

Oct. 3, 1933.

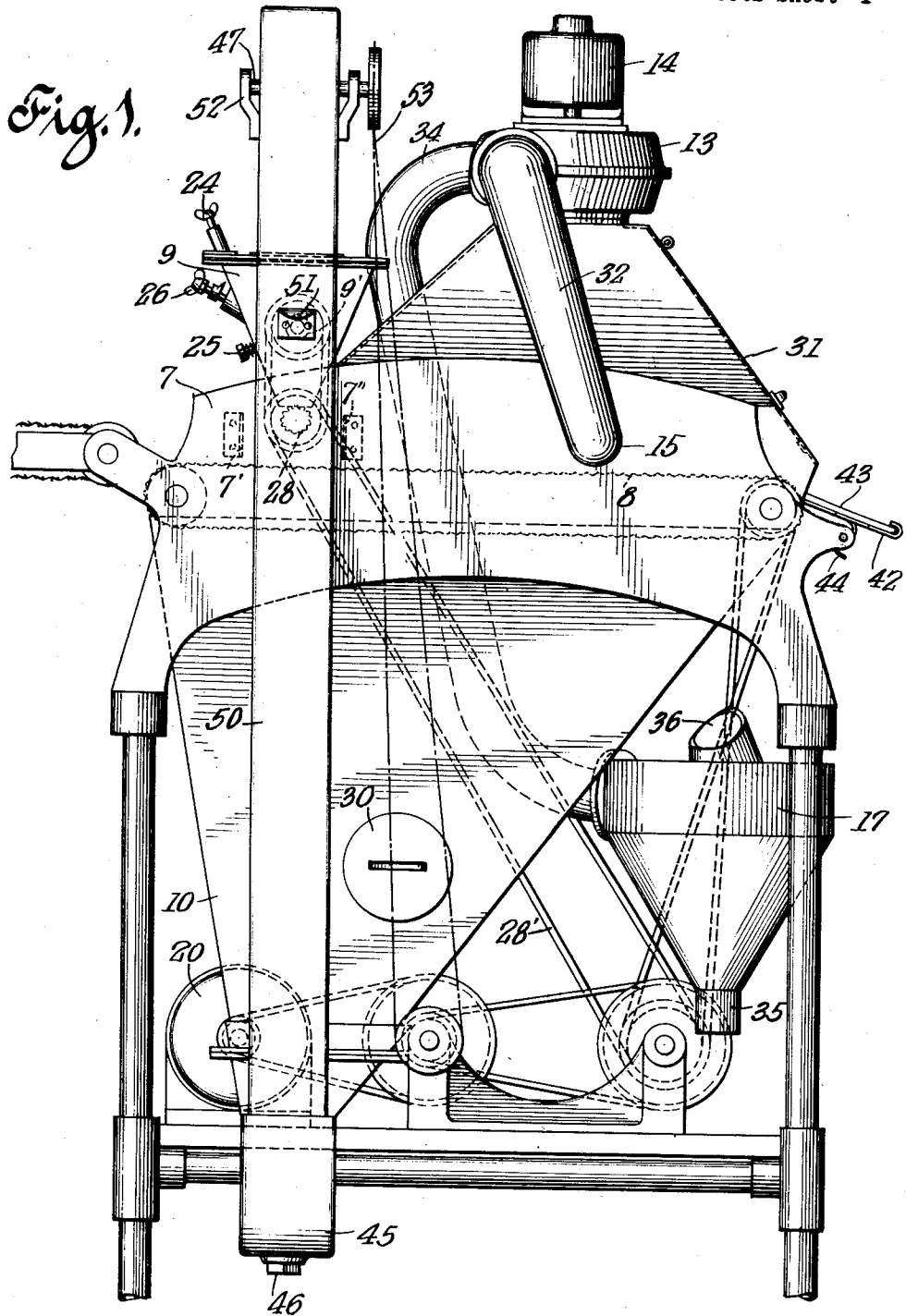
S. LIPSIOUS

1,929,200

POWDERER

Filed Nov. 24, 1930

3 Sheets-Sheet 1



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Samuel Lipsius
BY *[Signature]*
ATTORNEY

