Nov. 12, 1940. W. B. THOMPSON 2,220,921

APPARATUS FOR APPLYING FLOCK

Filed Aug. 27, 1936 2 Sheets-Sheet 1

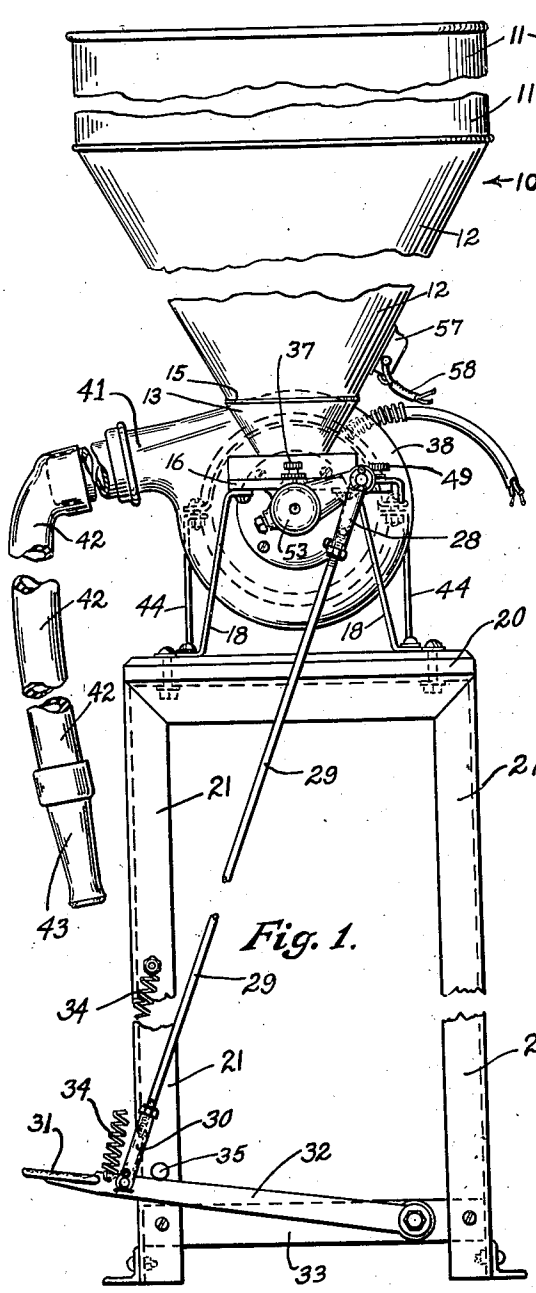


Fig. 1.

