May 19, 1936. W. B. THOMPSON 2,041,627

APPARATUS FOR APPLYING FLOCK

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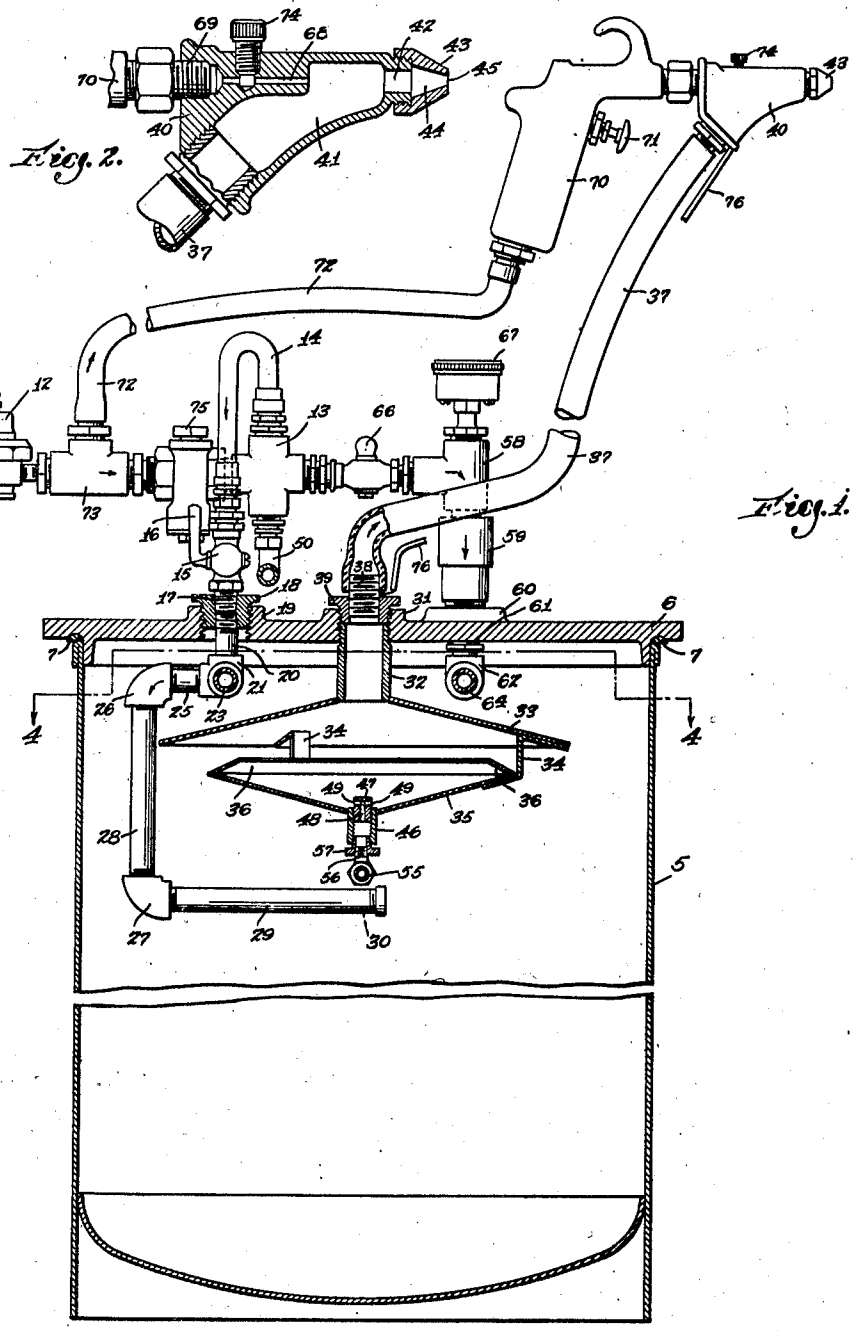


Fig. 1.

Fig. 2.

Inventor
Wayne B. Thompson
by Charles W. Hoffman
his attorney

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Fig. 3.

