping bottom walls 10 as is best shown in Figure 3. The hopper 9 is provided with a cover 11. The front wall 12 of the hopper is in the form of a panel which extends from the base of the support 8 to the top of the hopper 9.

The extreme bottom of the hopper is arcuate in transverse section as is best seen by reference to the numeral 13 in Figure 3. In the bottom of the arcuate trough 13 are a number of aligned openings designated by the reference numeral 14 in Figures 2 and 3. Ten of the openings 14 are shown although any desired number may be employed.

Below and adjacent the arcuate trough 13 is a hollow cylindrical pipe designated by the reference numeral 15 and which for purposes of convenience is hereinafter referred to as a tunnel. By reference to Figures 2 and 3 it will be noted that the openings 14 extend through the wall of the tunnel 15 to thus form a communication between the interior of the hopper 9 and the interior of the tunnel 15. The tunnel 15 converges slightly at 16 and communicates with a discharge conduit 17.

Disposed within the tunnel 15 is a hollow cylinder 18 provided with an adjusting handle member 19. As shown in Figure 2 the rightward end of the hollow cylinder 18 abuts against the converging portion 16 of the tunnel 15 and is held in such abutting relationship by means of a bar 20 bearing against the leftward end of the hollow cylinder.

As is best shown in Figures 4 and 5, the wall of the hollow cylinder 18 is provided with a plurality of series of apertures 21 which are preferably of the same size or larger than the openings 14 in the arcuate trough 13 of the hopper. It will be seen that these apertures 21 are arranged in a

series of rows extending longitudinally of the hollow cylinder 18. In one row there is a single aperture, in the next row there are two apertures, in the next row there are three apertures, and this continues until in the last row there are ten apertures to correspond with the ten openings 14 in the arcuate trough 13. It will therefore be readily apparent that the hollow cylinder 18 may be rotated about its own longitudinal axis by means of the handle member 19 to align any number of apertures 21, between the limits of zero and ten, with openings 14. That is to say it is possible to selectively adjust the hollow cylinder 18 in such manner that the interior of the hopper 9 communicates with the interior of the hollow cylinder 18 through one or ten or any intermediate number of passageways, or in such manner as to close all of the openings 14.

Attached to the front of the panel 12 there is provided an indicator bar 22 which serves to retain the handle 19 in the selected position by means of notches 23 which cooperate with a detent 24 on the handle 19.

Within the hopper 9 and so positioned and dimensioned as to fit within the arcuate trough 13 is an agitator 25. This agitator comprises a polished cylinder 26 provided with polished metal fins 27 which are designed to agitate and break up the dust in the hopper by destroying all cakes or lumps and to sweep the dust uniformly past the feed openings 14. It will be noted that the adjacent fins are in the form of oppositely arranged helixes along the surface of the cylinder 26. The agitator 25 is mounted in dust proof bearing 28 and is adapted to be driven by suitable means such as a motor 29 through a belt 30.

Suitable means such as a blower 17a is provided for causing a stream of air to pass rapidly through the hollow cylinder 18 and the conduit 17. Such means may be any conventional form of blower or other suitable arrangement. The conduit 17 should be attached to the intake of the blower 17a which should be driven at appropriate speed to maintain a constant vacuum head in the hollow cylinder 18.

Although the operation of the apparatus should now be clear it will be described briefly. The handle member 19 is positioned to cause the proper number of apertures 21 to align with openings 14 to give the desired rate of discharge of dust into the air stream. The motor 29 should then be started which will cause the agitator 25 to rotate. The blower 17a should also be placed in operation. Rotation of the agitator will assure a continuously uniform sweeping of dust over each opening 14 and consequently will discharge dust into the interior of the hollow cylinder 18 through each aperture 21 which is in alignment with an opening 14. This dust will be picked up by the air stream passing through the hollow cylinder 18 and the conduit 17.

In addition to the general principle of operation described above I have found that there are several important considerations to be borne in mind in the design of the apparatus embodied in my invention. The diameter of the agitator 25 should be greater than the span of possible arching of the dust to be used in the hopper. It is important that the agitator 25 be driven or actuated at low speed in order that the centrifugal force imparted to the dust will be less than gravity. The openings 14 and the apertures 21 should be of a diameter larger than the criti-

cal clogging diameter for any particular dust which is likely to be used in the machine.

By this invention I have provided a calibrated feed for a dusting machine which is positive and highly uniform for any particular calibration. The uniformity of feed appears to be due in large measure to the peculiar design and shape of the agitator which uniformly conditions the dust for each opening 14, moving equal amounts of dust under equal pressure over each opening, to the fact that the dust feeding passageways remain fully open instead of being periodically closed or partially closed during normal operation, which closing would cause an undesirable throttling effect.

A feature which I consider of great importance is the practical elimination of friction between closely fitting moving parts. The only movement necessary between the tunnel 15 and the hollow cylinder 18 occurs during calibration or adjustment of the feed, since in normal use there is no relative rotation between these two elements. The openings communicating from the interior of the hopper to the air stream are not closed and there is no periodic "cup dosing" as is the case when the coacting parts of a feed valve rotate relative to each other. Not only does my arrangement eliminate wear of the feed valve but it prevents a packing of dust between relatively moving surfaces.

It is to be understood that the form of the invention herein shown and described is the preferred form but that various changes in detail may be resorted to without departing from the scope of the invention as defined by the following claims.

Having thus described my invention, I claim:

1. An adjustable discharge dusting machine comprising a dust hopper having an arcuate trough at the bottom thereof, a tunnel below said trough, a plurality of openings in the wall of said tunnel communicating with the interior of said trough, a normally stationary member within said tunnel and fitting closely to the inner wall thereof, means for selectively adjusting said member to close one or more of said openings in said tunnel wall to thus selectively vary the number of openings communicating between said tunnel and said trough interior, a rotor assembly extending longitudinally of said trough, said rotor assembly comprising a cylinder of a radius slightly less than the radius of said trough to prevent uncontrolled flow of dust from said hopper to the bottom of said trough and narrow fins extending helically about the circumference of said cylinder, means for rotating said rotor assembly to convey dust from said hopper to the bottom of said trough and to sweep said dust across said openings, and means for causing a flow of air at reduced pressure longitudinally through said tunnel.

2. An adjustable discharge dusting machine comprising a dust hopper having an arcuate trough at the bottom thereof, a cylindrical tunnel below said trough, a plurality of openings in the wall of said tunnel communicating with the interior of said trough, a hollow cylinder extending through said tunnel and fitting closely with the inner wall thereof, a plurality of series of apertures in the wall of said hollow cylinder, each series being composed of a different number of apertures, means for selectively adjusting said hollow cylinder to cause the apertures of any one of said series to align with openings in said tunnel wall and to thus communicate with the

interior of said trough, a rotor assembly extending longitudinally of said trough, said rotor assembly comprising a cylinder of radius slightly less than the radius of said arcuate trough and a plurality of narrow helical fins on the circumference of said rotor cylinder with adjacent fins being oppositely arranged helixes, means for ro-

5 tating said rotor assembly to cause said fins to convey dust from said hopper around said rotor cylinder to the bottom of said trough and back and forth across said openings, and means for causing a flow of air at reduced pressure longitudinally through said tunnel.

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