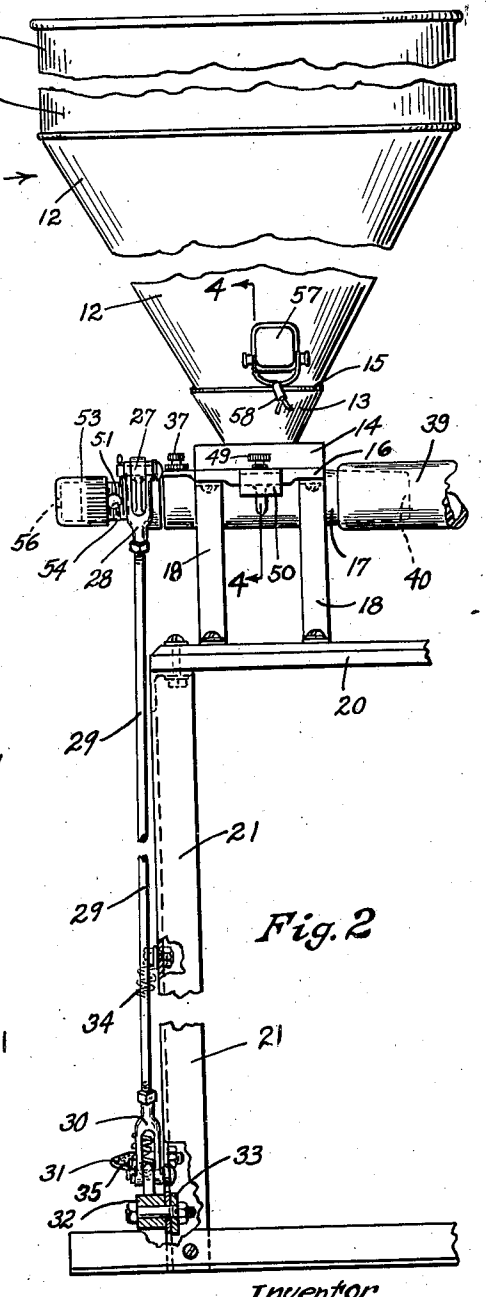


Fig. 2

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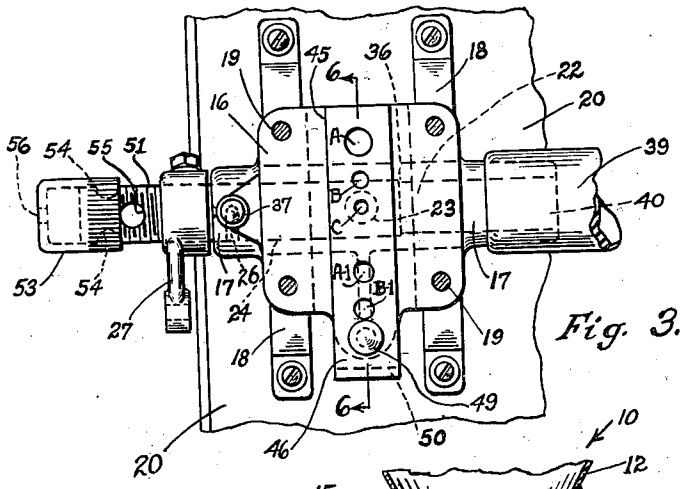


Fig. 3.

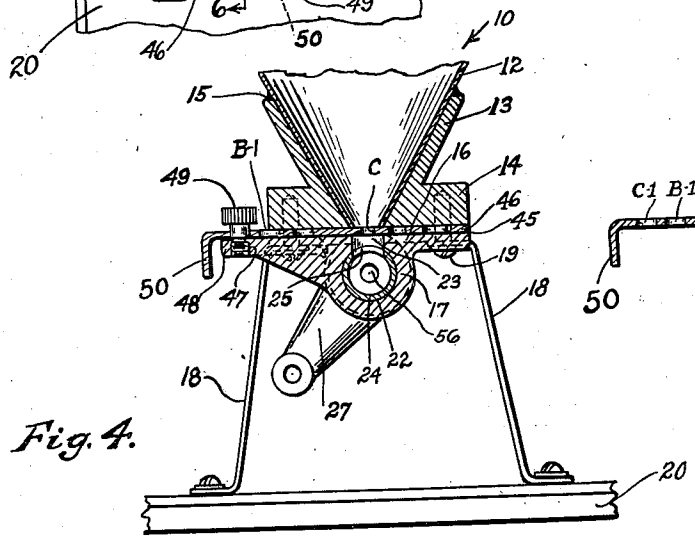


Fig. 4.

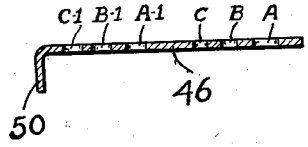


Fig. 6

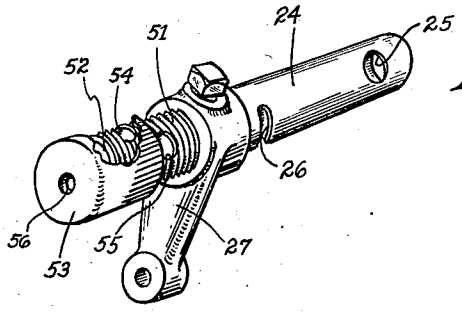


Fig. 5

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APPARATUS FOR APPLYING FLOCK

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Application August 27, 1936, Serial No. 98,173

14 Claims. (Cl. 91—8)

The present invention relates to apparatus for applying material such as powder, comminuted or finely divided solid matter, non-fibrous flock, or the like.

In my Patent No. 2,194,487, granted March 26, 1940, I have disclosed an apparatus adapted particularly for applying fibrous flock, the apparatus being provided with a container for the flock, a conduit provided with an air inlet and a discharge outlet, means for transferring the flock from the container into the conduit, and a blower for creating a flock-entraining air current in the conduit to effect the discharge of the flock. The apparatus disclosed in my said patent was provided to eliminate certain disadvantages in flock applying apparatus arising where the flock is held under pressure in a closed container, some of these disadvantages consisting in the expense that an air compressor necessitates, the fact that the apparatus must be periodically thrown out of operation so that the container may be opened, refilled, and then closed again, and the fact that since in such apparatus the amount of the discharge is regulated by varying the pressure of the motive agent, with an air compressor it is frequently impossible to vary the pressure conveniently or with the speed that a given applying job requires.