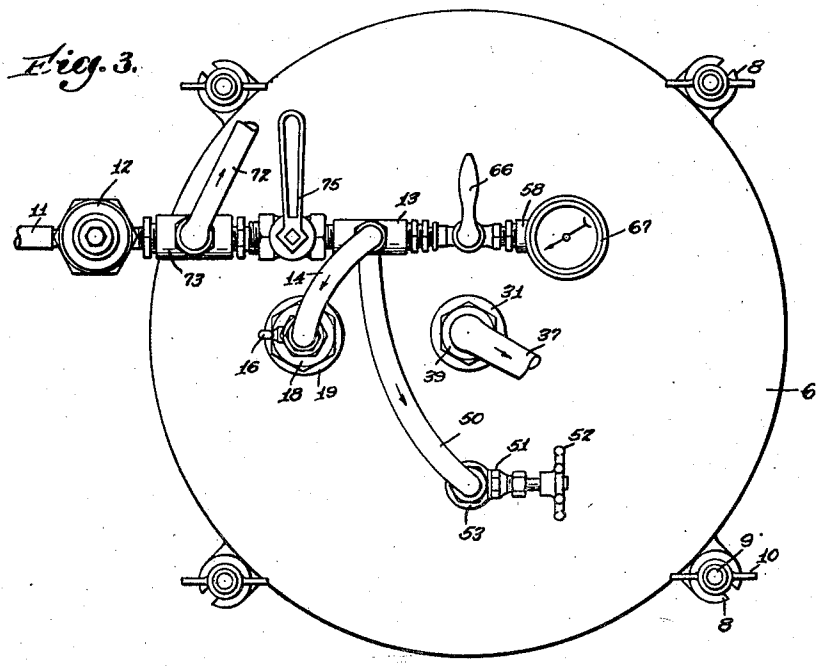
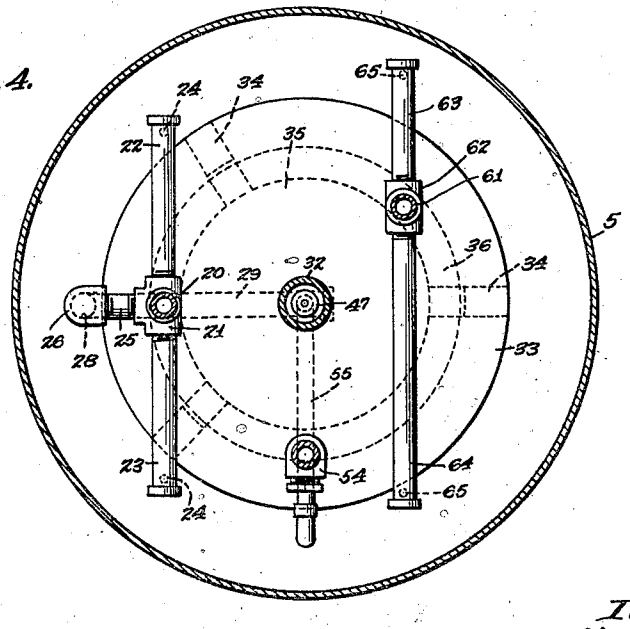


Fig. 4.



Inventor
Wayne B. Thompson
by Robert W. McBride
his attorney

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APPARATUS FOR APPLYING FLOCK

Wayne B. Thompson, Winchester, Mass.

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8 Claims. (Cl. 91—8)

The present invention relates to the art of coating and more particularly to apparatus for applying flock, which term is used herein to designate comminuted material, such as cotton, wool, silk, rayon and the dust of vegetable fibers.

In one commercially successful flock applying apparatus the flock is stored in a container which is detachable from the apparatus and is movable therewith as the operative swings it over the adhesively coated work to apply the flock thereto. Because the operative carries the apparatus in his hand during the flock applying operation the size of the container is definitely limited and in consequence it is necessary to detach the container frequently in order to replenish it with flock. In this commercially successful type of flock applying apparatus the nozzle through which the flock is discharged upon the work is located above the container and the flock is delivered to the nozzle and is discharged therefrom by the entraining action of air introduced into the container under pressure and allowed to escape therefrom to and out of the nozzle. This mode of operation is highly desirable in handling flock which has an inherent tendency to felter, but no way has been found heretofore to employ this desirable mode of operation in an apparatus provided with a stationary tank capable of holding a large quantity of flock.

The principal object of the present invention is to produce an apparatus in which a large quantity of flock may be stored and by which the flock may be applied in a rapid, reliable and economical manner.

To the accomplishment of this object, and such others as may appear hereinafter, the features of the present invention relate to certain devices, combinations and arrangements of parts hereinafter described and then set forth in the appended claims.

