

April 11, 1939.

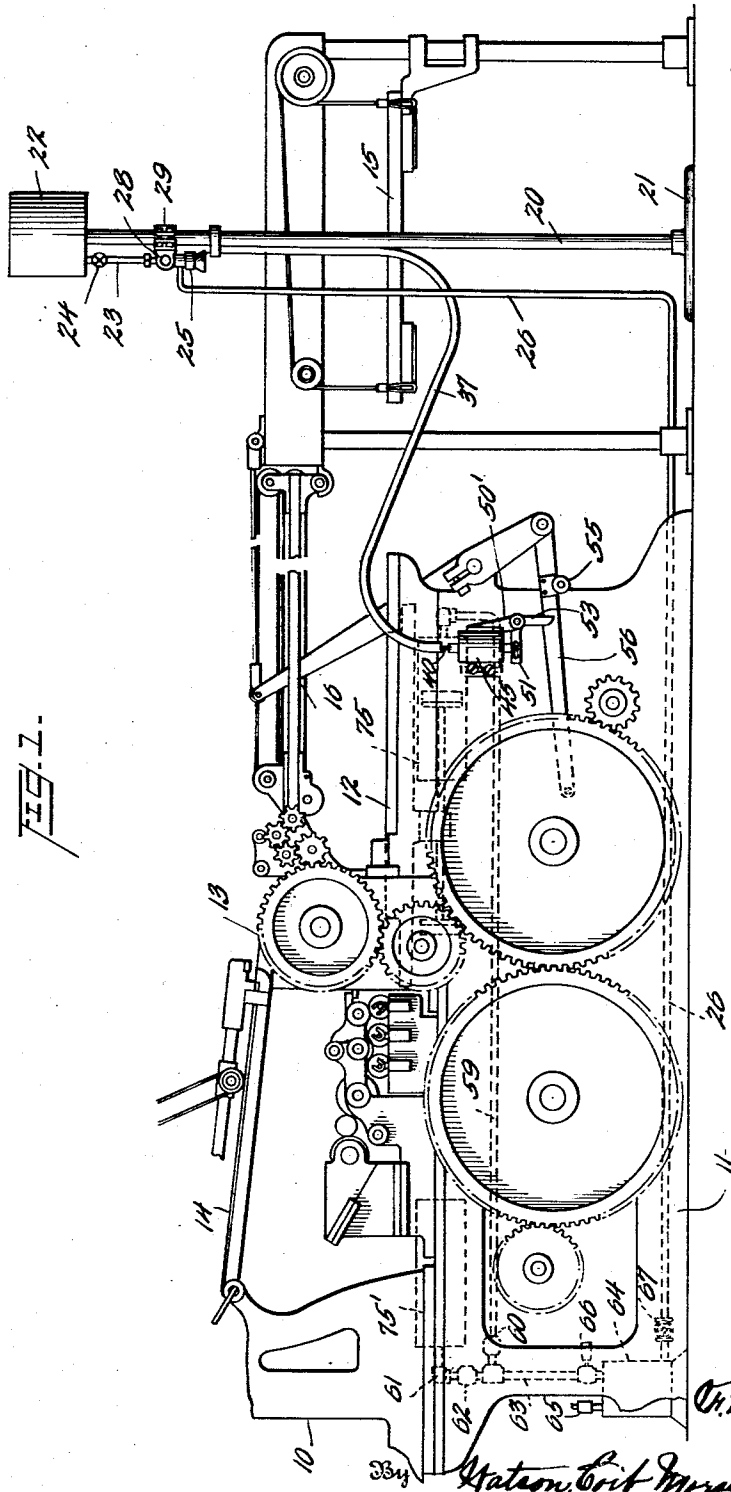
F. W. SEYBOLD

2,154,363

NONOFFSET SPRAYING DEVICE

Original Filed April 2, 1936

3 Sheets-Sheet 1



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