June 23, 1953 R. F. BERNDT 2,643,032

POWDER DISPENSER AND DISTRIBUTOR

Filed Sept. 30, 1949 2 Sheets-Sheet 1

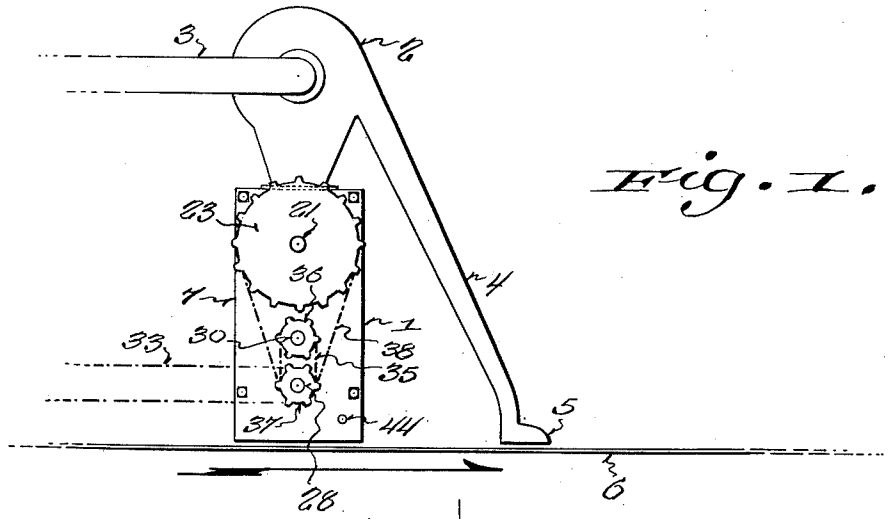

Fig. 1.

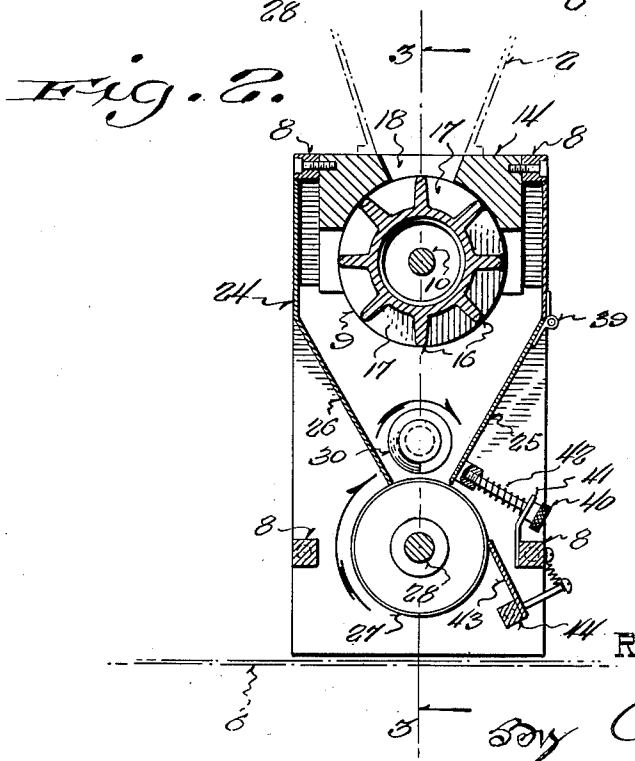

Fig. 2.

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June 23, 1953 R. F. BERNDT 2,643,032

POWDER DISPENSER AND DISTRIBUTOR

Filed Sept. 30, 1949 2 Sheets-Sheet 2

Fig. 5.