The apparatus disclosed in my said patent eliminates the use of an air compressor, provides that the flock in the container shall be under atmospheric pressure, permits the instant regulation of the amount of material discharged, and is designed for continuous operation.

Inasmuch as the apparatus disclosed in my said patent is intended for the application of fibrous flock, it has certain stirring and agitating mechanism functioning to keep the flock constantly in motion and to insure that the flock fibres do not cling together and form balls deleterious to proper flock application on a work piece. However, there are types of flock other than the fibrous kind which have relatively smooth surfaces and are relatively heavy as compared to the fibrous flocks. With these non-fibrous flocks there is not exhibited to any great extent the clinging and balling up tendency of fibrous flocks, and the problem of maintaining a continuous flow of such material from the container is taken care of more simply. An excellent example of such non-fibrous flock is "Cellophane" flock, which, in various colors, gives an attractive appearance to a surface so coated.

It is the principal object of the present invention to devise an apparatus for applying non-fibrous flock, powder, or the like, which will embody an improvement over the apparatus shown in my said patent, that is, which will utilize the salient features of said apparatus together with such modifications as the use of non-fibrous material renders possible.

To the accomplishment of this object and such others as may hereinafter appear the various features of the present invention reside in certain constructions, combinations, and arrangements of parts fully set forth hereinafter and then pointed out in the appended claims, possessing advantages which will be readily apparent to those skilled in the art.

The illustrated embodiment of the present invention will be readily understood from inspection of the accompanying drawings illustrating the best form of the invention at present known to the inventor, in which:

Figure 1 is a view in right side elevation of my apparatus, with portions cut away;

Fig. 2 is a detail view in rear elevation;

Fig. 3 is an enlarged detail view in plan of the portion of the apparatus lying at a level immediately below the hopper and the support therefor;

Fig. 4 is a view in sectional elevation taken along the line 4—4 of Fig. 2 but with the valve operating lever pulled down;

Fig. 5 is a view in perspective of the air inlet of the conduit, the inner member of the conduit valve, and the operating lever therefore; and

Fig. 6 is a view in sectional elevation of the slide taken along the line 6—6 of Fig. 3.

Referring to the drawings, the illustrated embodiment of the present invention is provided with a vertically disposed container or hopper 10 (Figs. 1, 2, and 4) which may be of any suitable construction, that shown herein comprising an upper, open topped cylindrical portion 11 and a lower, open bottomed frusto-conical portion 12. The lower portion 12 is received in a frusto-conical cup 13 rising integrally from a base 14 which has a flat under surface. As shown in Fig. 4, the inner surface of the cup 13 extends to the bottom surface of the base 14, as does the frusto-conical portion 12 of the hopper. To secure the hopper in position, a ring of solder 15 may connect the top of the cup 13 with the hopper. With this construction, material placed in the hopper flows downwardly through the opening at the bottom of the hopper to the apparatus associated therewith and from which

the material is withdrawn to a point of use, as will be described.

The cup base 14 is supported on the upper surface of a plate 16 (Figs. 1, 2, 3, and 4) which is preferably integral with a tubular member 17 beneath it, and the plate 16 and tubular member 17 are together supported upon legs 18 (Figs. 1, 2, 3, and 4) the upper, bent ends of which (Fig. 4) are held against the plate 16 by studs 19 which also serve to secure the base 14 to the plate 16. The lower ends of the legs 18 are suitably secured to the top 20 of a table provided with legs 21.

Referring now particularly to Figs. 2, 3 and 4, the tubular member 17 beneath the plate 16 extends beyond the opposite ends of the plate and is provided with a horizontal cylindrical passage 22 (Figs. 3 and 4) extending throughout the length of the member 17. The passage 22 lies beneath the opening in the bottom of the hopper 10 as shown in Fig. 4, and is in communication therewith by means of a vertical passage 23. Mounted for rotation within the left hand portion of the cylindrical passage 22 (viewing Figs. 2 and 3) is a sleeve 24 (Figs. 3, 4 and 5) provided adjacent one end with an opening 25 of substantially the same size as the vertical passage 23 and provided adjacent its center with a slot 26. The sleeve 24 forms a valve member cooperating with the cylindrical passage 22 and the vertical passage 23 to control the flow of material into the tubular member 17.

