Sept. 28, 1937. R. BLOW 2,093,995

METHOD OF PREVENTING OFFSETTING OF FRESHLY PRINTED SURFACES

Filed Jan. 17, 1936 2 Sheets-Sheet 1

Fig. 1.

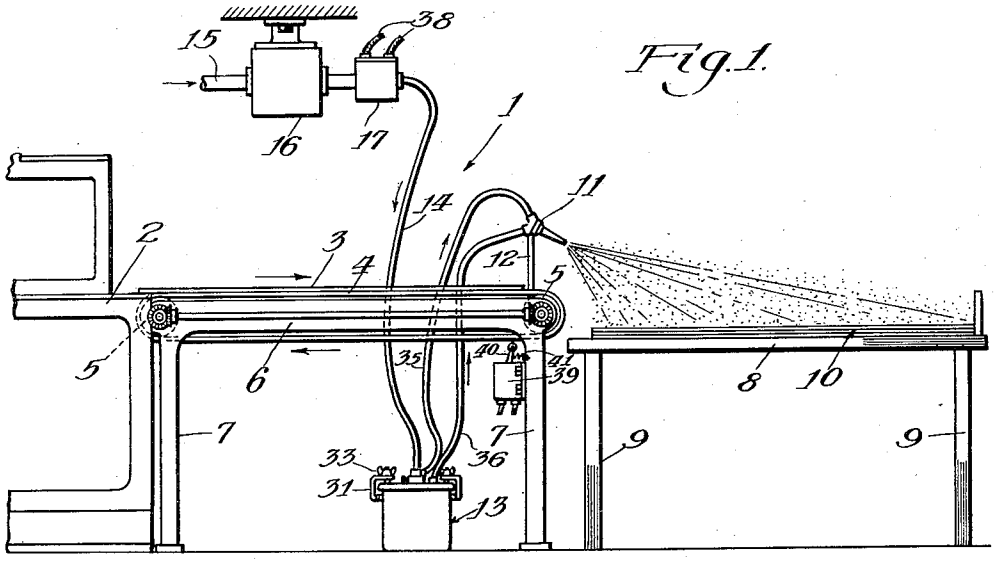


Fig. 2.

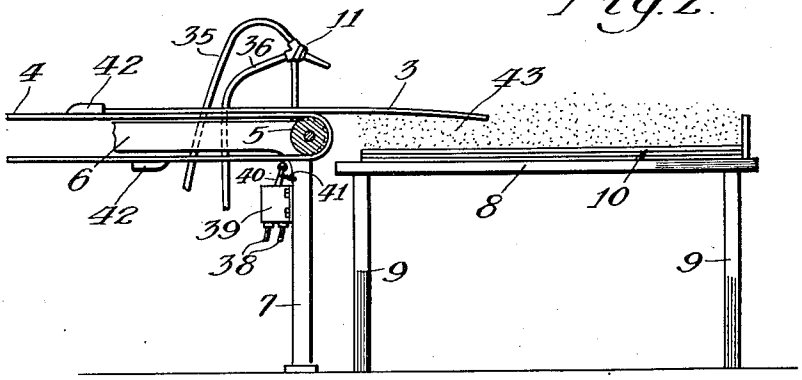
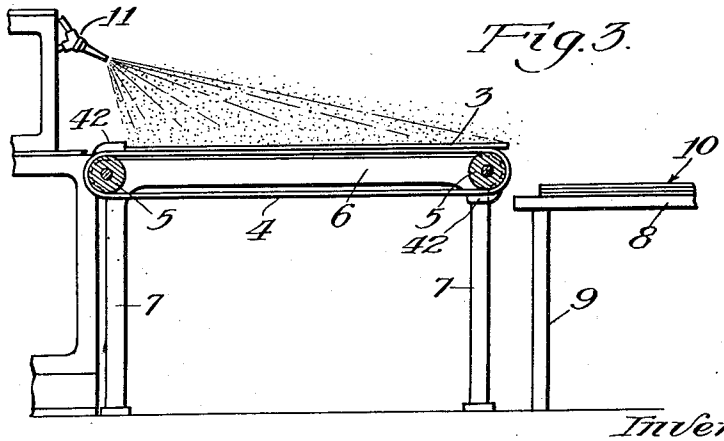


Fig. 3.