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3 Sheets-Sheet 2

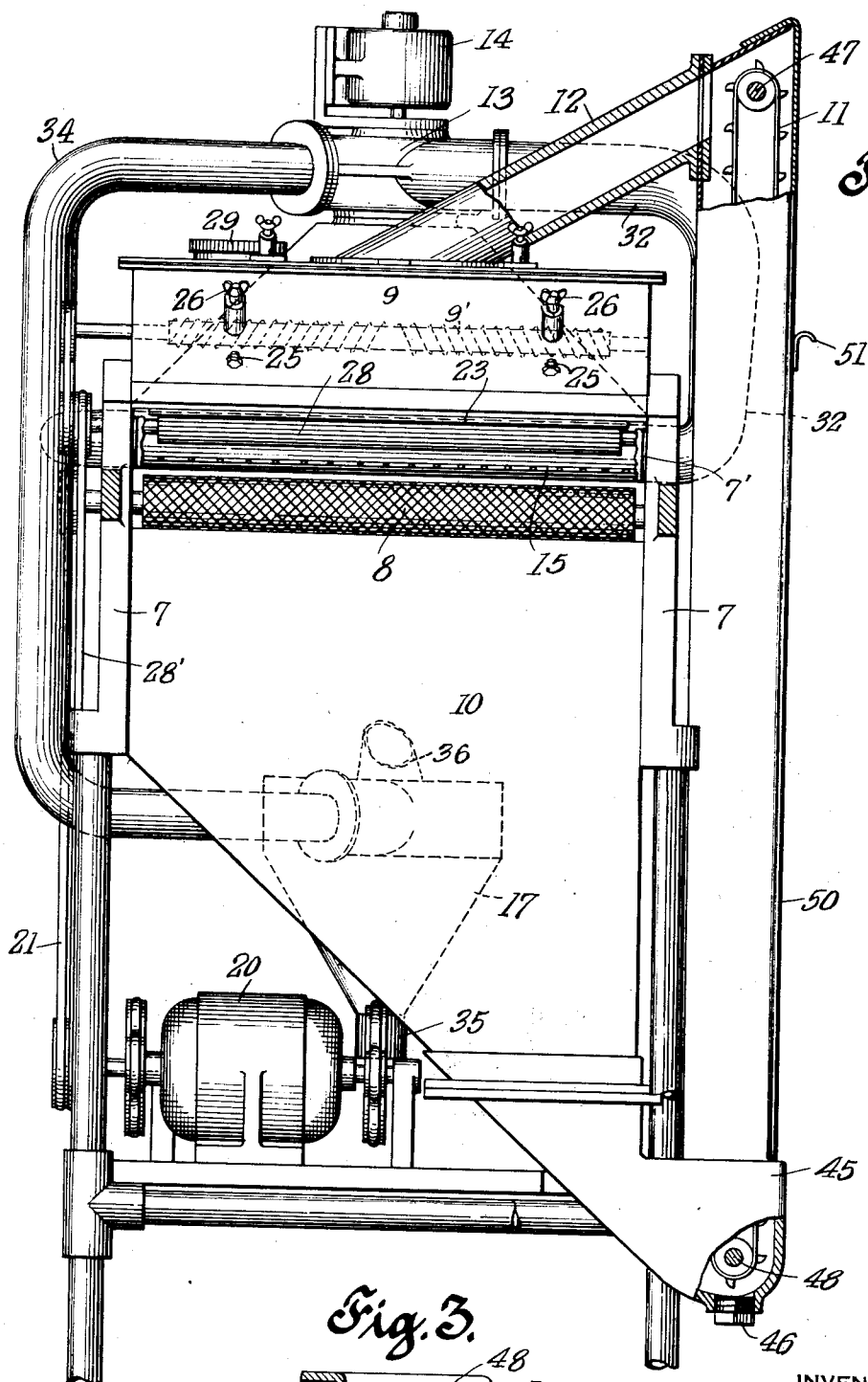


Fig. 2.

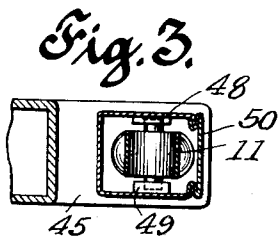


Fig. 3.

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Fig. 4.