It is intended that the opening 25 in the sleeve 24 register with the vertical passage 23, as shown in Fig. 4, or be moved out of registry therewith. To achieve this result, the left hand end portion 51 of the sleeve 24 (viewing Figs. 2, 3, and 5) is externally threaded so as to be received by and extend through one end of a lever 27 (best shown in Fig. 5) the opposite end of which is pivoted to a clevis 28 (Figs. 1 and 2) from which depends a rod 29. The lower end of the rod 29 is provided with a clevis 30 which is pivotally secured adjacent a foot pedal 31 on one end of a lever 32 the opposite end of which is pivoted to a brace 33 carried by the table legs 21 at one side of the apparatus. A coil spring 34 one end of which is connected to a leg 21 and the other end of which is connected to the lever 32 urges the lever 32 upwardly, and a stop 35 (Figs. 1 and 2) carried by the same leg 21 limits the upward lever movement. In order to insure that the sleeve opening 25 be alignable with the vertical passage 23 upon rotation of the sleeve 24, the cylindrical passage 22 is preferably slightly reduced in diameter beyond the sleeve, as shown in Fig. 3, to provide a shoulder 36 which the end of the sleeve abuts.

With the above-described construction it will be seen that the sleeve 24 may be rotated in the cylindrical passage 22 upon a swinging of the lever 32. The position of the sleeve 24 in the passage 22 is such that when the pedal 31 and the sleeve lever 27 are up, as shown in Fig. 1, the sleeve opening 25 is completely out of registry with the vertical passage 23, thereby closing off the passage 23. On the other hand, when the pedal 31 is depressed, thereby swinging the sleeve lever 27 down, as shown in Fig. 4, the sleeve opening 25 registers with the vertical passage 23. With the sleeve opening 25 in this last named position material flowing from the hopper 10 into the vertical passage 23 enters the sleeve 24, that is, enters the cylindrical passage 22. The sleeve opening 25 and the vertical passage 23 thus together form a passage providing a communication between the hopper 10 and the interior of the sleeve 24.

In order to insure that when the pedal 31 is depressed the sleeve opening 25 is in registry with the vertical passage 23, the top of the tubular member 17 is provided at its left hand end (viewing Figs. 2 and 3) with a stud 37 which extends through the member 17 and into the slot 26 in the sleeve 24. Upon rotation of the sleeve 24, that is, upon a movement of the sleeve lever 27 downwardly, the stud 37 abuts one end of the slot 26, as shown in Fig. 3, the slot being so positioned that the sleeve opening 25 and the vertical passage 23 register when the abutment of the stud 37 with the end of the slot 26 occurs. To the same end, namely, insuring the registry of the sleeve opening 25 with the vertical passage 23, and for the further purpose of locking the sleeve 24 in the cylindrical passage 22, the shank of the stud 37 is substantially as wide as the slot 26. With this construction the sleeve 24 is held against movement longitudinally of the passage 22 and is always maintained in proper position for rotation.

It will be apparent in view of this stud 37 and slot 26 construction that the slot could be given such length that upon rotation of the sleeve 24 in the opposite direction, that is, upon a movement of the sleeve lever 27 upwardly, the stud 37 could abut the other end of the slot 26, thereby limiting the rotation of the sleeve 24 and also limiting the upward movement of the lever 32. This mode of operation is to be avoided, however, even though it would render the stop 35 unnecessary, for the sleeve 24 and its associated elements would be subjected to strain and possible injury resulting from the upward pull of the spring 34, and this would be particularly true should an operative's foot slip from the pedal 31 accidentally. The stop 35 prevents this possibility of strain and injury.