The various features of the present invention will be understood readily from an inspection of the accompanying drawings, in which,

Figure 1 is a view in longitudinal sectional elevation;

Fig. 2 is a detail view in sectional elevation of the nozzle;

Fig. 3 is a view in plan, and

Fig. 4 is a view in sectional plan on the line 4—4, Fig. 1.

Referring to the drawings, the apparatus or tool for applying flock, is preferably provided with a metallic tank or chamber 5 comprising a container for a large amount of flock. After the tank 5 is partially filled with flock its open top is covered by a cover 6. The interior of the cover 6 is provided with a gasket 7 (Fig. 1) to engage the circular top edge of the tank 5 and form an air tight joint. The cover 6 is provided with a series of slotted lugs 8 (Fig. 3) each of which receives the shank of a bolt 9 which is pivoted between a pair of small plates (not shown) supported by the exterior surface of the tank 5. The free end of the bolt 9 is screw-threaded and receives a wing-nut 10 adapted to engage the lugs 8.

In order to introduce a motive agent, such as compressed air, into the flock tank 5, the apparatus is provided with a main air line 11 which is connected to some suitable source of supply through a pressure reducing valve 12. The main air line is provided with a cross 13 (Figs. 1 and 3) one outlet of which is connected to one end of a branch air line 14 comprising a flexible conduit the other end of which is connected to a valve body 15 provided with a valve operating arm 16. The valve body 15 is connected by a nipple 17 to an internally threaded plug 18 received in an internally threaded perforated boss 19 formed on the cover 6. The plug 18 receives also one end of a short piece of pipe 20 the other end of which is connected to a four way T 21 inside the tank 5. Two of the outlets of the T 21 are connected to pieces of pipe 22 and 23 (Fig. 4) both closed at one end. Each piece of pipe 22 and 23 is provided with an orifice 24 discharging vertically downward into the flock. The other outlet of the T 21 is connected through a nipple 25, two elbows 26 and 27 (Fig. 1) and a vertical length of pipe 28, to a piece of pipe 29, similar to the pieces 22 and 23, and provided with an orifice 30 discharging vertically downward into the flock on the center line of the tank 5.

In order to allow the air introduced into the tank 5 to escape therefrom the cover 6 is provided with a central, interiorly threaded, perforated boss 31, the lower portion of which receives the threaded end of a hollow cylinder 32 forming the outlet from the tank 5. The unthreaded end of the cylinder 32 carries an intensifier one element of which comprises a canopy 33 overlying the flock. The canopy 33 is provided with three pieces of Z-shaped metal 34 (Figs. 1 and 4) which support the upwardly and outwardly flaring sides of a frusto-conical pan or trap 35 comprising another element of the intensifier. The peripheral edge of the trap 35 is bent inwardly and upwardly to form a peripheral baffle 36 spaced from the lower peripheral edge of the canopy 33.

The hollow cylinder 32 communicates with a flexible conduit 37 one end of which is connected

by a nipple 38 to a plug 39 threaded into the boss 31 and engaged with the cylinder 32. The other end of the conduit 37 is coupled to a nozzle head 40. The nozzle head 40 is provided with a mixing chamber 41 (Fig. 2) and a lateral passage 42 forming the outlet from the chamber 41 into a nozzle 43 secured to the nozzle head 40 and provided with a frusto-conical passage 44 terminating in a round discharge orifice 45.

The air introduced into the flock through the orifices 24 and 30 stirs up and disperses the flock in the tank, separates floating particles therefrom and then carries the floating particles in a dense cloud under the canopy 33 around its periphery. Some of these particles collected under the canopy 33 are discharged from the nozzle 43 by the entraining action of the air during its escape from the tank 5 by way of the nozzle. Some of the particles collected under the canopy fall out of the entraining air into the trap 35. Other particles of flock are carried into the trap 35 around its periphery by the action of the air in stirring up and dispersing the flock and thereby setting it in motion within the tank 5.

