Dec. 15, 1936. W. B. THOMPSON 2,064,505

APPARATUS OR TOOL FOR APPLYING FLOCK

Filed June 3, 1933

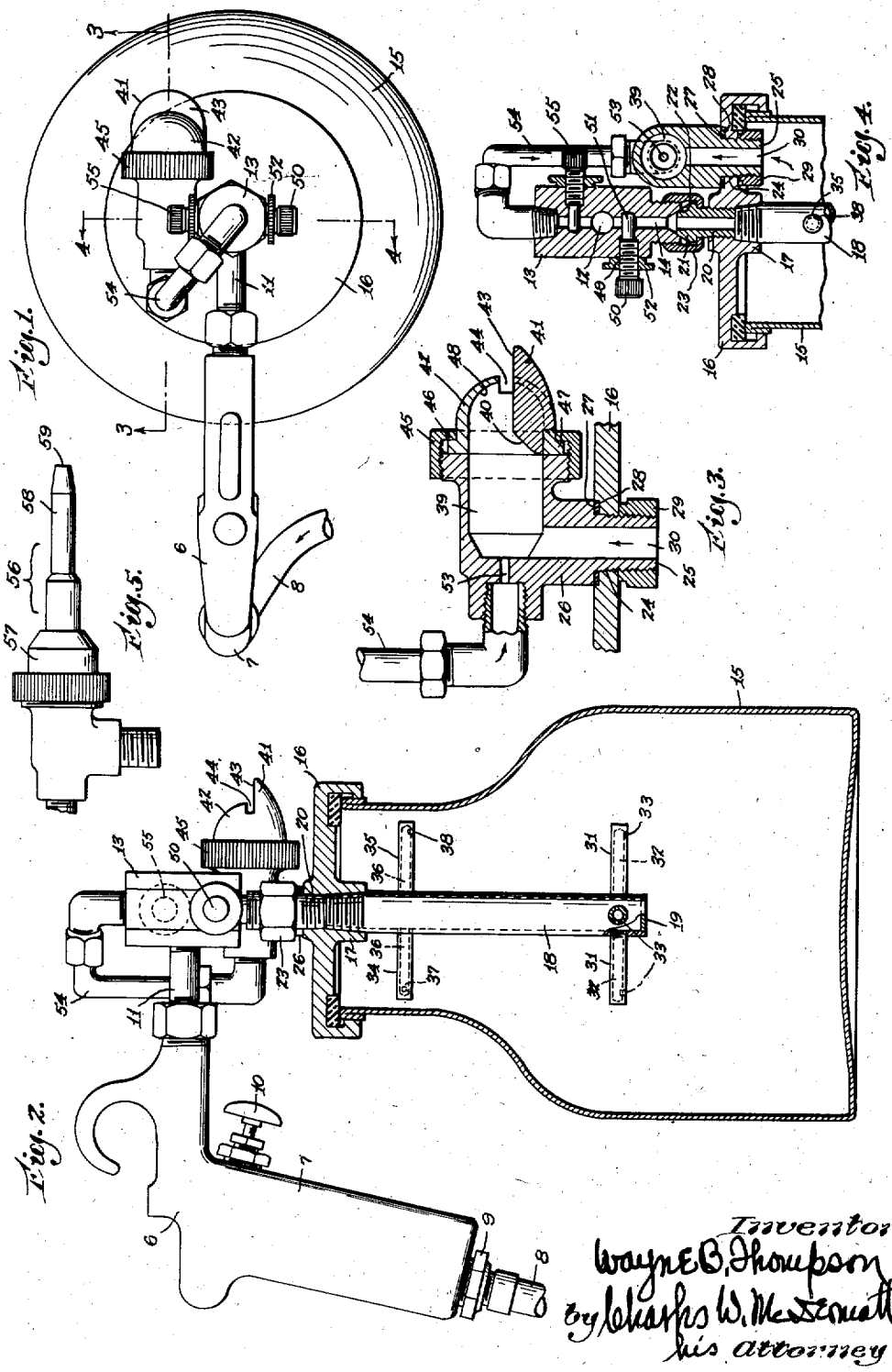


Fig. 1.