It has been pointed out above that when the sleeve opening 25 and the vertical passage 23 are in registry, material flows from the hopper 10 into the sleeve 24, that is, into the cylindrical passage 22. In order to withdraw this material in the passage 22 to a point of use, the apparatus is provided with a blower 38 (Fig. 1) which may be of any well known construction suitable for the purpose. The inlet end of the blower 38 is connected by means of a suitable coupling 39 (Figs. 2 and 3) to the discharge end 40 of the tubular member 17. The discharge end 41 of the blower 38 (Fig. 1) is connected to one end of a hose 42 the opposite end of which carries a suitable nozzle 43. Since the blower per se forms no part of my invention and may be any one of a number in commercial use, it is not deemed necessary to describe it further other than to say that it is preferably electrically operated and may be mounted upon the table top 20 by means of suitable legs 44.

Since the blower 38 is connected by means of the coupling 39 to the cylindrical passage 22, it will be seen that when the blower is in operation a current of air is set up within the passage 22, entraining any material that is in it and carrying the material through the blower and the hose 42 to a point of discharge from the nozzle 43. Stated in another way, the sleeve 24, the cylindrical passage 22, the coupling 39, the air passage in the blower 38, the hose 42, and the nozzle 43 together comprise in effect a conduit the

inlet end of which is the left hand end of the sleeve 24, viewing Figs. 2 and 3, and the outlet end of which is the nozzle 43. The blower 38 in operation creates a condition of unbalanced air pressure between the sleeve inlet and the nozzle outlet, thereby causing atmospheric air to enter the sleeve and travel in a material-entraining current along this conduit and finally out the nozzle outlet so that the material is discharged for application to the work.

Referring again to Fig. 4, it will be seen that if the material in the hopper 10 passed directly into the vertical passage 23, the sleeve opening 25, and so into the sleeve 24, the sleeve and the passage 22 might well become flooded with material, since the diameters of the open bottom of the hopper 10 and the vertical passage 23 are relatively large. Material such as non-fibrous flock, "Cellophane" flock, to cite one example, would flow rather freely from the hopper into the passage 22 of the construction so far described, and would in many cases result in the discharge from the nozzle 43 containing altogether too much material for a given applying job. In order to prevent this result, the illustrated embodiment of the present invention is provided with means for regulating the amount of flock which passes from the hopper 10 into the vertical passage 23 and the sleeve 24.

To this end the plate 16 is provided with a channel 45 (Figs. 3 and 4) extending across the plate at right angles to the axis of the cylindrical passage 22. Mounted for sliding movement in the channel 45 is a slide 46, having a thickness substantially equal to that of the depth of the channel so that the top of the slide and the top of the plate 16 lie substantially in a plane, as indicated in Figs. 1, 2, and 4. Referring to Figs. 3, 4, and 6 the slide 46 is provided with spaced flow openings A, B, and C herein shown as three in number merely for purposes of disclosure. These openings are of graduated sizes, as indicated, and upon movement of the slide 46 are adapted to be brought selectively beneath the center of the opening in the bottom of the hopper 10 and over the center of the vertical passage 23. In Fig. 4 the opening C is shown in the position just described, and that the openings A and B may be so positioned upon movement to the left of the slide 46 will be apparent from inspection of Figs. 4 and 6.

In order to maintain any one of the openings A, B, or C in proper position with respect to the opening at the bottom of the hopper and to the vertical passage 23, the slide 46 is also provided with three openings A—1, B—1, and C—1, each of which is adapted upon movement of the slide 46 to register with an opening 47 (Fig. 4) formed in a boss 48 at one side of the plate 16 and be held in registry by means of a stud 49 as shown in Fig. 4. By means of this construction, the effective size of the passage between the bottom of the hopper 10 and the interior of the sleeve 24 may be restricted as desired, permitting a relatively small amount of material to flow into the sleeve, a medium amount, or a relatively large amount. In Fig. 4 the flow opening C is the smallest of the three shown, thereby permitting the flow of a relatively small amount of material. A depending lip 50 may be provided on the slide 46 to facilitate moving it.

In the operation of the apparatus described above it is intended that the blower 38 operate at a substantially uniform rate. This arrangement thus provides that a substantially uniform air current flows through the apparatus, and leaves the regulation of the amount of material discharged to the position of the slide 46. In the use of some materials, however, or in the application of materials to some kinds of work, it may be desirable to cut down the velocity of the discharge from the nozzle, rendering it softer. This may be accomplished by cutting down the amount of air that can enter the inlet of the apparatus, that is, the sleeve 24.