In order to stir up the flock in the trap 35 and send it back into the air stream seeking an outlet out of the tank 5 and thereby intensify the density of the flock laden escaping air, the bottom of the trap 35 is provided with an internally threaded sleeve 46 (Fig. 1) into the upper end of which is threaded a plug 47. The plug 47 is provided with a central vertical air passage 48 which communicates with four lateral discharge orifices 49. The discharge orifices 49, which constitute the third element of the intensifier, are supplied with air from the bottom outlet in the cross 13 which is connected by a flexible conduit 50 (Fig. 3), a valve 51 provided with a valve operating wheel 52 through an internally threaded, perforated boss 53 in the cover 6, an elbow 54 (Fig 4) within the tank, and other fittings, to a lateral pipe 55 (Figs. 1 and 4) which communicates with the sleeve 46 through a vertical nipple 56 and a coupling 57. With this construction the flock which has accumulated in the trap 35 is stirred up into particles which are blown laterally by the air discharged through the lateral orifices 49 into engagement with the baffle 36 which commingles the flock with the air and directs the flock laden air inwardly into the path of the air stream introduced into the tank through the orifices 24 and 30 and now seeking an outlet from the tank 5 through the cylinder 32. The canopy 33 directs all the flock laden air into the outlet 32. The trap 35 collects the excess flock delivered by the escaping air under the canopy and the flock which falls into the trap from the moving main body of flock. The jets from the orifices 49 clear the trap of flock, thereby preventing it from feltering and, in connection with the canopy and the trap, intensifying the flock laden air escaping out of the tank through the outlet 32.

Stated in another way, the canopy 33 constitutes an open bottomed chamber in which the flock is concentrated in the air adjacent the outlet 32 from the tank. Since the trap 35 is spaced from the lower peripheral edge of the chamber formed by the canopy 33, it will be seen that there is a passage between the canopy 33 and the trap 35, this passage giving access into the canopy through its open bottom. The trap 35 forms the floor of this passage. Through this passage the flock laden air passes on its way to the outlet 32 by way of the canopy 33. Any flock which drops from the canopy 33 into the trap 35 is stirred up by the jets of air from the orifices 49 and is directed back into the air stream escaping by way of the canopy 33 so that the flock is concentrated in the air stream within the canopy adjacent the outlet 32.

In order to assist the air from the branch 14 in dispersing the flock in the tank and creating an atmosphere in the tank loaded with floating particles of flock when the tank 5 is low in flock, the main air line 11 is provided with a T 58 (Fig. 1) one outlet of which is connected by a branch air line 59 through the cover 6 to the interior of the tank 5. To this end the cover 6 is provided with a boss 60 which receives a nipple 61 connected to a T 62. The other outlets of the T 58 communicate with pieces of pipe 63 and 64 (Fig. 4) both closed at one end. Each pipe 63 and 64 is provided with an orifice 65 arranged to discharge air vertically downward into the flock. The flow of air through the branch air line 59 is controlled by a valve 66 (Fig. 1) and the pressure of air in the branch 59 is indicated by a gage 67.

Under some conditions of operation it may be desirable to thin the volume of flock discharged by an auxiliary blast of air. To this end the nozzle head 40 is provided with a passage 68 (Fig. 2) through which air under pressure is discharged into the chamber 41 from a nipple 69 threaded into the head 40 adjacent the passage 68. The nipple 69 is coupled to one end of an air passage (not shown) formed in a gun body 70. The gun body 70 is shaped to fit in the palm of an operative's hand and is provided with a valve operating button 71 which controls the passage of air through the gun body. The other end of the air passage in the gun body 70 is coupled to one end of a flexible conduit 72 the other end of which is fitted into a T 73 (Figs. 1 and 3) on the main air line 11. The pressure of the air passing through the passage 68 may be varied, within the limit determined by the pressure reducing valve 12, by a valve 74.

Referring to Fig. 2, the passage 68 is made smaller than the passages 42, 44 and 45 in order that when the auxiliary air jet is used it will not create a condition of pressure in the chamber 41 operating to retard the flow of the flock laden air out of the conduit 37.

To apply the flock the tank 5 is filled with flock to a level just below the pipe 29. With the valve in the branch 14 opened and the valve in the branch 59 closed, the handle 70 of the apparatus is engaged with the palm of the operative's hand with the index finger thereof disengaged from the valve operating button 71. Then an operating wrench 75 (Fig. 3) is manipulated to open a main valve in the main air line 11 to allow air to be introduced into the tank 5 to stir up the flock and allow particles thereof to commingle with the air. The flock laden air flows in between the canopy 33 and the trap 35 which, in connection with the lateral orifices 49, cooperate to form an intensifier for preventing the flock from feltering under the canopy and intensifying the density of the flock laden air escaping from the tank 5. The flock flows out of the nozzle 43 in a turbid condition. By manipulating the gun body 70 the flock is applied to the surface of the adhesively coated work.