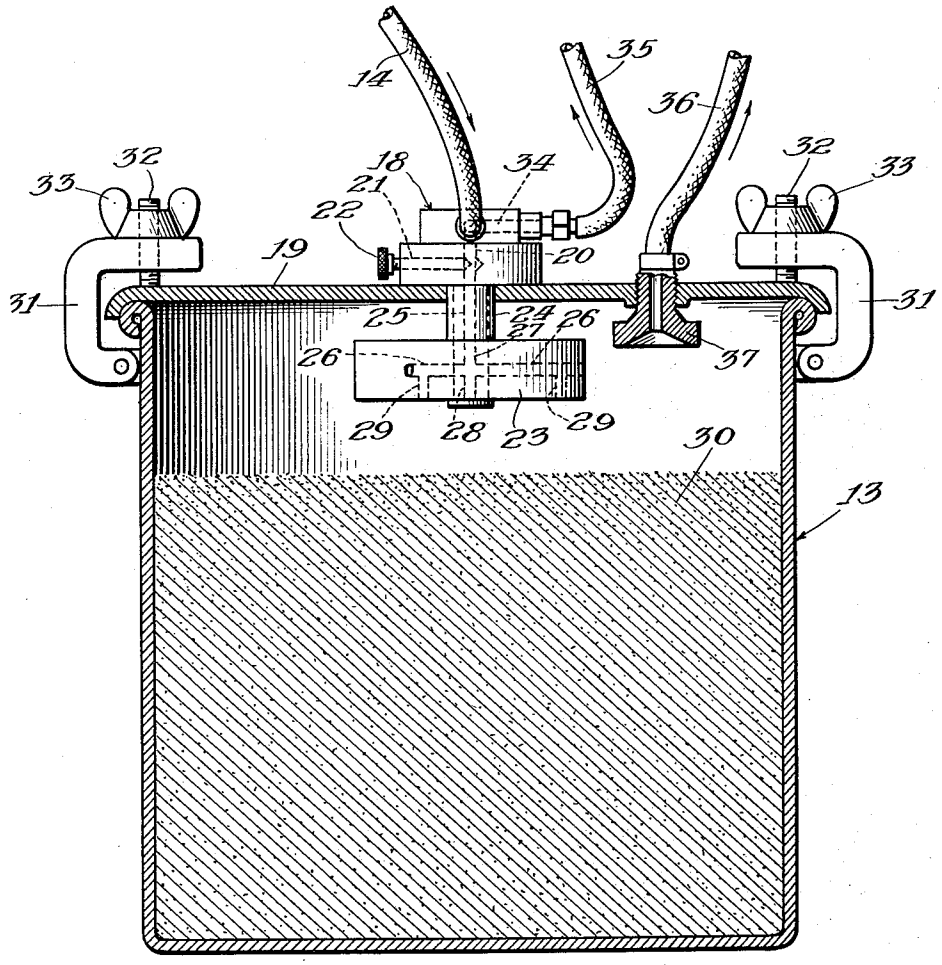
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METHOD OF PREVENTING OFFSETTING OF FRESHLY PRINTED SURFACES

Filed Jan. 17, 1936 2 Sheets-Sheet 2

Fig. 4



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Patented Sept. 28, 1937 2,093,995

UNITED STATES PATENT OFFICE

2,093,995

METHOD OF PREVENTING OFFSETTING OF FRESHLY PRINTED SURFACES

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Application January 17, 1936, Serial No. 59,519

4 Claims. (Cl. 101—416)

This invention relates to improvements in a method of preventing the offsetting of freshly applied ink from a recently printed sheet to a sheet deposited upon said freshly printed surface.