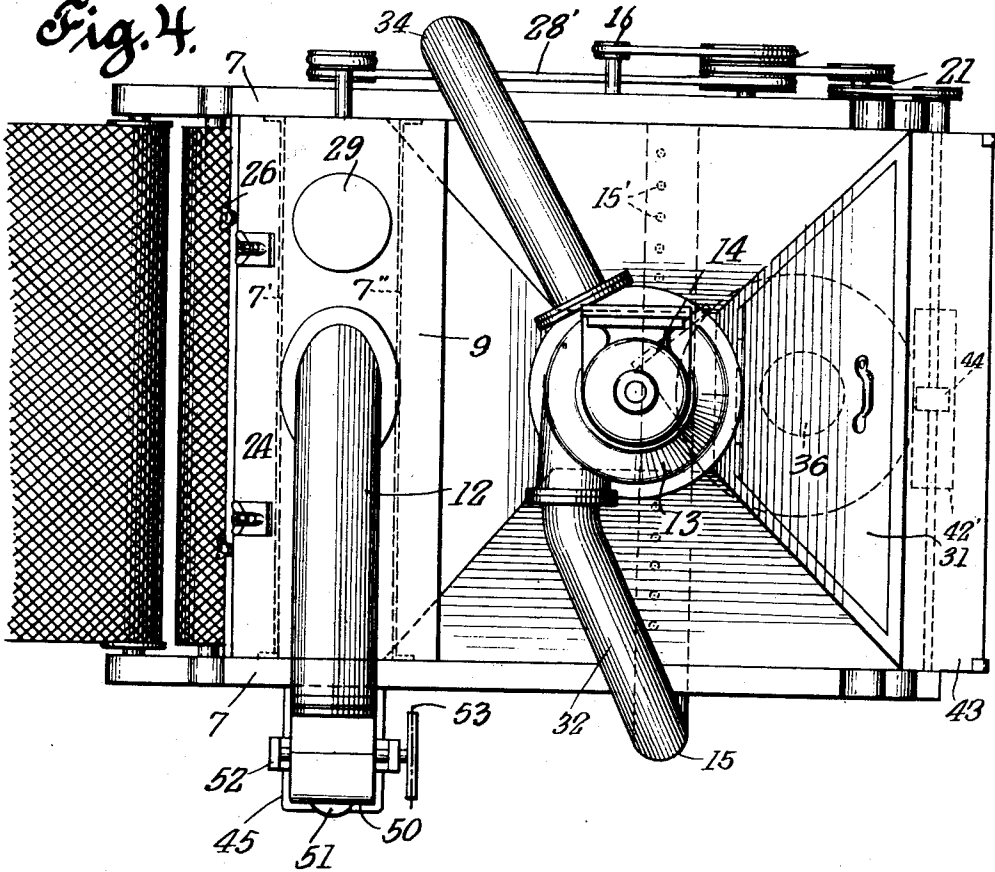
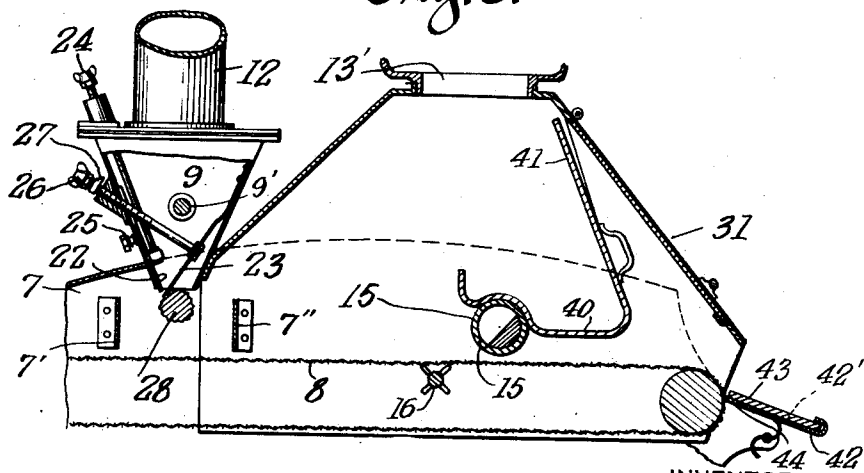


Fig. 5.



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UNITED STATES PATENT OFFICE

1,929,200

POWDERER

Samuel Lipsius, New York, N. Y.

Application November 24, 1930

Serial No. 497,716

4 Claims. (Cl. 91-59)

My invention relates to the subject of thermography or commonly termed embossed or raised printing, and particularly to machines for automatically applying powder to the printed sheets.

One object is to provide apparatus of a simple and compact form capable of rapidly applying powder to previously printed sheets and completely removing the excess powder from the unprinted portions of the sheet.

Another object is to provide means for automatically applying powder and automatically returning to the feeding means such powder as has not adhered to the printed portions of the sheet.

Another object is to provide effective means for regulating the deposit of powder on the sheets.

Another object is to provide means for effectively removing excess powder from the printed sheets.