Fig. 4.

Fig. 3.

Fig. 5.

Fig. 2.

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

Patented Dec. 15, 1936 2,064,505

UNITED STATES PATENT OFFICE

2,064,505

APPARATUS OR TOOL FOR APPLYING FLOCK

Wayne B. Thompson, Winchester, Mass., assignor to Spray Engineering Company, Somerville, Mass., a corporation of Massachusetts

Application June 3, 1933, Serial No. 674,211

13 Claims. (Cl. 91—8)

The present invention relates to tools or apparatus for applying flock, which term is used herein to designate comminuted material, such as cotton, wool, silk, rayon and vegetable fibers.

It has been long proposed to use flock in the form of the dust of vegetable fibers or very fine, sifted woolen or cloth refuse, especially that obtained from shearing the nap on cloths, as a coating for wall paper to give it a velvety or cloth-like appearance. More recently it has been proposed to apply flock to many different kinds of articles of manufacture other than wall paper, but experience has demonstrated that the apparatus formerly used to apply flock to wall paper is not adaptable to the many different operating conditions encountered in the extended use of flock. One great difficulty in the use of apparatus heretofore proposed for the application of flock is the liability of the apparatus to clog owing to the tendency of the flock fibers to felter.

The prncipal object of the present invention is to produce a tool or apparatus for universal use by which 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 drawing, in which,

Figure 1 is a view in plan;

Fig. 2 is a view in longitudinal sectional elevation;

Fig. 3 is a detail view in sectional elevation on the line 3—3, Fig. 1;

Fig. 4 is a detail view in sectional elevation on the line 4—4, Fig. 1, and

Fig. 5 is a detail view in elevation of a modified form of nozzle.

Referring to the drawing, the apparatus or tool for applying flock, is preferably provided with a metallic body 6 (Fig. 1) which has integral therewith or suitably attached thereto a handle or extension 7. The motive agent, which may be air under pressure, is preferably introduced into the body portion 6 through the handle 7 which is connected to an air hose 8 through an air hose coupling 9. The passage of the air through the body portion 6 is controlled by a valve button 10. The front end of the body portion is coupled to one end of a short piece of pipe 11 the other end of which is fitted into a lateral passage 12 (Fig. 4) formed in a distributor 13. The lateral passage 12 communicates with a central passage 14 formed vertically through the distributor 13.

In the illustrated embodiment of the invention the flock is placed in a container 15 which is detachably connected to a closure 16 by the same means disclosed in the patent granted to Preble and Thompson, No. 1,819,117, August 18, 1931. The closure 16 is provided with a central, internally threaded, perforated boss 17 into the lower portion of which is threaded the frusto-conical end of a hollow pipe 18 depending into the flock within the container 15. The pipe 18 is closed at its bottom end 19. The upper end of the pipe 18 abuts against and communicates with a hollow nipple 20 having its lower end threaded into the upper portion of the boss 17. The upper end of the nipple 20 is provided with a frusto-conical head 21 which is held against a frusto-conical seat 22, formed in the bottom of the passage 14, by a coupling 23.

The closure 16 is provided with an opening 24 (Fig. 4) which receives the threaded neck 25 of a nozzle head 26. Received on the neck 25, and interposed between an annular shoulder 27, formed on the head 26, and the closure 16, is a packing washer 28, seated in a circular depression formed in the closure 16 around the opening 24. The nozzle head 26 is secured to the closure 16 by a nut 29 threaded on the neck 25 and engaged with the bottom of the closure 16. The nozzle head 26 is provided with a vertical passage 30 constituting the outlet from the container 15.

