UNITED STATES PATENT OFFICE.

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SHEET-DELIVERY APPARATUS.


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To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Sheet-Delivery Apparatus, of which the following is a specification.

The present invention relates to sheet-delivery apparatus for that class of machines commonly known as "back-and-cylinder printing-presses," and has for its object the delivery of the printed sheets with the freshly-printed sides uppermost, the simplification of the construction and operation of the mechanism, and other objects, as will hereinafter appear.

To these ends the invention includes combinations of devices hereinafter described, and more fully pointed out in the claims concluding this specification.

The preferred form of the present invention is illustrated in the accompanying drawings, forming part thereof, in which—

Fig. 1 is a side elevation of part of a machine in which the invention is embodied. Fig. 2 is a partial plan view of the machine shown in Fig. 1. Fig. 3 is a view, partly in section looking toward the impression-cylinder, of the sheet-support shown in Fig. 1 and operating mechanism therefor. Fig. 4 is a view from the end of the delivery-board, showing adjustable stops and guides for the sheets. Fig. 5 is a plan view showing the support and other parts in positions different from those shown in Fig. 2 and parts being omitted for the sake of clearness. Fig. 6 is a detail view, partly in section.

The impression-cylinder and the type-bed may be of any usual or suitable construction and may be operated in any of the usual ways. Hence no mechanism for operating them is shown nor will such mechanism be described. The sheets may be delivered directly or indirectly from the cylinder upon the extensible collapsible sheet-support C. In the case shown the sheets are delivered indirectly by means of the endless tapes B, which run upon suitable rollers or pulleys 20, which are driven from the impression-cylinder or other part of the machine. A set of guide-fingers F may be employed in conjunction with the tapes B in the feeding of the sheets forward upon the sheet-support C. The support C may be in the form of a fabric or a set of discontinuous tapes fast at one end to the bar K and at the other end to the roller D. In that form of the invention illustrated in the drawings the roller D is hollow and is loosely mounted upon a shaft M which is journaled in boxes V on the travelers v, running upon the racks O through the medium of the rollers m. These rollers m bear upon the racks O, which are fast to the framework of the machine. The shaft M is provided with pinions N at its ends, which mesh with the racks O, above named, and at one end with a pinion P, which is in mesh with a movable rack R. The rack R is suitably guided on the frame of the machine and is wide enough to mesh with the pinion S, fast on the short shaft r, which is journaled in the frame. The pinion P is less than the pinion N in diameter or size. The movable rack R exerts its power on the pinion P at a point between its axis of motion and the point where pinion N at that side meshes with the rack O, thus causing the roller D to be moved out and in faster than the rack R. The shaft r is provided with a pinion S as Y, by means of which it is operated, as hereinafter set forth. The racks O extend from the point where the support C receives the sheets to near the roller W at the end of the machine. This roller W is loosely mounted upon the fixed stud a and is moved in the direction of the arrow by means of the spring X, which is coiled about the stud a loosely and has its ends fast to the roller W and to the framework of the machine. A ligament, as a tape U, is fast at one end to the roller W and at the other end to the roller D above named. The ligament U and the support C are fast to the roller D in such wise that one is wound upon the roller D as the other is wound off the same. In order to prevent the sheets from rising from the support C, a set of fixed guide-fingers G are employed, these fingers being borne by the bar b, which extends across the framework of the machine, being supported from the bar K by the arms d. A set of guide-fingers F are shown for use in conjunction with the tapes B for a like purpose. These guides F may be raised and
lowered as required about the shaft from which they are supported.

The rack R is reciprocated by means of the pinions S Y, the shaft r, the reciprocating rack T, which is suitably guided on the framework of the machine and meshes with the pinion Y, the bar e, connecting the rack T and the bell-lever Z, and the bar h, connecting the lever Z and the crank-arm q. The crank is rotated in proper time by gearing connecting it with the driving mechanism of the machine. (None of this is shown.) The rod e by preference is adjustably connected with the bell-lever Z, as by the arc-shaped slot 2, so that the distance between the center of motion of the lever and the point of connection of the rod may be varied. The pin 3, which connects the rod e and the slotted lever, may be moved and held in position by means of the rod s, which is screw-threaded externally, v, and the hollow nut 5 and the hollow shaft 6, which carries the nut. The shaft is suitably swiveled in the bell-lever Z to swing in a vertical plane and is provided with a hand-wheel 7, whereby it is operated. The radius of the slot 2 is equal to the length of the rod or link e.