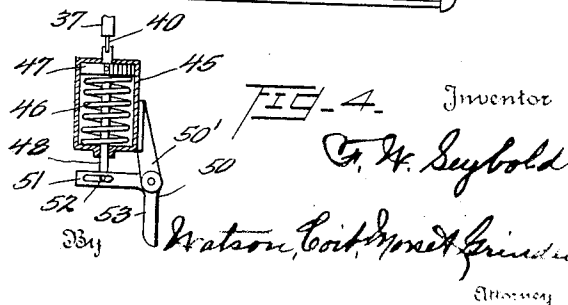
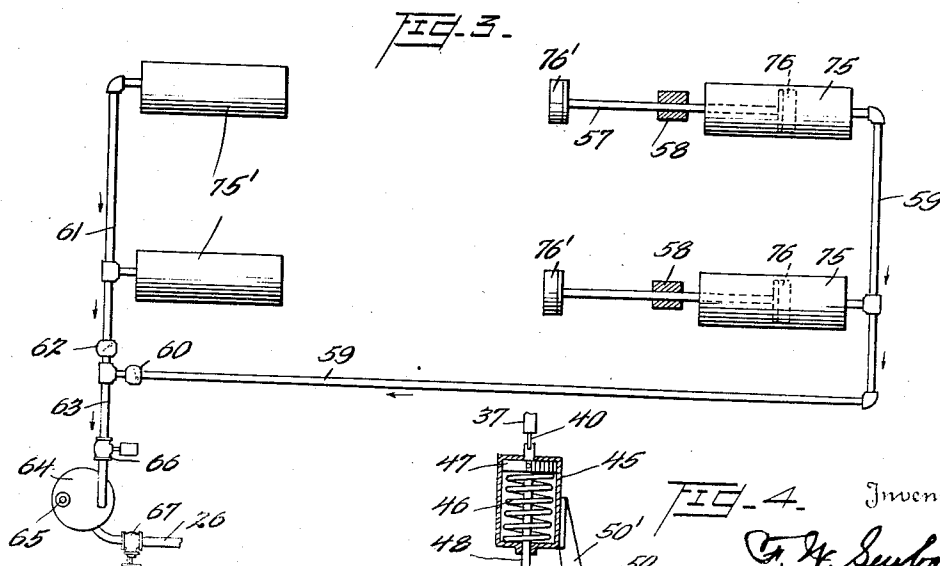
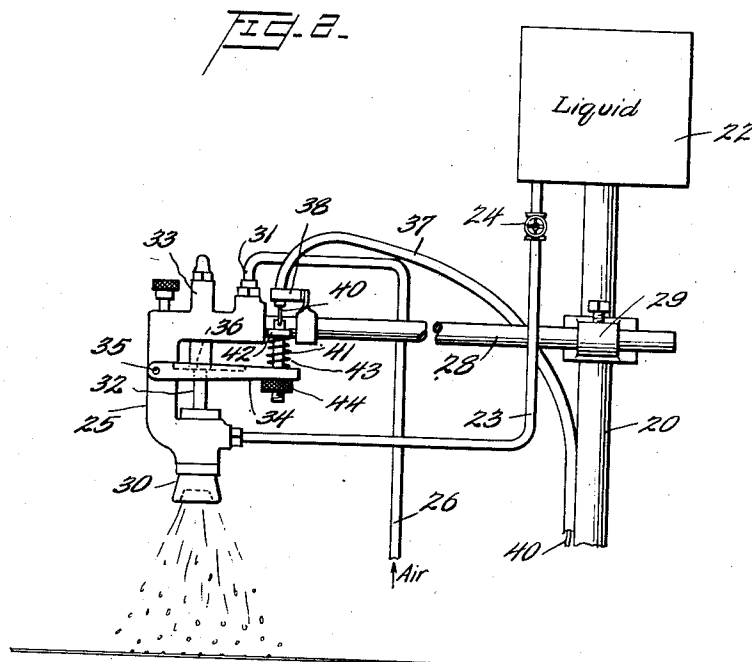
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NONOFFSET SPRAYING DEVICE