To achieve this result, the open end 52 (Fig. 5) of the sleeve threaded portion 51 extending through the sleeve lever 27 is covered by an internally threaded cap 53, and at either side the threaded portion 51 is provided with an opening 54. At top and bottom the threaded portion is also provided with oppositely disposed openings 55 located between the openings 54 and the lever 27. In a similar manner the closed end of the cap 53 is provided with an opening 56, best shown in Fig. 5. The sum of the areas of the openings 54, 55, and 56 is at least as large as the cross sectional area of the interior of the sleeve 24, thereby providing that when the cap 53 is turned on the threaded portion 51 so that all the openings 54 and 55 are exposed, in the operation of the blower 38 atmospheric air will enter these openings, as well as the opening 56, and pass into the sleeve 24 in as large an amount as would be the case if the open end 52 of the sleeve portion 51 were not provided with the cap 53 and the openings 54 and 55. When, however, it is desired to cut down the velocity of the material and air discharge from the nozzle 43, the cap 53 may be turned on the threaded portion 51 so as to partially or completely cover the openings 54 and 55, thereby reducing the amount of air entering the sleeve 24 and producing a softer discharge from the nozzle 43. Inasmuch as the cap opening 56 is always uncovered, some air always enters the sleeve 24 during the operation of the blower 38, this provision being made so that the blower does not act against what in effect would be a passage having a blind end. Since the openings 54 and 55 when fully open, together with the opening 56, are at least the cross sectional area equivalent of the interior of the sleeve 24, it will be seen that in the specific embodiment of the invention shown, these openings provide the real inlet for the conduit formed by the sleeve 24, the cylindrical passage 22, the coupling 39, the passage in the blower 38, the hose 42, and the nozzle 43, and that the condition of unbalanced air pressure which the blower 38 sets up between the inlet and the outlet of the conduit is actually set up between the openings 54, 55, and 56 on the one hand and the nozzles 43 on the other.

The above-described construction provides means—specifically, the sleeve 24 and associated parts—by which the flow of material from the hopper 10 into the conduit may be permitted or shut off while the blower 38 is in continuous operation. The above-described construction also provides means—specifically, the slide 46 and associated elements—by which the amount of material flowing into the conduit may be varied. In this connection it should be pointed out, however, that in the preceding description it has been assumed that the sleeve opening 25 and the vertical passage 23 are in complete registry when the apparatus is in operation. But it will be apparent that by not depressing the pedal 31

completely, i. e., by depressing the pedal only slightly so that the sleeve opening 25 is only partially in registry with the vertical passage 23, the effective size of the passage 23 is diminished, thereby producing an effect in diminishing the amount of material flowing into the conduit similar to that resulting from shifting the slide 46 so as to bring a smaller opening, B or C, for example, if A is being used, beneath the opening in the bottom of the hopper 10. In effect the fact that the sleeve 24 may be rotated to partially close the vertical passage 23 provides a substantial equivalent for the openings A, B, and C in the slide 46, and to pursue this matter further, it will be seen that while shifting the slide 46 to change the size of the slide opening beneath the hopper 10 provides a primary means for varying the amount of material entering the conduit, a partial depressing of the pedal 31 after the shifting of the slide 46 will provide a secondary means for varying the amount of flow of the material. These two flow varying means may be used independently, and when acting together can be utilized to provide a finer regulation of material flow than is the case of the slide 46 acting alone when the passage 23 is completely open. The foregoing statements have been made to show the possibilities of the disclosed form of the present invention. For most purposes, however, it will be found sufficient to control the amount of material flow merely by means of the slide 46.

If the material to be applied by the illustrated embodiment of the present invention comprises non-fibrous materials which have relatively smooth surfaces and are relatively heavy as, for example, "Cellophane" flock, in many instances the material will flow through the slide openings A, B, or C, through the passage formed by the sleeve opening 25 and the vertical passage 23, and into the sleeve 24 in a continuous manner. To insure a continuous flow, however, with all types of material, it is desirable that the material be caused to flow downwardly positively. A suitable way of insuring such flow is to slightly agitate the material, thereby providing that particularly when the hopper 10 is full the weight of the material does not cause the material in the lower portion of the hopper to pack and bridge over the bottom opening, preventing further flow.