Another object is to provide convenient means for inspecting the interior of the machine.

Other objects will be apparent from the following specifications:

In its preferred form the machine contemplates the use of a housing containing a suitable horizontal travelling conveyor for the printed sheets, a hopper arranged above one end of the conveyor provided with means for automatically depositing suitable powder, means for vibrating the sheets, a suction blower arranged above the conveyor for blowing the excess powder from the sheets and sucking up the powder in the air, means for collecting the excess powder beneath the conveyor and elevating means for returning to the hopper the powder which has been collected beneath the conveyor.

Details of one form of construction and arrangement will be understood from the accompanying drawings.

Fig. 1 is a side view of a machine embodying one form of the invention.

Fig. 2 is a front and partial section of the machine.

Fig. 3 is a horizontal section and plan showing a detail of the elevator mechanism.

Fig. 4 is a plan view of the principal portions of the machine.

Fig. 5 is a longitudinal sectional view of the machine.

The casing or hood 7 may be of any suitable construction and the mesh work conveyor 8 is suitably mounted and driven as is customary in machines of this character.

The hopper 9 is mounted above the conveyor

at one end of the machine and adapted to deposit powder upon the sheets on the conveyor as they pass through the machine.

A tapered collecting receptacle 10 is mounted beneath the conveyor for collecting the powder which does not pass out of the machine. This collecting member has its lower end arranged at one side of the machine, and a bucket type elevator 11 is provided for picking up the powder from the bottom of the collector and discharging it into an inclined chute 12 which leads back to the top of the hopper 9.

The removal of excess powder is accomplished by a suction blower 13, driven by a motor 14. To the pressure outlet of the blower is connected a pipe or conduit 15, having air outlets 15' arranged immediately above the upper run of the conveyor. A vibrator 16 is arranged adjacent the air vents for vibrating the conveyor and the sheets supported on it so as to loosen the powder and permit the air blasts to remove the last vestige of unattached powder. The blower 13 has its suction inlet 13' arranged in the hood above the conveyor so as to remove the particles of powder which are in the air above the conveyor.

A centrifugal or cyclone type separator 17 may also be connected to the pressure outlet of the blower as an auxiliary pressure relief. An air bag or dust collector might be used however in place of this separator.

A motor 20 furnishes the necessary power for driving the various moving parts other than the blower, for instance, by belts such as belt 21 which drives the conveyor 8.

The hopper 9 has its sides inclined and between them are located a sliding plate 22 and a vibrating plate 23. The plate 22 is adapted to be adjusted up and down by a screw threaded rod and thumb nut 24, and is held yielding in place by an adjustable spring device 25. The discharge opening may be varied to permit a greater or lesser quantity of powder to escape in a given time by providing an arrangement whereby the plate 23 may be adjusted toward and from the lower edge of the plate 22 by means of a screw and thumb nut 26, which may have an indicator or pointer 27 for showing the position of adjustment.

A toothed or ribbed shaft 28 co-acts with the lower edge of the flexible or resilient plate 23 and is driven by a belt 28' to open and close the space between the plates 22 and 23 by a vibrating action, thus sifting the powder upon the sheets. The size of the opening and the vibrating action may be adjusted by means of the members 24

and 26. The hopper may be provided with a filler opening having a removable cap 29.

Access to the collector 10 may be had through a side opening having a cover or cap 30.

- 5 Access to the hood above the conveyor 8 may be had through an opening which is closed by a hinged cover 31.

- 10 Powder barriers 7' and 7'' are arranged above the conveyor belt 8 extending between the sides of the casing 7 on either side of and parallel with the toothed shaft 28 to prevent the falling powder from being drawn directly into the casing 7 or spilling out from the front of the machine.

- 15 The cleaning pipe 15 extends across from one side of the machine to the other and is supplied with air under pressure from the blower by one or more pipes 32.

- 20 Vibrator 16 is very desirable when the work to be done requires large quantities of powder on some portions of the sheet, in such cases there is a very great excess of powder on the unprinted portions of the sheets and this tends to pile up in front of the air blast and swirl back on to the sheets after they pass the pipe 15.

This vibrator 16 has been found to provide a very effective method of loosening the powder and permitting the air blast to remove the excess powder.

- 30 In order to provide sufficient suction to remove the flying particles of powder from the hood, it is necessary to use a suction blower having a blowing capacity greater than is required for the blowing action through the pipe 15. I therefore provide the cyclone type of separator 17 which is connected by a pipe 34 to the outlet of the blower 13. This separator 17 has a collecting device 35 at the lower end and an air relief outlet 36 at the upper end, as is customary with such devices.