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3 Sheets-Sheet 2



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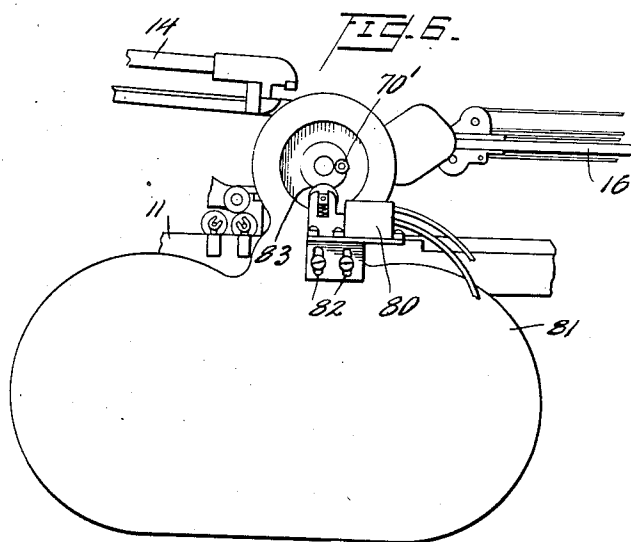
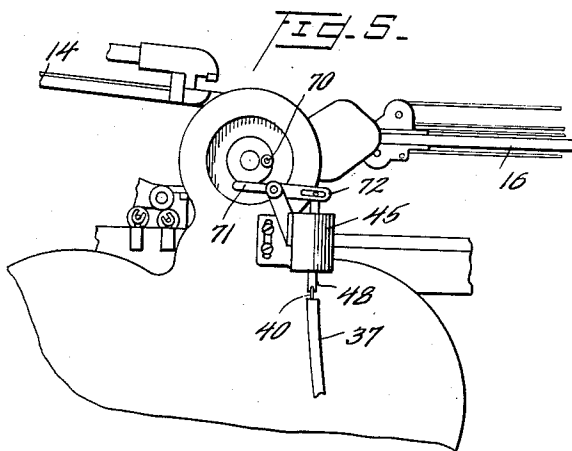
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NONOFFSET SPRAYING DEVICE

Original Filed April 2, 1936

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,154,363

NONOFFSET SPRAYING DEVICE

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Renewed February 6, 1939

8 Claims. (Cl. 101—416)

This invention relates to the art of printing, and more particularly to the elimination of off-setting of freshly printed sheets by the applica-
tion to each sheet, immediately following its
5 printing, of a material serving to space the sheet sufficiently from the following sheet, which is superimposed upon it, to prevent sticking and/or smutting of the ink.

It is a general object of the present invention
10 to provide novel and improved equipment for the application of anti-offset material.

More particularly it is an object of the invention to provide simplified spraying or atomizing equipment for the discharge of anti-offset liquid
15 toward a freshly printed sheet.

An important feature of the invention resides in the provision of a spray nozzle mounted to direct atomized anti-offset liquid toward a freshly printed sheet together with novel means for periodically initiating the spray of liquid and atomizing compressed air in synchronism with the operation of the paper delivering means on the printing press.

The second feature of the invention resides in the arrangement of apparatus for controlling the atomizer valves so that anti-offset liquid is supplied only when a sheet is delivered from the press and the spraying equipment is automatically prevented from functioning when sheets are not
30 being printed even though the press may be in operation or idling.

A further and important feature of the invention resides in the manner of automatically compressing the air, required for atomizing the anti-
35 offset liquid, as a result of a normal operation of the printing press.

Another feature of the invention resides in the use of air for atomizing the anti-offset liquid which is compressed by the cushioning means
40 for absorbing the shock of reversal of direction of movement of the press bed.

Other and further objects and features of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawings and following specification wherein is disclosed a single exemplary embodiment of the whole invention with alternative forms of nozzle valve control, the understanding being that the disclosure is only for purposes of
50 explanation and that such changes may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawings:

55 Figure 1 is a side elevation of a conventional

form of two-revolution-type flat bed and cylinder press equipped with apparatus in accordance with the present invention;

Figure 2 is a fragmentary detail on enlarged scale of the spray nozzle, liquid reservoir and
5 control valves;

Figure 3 is a schematic lay-out of the cushion cylinders for the press bed and the piping and tank arrangement for compressing air;

Figure 4 is a detail on an enlarged scale of the
10 control cable operating device;

Figure 5 is a fragmentary side elevation of the printing press of Figure 1 showing a further form of control cable operating mechanism; and

Figure 6 is a view similar to Figure 5 showing
15 the press arranged to electrically control the valves of the atomizer.

