

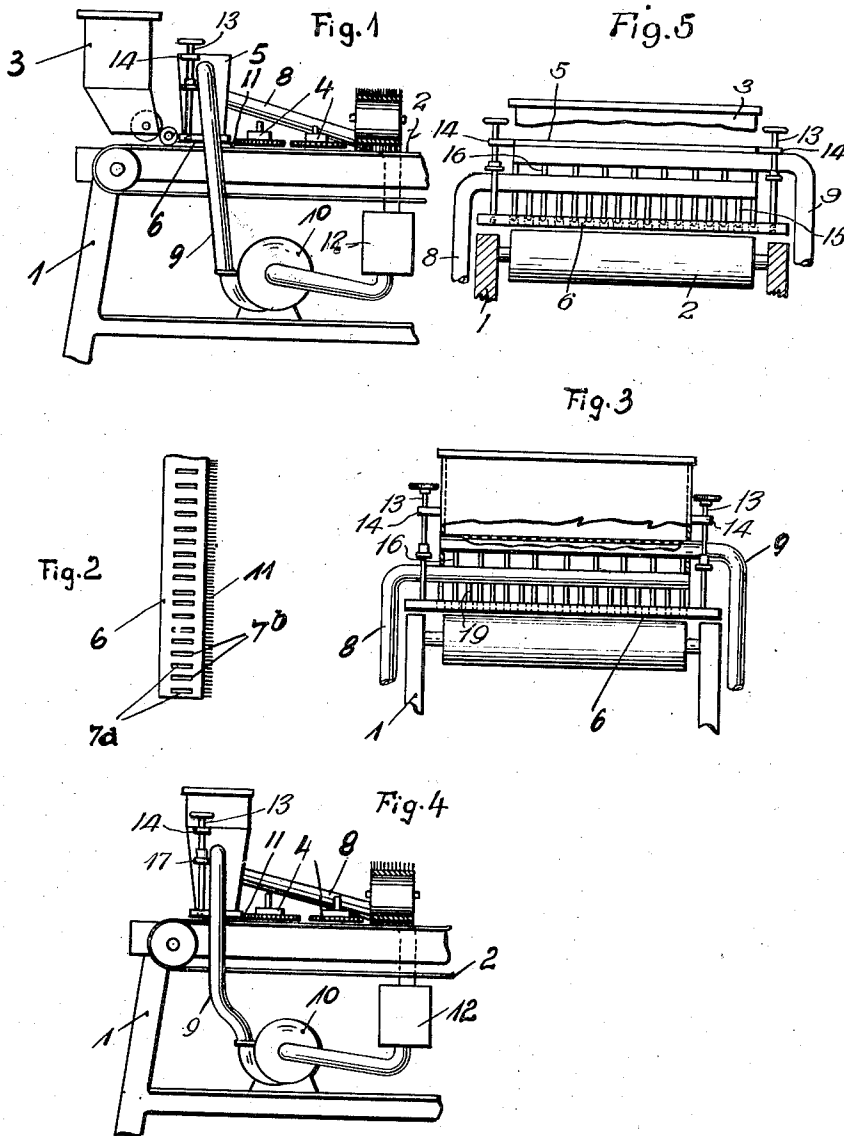
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BRONZING MACHINE

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# UNITED STATES PATENT OFFICE

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## BRONZING MACHINE

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6 Claims. (Cl. 91—59)

An application has been filed in Germany on the 5th December, 1933.

The present invention relates to improvements in bronzing machines.

5 In the known bronzing machines, the sheets provided with adhesive print are carried through the machine and an excess of bronze powder is applied to the sheets. A part of the bronze powder serves for covering the portions provided with the adhesive print and is rubbed into the  
10 print by rubbing devices. The remaining portion is removed by dusting off devices, for instance, bands. The requirements for a perfect removal of the superfluous bronze powder often  
15 depend on the nature of the paper and the bronze powder, and on the printing process employed, and it is very difficult to effect a perfect removal even when a considerable number of dusting off bands are used. The excess of  
20 bronze powder which is removed loses its polish owing to its being rubbed to and fro by the rubbing devices and by the dusting off bands, and consequently the powder so removed loses its value and cannot, as a rule, be fully re-  
25 employed.

The object of the invention is to avoid these drawbacks by providing anterior to the first rubbing device, a device which whirls up by means of air moved against the sheet, the portion  
30 of the powder lying loosely upon the sheet [that is, the portion which is not held by the adhesive print] and subsequently removes this excess portion.

The device consists of a member located directly anterior to the rubbing devices, and suspended just above the band conveying the sheets the longitudinal axis of said member running in a direction transverse to the band. This member is provided upon its whole length with holes  
40 which are connected alternately to a suction conduit and to a pressure conduit for air so that, say, the even holes are connected to the suction conduit and the odd holes are connected to the pressure conduit. The sheets which meet the  
45 dusting off device are consequently subjected simultaneously to a suction action and an air pressure action so that the actions of the air upon the sheet cancel each other as far as the sheet itself is concerned and there is no possibility of the front edge portion of the sheet becoming bent upwardly. In order to obtain satisfactory results when the machine is in operation, it is, of course, important that the magnitude of the suction and of the pressure be  
50 equal. In order to obtain this equality of the

magnitudes of the suction and the pressure, it is advisable to employ the same apparatus for producing the pressure and the suction. The air producing the pressure and the suction action consequently moves in a closed circuit. 5  
This arrangement has the additional advantage of reducing the cost as it is cheaper than the employment of separate fans for the production of the suction action and the pressure action respectively. The member receiving the air at  
10 lower pressure and the air at high pressure is located immediately above the sheet, and in itself counteracts any tendency of the front portion of the sheet to curl or bend upwards. The member extends from the bronze applying  
15 device up to the first rubbing device and therefore assists in the easy conveyance of the sheet from the bronzing apparatus to the rubbing devices, the said member being preferably provided at its rear edge with a covering of soft  
20 material or fabric, such as plush or fur, as hereinafter described. When the sheet passes below the bronzing device and is carried onwards by the conveying band to the rubbing device, there is in the ordinary way a danger  
25 that the front edge of the sheet, which is not mathematically accurately dimensioned, will strike against the rubbing device thereby becoming crumpled, so that when the band feeds it  
30 onwards it arrives in a creased condition below the said rubbing device. The aforesaid fabric covering is intended to assist in preventing the possibility of the sheet becoming crumpled or creased. The fabric bears by virtue of its own  
35 weight on the sheet. It naturally does not apply any considerable force to the sheet but it nevertheless prevents the front edge of the sheet from rising and becoming crumpled or creased, inasmuch as the said fabric covering is located  
40 quite close to the rubbing device and holds the said front edge of the sheet tightly up against the conveying band. Although the actions of the suction air and the pressure air cancel each other as far as any bodily movement of the sheets is concerned, they do not cancel each  
45 other as far as excess bronze powder lying loosely upon the sheet is concerned. The suction action of the air and the pressure action thereof upon this loose bronze powder depends upon the distance of the holes through which  
50 the air at low pressure and the air at high pressure pass, from the sheets. As sheets of various thicknesses have to be dealt with by the same bronzing machine, the improved dusting device including the perforated member is ver- 55

tically adjustable so that it may easily be brought into the most favourable position with regard to the sheets conveyed through the machine.

5 The accompanying drawing shows by way of example one construction embodying the features of the invention.

Fig. 1 is an elevation of the front portion of the bronzing machine.

10 Fig. 2 is a view from below of a portion of the dusting device.

Fig. 3 is a section of the dusting device.

Fig. 4 which shows in elevation a somewhat modified construction, and

15 Fig. 5 is a section of Fig. 1.

1 indicates the frame of the bronzing machine and 2 indicates an endless conveyor band which carries the sheets through the bronzing machine. At the feed point of the sheets into the bronzing machine a bronze applying apparatus 3 is provided. The bronze supplied by this apparatus to the sheets is rubbed into the sheets by rubbing devices 4 during the passage of the sheets through the machine. Several such rubbing devices 4 may be employed. Anterior to the first rubbing device 4 the dusting device 5 forming the subject of the invention is located. The dusting device extends across the whole width of the machine and is supported upon the frame in any suitable manner. The dusting device 5 is provided at the end adjacent to the endless band 2 with a bar-like member 6 which extends close to the first rubbing device 4 and is suspended close above the conveying band. 35 The member 6 is provided upon its whole length with holes 7a, 7b, the holes 7a being connected to a suction conduit 8 and the holes 7b being connected to a pressure conduit 9. The holes 7a and 7b are preferably elongated and extend 40 transversely to the length of the member 6. A common fan 10 serves for producing both the low pressure air and the high pressure air so that the reduction in pressure of the low pressure air is equal to the increase in pressure of the high pressure air. The suction conduit is 45 provided with a filter box 12 in which bronze powder carried by the low pressure air is eliminated.

The sheets pass without any hindrance under the dusting devices. As suction openings alternate with the pressure openings, the lifting action of the low pressure air upon the sheet, more particularly its forward edge, is cancelled by the action of the high pressure air. In order 55 to regulate the action of the high pressure air and the low pressure air upon the bronze powder, more particularly in accordance with the different sheet thicknesses, the perforated member is adapted to be lifted or lowered with regard to the sheets. For this purpose the bar-like member 6 (see Fig. 3) is mounted on vertical screw-threaded spindles 13 which are 60 guided in bearings 14 provided laterally on the device so as to be rotatable but not slidable and which engage at their ends in screw-threaded holes on the bar-like member 6. By rotation of the spindles 13 the said member 6 can therefore be raised or lowered.