- 40 To avoid having any floating particles of powder fall upon the conveyor or sheets beyond the blower pipe 15 I provide a tray 40 which has one edge supported on the pipe 15 and the upper edge 41 supported near the suction inlet 13—this tray collects the powder which is not sucked up by the suction blower or deposited in the collector. From time to time this tray is removed and emptied.

- 50 As a further precaution to remove any excess particles which may still remain on the sheets I provide an inclined delivery shelf 42 with an opening 42', this opening is covered by a suitable plate 43 which is vibrated by a rotating beater 44 so that the excess powder drops off as the sheets are delivered to the oven (not shown) which is usually arranged to receive the sheets from the powderer.

- 60 The collector 10 is preferably provided with a basin portion 45 which is detachably secured in place so as to make it convenient to get at the elevator 11. A detachable plug 46 facilitates the removal of powder from the lower end of the basin. The elevator runs on two shafts, 47 at the top and 48 at the bottom. The shaft 48 at the bottom is preferably entirely enclosed and has bearings 49 inside the basin 45 so that there are no openings for the exit of powder at this point.

- 70 The front 50 of the elevator shaft is preferably removable and may be raised and lowered by means of a handle member 51 so that the entire front may be removed to permit access to the conveyor buckets.

- 75 The upper shaft 47 is supported in outside bearings 52 and driven by a belt 53 which is con-

nected in any suitable manner to the motor 20 so as to move the elevator at a suitable speed.

The power which is picked up by the buckets 11 is discharged down the chute 12 into the hopper 9 where it may be distributed toward the ends of the hopper by the screw threaded shaft 9' so as to maintain a substantially uniform spread of powder.

By the construction herein shown and described it is possible to regulate the deposit of powder to accommodate small cards as well as large sheets. It is also possible to handle various types of powder in the same machine and to adjust the machine to accommodate different hygroscopic conditions.

It will be obvious that the speed of the suction blower may also be adjusted to take care of varying conditions and requirements.

There is practically no waste of powder and the action is such that the powder does not materially change in composition while the machine is in operation. This feature though not apparent is quite important since the powder, of course, consists of particles of various sizes and it is important that the relative proportions of these various sizes shall not materially be changed, otherwise the quality of the work produced will vary.

I claim:

1. In a powdering machine, a foraminous conveyor for carrying sheets, a gravity feeding hopper above said conveyor, means for mechanically vibrating said sheets for loosening the powder thereon, means for blowing a blast of air over said sheets simultaneously with the vibration thereof and at the point where the sheets are vibrated for removing the loosened excess powder, a suction blower having its suction end positioned above the conveyor for carrying away the floating particles of powder, a gravity collector beneath said conveyor and an elevator for returning the excess powder in said collector to said feeding hopper.

2. In a powdering machine, a conveyor for carrying sheets, a gravity feeding hopper above said conveyor, a guard plate on each side of the hopper discharge opening and across the conveyor for preventing spreading of the powder from the feeding hopper, means for loosening the powder on the sheets including means for vibrating the conveyor and means for blowing a blast of air over said sheets adjacent the point where the conveyor is vibrated for removing the loosened excess powder, a suction blower having its suction end positioned above the conveyor for carrying away the floating particles of powder, a gravity collector beneath said conveyor and an elevator for returning the excess powder in said collector to said feeding hopper.

3. In a powdering machine, a foraminous conveyor for carrying sheets, a gravity feeding hopper above said conveyor, means for vibrating said sheets for loosening the powder thereon, means for blowing a blast of air over said sheets simultaneously with the vibration thereof for removing the loosened excess powder, a suction blower having its suction end positioned above the conveyor for carrying away the floating particles of powder, a gravity collector beneath said conveyor, an elevator for returning the excess powder in said collector to said feeding hopper and a separator connected to the outlet of the suction blower for relieving excess pressure from said blower.

4. In a powdering machine, a conveyor for car-

rying sheets, a gravity feeding hopper above said conveyor, means for removing excess powder, said means including a perforated pipe across and above the conveyor, a suction blower having its suction end positioned above the conveyor for carrying away the floating particles of powder, a gravity collector beneath said conveyor, an elevator for returning the excess powder in said collector to said feeding hopper and a removable powder collecting guard tray beyond said perforated pipe and having one edge supported thereby and above the conveyor.

SAMUEL LIPSIUS.

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