Modern printing presses whether equipped for single or multi-color impressions are seriously hampered in their operation and limited in their speed because of a common trouble known as smutting or offsetting. The sheets delivered from the conventional bed and cylinder type of press are piled one upon the other with the printed surface uppermost. If they are delivered too rapidly, the ink on each impression is insufficiently dried by the time the next sheet is deposited on top of it, and sticking, smutting or offsetting occurs. Printers have resorted to various means to overcome this difficulty, and one of the most common is the use of slip sheets which are interposed between successive printed sheets and are provided with such a surface as to prevent sticking and smutting between the im-
20 pressed sheet and the following slip sheet. These sheets are expensive, cumbersome to use, and must be removed from the pile of printed sheets before they can be further treated as, for instance, printed with a second color, cut, folded or otherwise operated on. Sometimes, heating means are
25 employed to dry the ink more rapidly, or the ink is thinned with a more volatile solvent. All of these make-shift methods have their drawbacks and in every case the potential speed of the press is not fully available.

It has heretofore been suggested that a liquid be sprayed on the freshly printed sheet which will either dry the ink or space the following sheet sufficiently therefrom to prevent offsetting. The patent to Grammer, 1,445,273, February 13,
30 1923, discloses the use of molten paraffin for this purpose, the material being atomized at such a distance from the sheet that the extremely fine particles are substantially cold and solid by the time they reach the sheet. These fine particles
35 40 45 50 55

are of sufficient diameter to separate successive sheets and prevent offsetting. It has more recently been proposed to substitute for waxes, which are inconvenient to use, a liquid comprising a highly volatile solvent carrying in solution a suitable solid matter. The solvent evaporates in its travel from the spray nozzle to the sheet and there is deposited on the sheet a dust-like layer of fine particles of the solid material serving to space the sheets and being of such a nature as to be dissolved in any subsequent ink applied to the sheet so as to have no deleterious effect on any further treatment which the sheets may require. It is for the application of such a liquid that the apparatus of the present invention has been devised. A preferred liquid consists of a solution of gum arabic in alcohol.

Reference should now be had to the drawings for a further consideration of the invention. In Figure 1 a printing press 10 is shown which is of conventional construction and includes a frame 11, a reciprocating bed structure 12, a rotary impression cylinder 13, a feed board 14, an automatically lowering delivery table or pile board 15, and delivery mechanism 16, all suitably driven from a source of power, not shown, through the gearing and other mechanism, partially shown in the drawing, in a manner well-known. In this type of press, sheets are fed from the feed board 14 on to the surface of the impression cylinder 13 where their forward edges are successively grasped by grippers on the cylinder and the sheet is moved around the cylinder and pressed by it against the printing surface carried on the reciprocating bed 12. By the time the bed has reached the end of its stroke in the printing direction, the impression cylinder has made about one full revolution and the grippers release the paper.

On the return stroke of the bed, the impression cylinder is automatically elevated by a suitable mechanism to prevent contact between the cylinder, which continues to rotate in the same direction, and the returning bed. The second complete revolution of the cylinder discharges the sheet to the delivery mechanism 16 which carries it forward and deposits it on the pile board 15 which is gradually lowered as the pile of sheets builds up to maintain the upper surface of the pile at a suitable level for receiving the freshly printed sheets.

In order to prevent offsetting of the newly printed sheet by the one following which is deposited on top of it, an anti-offset liquid is sprayed on to the freshly printed sheet sometime between its discharge from the impression cylinder 13 and the deposit of the next sheet on the pile board 15. It makes but little difference when the spraying is done; while the sheet is moving off of the impression roller, while it is being fed forward by the tapes or other delivery means, or after it is stationary on the pile.