In order to discharge air under pressure into the container to stir or disperse the mass of flock therein, separate a portion of the moving mass of flock into floating particles and cause them to enter the passage 30 by the entraining action of the air seeking an outlet from the container therethrough, the pipe 18, near its closed end 19, is provided with four equally spaced arms 31 radiating laterally therefrom. Each arm 31 is provided with a blind passage 32 into which air from the pipe 18 flows. The air in each passage 32 discharges into the flock through an orifice 33 formed in the arm 31 to the left (Fig. 2) and downwardly on an angle of 45 degrees relative to the center line of the pipe 18. With this construction the air discharged into the flock through the orifices 33 causes it to swirl in a clockwise direction (Fig. 1) about the pipe 18. As the flock swirls some of it is separated from the mass of flock into particles which commingle with the air. This flock, commingled with the air, rises and is caused to enter the passage 30 by the entraining action

of the air current discharged into the flock and exhausted through the passage 30.

Some of the flock swirls into the upper part of the container adjacent the entrance to the passage 30 at which point the swirling flock encounters the flock laden air seeking an outlet therethrough. The mass of flock thus concentrated at the entrance to the passage 30 tends to felter and form a mat with the result that the flock remains in the container and air only escapes therefrom. In order to agitate the mass of flock concentrated at the entrance to the passage 30 to prevent its feltering, to break it up into floating particles, and to intensify the flock entrained air escaping from the container through the passage 30, the pipe 18 is provided with two upper arms 34 and 35 (Fig. 2), each provided with a blind passage 36. The air which enters the blind passage 36 of the arm 34 discharges into the container 15 through an orifice 37. The air which enters the blind passage 36 of the arm 35 discharges into the container 15 through an orifice 38. The orifices 37 and 38 are formed in the arms 34 and 35, respectively, on the sides thereof which face the entrance of the passage 30. The orifice 37 is arranged to discharge the air horizontally on one side of the pipe 18 while the orifice 38 is arranged to discharge the air laterally and downwardly on an angle of 45 degrees relative to the vertical plane passing through the center line of the arms 34 and 35 on the other side of the pipe 18. The air discharged from the orifices 37 and 38 acts on the mass of swirling flock adjacent the entrance to the passage 30 in a direction opposed to the initial flock motivating air discharged through the orifices 33. With this construction and mode of operation the mass of flock, concentrated at the entrance to the passage 30, and which had been previously agitated by the air discharged into the container through the orifices 33 is agitated by the air discharged into the container through the orifices 37 and 38. This re-agitation of the mass of flock prevents it from forming a mat of feltered flock at the entrance to the passage 30, and separates it into particles which commingle with the re-agitating air. The commingled particles are discharged from the container by the entraining action of the re-agitating air escaping from the container through the passage 30. The orifices 37 and 38 constitute an intensifier to intensify the density of the flock laden air escaping from the container.

The flock which enters the passage 30 by the entraining action of the air current exhausting from the container 15 is delivered into a mixing chamber 39 formed in the nozzle head 26 and is driven by the entraining air current against the internal wall of the mixing chamber opposite the passage 30 and then to an inclined wall 40 forming the rear end face of a lip 41 integral with and projecting from a dome-shaped nozzle 42. As shown in Figs. 1 and 3, the lip 41 is provided with a flat upper face 43 a portion of which forms the bottom wall of an elongated peripheral slot 44 formed centrally in the nozzle 42. The nozzle 42 is provided with a rear flat face which is held against the front flat face of the nozzle head 26 by a retaining member 45 having an internally threaded portion to engage external threads on the head 26 and an inturned portion 46 to engage a peripheral flange 47 on the nozzle 42.

The flock which glances from the internal wall of the mixing chamber opposite the passage 30 to the inclined wall 40, glances in turn therefrom into engagement with the curved internal wall 48 of the dome-shaped nozzle 42. From the curved wall 48 the flock glances to the flat surface 43 which spreads the flock and causes it to emerge from the elongated slot 44 in a concentrated, fanned-out condition.