In the printing art it is customary in the printing operation to pile freshly printed sheets one on top of the other in the form of a stack. In view of the fact that the printed sheets are deposited in rapid succession on said stack, provision is usually necessary for preventing the offsetting of the wet ink from the printed surface to the rear face of the adjacent sheet in the stack.

Numerous expedients have been heretofore used to accomplish this end including the employment of a "slip sheet", that is, the insertion or deposition of a slip sheet or protector sheet between adjacent printed sheets. This expedient is satisfactory in some cases but in others it is not effective and in all cases it is expensive, involving the cost of the separate mechanism required to handle the slip sheets as well as the additional cost of the slip sheets themselves.

It has also been heretofore proposed to use wax as a protecting agent to prevent offset, said wax being sprayed onto the freshly printed surface of a sheet or web. This method of preventing offset although indifferently effective in some instances is open to the objection that the wax, in general, is difficult to handle. When using wax for this purpose, the spray heads periodically clog, and all equipment adjacent the spray becomes covered with the wax. In addition, in printing multi-colored work, difficulty is encountered in printing subsequently applied colors due to the presence of the wax upon the previously printed sheet or web.

Another commonly used expedient is the employment of an aqueous suspension, solution or emulsion of gums or like material, which is blown upon the surface of the freshly printed sheet in the form of a mist whereby said gums are deposited upon the freshly printed surface and serve to protect said inked surface from injurious contact with the next adjacent sheet.

This method is open to numerous objections among which may be mentioned the difficulty of clogging or gumming of the equipment used; and the danger of wetting the freshly printed sheet whereby the same adheres to the sheet deposited thereon (this difficulty is frequently encountered because of the presence of an aqueous carrier especially when coated or semi-coated papers are being printed). Moreover, the sheets or printed web may stick or adhere due to the presence of an excess of the spray material particularly when a siccative material such as glue, gum arabic, or the like is used.

In my present invention a process is described which is characterized in that no expensive slip sheets are necessary and the protecting agent is handled in the dry state which eliminates the hazard of excessively moistening or wetting the printed sheet or depositing a siccative material thereon. In addition, no difficulty is encountered in discharging proper quantities of the agent in maintaining the agent in proper condition to be discharged, nor in keeping the equipment free and operative over long periods of time.

Briefly described my invention comprises periodically discharging a predetermined quantity of substantially dry, finely divided solid material in company with a gaseous carrier, preferably air, at a predetermined pressure whereby the finely divided solid material is uniformly distributed upon the freshly printed surface, protecting that surface from injurious contact with a superposed sheet.

The objects and advantages of my invention will be apparent from the accompanying drawings and following detailed description.

In the drawings, Fig. 1 is a diagrammatic side elevational view of the discharge end of a printing press illustrating suitable apparatus for carrying out my invention.

Fig. 2 is a similar view showing the printed sheet in the act of being discharged.

Fig. 3 is a similar view of a modified apparatus for carrying out my invention at a different period of travel of the printed sheet.

Fig. 4 is a side sectional view of the preliminary "dusting" or "clouding" chamber.

Referring in detail to the drawings, (Fig. 1), 1 indicates the rear or discharge end of a conventional type printing press. In view of the fact that my invention does not appertain to the printing operation itself only the frame 2 of the printing press per se is illustrated.

After the printing operation is performed in the printing mechanism of the press, the freshly printed sheets 3 are delivered in seriatim to a conveyor which usually comprises a plurality of parallel moving conveyor belts 4 which travel in endless fashion around pulleys 5 in the direction indicated by the arrows in Fig. 1. The conveyor is carried by frame 6 which, in turn, is supported by legs or columns 7.

From the conveyor the sheets 3 are passed to a table 8 having supports 9, said table being disposed adjacent the rear or discharge end of

the conveyor. The sheets 3 discharged to table 8 are piled thereon in the form of a stack 10, the sheets being positioned in superimposed relationship. Although different type presses discharge the printed sheets in different fashions, substantially all of the discharge mechanisms ultimately stack the sheets, and accordingly, in view of the fact that my invention is adapted to protect the freshly printed surfaces and prevent offsetting when the sheets are stacked, it is applicable to substantially all types of presses.