For convenience, the present invention shows the spraying equipment mounted to direct atomized liquid toward the sheet after it has been deposited on the pile. For this purpose, it is preferred to have a portable apparatus which can be used with various presses. The major portion of the apparatus is therefore mounted on a vertical standard 20, supported by a base 21. The standard extends beside the table 15 and to a height considerably above it and supports at its top a tank or reservoir 22 to contain a suitable supply of anti-offset liquid which is fed by gravity through pipe 23, under con-

trol of valve 24, to the spraying apparatus 25, although it is contemplated mounting the tank at a lower level if desired, and elevating the liquid by the application of air pressure to the surface of that in the tank.

Air under pressure is supplied through pipe 26 which also leads to the spray equipment 25 and serves to atomize the liquid.

The spraying equipment is shown in detail in Figure 2 and is supported by a laterally extending arm 28 which is held by clamp 29 to the standard 20, provision being made for both vertical and lateral adjustment so that the spray nozzle can be centered over the sheet on the pile and can be adjusted in height in accordance with the divergence required to cover the area of the particular sheet being printed.

The spray device or head proper is constructed according to more or less conventional form similar to that used for spraying paint, insecticides and the like. In such a device, the liquid is supplied adjacent the nozzle 30 from the pipe 23 and the air is supplied at 31. Both the air and the liquid are conducted, through suitable passages, to the nozzle where the liquid is picked up by the compressed air, and finely divided and discharged from the nozzle as a mist. Suitable means in the spray head are provided to regulate the ratio of air to liquid and in addition a pair of valves jointly under the control of the rod 32 may cut off completely the flow of the two fluids. The rod is maintained in a forward position by a spring housed in the chamber 33 and is retracted to open the valves by a trigger-like arm 34 pivoted to the frame of the spray head at 35 and engaging a shoulder on the rod 32 at 36.

In the preferred embodiment this trigger arm is moved in an upward direction as viewed in Figure 2 by mechanical means, conveniently a sheathed cable or Bowden wire 37. The end of the sheath is attached to the arm 28 by a clamp 38 and the cable or wire 40 is attached to a rod 41 the threaded lower end of which passes through the arm 34 and adjustably receives a knurled nut 44, which engages under the arm. The upper portion of the rod 41 moves in a guide 42 secured to the arm 28 and a spring 43 interposed between this guide and the rear face of the trigger arm 34 maintains the arm in contact with the knurled nut 44.

The opposite end of the flexible control cable 37 is attached to a device such as shown in Figure 4 which includes a barrel 45 housing a spring 46 engaged between the bottom head of the barrel and the piston 47 on the rod 48 slidably extending through both heads of the barrel and having its upper end attached to the cable 40. The barrel is suitably secured to a stationary part of the press. The lower end of the rod 48 is arranged to be drawn downwardly, or in direction to pull the cable, by suitable mechanism operated by the press. As shown in Figures 1 and 4, this comprises a bell crank lever 50, fulcrumed on arm 50' secured to barrel 45, a slotted arm 51 of which extends substantially at right angles to the rod 48 and receives the pin 52 thereon for connecting the two together. The other arm 53 of the bell crank lever is positioned in the way of a roller 55 on the pitman 56 connecting one of the large gears of the press to a part of the paper delivery mechanism. This roller is so positioned as to engage the arm 53 shortly after a sheet of paper has been deposited on the pile board 15, so that a brief operation of

the spray device is effected and the offset material is applied to the sheet to prepare it for the reception of the next one. Return of the cable 40 and arm 53 is effected by the spring 46 and if desired the rate of return may be regulated by the dashpot action of the piston 47 or by other adjustable dashpot mechanism if this is found necessary in order to prolong the period of spraying.

A continuous supply of compressed air of substantially uniform pressure is required for the operation of the spray equipment and while this may be taken from any suitable source, it is highly convenient and economical to compress the air as a result of one of the normal functions of the press. Most reciprocating bed presses are equipped with means to cushion the bed at the end of its stroke and to assist in starting it on the return stroke. Most of these devices comprise one or more cylinders fixed to the frame of the press for each end of the bed, which cylinders receive pistons movable with the bed as the bed approaches the ends of its stroke.