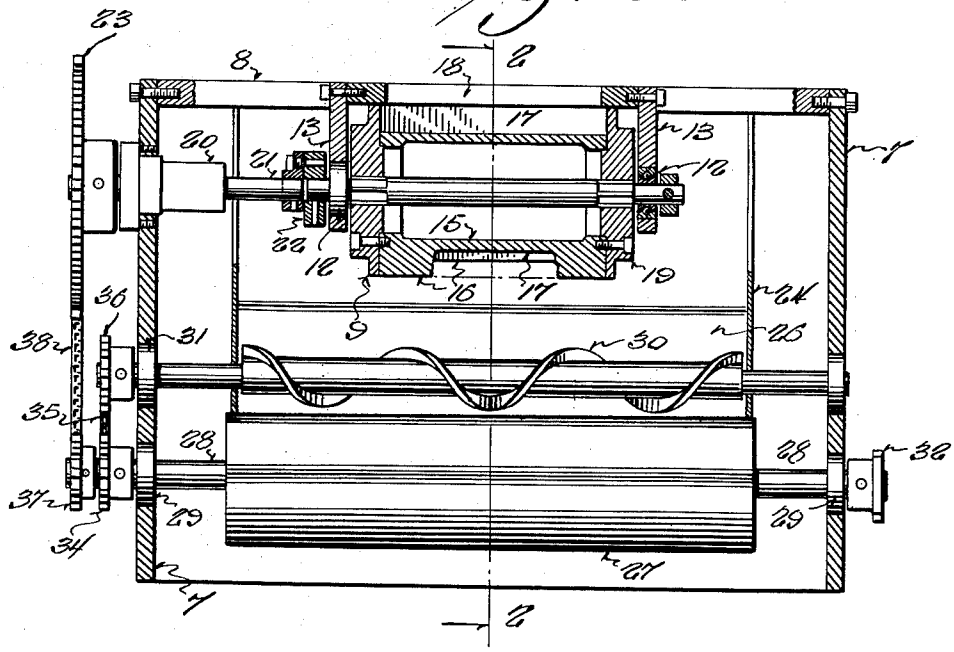
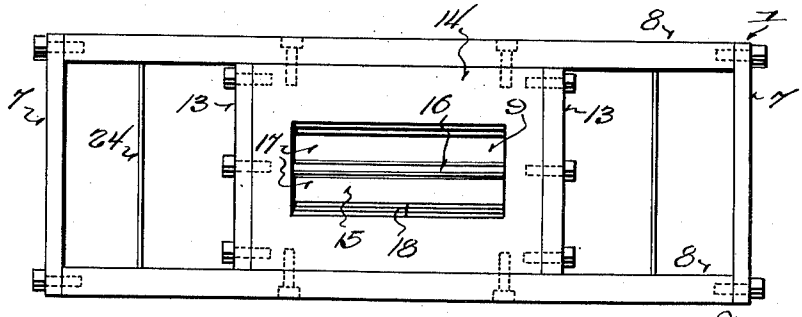


Fig. 4.



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POWDER DISPENSER AND DISTRIBUTOR

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Application September 30, 1949, Serial No. 118,831

2 Claims. (Cl. 222—254)

1

This invention pertains to an improved mechanism for dispensing and distributing powdered material upon a relatively movable flat surface, and while the apparatus may have numerous applications, the same has been devised particularly for use in powder dusting sheets or a web of paper in the process of raised printing, such as described in my co-pending application, Serial No. 742,759 upon which the present invention is an improvement regarding the distributor described in said application.

More specifically the apparatus disclosed in the above application, provides an inclined tray for receiving measured quantities of powder from a rotary delivery valve communicating with a centrifugal separator and pick-up. The rate of discharge of powder from the distributing tray is controlled by an adjustable gate. Being dependent upon gravity distribution, the above mechanism proved to be ununiform in operation and frequently failed completely through caking or clogging of powder in the distributing tray.

Therefore, it is the primary object of the present invention to overcome the foregoing objections by the provision of a positive distributing mechanism for accurately controlling the rate of discharge of powder, and effecting uniform distribution of the same over the surface of treated material.

Incidental to the foregoing a more specific object of the invention resides in the provision of a driven feed roller from which the powder is delivered to the work material, and means for distributing the powder longitudinally over the length of the roller, together with means for controlling the rate of discharge.