It is to be understood, of course, that although my invention is described in conjunction with, and in the environment of a press of the "flat-bed" type, it is equally applicable to presses of the rotary type wherein the printed web is rolled or otherwise handled as a continuous web. My invention is broadly directed to a process of preventing offsetting of print and, consequently, is not concerned with, and the operation thereof is not affected, by the manner in which the print is originally produced.

In carrying out my invention one or more guns or discharge nozzles 11 are mounted upon the rear end of the frame 6, being carried by any suitable support 12. The gun or guns 11 mounted in this manner are so disposed as to discharge the protecting agent over the surface of the uppermost sheet 3 in the stack 10.

A container 13, shown in detail in Fig. 4, is positioned adjacent the conveyor frame and is connected to a source of air under pressure by means of a flexible conduit 14. The air delivered through conduit 14 is initially obtained from a source of air under pressure (not shown) which may comprise a compressor or blower which may discharge through conduit 15. The pressure in conduit 15 is preferably higher than that adapted to be used and, consequently, a conventional pressure regulator 16 is connected to said conduit. A valve 17 is connected between the pressure regulator and conduit 14 and controls the passage of air through said conduit.

As has been hereinbefore described, conduit 14 connects into container 13, said conduit connecting into the block 18 mounted upon the cover 19 of the container. A recess 20 is provided in the block 18 and a needle valve 21 controls the passage of air from conduit 14 through recess 20, the needle valve 21 being provided with a knurled head 22 whereby the same may be manipulated. A rotor 23 mounted upon shaft 24 may depend from cover 19 into the interior of container 13, shaft 24 being provided with a recess or bore 25 which may comprise a continuation of the recess 20. Rotor 23 may be substantially cylindrical in construction and is adapted to rotate upon shaft 24. Rotor 23 is provided with a plurality of radially extending bores 26 which discharge at the exterior or peripheral surface of the rotor 23. The bore 25 in shaft 24 connects with a bore 27 in rotor 23, said latter bore being also in communication with the bores 26. The bores 26 are so constructed that when air under pressure is passed from conduit 14 to the rotor bores, the rotor is revolved by the reaction of the air being discharged at the periphery of the rotor.

Container 13 is adapted to carry a quantity of finely divided material 30, hereinafter referred to as protecting agent. Clamps 31 may be swingably mounted upon the walls of container 13, said clamps being U-shaped and being adapted to extend over the cover 19 when the cover is in closure position. Screws 32 having slotted heads (not shown) are threaded into the arms of clamps 31 and are adapted to bear, at their lower ends, upon cover 19. Winged nuts 33 threadedly engage screws 32.

Block 18 may also be provided with a bore 34 which is in communication with conduit 14. A flexible conduit 35 connects with bore 34 at one end and is connected at the opposite end to the gun or nozzle 11. A conduit 36 also connected to the gun or nozzle 11 connects into the top of the container 13, said conduit terminating within the interior of the container 13 in fitting 37.

The arrangement is such that when valve 17 is opened, air under pressure passes through conduit 14 to block 18. Here the air stream is divided, a portion passing through bore 34 and conduit 35 to the gun 11 and a portion being passed downwardly through bores 20 and 25 to the interior of the rotor 23. The air discharged from the bores 26 in rotor 23 cause said rotor to rotate. A portion of the air is discharged from the bottom of the rotor through conduits 28 and 29, and said air stream thus discharged impinges upon upper surface of the protecting agent 30 within container 13 and agitates the same. As a consequence, a quantity of the protecting agent is thrown upwardly into the atmosphere above the bulk supply 30 and the space within the container above the bulk supply 30 carries a cloud of finely divided protecting agent in suspension in the air. As the air is discharged through conduit 35 and out of the gun 11, the suspended finely divided protecting agent is also passed through the conduit 36 and discharged in company with the air from nozzle 11. In this manner finely divided protecting agent is discharged in an air suspension upon the uppermost sheet 3 of the stack 10.