The passage 14, purposely, is constructed to conduct into the container 15 an excessive amount of air under pressure to insure the discharge of the flock in a volume greater than that needed under ordinary operating conditions. In order to be able to cut down the amount of compressed air delivered to the container and thus reduce, as required, the volume of the flock discharged, the distributor 13 is provided with a valve 49 having a body portion threaded into the distributor 13, a knurled head 50, and a cylindrical stem 51, arranged to extend through the passage 14 laterally in that portion thereof interposed between the passage 12 and the container 15. As shown in Fig. 4 the passage 14 is closed by the stem 51. By manipulating the knurled head 50 the stem 51 may be withdrawn varying distances to provide varying restrictions in the passage 14 through which the compressed air flows. The desired adjustment of the valve 49 is maintained by a locknut 52.

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 26 is provided with a passage 53 through which air under pressure is discharged into the chamber 39 from a conduit 54, one end of which is threaded into the head 26 adjacent the passage 53 and the other end of which is threaded into the head 26 adjacent the upper end of the passage 14.

The passage 14 above the lateral passage 12, may be closed by a valve 55 similar to the valve 49. When the valve 55 is closed the flock is discharged by the entraining action of the air which escapes from the container 15. When the valve 55 is open air under pressure flows to the chamber 39 and thins out the entrained flock passing therethrough. The valves 49 and 55 are, in effect, pressure reducing valves.

The flock used in coating the work varies widely in kind, quality and fineness. By manipulating the valves 49 and 55 the pressure of the air delivered into the container 15 and to the nozzle head 26 may be varied as desired to meet different operating conditions and to suit the requirements for the peculiar characteristic of the particular flock being handled.

By loosening and then tightening the retaining member 45, the nozzle 42 may be adjusted angularly to locate the slot 44 in any desired plane, and thus vary the plane of the flattened discharge of flock. If a fan discharge is not suited to the particular operating condition the nozzle 42 may be removed and a nozzle 56 comprising a mixing chamber 57 and a discharge tube 58, tapering internally slightly from the chamber 57 to a round discharge orifice 59, may be substituted therefor.

To apply the flock, the work is coated with a suitable adhesive. The handle 7 of the apparatus is engaged with the palm of the operative's hand with the index finger thereof engaged with the valve 10. With the valve 49 opened and the valve 55 closed, the valve 10 is actuated to allow compressed air to flow into the container 15. The flock flows out of the slot 44 in a turbid, fanned-out condition. By manipulating the apparatus the flock is applied to the surface of

the coated work, care being taken to drive the flock into the adhesive of the previously coated work. In order to prevent the formation of flock mounds on the work the operative after each flock applying operation directs the flock slantwise at the work with the result that the excess flock is blown therefrom and subsequently recovered for re-use. Usually it is necessary to apply successive coats of flock to the adhesively coated work in order to obtain an even surface having a velvety or cloth-like appearance.

Referring to Fig. 3, the passage 53 is made smaller than the slot 44 in order that when the auxiliary air jet is used it will not create a condition of pressure in the chamber 39 operating to retard the flow of the flock laden air out of the passage 38.

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. A tool or apparatus for applying flock having, in combination, a container for the flock, a nozzle, means for introducing air under pressure into the container, and a connection between the container and the nozzle permitting the escape from the container by way of the nozzle of at least a portion of the air introduced into the container, the withdrawal of the flock from the container and its discharge through the nozzle by the entraining action of the escaping air, said air introducing means including means for discharging air within the container in the general direction of the flock and means for discharging air within the container in the general direction of the connection between the container and the nozzle.

2. A tool or apparatus for applying flock having, in combination, a container for the flock, means for subjecting the flock in the container to the action of a motive agent, and a nozzle mounted above the container and communicating therewith permitting the escape from the container by way of the nozzle of at least a portion of the motive agent introduced into the container, the withdrawal of the flock from the container and its discharge through the nozzle by the entraining action of the escaping motive agent, said means for subjecting the flock in the container to the action of a motive agent including means for discharging motive agent within the container in the general direction of the flock and means for discharging motive agent within the container in the general direction of the communication between the container and the nozzle.