The flock used in coating the work varies widely in kind, quality and fineness. By manipulating the valves in the main air line 11 and the three branches 14, 50, and 59, the air introduced into the tank 5 and the intensifier may be varied

as desired to meet the different operating conditions and to obtain the desired volume of flock with the particular type thereof.

In order to prevent the accumulation of statical electricity the opposite ends of a wire 76 are connected to the nozzle head 40 and the nipple 38, (Fig. 1), respectively.

Nothing herein explained is to be interpreted as limiting the various features of the present invention in the scope of its application to use in connection with the particular apparatus or the particular mode of operation or both selected for purposes of illustration and explanation. While the particulars of construction herein set forth are well suited to one mechanical form of the invention and to the use to which it is put, it is not limited to this use, nor to these details of construction, nor to the conjoint use of all its features, nor is it to be understood that these particulars are essential since they may be modified within the skill of the artisan without departing from the true scope of the actual invention, characterizing features of which are set forth in the following claims by the intentional use of generic terms and expressions inclusive of various modifications.

What is claimed as new, is:

1. An apparatus for applying flock having, in combination, a nozzle, a tank for the flock, an outlet from the tank in communication with the nozzle, a canopy associated with the outlet and communicating therewith, means for introducing air under pressure into the tank to disperse the flock therein and discharge the dispersed flock from the tank by the entraining action of the air escaping from the tank by way of the canopy and the outlet, and a flock trap mounted in the tank beneath and spaced from the canopy.

2. An apparatus for applying flock having, in combination, a nozzle, a tank for the flock, an outlet from the tank in communication with the nozzle, a canopy associated with the outlet and communicating therewith, means for introducing air under pressure into the tank to disperse the flock therein and discharge the dispersed flock from the tank by the entraining action of the air escaping from the tank by way of the canopy and the outlet, a flock trap mounted in the tank beneath and spaced from the canopy, and means for dispering the flock in the trap.

3. An apparatus for applying flock having, in combination, a nozzle, a tank for the flock, an outlet from the tank in communication with the nozzle, a canopy associated with the outlet and communicating therewith, means for introducing air under pressure into the tank to disperse the flock therein and discharge the dispersed flock from the tank by the entraining action of the air escaping from the tank by way of the canopy and the outlet, a flock trap mounted in the tank beneath and spaced from the canopy, and means for dispersing the flock in the trap and directing the dispersed flock into the escaping flock laden air.

4. An apparatus for applying flock having, in combination, a nozzle, a tank for the flock, an outlet from the tank in communication with the nozzle, a canopy associated with the outlet and communicating therewith, means for introducing air under pressure into the tank to disperse the flock therein and discharge the dispersed flock from the tank by the entraining action of the air escaping from the tank by way of the canopy and the outlet, a flock trap mounted in the tank beneath and spaced from the canopy, and means for introducing air under pressure directly into the trap.

5. An apparatus for applying flock having, in combination, a nozzle, a tank for the flock, an outlet from the tank in communication with the nozzle, a canopy, in the tank, suspended from the outlet, and a trap supported by the canopy in position to catch flock dropping therefrom.

6. An apparatus for applying flock having, in combination, a nozzle, a tank for the flock, an outlet from the tank in communication with the nozzle, means adjacent the outlet forming a flock concentrating chamber associated with the outlet, a pan supported within the tank beneath the flock concentrating chamber and spaced therefrom and from the walls of the tank to provide a passage between the flock concentrating chamber and the pan, means for introducing air under pressure into the tank to disperse the flock therein and discharge the dispersed flock through the passage into the flock concentrating chamber and therefrom out of the tank by the entraining action of the air escaping from the tank by way of the passage, the flock concentrating chamber, and the outlet, and means for preventing the accumulation of flock in the pan.

7. An apparatus for applying flock having, in combination, a nozzle, a tank for the flock, an outlet from the tank in communication with the nozzle, a canopy, in the tank, suspended from the outlet, a trap supported by the canopy in position to catch flock dropping therefrom, and means connected to the trap for preventing the feltering of the flock caught in the trap.

8. An apparatus for applying flock having, in combination, a nozzle, a tank for the flock, an outlet from the tank in communication with the nozzle, a canopy, in the tank, suspended from the outlet, a trap supported by the canopy in position to catch flock dropping therefrom, and means for introducing air under pressure directly into the trap to disperse the flock caught therein.

WAYNE B. THOMPSON.