Figure 3 shows schematically such an arrangement in which a pair of cylinders 75 are arranged at one end of the press and a second pair 75' at the other end of the press. The pistons 76 cooperate with the cylinders 75 and the piston 76' with the cylinders 75'. These pistons are arranged in pairs on rods 57 secured to portions 58 under the press bed. The pistons are shown received in the cylinders 75 and compressing the air in the outer ends thereof. These ends are connected by a pipe 59 to a check valve 60 while the opposite set of cylinders is connected by pipe 61 to a check valve 62. The check valves 60 and 62 open away from the cylinders permitting air to be discharged through the pipes 59 and 61 from the cylinders but not toward them. A pipe 63 and suitable couplings connect the check valves 60 and 62 to the reservoir or tank 64 for the air compressed by the pistons.

The tank is conveniently located in respect to the press as shown in Figure 1 and is provided with an adjustable relief valve 65 arranged to blow off at a pressure determined as suitable for the operation of the spraying equipment. It may be desirable in connection with this arrangement of parts to introduce a valve 66 in the pipe 63 which is adjustable for opening pressure in order to insure sufficient resistance to the bed cushions in the event of an empty reservoir, so that they may perform their functions satisfactorily. Air is led from the tank 64 through the valve 67 to the pipe 26 leading to the spray equipment. In operation sufficient air is built up in the tank after a few operations of the press bed to provide for the operation of the spray equipment and such pressure is maintained throughout the operation of the press.

An alternative arrangement for operating the valves of the spraying device is shown in Figure 5. The equipment is substantially the same as in Figure 1 but instead of being associated with the pitman 56 or some other portion of the delivery mechanism of the press, arrangement is made to operate the cable directly from the impression cylinder. It is obvious that the operation may be from any portion of the press which is suitably timed to spray each sheet. In the construction of Figure 5 a roller 70 is journaled on a stud mounted on one end of the impression cylinder preferably on a radius leading from the center of the gripper portion of the cylinder. When this roller is near the bottom of its path it engages

the arm 71 of the two arm lever 72 and actuates the cable pulling mechanism of the same type described in connection with Figure 4. This position of the operating roller is a particularly happy one since it enables entire automatic control of the spraying. It is often desirable to operate the press without printing in making it ready for a run or maybe for adjustment purposes. During this type of operation, which is conveniently referred to as idling, the impression cylinder is "thrown off", i. e., it is lifted sufficiently high to be out of contact with the bed or any type thereon. This lifting is sufficient to prevent contact between the roller 70 and the lever arm 71 so that no spraying takes place during this idling and no auxiliary control is required to stop such spraying. Furthermore, even though the impression cylinder makes two revolutions for each printed sheet delivered, on only one of these revolutions is it in the impression position and the other is with the cylinder lifted so that the roller does not contact the lever arm.

In cases where it is desired to substitute some other operating mechanism for the mechanical one shown, resort may be made to a solenoid or other magnet for operating the trigger arm of the spray device and controlling the flow of current to the same by a switch closed periodically by some portion of the printing press. In Figure 6 a switch 80 is shown suitably mounted on the gear cover 81 in the manner of the mounting of the cylinder 45 in Figure 5. The switch is actuated by the cooperation of the roller 70' carried by the impression cylinder and the roller 83 forming a portion of the switch mechanism. Adjusting slots 82 are shown to vertically position the roller 83 to be engaged only on the impression revolution of the cylinder. A similar adjustment can be provided for the barrel 45 in Figure 5.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. Anti-offset printing apparatus comprising a bed and cylinder press, an air cushion cylinder supported at each end of the press and each adapted to cooperate with a piston on its end of the bed, an air tank, a pipe from each cylinder to said tank, a check valve in each pipe opening toward said tank, a relief valve on said tank, a spray nozzle directed to deliver anti-offset liquid toward a sheet freshly printed by said press, means connecting said air reservoir and nozzle to deliver air for atomizing the liquid, valves adjacent said nozzle to control the flow of air and liquid thereto, a controller adjacent the press cylinder, means on the cylinder to actuate the controller once per revolution, and a connection from said controller to said valves to operate the valves with the rotations of the press cylinder.

2. Anti-offset printing apparatus comprising in combination, a printing press of the bed and rotary cylinder type; a spray nozzle adapted to be mounted to deliver anti-offset liquid toward a sheet freshly printed by said press, a source of liquid and of compressed air for said nozzle, valves for said liquid and air, means for actuating said valves, control apparatus for said means and an operator on said press cylinder adapted to engage and operate said control apparatus only as the cylinder is rotated on impression.

3. Anti-offset printing apparatus comprising in combination, a printing press of the bed and rotary cylinder type, said cylinder being equipped for impression and throw-off positioning, a spray nozzle adapted to be mounted to deliver anti-off-

set liquid toward a sheet freshly printed by said press, a source of liquid and of compressed air for said nozzle, valves for said liquid and air, means for actuating said valves, control apparatus for said means and an operator on said press cylinder adapted to engage and operate said control apparatus as the cylinder is rotated, said operator and control apparatus being so positioned that they contact momentarily once per revolution only when the cylinder is in impression position.

4. Control apparatus for anti-offset spray equipment comprising the impression cylinder of a bed and rotary cylinder press, means to throw off said cylinder except on impression rotations, a stud extending eccentrically from one end of said cylinder, a control device adapted to be momentarily engaged by said stud as the cylinder rotates on impression, said device being so located that no engagement with the stud occurs when the press cylinder is thrown off.

5. Anti-offset printing apparatus comprising in combination, a printing press of the bed and rotary cylinder type, said cylinder being equipped for impression and throw-off positioning, a spray nozzle adapted to be mounted to deliver anti-offset liquid toward a sheet freshly printed by said press, a source of liquid and of compressed air for said nozzle, valves for said liquid and air, means for actuating said valves, including a flexible sheathed cable, a barrel secured to the sheath of the cable at the end remote from the said valves, a rod secured to said cable and slidable in said barrel, means mounting said barrel beneath the end of said cylinder, a stud on said cylinder positioned to actuate said rod only when the cylinder rotates in impression position.

6. Anti-offset printing apparatus comprising in combination, a printing press of the bed and rotary cylinder type, said cylinder being equipped for impression and throw-off positioning, a spray nozzle adapted to be mounted to deliver anti-offset liquid toward a sheet freshly printed by said

press, a source of liquid and of compressed air for said nozzle, valves for said liquid and air, means for actuating said valves, including a flexible sheathed cable, a barrel secured to the sheath of the cable at the end remote from the said valves, a rod secured to said cable and slidable in said barrel, means mounting said barrel beneath the end of said cylinder, a stud on said cylinder positioned to actuate said rod momentarily once per revolution only when the cylinder rotates in impression position.

7. Anti-offset printing apparatus comprising in combination, a printing press of the bed and rotary cylinder type, said cylinder being equipped for impression and throw-off positioning, a spray nozzle adapted to be mounted to deliver anti-offset liquid toward a sheet freshly printed by said press, a source of liquid and of compressed air for said nozzle, valves for said liquid and air, means for actuating said valves, including a flexible sheathed cable, a barrel secured to the sheath of the cable at the end remote from the said valves, a rod secured to said cable and slidable in said barrel, means mounting said barrel beneath the end of said cylinder, a stud on said cylinder positioned to actuate said rod only when the cylinder rotates in impression position, a spring in said barrel to return said rod and cable after actuation, and means associated with said cylinder and rod to regulate the rate of return.

8. Control apparatus for auxiliary printing press equipment adapted for operation in synchronism with any repetitive press operation comprising the impression cylinder of a bed and rotary cylinder press, means to lift said cylinder except on impression rotations, a member eccentrically fixed on said cylinder, a control device positioned for actuation by said member once per impression revolution of the cylinder, said device being so positioned that no actuation takes place during lifted rotation of the cylinder.

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