In addition to the foregoing, other objects will appear as the description proceeds, and while the accompanying drawings illustrate one complete physical form of the invention constructed in accordance with the best mode so far devised, it is to be understood that changes in the precise embodiment of the invention are contemplated within the scope of the appended claims.

In the drawings:

Figure 1 is an elevational view of an apparatus for collecting, separating and dispensing powder in a raised printing process, the improved distributor mechanism being incorporated therein;

Figure 2 is a transverse vertical sectional view through the delivery and dispensing mechanism, the same being taken on the line 2—2 of Fig. 3;

Figure 3 is a longitudinal sectional view taken on the line 3—3 of Fig. 2; and

Figure 4 is a top plan view of the frame which

2

carries the rotary delivery valve and dispensing mechanism.

Referring now more particularly to the accompanying drawings numeral 1 designates a frame which encases the mechanism constituting the present invention. Mounted on the top of the frame 1 is a centrifugal separator 2 in which reduced pressure is created through a suction line 3. The centrifugal separator 2 is provided with an angular inclined nozzle 4, provided at its lower end with a suction foot 5 for removing surplus powder from a dusted sheet of material, traveling on a continuous belt 6.

The centrifugal separator shown, corresponds to the disclosure in pending application Serial No. 742,759, and therefore forms no part of the present invention.

The frame 1, which is suitably supported above the belt 6, transversely of the same, comprises a pair of end plates 7 connected by transverse bars 8. Supported within the upper end of the frame 1 is a rotary delivery valve 9, splined or otherwise secured upon a shaft 10 journaled in anti-frictional bearings 12, carried by end plates 13, secured to a top plate 14 fastened between the upper transverse bars 8.

In the present instance the rotary delivery valve 9 illustrated comprises, a cylindrical sleeve 15 provided with spaced radial fins 16 forming a series of annular pockets 17, which successively register with an opening 18 formed in the top plate 14 to receive powder from the centrifugal separator 2. The cylindrical sleeve 15 is fastened to a pair of end discs 19 splined on the shaft 10.

Inasmuch as the rotary delivery valve is fully disclosed in application Serial No. 742,759, the same forms no part of the present invention, other than as set forth in the combinations hereinafter claimed.

Journaled in a bearing 20, is a stub shaft 21 connected with the shaft 10 through a flexible coupling 22. The bearing 20 is secured in one of the end plates 7, and fastened upon the extended end of the shaft 21 is a sprocket wheel 23.

Suitably mounted within the frame 1, below the rotary valve 9 is an auxiliary hopper 24 provided with converging front and rear end walls 25 and 26, respectively, which form a longitudinal opening in the bottom of the hopper.

Positioned immediately below the opening in the auxiliary hopper 24 is a smooth surfaced feed roller 27 the diameter of which is substantially larger than the width of the longitudinal opening in the bottom of the hopper, the shaft 28 of roller

27 being journaled in anti-frictional bearings 29 secured in the end walls 7.

Positioned within the auxiliary hopper 24 in longitudinal alignment with the feed roller 27 and immediately thereabove is a right and left hand worm 30, the ends of which are journaled in anti-frictional bearings 31 mounted in the end plates 7.

For positive drive of the rotary valve 9, the feed roller 27 and the worm 30, the shaft 28 of the smooth feed roller is provided at one end with a sprocket 32 driven by a chain 33 connected with any suitable source of power.

The opposite end of shaft 28 is likewise provided with a sprocket wheel 34 connected by a chain 35 with a sprocket 36 secured upon one end of the worm shaft 30. Adjacent the sprocket 34 a similar sprocket 37 is secured on the shaft 28 and connected with the sprocket wheel 23 through a chain 38 to drive the rotary valve 9.