To effect continuous material flow in this manner, the frusto-conical portion 12 of the hopper 10 may be provided exteriorly with a vibrator 57 (Figs. 1 and 2) of any well known construction. While this vibrator may be of the mechanically operated type, it is preferred to use an electrically operated vibrator, provided with the usual wiring 58 for connection with a source of electric current (not shown). By reason of the vibrator 57, the frusto-conical wall 12 is constantly vibrated, which vibration is transferred to the material in the lower portion of the hopper 10 and causes it to continuously settle to the bottom thereof as fast as material flows into the conduit through the slide 46.

In the operation of the illustrated embodiment of the present invention, the particular non-fibrous flock or other material to be applied is placed in the hopper 10 and the blower 38 is supplied with electric current to set it in operation. A condition of unbalanced air pressure is thus set up through the conduit formed by the cap 53, the sleeve portions 51 and 24, the cylindrical passage 22, the coupling 39, the air passage through the blower 38, the hose 42 and the nozzle 43, resulting in a current of air flowing through the conduit from the openings 54, 55, and 56 and discharging from the nozzle 43. During this operation no material is discharged because the pedal 31 is not depressed, the spring 34 serving to hold the lever 32, the rod 29, and the sleeve lever 27 up so that the sleeve opening 25 is completely out of registry with the vertical passage 23 below the bottom of the hopper 10. Depending upon the amount of material it is desired should enter the conduit, the position of the slide 46 is adjusted to bring the appropriate opening A, B, or C beneath the hopper bottom and over the vertical passage 23. When these acts have been done, the apparatus is ready for the applying operation. To effect this, the operative depresses the pedal 31, the abutment of the stud 37 with one end of the sleeve slot 26 limiting the downward movement of the pedal 31 and the lever 32. Since depressing the pedal 31 causes the sleeve 24 to be rotated to bring the opening 25 into registry with the vertical passage 23, material in the hopper thereupon drops by way of the slide opening A, B, or C as the case may be through the passage formed by the sleeve opening 25 and the vertical passage 23. When in the sleeve 24 the material is entrained by the current of air passing therethrough and is discharged from the nozzle 43. The flow of material from the nozzle 43 can be instantly shut off by releasing the pedal 31 without shutting off the blower 38, and the continuous flow of the material from the hopper 10 into the conduit is assured regardless of its nature when the pedal 31 is depressed because the vibrator 57 agitates the material in the hopper and prevents it from bridging over the opening in the hopper bottom. When it is desired to vary the amount of material in the discharge, the slide 46 may be shifted to bring a larger or a smaller opening beneath the hopper bottom, and the amount of material in the discharge may also be varied by depressing the pedal 31 less than the full amount, thereby throwing the sleeve opening 25 only partially into registry with the vertical passage 23 to vary its effective size. Should it be desired to give the discharge from the nozzle 43 a softer character, it is necessary merely to turn the cap 53 the desired amount, thereby partially or completely covering the openings 54 and 55 and so diminishing the amount of air that enters the conduit through the openings 54 and 55. The above-described apparatus provides a small, compact, and efficient apparatus for applying non-fibrous flocks, powder, comminuted or finely divided solid matter, or the like in an easily controlled manner, and since the cessation of material discharge is not dependent upon a shutting off of the blower 38, it will be seen that the conduit may be easily cleaned for use with different material by merely releasing the pedal 31 while the blower 38 remains in operation.

It will be clear to those skilled in the art and with the general objects of the present invention in view, that changes may be made in the details of structure, the described and illustrated embodiment of the present invention being intended as an exploitation of underlying essentials of the invention, the features of which are definitely stated in their true scope in the claims presented herewith.

What is claimed as new, is:

1. In an apparatus for applying material such as powder or flock, the combination with a con-

tainer for the material, a conduit provided with an air inlet, an outlet, and a passage for the transfer of material from the container to the conduit, means for creating a condition of unbalanced air pressure between the inlet and the outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, and means separate from the container and through which the material passes on its way to the conduit for varying the amount of material entering the conduit, of means movable about the longitudinal axis of the conduit for varying the amount of air entering the inlet.

2. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage for the transfer of material from the container to the conduit, and means for creating a condition of unbalanced air pressure between the inlet and the outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, of means rotatable about the longitudinal axis of the conduit to vary the amount of air entering the inlet.

3. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage for the transfer of material from the container to the conduit, and means for creating a condition of unbalanced air pressure between the inlet and the outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, of a member movable relatively to the passage and provided with openings of different sizes through any one of which, at the selection of the operator, the material flows on its way to the conduit for varying the amount of material entering the conduit.

4. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet and a passage, said container having an opening aligned with said passage, and a portion of said conduit being movable relatively to the container and provided with an opening alignable with said passage for the transfer of material from the container to the conduit, and means for creating a condition of unbalanced air pressure between the inlet and outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, of means through which the material flows on its way to the passage for varying the amount of material entering the conduit.

5. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet and a passage, said container having an opening aligned with said passage, and a portion of said conduit being movable relatively to the container and provided with an opening alignable with said passage for the transfer of material from the container to the conduit, and means for creating a condition of unbalanced air pressure between the inlet and outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, of means for varying the amount of material entering the conduit comprising a movable member having openings of different sizes selectively registrable with the aligned passage and container opening.

6. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage communicating with the container for the transfer of material from the container to the conduit, means for creating a condition of unbalanced air pressure between the inlet and the outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, and means having a portion mounted within the conduit for movement about its longitudinal axis for varying the effective size of the passage, of means through which the material flows on its way to the passage for varying the amount of material entering the conduit.

7. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage communicating with the container for the transfer of material from the container to the conduit, means for creating a condition of unbalanced air pressure between the inlet and the outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, and a valve through which said air current flows mounted for movement about the longitudinal axis of the conduit for varying the amount of material entering the conduit, of means through which the material flows on its way to the passage for varying the amount of material entering the passage.

8. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage communicating with the container for the transfer of material from the container to the conduit, means for creating a condition of unbalanced air pressure between the inlet and outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, and means exterior of the container for varying the amount of material entering the passage, of means separate from the container and having a portion within the conduit for varying the effective size of the passage.

9. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage communicating with the container for the transfer of material from the container to the conduit, means for creating a condition of unbalanced air pressure between the inlet and the outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, and means having a portion within the conduit for varying the effective size of the passage, of slidable means exterior of the container for varying the amount of material entering the passage.

10. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage communicating with the container for the transfer of material from the container to the conduit, means

for creating a condition of unbalanced air pressure between the inlet and the outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, and means exterior of the container for varying the amount of material entering the passage, of means mounted within the conduit for movement about its longitudinal axis for varying the effective size of the passage.

11. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage communicating with the container for the transfer of material from the container to the conduit, means for creating a condition of unbalanced air pressure between the inlet and the outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, means exterior of the container and movable in one direction for varying the amount of material entering the passage, and means within the conduit and movable in a different direction for varying the effective size of the passage of means for varying the amount of air entering the inlet.

12. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage communicating with the container for the transfer of the material from the container to the conduit, means for creating a condition of unbalanced air pressure between the inlet and the outlet of the container to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, and a valve through which said air current flows mounted within the conduit for movement about its longitudinal axis to vary the amount of material entering the conduit, of means exterior of the container for varying the amount of material entering the passage.

13. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage communicating with the container for the transfer of the material from the container to the conduit, and means for creating a condition of unbalanced air pressure between the inlet and the outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, of means for regulating the amount of material entering the conduit comprising primary means for varying the amount of material transferred to the passage and secondary means for varying the effective size of the passage.

14. In an apparatus for applying material such as powder or flock, the combination with a container for the material, a conduit provided with an air inlet, an outlet, and a passage communicating with the container for the transfer of material from the container to the conduit, means for creating a condition of unbalanced air pressure between the inlet and the outlet of the conduit to cause atmospheric air to enter the inlet and travel in a material-entraining current within the conduit and out the outlet, and a member movable relatively to the passage and provided with openings of different sizes through which the material flows for selectively varying the amount of material entering the conduit, of means separate from said movable member for closing the passage to prevent material from entering the conduit.

WAYNE B. THOMPSON.

CERTIFICATE OF CORRECTION.

Patent No. 2,220,921. November 12, 1940.

WAYNE B. THOMPSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, first column, lines 47 and 64, claims 4 and 5, after the word "outlet" insert a comma; lines 54 and 72, same claims, before "outlet" insert --the--; page 6, first column, line 26, claim 11, after "passage" insert a comma; line 32, claim 12, and second column, line 9, claim 13, for "transfer of the" read --transfer of--; first column, line 35-36, claim 12, for "container" read --conduit--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of December, A. D. 1940.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents