Dec. 22, 1925. 1,566,800.

C. J. MacARTHUR

DEVICE FOR OFFSET PREVENTION AND SURFACE FINISHING IN PRINTING

Filed April 21, 1924

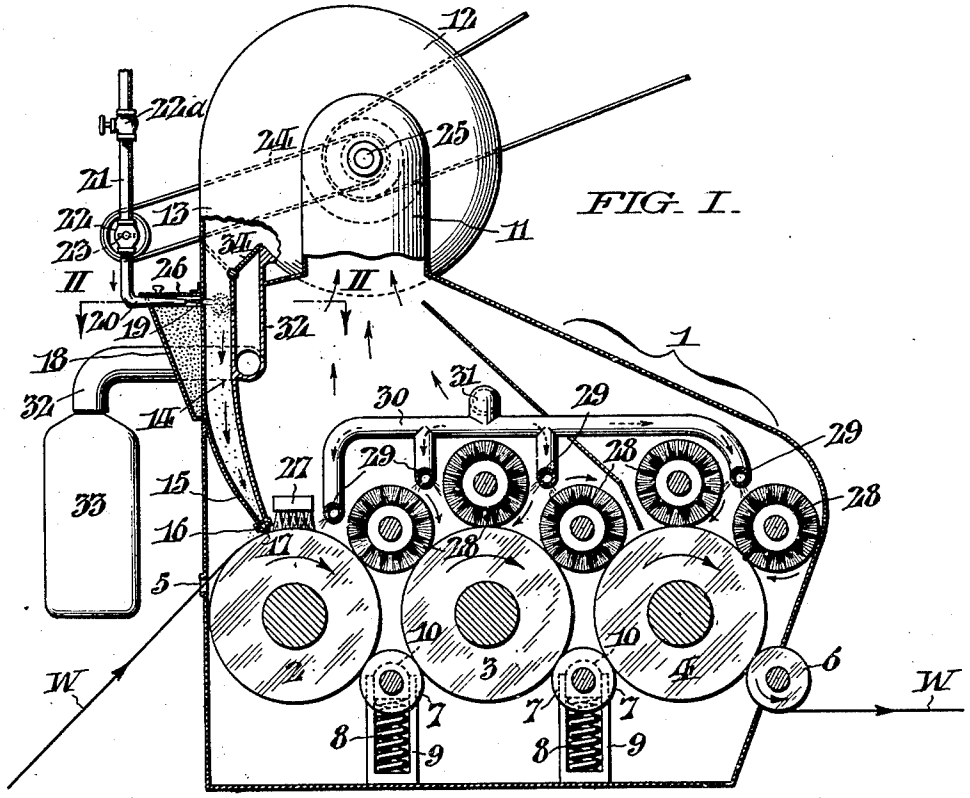


FIG. I.

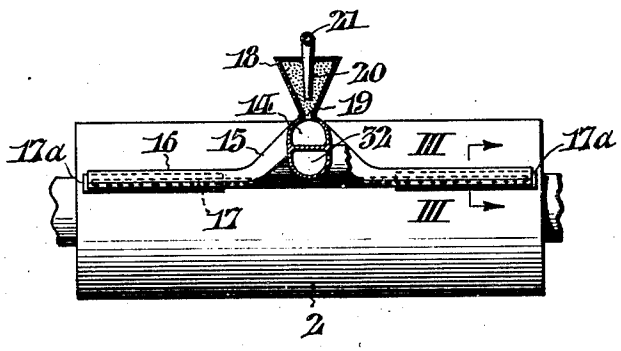


FIG. II.

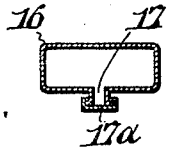


FIG. III.

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UNITED STATES PATENT OFFICE.

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DEVICE FOR OFFSET PREVENTION AND SURFACE FINISHING IN PRINTING.

Application filed April 21, 1924. Serial No. 707,883.

To all whom it may concern:

Be it known that I, CHARLES J. MacARTHUR, a citizen of the United States, residing in Glen Ridge, in the county of Essex and State of New Jersey, have invented a certain new and useful Device for Offset Prevention and Surface Finishing in Printing, whereof the following is a specification, reference being had to the accompanying drawings.

This invention is concerned, on the one hand, with prevention of "offset" in printing, i. e., with rendering freshly-printed ink immune against smudging or sticking as is necessary to enable and facilitate superposed or multi-color printing, as well as to permit freshly printed sheets with impressions on either or both sides, to be stacked—or continuous webs rolled—without entailing the use of "interleaves" or "slip-sheets", oil fountains, shifting tympans or traveling tympans on rotary presses as is variously needed. This desideratum I attain by application to the printed sheets or webs immediately after receiving an impression (as in superposed or multi-color printing), and at the completion of such printing, of finely divided or pulverulent material capable of being readily and quickly absorbed and assimilated by the substance acting as the vehicle for the coloring matter in the ink to "set" the latter against subsequent smudging. Of such materials I have found that transparent and translucent powders such as soapstones silicate, hydrate of alumina, magnesia, starches and talc may be used with equal results from the standpoint of ready absorption and assimilation by the ink. My invention is further concerned with surface-finishing of freshly printed sheets, or webs, and I have further found that by proper selection as between the various materials mentioned above, that both high finish and various degrees of dull finish may be secured in the surface of the printed sheets by rubbing action with the powders.

In the main, my invention is directed to the provision of a very simple and efficient means capable of applying powdered absorbing and surface-finishing material uniformly over the entire surface or any predetermined portion of a newly printed sheet or web for assimilation by the moist ink, treating the surface of the sheet or web by rubbing action and suction to remove the surplus powder, and at the same time impart an improved finish to said surface that not only greatly enhances its appearance, but places the same in condition for immediate reception of another impression or impressions in superimposition or upon the reverse side of the sheet or web without setting-off, smutting or transferring when brought into contact with tympans or other similar instrumentalities ordinarily associated with the cylinders of rotary printing presses.

Other objects and attendant advantages will become readily apparent from the detailed description which follows of a typical embodiment of my invention, the appended claims serving to indicate precisely and definitely the features which I believe to be novel, and therefore patentable.

In the drawings Fig. I is an illustration, partly in section and partly in elevation, showing my improved means for treating freshly printed sheets or webs for the purpose of preventing subsequent offset and improving the finish of their surfaces.

Fig. II is a partial plan sectional view taken as indicated by the arrows II—II in Fig. I.

Fig. III is a detail sectional view of the powder discharge nozzle taken as indicated by the arrows III—III in Fig. II.

As shown, the device is in a convenient form for use as an attachment for any standard type of printing press, designed either for continuous web or sheet printing, and comprises an enclosure designated comprehensively by the numeral 1, said enclosure housing a series of rolls 2—3—4 over and about which the freshly printed sheet or web "W" is passed in the direction of the arrows in Fig. I. The sheet or web "W" enters the enclosure at one side through an opening 5, and emerges at the opposite side of the casing as it passes un-

der an auxiliary guide roller 6. Frictionally engaging with the rolls 2—3—4 to assist progression of the web "W" through the enclosure 1, are idlers 7 that are urged against said rolls by helical compression spring 8 accommodated within the guide-ways 9 for the bearings 10 of the idlers 7. At its upper end, the enclosure 1 is connected by an elbow 11 with the suction inlet of a centrifugal blower 12; while the outlet 13 of said blower is in communication with a vertically-disposed duct 14 which is attenuated toward the lower end as shown at 15, for mergence with an elongated nozzle 16 having a comparatively narrow discharge slot 17 that extends longtiudinally of, and in close proximity to the roll 2, it being co-extensive with the latter as shown in Fig. II so as to be capable of covering the entire width of the passing web W.

Slides 17ª shiftable along the nozzle outlet 17 permit adjustment for variation in the extent of the sheet surface covered as may be desired or required. Mounted to the left hand side of the casing 1 (as considered in Fig. I) is a hopper or magazine 18 for the powdered material which is to be used in preventing offset of the newly printed ink, and also for surface finishing. The hopper 18 is triangular in cross configuration (Fig. II) and communicates with the conduit 14 through an orifice 19 opposite to which is located a pneumatic injector 20 that receives air under pressure through a pipe 21 from any convenient source, not shown. Interposed in the pipe 21 is a valve 22 with a rotary flapper 23 driven by a belt connection 24 from the shaft 25 of the blower. By reason of this arrangement, the injector 20 is intermittently energized with the result that the powdered material is introduced, via the orifice 19, in successive puffs into the conduit 14 to charge the air passing downward through the latter. The pipe 21 has also interposed in it a hand valve 22ª whereby the flow of air to the injector 19 may be regulated or entirely shut off when occasion requires. In order that the supply of powder may be replenished from time to time, the reservoir 18 is provided with a hinged cover 26.

Immediately after receiving the powder, the printed sheet is engaged by a reciprocating brush 27 which bears toward the top of the leading roll of the series 2—3—4 and serves to distribute the powder thoroughly over the sheet and thus assures absorption and assimilation by the ink. As a means for removing the excess powder from the sheet during the remainder of its travel through the enclosure 1, I provide a series of rotary brushes 28 which are allocated as shown and bear toward the surfaces of the rolls 2, 3, 4. These rotary brushes 28 are preferably driven in a direction counter to that of the rotation of rolls 2—3—4, and serve, in addition to the function previously mentioned, to improve the surfaces of the travelling sheet by rubbing action with the powder.

For the purpose of preventing powder accumulation on the rotary brushes 28, I employ a pneumatically operative eliminating system which includes a series of pipes 29 extending transversely of the enclosure in the intervals between adjacent brushes. The pipes 29 have perforations set so as to direct the scavenging air against the rotating brushes, and air under pressure is conducted to them through a common manifold 30 connected by a branch 31 preferably to the same source that supplies the injector 20.

The removal and recovery of all the powder from the circulatory course within the enclosure 1 may be accomplished as a result of the institution of provisions as follows: A conduit 32 at one side of the duct 14 aforementioned, also leads from the pressure outlet 13 of the blower 12, and extends laterally through the rear of the enclosure 1 for connection at the exterior with a powder collector 33 which may be in the form of a fabric bag of fine texture. Diversion of the outflow from the blower 12 through the conduit 32 instead of the duct 14 is determined by swinging of a hinged or pivoted deflector 34 from the full-line position to the dotted-line position shown in Fig. I. Thus by positioning the deflector 34 as directed, instead of circulating within the enclosure 1, the air is exhausted through the collector 33 and the powder incidentally filtered out and retained therein. When this is to be accomplished, the air to the injector 20 is of course cut off by aid of the hand valve 22ª and the further supply of powder thereby interrupted. After complete recovery of the powder as just explained, the device may be bodily removed from the printing press for inspection, adjustments or replacements without the possibility of any powder droppings being spilled upon the bearings or any intricate parts of the press as might otherwise occur through carelessness or inadvertence.

In the normal operation of the device, it will be seen that the powder laden air escaping at high velocity from the nozzle 16 is forcibly blown upon the newly printed sheet "W" as the latter passes over roll 2. The application of the powdered material is immediately followed by the rubbing action of the reciprocatory brush 27 which not only effectively distributes the powder but insures its absorption and assimilation by the ink, further pressure facilitating this end being also applied to the treated sheet or web in passing between the spring-pressed idler rollers 7 and the driven rollers 2, 3, 4. In its continued progress through the enclosure 1 over the rolls 3—4, the web W is

subjected to the successive rotary brushes 28 with the result that any excess powder is removed, the treatment by said brushes with the presence of the powder also causing impartation of either a high or a dull surface finish in accordance with the kind of powder employed as hereinbefore described. The excess powder removed from the brushes 28 and thus restored to a state of suspension within the enclosure 1, is drawn into the inlet 11 of the blower 12 and recirculated, the desired extent of saturation of air with the powdered material being maintained through the pulsating operation of the injector 20 and control of air supply thereto by the valve 22a. The uninterrupted circulation of the air within the enclosure 1 will obviously not only prevent clogging, but effect continuous automatic normal reclaiming of any excess powder so that there is no possible chance of its escape or wastage.

The device, as will readily be seen is complete and compact so that it can be employed as a unit in connection with any standard form of printing press, or in multiple with similar units in presses designed for superposed or multi-color work, or those in which a sheet is simultaneously printed on opposite sides.

The application of them to the presses may be readily accomplished by any skilled mechanic schooled in the art to which my invention appertains and need not therefore, it is thought, be further dwelt upon herein.

Having thus described my invention, I claim:

1. A device of the character described comprising an enclosure through which a freshly-printed web or sheet is passed, a blower whereby air is continuously circulated within the enclosure, a hopper for powdered absorbing and surface-finishing material, means whereby the powdered material is intermittently introduced into the pressure outlet of the blower, a nozzle communicating with said outlet to direct the powder laden air forcibly against the freshly printed surface, and means for finishing said surface of the web or sheet by rubbing action with the powder.

2. A device of the character described comprising an enclosure through which a freshly-printed sheet or web is passed, a blower whereby air is continuously circulated within the enclosure, a hopper for powdered absorbing and surface-finishing material, a pneumatic injector operative intermittently to introduce powder from said hopper into the outlet of the blower, a nozzle communicating with said outlet to direct the powder-laden air forcibly against the surface of the freshly printed web or sheet, and a reciprocating brush for finishing the surface of the web or sheet by rubbing action with the powder.

3. A device of the character described comprising an enclosure through which a freshly-printed web or sheet is passed, a blower whereby air is continuously circulated within the enclosure, a hopper for powdered absorbing and surface-finishing material, a pneumatic injector adapted to displace the powdered material from the hopper aforesaid and introduce the same into the outlet of the blower, an intermittently-operative valve associated with the injector to induce pulsating action, and a nozzle communicating with the blower outlet to direct the powder-laden air forcibly upon the surface of the freshly printed web or sheet.

4. A device of the character described comprising an enclosure through which a freshly-printed web or sheet is passed, a blower whereby the air is continuously circulated within the enclosure, means for introducing powdered absorbing and surface-finishing material into the air current for forcible impingement upon the printed sheet or web and assimilation by the moist ink, a series of rolls within the enclosure over and about which the web or sheet is progressed, co-operative rotary brushes for removing the excess powdered material from the travelling sheet or web, and a pneumatic scavenging system including pipes with jet outlets for directing pressure-impelled air against the brushes to remove the powder accumulation therefrom.

5. A device of the character described comprising an enclosure through which a freshly-printed web or sheet is passed, means whereby air laden with powdered absorbing and surface-finishing material is continuously circulated within the enclosure, and means whereby the air flow may be diverted to the exterior for complete recovery of the powdered material from the circulatory course within the enclosure.

6. A device of the character described comprising an enclosure through which a freshly-printed web or sheet is passed, a blower whereby air laden with powdered absorbing and surface-finishing material is continuously circulated within the enclosure, a duct leading from the pressure outlet of the blower to direct the powder-laden air against the surface of the freshly-printed sheet, a conduit also leading from the pressure outlet of the blower to a powder collector at the exterior, and means whereby the pressure flow of the blower may be diverted from the duct to pass into the conduit for the complete removal and collection of the powder from the circulatory course within the enclosure.

7. A device of the character described comprising an enclosure through which a freshly-printed web or sheet is passed, a blower whereby air laden with powdered

absorbing and surface-finishing material is continuously circulated within the enclosure, a duct leading from the pressure outlet of the blower to direct the powder-laden air against the surface of the freshly printed web or sheet, a conduit also leading from the pressure outlet of the blower to a powder collector, and a swingable deflector whereby the outflow from the blower may be diverted to pass into the conduit for complete removal and collection of the powdered material from the circulatory course within the enclosure.

In testimony whereof, I have hereunto signed my name at Kansas City, Mo., this fourteenth day of April, 1924.

CHARLES J. MacARTHUR.