3. A tool or apparatus for applying flock having, in combination, a container for the flock, a nozzle, means for introducing air under pressure into the container, a connection between the container and the nozzle permitting the escape from the container by way of the nozzle of at least a portion of the air introduced into the container, the withdrawal of the flock from the container and its discharge through the nozzle by the entraining action of the escaping air, and means within the container for intensifying the density of the flock laden air escaping from the container.

4. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container having an inlet and an outlet therein, a nozzle connected to the outlet, means for introducing air under pressure through the inlet into the container to impart movement to the flock, to separate from the flock floating particles, and to discharge these floating particles through the outlet by the entraining action of the air seeking to escape therethrough, and auxiliary means for introducing air under pressure into the container to re-agitate the flock therein concentrated at the outlet and intensify the density of the flock laden air escaping from the container through the outlet.

5. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container having an inlet and an outlet therein, a nozzle connected to the outlet, means for introducing air under pressure into the container including a vertical pipe connected to the inlet and provided with a closed end and a plurality of arms adjacent thereto, each arm having an orifice for discharging air in the general direction of the flock in a lateral and downward direction to disperse the flock and cause it to be swirl about the pipe.

6. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container having an inlet and an outlet therein, a nozzle connected to the outlet, means for introducing air under pressure into the container including a vertical pipe connected to the inlet and provided with a closed end, a plurality of lower arms adjacent thereto, and a plurality of upper arms interposed between the inlet and the lower arms, each lower arm having an orifice for discharging air into the body of the flock in a lateral and downward direction, each upper arm having an orifice arranged at one side of the outlet, one of said upper arm orifices discharging air horizontally in the general direction of the outlet and another one of said upper arm orifices discharging air laterally in the general direction of the outlet and downwardly therefrom.

7. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container having an inlet and an outlet therein, a nozzle connected to the outlet, means for introducing air under pressure into the container including a vertical pipe connected to the inlet and provided with a closed end, a plurality of lower arms adjacent thereto, and a plurality of upper arms interposed between the inlet and the lower arms, each lower arm having an orifice for discharging air into the body of the flock in a lateral and downward direction, each upper arm having an orifice arranged at one side of the outlet, one of said upper arm orifices discharging air horizontally in the general direction of the outlet and at one side of the pipe, and another one of said upper arm orifices discharging air laterally in the general direction of the outlet and downwardly therefrom on the other side of the pipe.

8. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container having an inlet and an outlet therein, a nozzle connected to the outlet, and means for introducing air under pressure into the container, said means including a vertical pipe connected to the inlet and provided with a closed end, a plurality of arms adjacent thereto, at least one of said arms being adapted to discharge air in the general direction of the flock, and a plurality of arms adjacent the inlet end of the pipe adapted to discharge air in the general direction of the outlet.

9. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container having an inlet and an outlet therein, a mixing chamber mounted on the closure in communication with the outlet, a nozzle connected to the mixing chamber, and means for introducing air under pressure into the container, said means including a vertical pipe connected to the inlet and provided with a closed end, means carried by said pipe for discharging air in the general direction of the flock, and means carried by the pipe for discharging air in the general direction of the outlet.

10. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container provided with an inlet and an outlet therein, a mixing chamber in communication with the outlet, a nozzle connected to the mixing chamber, means for introducing air under pressure into the body of the flock within the container, means for introducing air under pressure into the container in the general direction of the outlet, and means for introducing air under pressure into the mixing chamber.

11. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container provided with an inlet and an outlet therein, a mixing chamber mounted on the closure in communication with the outlet, a nozzle connected to the mixing chamber, means for introducing air under pressure into the container to impart movement to the flock, to separate from the flock floating particles, and to discharge these floating particles through the outlet into the mixing chamber by the entraining action of the air seeking to escape therethrough, auxiliary means for introducing air under pressure into the container to re-agitate the flock concentrated at the outlet and auxiliary means for introducing air under pressure into the mixing chamber to thin the volume of flock therein.

12. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container, a mixing chamber mounted on the closure in communication therethrough with the interior of the container, a nozzle connected to the mixing chamber, means for introducing air under pressure into the container at points adjacent the closure and at a level therebeneath, and means carried by the closure outside the container for introducing air under pressure into the mixing chamber.

13. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container provided with an inlet and an outlet, a mixing chamber above the closure communicating with the container through the outlet, a nozzle secured to the mixing chamber, means for introducing air under presure through the inlet into the container, separate means for introducing air under pressure into the mixing chamber and valves for controlling the admission of air into the container and mixing chamber, respectively.

WAYNE B. THOMPSON.

CERTIFICATE OF CORRECTION.

Patent No. 2,064,505. December 15, 1936.

WAYNE B. THOMPSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 21, for "prncipal" read principal; page 3, second column, line 36, claim 5, strike out the word "be"; page 4, second column, line 13, claim 11, after "outlet" insert a comma; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23rd day of February, A. D. 1937.

(Seal)

Henry Van Arsdale
Acting Commissioner of Patents.

8. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container having an inlet and an outlet therein, a nozzle connected to the outlet, and means for introducing air under pressure into the container, said means including a vertical pipe connected to the inlet and provided with a closed end, a plurality of arms adjacent thereto, at least one of said arms being adapted to discharge air in the general direction of the flock, and a plurality of arms adjacent the inlet end of the pipe adapted to discharge air in the general direction of the outlet.

9. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container having an inlet and an outlet therein, a mixing chamber mounted on the closure in communication with the outlet, a nozzle connected to the mixing chamber, and means for introducing air under pressure into the container, said means including a vertical pipe connected to the inlet and provided with a closed end, means carried by said pipe for discharging air in the general direction of the flock, and means carried by the pipe for discharging air in the general direction of the outlet.

10. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container provided with an inlet and an outlet therein, a mixing chamber in communication with the outlet, a nozzle connected to the mixing chamber, means for introducing air under pressure into the body of the flock within the container, means for introducing air under pressure into the container in the general direction of the outlet, and means for introducing air under pressure into the mixing chamber.

11. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container provided with an inlet and an outlet therein, a mixing chamber mounted on the closure in communication with the outlet, a nozzle connected to the mixing chamber, means for introducing air under pressure into the container to impart movement to the flock, to separate from the flock floating particles, and to discharge these floating particles through the outlet into the mixing chamber by the entraining action of the air seeking to escape therethrough, auxiliary means for introducing air under pressure into the container to re-agitate the flock concentrated at the outlet and auxiliary means for introducing air under pressure into the mixing chamber to thin the volume of flock therein.

12. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container, a mixing chamber mounted on the closure in communication therethrough with the interior of the container, a nozzle connected to the mixing chamber, means for introducing air under pressure into the container at points adjacent the closure and at a level therebeneath, and means carried by the closure outside the container for introducing air under pressure into the mixing chamber.

13. A tool or apparatus for applying flock having, in combination, a container for the flock, a closure for the container provided with an inlet and an outlet, a mixing chamber above the closure communicating with the container through the outlet, a nozzle secured to the mixing chamber, means for introducing air under presure through the inlet into the container, separate means for introducing air under pressure into the mixing chamber and valves for controlling the admission of air into the container and mixing chamber, respectively.

WAYNE B. THOMPSON.

CERTIFICATE OF CORRECTION.

Patent No. 2,064,505. December 15, 1936.

WAYNE B. THOMPSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 21, for "prncipal" read principal; page 3, second column, line 36, claim 5, strike out the word "be"; page 4, second column, line 13, claim 11, after "outlet" insert a comma; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23rd day of February, A. D. 1937.

(Seal)

Henry Van Arsdale
Acting Commissioner of Patents.