70 Into the holes 7a and 7b respectively of the member 6 nozzles 16 and 19 respectively project which are rigidly fixed to the suction and pressure conduits 9 and 8 respectively. The member 6 can therefore be raised or lowered without it being necessary to displace the suction or blast nozzles 15 and 16 respectively.

If required the perforated member may be covered at least at its rear edge with plush or fur, as indicated at 11, for the purpose of facilitating the passage of the sheets from the bronze applying device to the first rubbing device. This is due to the fact that the hair of the plush or fur coating of the perforated member extends up to and below the first rubbing device. 5

In order to simplify the construction and operation of the bronzing machine, a separate 10 bronze applying device may, in some cases, be entirely dispensed with and bronze powder may then be blown on to the sheets by those nozzles of the perforated member which supply air at high pressure. For this purpose the pressure 15 conduit may be so connected with the bronze powder storage receptacle as to cause the high pressure air to become saturated with bronze powder.

A constructional form of this kind according 20 to the invention is illustrated in Fig. 4. The suction conduit 8 and the pressure conduit 9 are in this case led through a container 17 containing the bronze powder. The part of the pressure conduit located in the container 17 is 25 constructed in a manner known per se so that the bronze powder is entrained by the current produced by the suction action on the air and is blown on to the sheet. Rollers for applying the bronze powder to the sheet such as are shown 30 in the construction according to Fig. 1 are not necessary in the construction according to Fig. 4.

I claim:

1. In a bronzing machine the sub-combination 35 of: means conveying the sheets through the machine; a device for rubbing in the bronze powder; and means arranged anterior to the rubbing in device for whirling up by means of air moved against the sheets the excess of bronze 40 powder lying loosely upon the sheets and for removing the bronze powder by suction, said means for whirling up the bronze powder and removing same by suction comprising a number of pressure nozzles and a number of suction nozzles, arranged 45 immediately above the conveying band, the suction nozzles and the pressure nozzles being arranged side by side in a row transversely to the direction of feed of the sheet, in such manner that the suction nozzles alternate with the pressure nozzles, substantially as described. 50

2. In a bronzing machine the sub-combination of: means conveying the sheets through the machine; a device for rubbing in the bronze powder; and means arranged anterior to the 55 rubbing in device for whirling up by means of air moved against the sheets the excess of bronze powder lying loosely upon the sheets and for removing the bronze powder by suction, said means for whirling up the bronze powder and removing same by suction comprising a perforated member extending up to the rubbing device and provided upon its whole length with holes, even holes being connected with a suction conduit and odd holes being connected with a 65 pressure conduit, substantially as described.

3. In a bronzing machine the sub-combination of: means conveying the sheets through the machine; a device for rubbing in the bronze powder; and means arranged anterior to the 70 rubbing in device for whirling up by means of air moved against the sheets the excess of bronze powder lying loosely upon the sheets and for removing the bronze powder by suction, said means for whirling up the bronze powder and 75

removing same by suction comprising a perforated member extending up to the rubbing device and provided upon its whole length with holes, even holes being connected with a suction conduit and odd holes being connected with a pressure conduit, said holes being elongated and extending transversely to the member, substantially as described.

4. In a bronzing machine the sub-combination of: means conveying the sheets through the machine; a device for rubbing in the bronze powder; and means arranged anterior to the rubbing in device for whirling up by means of air moved against the sheets the excess of bronze powder lying loosely upon the sheets and for removing the bronze powder by suction, said means for whirling up the bronze powder and removing same by suction comprising a perforated member extending up to the rubbing device and provided upon its whole length with holes, even holes being connected with a suction conduit, said perforated member being covered at the side adjacent to the rubbing device with soft pliable material substantially as described.

5. In a bronzing machine the sub-combination of: means for conveying sheets through the machine; means for rubbing applied bronze powder

into the sheets; means for applying bronze powder to the sheets and dusting off excess powder located anterior to said rubbing means comprising in combination: means for blowing air under pressure and bronze powder contained therein on to the sheet and means adjacent thereto for removing loose bronze powder by suction, the said blowing means and suction means extending up to points in immediate proximity to the sheet substantially as described.

6. In a bronzing machine the sub-combination of: means for conveying sheets through the machine; means for rubbing applied bronze powder into the sheets; means for applying bronze powder to the sheets and dusting off excess powder located anterior to said rubbing means comprising in combination: means for blowing air under pressure and bronze powder contained therein on to the sheet and means adjacent thereto for removing loose bronze powder by suction, said last named means comprising a bronze powder receptacle; a perforated member extending across the conveyer band; holes in said member connected to the suction conduit; alternate holes in said member connected to a pressure conduit; said perforated member, suction conduit, pressure conduit and bronze receptacle forming a closed circuit, substantially as described.

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