Valve 17 may be of the conventional solenoid operated type and the solenoid may be connected by means of leads 38 to a switch 39 which may be carried upon a portion of the printing press. Switch 39 is not shown in Fig. 1 but the same may be positioned at any portion of the printing press and may be actuated to periodically open valve 17 in timed relation with the passage of printed sheets so that when the printed sheet 3 is discharged upon the stack 10, valve 17 will be opened for a predetermined period of time sufficient to discharge a proper amount of protecting agent upon the freshly printed surface of the uppermost sheet on the stack.

As a possible manner of actuating valve 17 the switch 39 may be provided with a rockable arm 40 which is normally maintained in "off" position by means of the coil spring 41. One of the conveyor belts 4 may carry cam shaped lugs 42 which, during movement of the conveyor belt, contact arm 40 and rock the same to "on" position. It can readily be seen that during the period that either of the lugs 42 contact arm 40, the solenoid in valve 17 will be energized to open said valve and permit air to be discharged into the container 13 whereby protecting agent is discharged from the nozzle 11.

As has been hereinbefore pointed out the protecting agent comprises a finely divided solid material which is preferably of a size in the neighborhood of 200 to 325 mesh. It can readily be seen that when said material is discharged from the nozzle 11, depending upon the particle size, it may form a cloud immediately above the table 8. This cloud, if the material is of small particle size, gradually settles upon the freshly printed

surface of the uppermost sheet in the stack 10 uniformly distributing the particles over the freshly printed surface. However, if the particles are relatively large, or it is not desired to form the cloud above the printed sheet or web, the material may be directly discharged upon the printed surface. This latter procedure is particularly preferable when the process is used with continuously passing webs as in the case of rotary presses.

My process may be so operated, by properly timing the passage of printed sheets to the table 8 and corelating said passage with the discharge of the nozzle 11 that a freshly printed sheet 3 may be discharged upon the stack 10 while the cloud of protecting agent still hovers above the uppermost sheet of the stack 10. This period of operation is illustrated in Fig. 2 and it will be observed that the sheet 3 upon the conveyor 4 is being projected over the cloud 43 which has not had time to completely settle upon the sheet 3 at the top of the stack 10. Consequently the protecting agent comprising the cloud 43 will be trapped beneath the advancing sheet 3 and the uppermost sheet 3 in the stack 10, thereby permitting of exceedingly rapid discharge of the sheets 3. In other words, the printing press may be operated at an exceedingly rapid rate and yet a suitable quantity of protecting agent will be uniformly distributed on the freshly printed surface of each sheet.

Referring particularly to Fig. 3 a different positioning of nozzle 11 is illustrated. In this manner of carrying out my invention the nozzle 11 discharges while the sheet 3 is on the conveyor and before it is deposited upon the table 8. In other words, my invention contemplates distributing the protecting agent upon the freshly printed sheet either when it is finally positioned upon the stack 10 and is stationary, or while it is moving. In either case the action of the protecting agent is substantially the same. Obviously the period of discharge of the nozzle 11 in each case must be corelated so as to discharge a suitable quantity of protecting agent upon the printed surface at the proper time. In the case of continuous web operation the nozzle is so controlled as to operate continuously.

The proportion of protecting agent discharged from the nozzle 11 may be regulated by the needle valve 21. It can readily be seen that the stream of air passed through conduit 14 is divided within the block 18, a portion of said air being passed through conduit 35 and a portion being introduced into the interior of the container 13. If the needle valve 21 is so manipulated as to restrict the bore 20, the proportion of air to protecting agent will be increased. If the needle valve 21 is so manipulated as to offer no obstruction to the air passing through the bore 20, the proportion of protecting agent to air will be relatively increased.