As best shown in Figure 2, the rear wall 26 of the auxiliary hopper 24 converges toward the worm 30, and terminates in close contact with the feed roller 27. The front wall 25 of the hopper 24 also converges toward the worm 30, and is connected to the upper front wall of the hopper by suitable hinges 39. By means of the hinge connection of the plate 25, its lower end can be adjusted to and away from the periphery of the feed roller 27 to regulate the size of the opening between the two. By reason of the different relative sizes of the smooth surfaced feed roller 27 and the bottom opening of the hopper 24, the front wall 25 of the hopper is always substantially normal to the surface of the roller and if projected would engage the surface of the roller at a point well above a horizontal plane through the axis of the roller.

A thumb screw 40 carried by a bracket 41 serves to adjust the hinged front plate 25 with relation to the feed roller 27, while the spring 42 interposed between the plate 25 and bracket 41 functions to urge the plate 25 to its adjusted position.

Inasmuch as static occurs in the feed roller 27, a doctor blade or scraper 43, having an uninterrupted straight edge, is fastened to a rocker bar 44 journaled in the end plates 7 of the frame 1. As best shown in Figure 2, the uninterrupted straight edge of the blade continuously engages the periphery of the feed roller 27 throughout its length to remove powder from the roller which would otherwise cling to the same because of existing static.

In operation, the rotary valve 9 delivers measured quantities of powder, received from the centrifugal separator 2, to the auxiliary hopper 24, and as the same is discharged upon the right and left hand worm 30, and the closely adjacent surface of the rotating feed roller 27, it will be apparent that the powder will be distributed longitudinally over the surface of the feed roller from a central point toward its ends, inasmuch as the right and left hand turns of the worm converge at a central point intermediate the ends of the worm.

The direction of travel of the feed roller 27, as indicated by the arrow in Figure 2, tends to pick up powder from the rear wall 26 of the auxiliary hopper 24 and carry the same forwardly through the opening between the periphery of the feed roller 27 and the lower end of the adjustable plate 27. As previously explained, the powder is then discharged upon work material carried upon the belt 6, and any particles tending to adhere to the periphery on the feed roller 27 are removed by the spring urged doctor blade 43.

Also, in practice it has been found that the doctor blade 43 serves to further equalize distribution of powder over the surface of treated material in the event that uneven streams are discharged from the feed roller 27, due to the fact that upon engaging the doctor blade the powder has a tendency to spread or flow laterally on the same.

From the foregoing explanation, considered in connection with the accompanying drawings, it will be apparent that a comparatively simple and inexpensive mechanism has been devised for positively and uniformly dusting powder upon printed sheets or other work material to be treated, such as in the process of raised printing.

I claim:

1. In combination with a rotary valve for delivering substantially dry powder from a hopper, a distributing mechanism comprising an auxiliary hopper positioned below said delivery valve and having a bottom discharge opening, a driven, smooth surfaced feed roller mounted immediately below the bottom opening of said auxiliary hopper for positively discharging powder from said hopper, and a right and left hand worm positioned in said auxiliary hopper immediately above said feed roller for distributing powder over the surface of said feed roller, said worm being substantially parallel to the axis of the roller and being substantially equal in length to the length of the roller.

2. In combination with a rotary valve for delivering substantially dry powder from a hopper, a distributing mechanism comprising an auxiliary hopper positioned below said delivery valve and having a bottom discharge opening, a driven, smooth surfaced feed roller mounted immediately below the bottom opening of said auxiliary hopper for positively discharging powder from said hopper, a right and left hand worm positioned in said auxiliary hopper immediately above said feed roller for distributing powder longitudinally over the surface of said feed roller, an adjustable gate forming one side of said auxiliary hopper and cooperating with said roller to regulate the rate of powder discharge from said auxiliary hopper, said adjustable gate being substantially normal to the surface of the feed roller and its lower edge being located adjacent the upper surface of said roller, and a pivotal spring-urged scraper blade having an uninterrupted straight edge adapted to continuously longitudinally engage the periphery of said feed roller throughout its length for removing powder therefrom, said scraper blade being so positioned and arranged with respect to the feed roller that the powder removed from the roller must pass over it whereby said blade also serves to aid in even distribution of the powder.

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