The protecting agent employed in my process comprises in general any finely divided solid material which has no detrimental effect upon the printed sheet, that is, the ink, the paper or the printing quality. Moreover, it is desirable that the material be substantially inert and noncorrosive. The particle size of the material is smaller than approximately 75 mesh and is preferably such as will pass a 325 mesh screen. Many materials may be used as protecting agent such as, clay or other minerals, calcium carbonate, aluminum hydrate, French chalk, barium sulphate, titanium oxides, calcium and magnesium sulphate, magnesium carbonate, whiting, barytes, barium sulphate, blanc fixe, lithopone, zinc oxide, zine sulphide, ponouth, Beckton white, china clay, talc and all inert silicates. Preferably, a mixture of approximately equal parts of precipitated calcium carbonate and starch is employed. Precipitated calcium carbonate or French chalk has a relatively low specific gravity and is also deficient in covering power, that is, it is less opaque. If desired, whiting may be substituted for the precipitated calcium carbonate. Of course, other materials may be used such as substantially all starches, for instance, those morphologically classified in the rice or potato group. Generally, those materials which are characterized by lack of covering power, that is, relatively transparent or translucent materials; inertness; having properties of specific gravity, particle size, etc., making their blowing feasible; and, of sufficiently large particle size as to effectively serve as a protecting agent.

When using the agitating arrangement shown and described an air pressure on the gun 11 of less than 25 pounds per square inch is desirable, the pressure preferably ranging in the neighborbood of five pounds per square inch but not materially less than two pounds per square inch. If mechanical agitation of the agent in the initial mixing container is used, that is, if revolving blades or the like are used to agitate the material 30, pressures higher than twenty-five pounds per square inch may be used.

It is to be understood, of course, that although the protecting agent is shown and described as being discharged downwardly upon the freshly inked surface, the discharge may be in an upwardly direction, that is, the sheet or web may be delivered or traveling with its printed face downwardly or the discharge may be made while the web or sheet is traveling vertical.

I claim as my invention:

1. A method of preventing offsetting of ink from a freshly printed sheet which comprises, maintaining a quantity of dry, finely divided protecting agent in an enclosed zone, introducing air under pressure to said enclosed zone to agitate said protecting agent and form a cloud of protecting agent suspended in air in said zone, passing said suspended protecting agent to a discharge, simultaneously passing air unimpregnated with suspending agent and under pressure through said discharge to serve as a carrier for said suspended protecting agent, and discharging said air-carried suspended protecting agent on to a freely printed surface.

2. A method of preventing offsetting of ink from a freshly printed sheet which comprises, maintaining a quantity of dry, finely divided protecting agent in an enclosed zone, introducing air under pressure to said enclosed zone, dividing said air and passing a portion thereof into said enclosed zone to agitate said protecting agent and form a cloud of protecting agent suspended in the air in said zone, discharging said protecting agent from said zone to the surface of a freshly printed sheet, and simultaneously discharging the remainder of the air passed to said zone in company with said suspended protecting agent to serve as a carrier therefor.

3. A method of preventing offsetting of ink from stacked freshly printed sheets which comprises, maintaining a quantity of dry finely divided protecting agent in an enclosed zone, passing air under a pressure greater than two pounds per square inch and preferably less than

twenty-five pounds per square inch to said zone, dividing said air and passing a portion thereof into said enclosed zone to agitate said protecting agent and form a cloud of protecting agent suspended in the air in said enclosed zone, discharging said protecting agent from said zone to the surface of a freshly printed sheet, and simultaneously discharging the remainder of the air passed to said zone in company with said suspended protecting agent to serve as a carrier therefor.

4. A method of preventing offsetting of ink from stacked freshly printed sheets which comprises, maintaining a quantity of dry finely divided protecting agent of a particle size smaller than 75 mesh and preferably in the neighborhood of 325 mesh in an enclosed zone, passing air under a pressure greater than two pounds per square inch and preferably less than twenty-five pounds per square inch to said zone, dividing said air and passing a portion thereof into said enclosed zone to agitate said protecting agent and form a cloud of protecting agent suspended in the air in said enclosed zone, discharging said protecting agent from said zone to the surface of a freshly printed sheet, and simultaneously discharging the remainder of the air passed to said zone in company with said suspended protecting agent to serve as a carrier therefor.

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