The delivery-board E is provided with adjustable stops H for the heads of the sheets. The stops H are pivoted to a board 9 at the points S, the said board being provided with T-heads 10, which engage under the lips or flanges 11 to the board E and overhang the edges of the grooves 12 therein. These grooves 12 (of which but one is shown) extend toward and from the impression-cylinder on the top of the board E. A spring 13, coiled about the axis 8 of the stop H, bears against the back of the stop H and on top of the board E and retains the stop in an upright position. The board E is also provided with adjustable side guides or stops J for the sides of the sheets, said guides being carried by the arms 14. (The guides J above or at one side of the machine are omitted from the drawings.) The arms 14 are provided with collars 15, with an upset screw hold on the rods 16, as by set-screws, the rods 16 being adjustably held by the perforated plate 17. These plates are adjustable transversely of the machine by means of the slots 19 therein and the headed tap-bolt 18 or by a nut instead of the head on said bolt.

The means shown in the drawings for adjusting the position of the pin or stud 3 along the slot 2 comprises an arm 31, projecting laterally from the lever Z, a bearing comprising two plates or blocks 32 33, secured to each other and having horizontal journals which engage with suitable bearings in the arm 31, a hollow shaft 6, having a flange held between the plates 32 33, whereby the shaft swivels in the bearing formed by said plates and the said plates pivot or hinge upon the arm 31, and a hand-wheel 7 on the shaft 6, with a nut 5, to which the shaft 6 is fixed to turn the nut, and a screw-threaded rod 4, which is pivotally connected with the stud or pin 3 to swing up and down and which engages with an internal thread of the nut 5. The distance of the pin or stud 3 from the axis of motion of the lever Z may be varied while the machine is working or in motion by turning the handle 7 and shaft 6, whereby the nut 5 will be turned to draw rod 4 into or to force it outward of the shaft and so to move the pin 3 toward or from the axis of motion of the lever Z and so to vary the throw of the rack T and the delivery.

The operation of the devices above described is as follows: The sheets are run out from the impression-cylinder onto the endless tapes B, which carry the sheets forward onto the discontinuous support C, which at this time is beginning to unroll from the roller D as the latter is carried outward or away from the impression-cylinder by the described mechanism. The roller D is moved at a rate of speed sufficient to keep the sheet from over-running the roller. As the support C is unwound from the roller D the ligament U is wound on the roller. It is understood, of course, that the ligament is at one side (edge) of the support out of the way of the sheets and does not overlap the support, or rather that the tape U shall not be in the path of the sheets, for it may overlap the support. The sheets are fed onto the support by the tapes B and the rollers 21, the latter being borne by the arms F, which are supported by the shaft 38 near the impression-cylinder. The shaft 25 may be and preferably is journaled in the frame, so that the guides F and rollers 21 (in case the guides F are fast to the shaft) may be lifted or swung up out of the way, or the guides F may be pivoted on the shaft (fixed in the framework) and be so lifted up or swung. After the roller D begins to return from its extreme position the sheets drop off head first onto the board E, being guided in so doing by the stops H and guides J and are thus piled evenly. The ligament U turns the roller D as the latter is drawn backward by the shaft M, thus winding up the support C while unwinding the tape U. The shaft M is moved bodily to and fro by means of the racks O R, the pinions S Y, rack T, rod e, bell-lever Z, rod H, and crank q, the last being driven in unison with the bed 25—that is, the crank q makes one complete revolution while the bed is making one complete excursion to and fro. The spring X takes up any slack in the support C, as will be understood.

The devices are shown in the positions they occupy when the sheets are of the maximum size the machine will print. When narrower sheets are printed, the stops J are adjusted toward the center of the board E. When shorter sheets are delivered, the stops H are adjusted toward the impression-cylinder, as are the guides J, and the pin 3 is moved toward the center of motion of the bell-lever Z by the described means.
Another feature of the invention is that the guides 26, which are borne by the shaft 27, are so arranged as not to interfere with the adjustment of the pulleys 25 transversely of the machine, as by set-screws 24, securing them to their shafts. The fingers F are adjustable transversely of the machine in order that the rollers 21 may always cooperate with the rollers 25 and feed the sheets forward.

The rollers 21 are borne by crank-arms which are pivoted to the fingers F and bear by their weight on rollers 25.

I remark that the roller D, the rack T, and the intermediate parts should be in the position shown in Fig. 1, and so, also, of the bell-crank Z, when the slot 2 is laid off, in order that adjustment of the distance of travel of the roller D for different-sized sheets may be made by turning the handle 7.

The guides G are movable or adjustable end-wise in the holders 30, which themselves are adjustable longitudinally and circumferentially of the shaft b.

It is obvious that the sheets may be run directly upon the support C, which in such case would be placed adjacent the impression-cylinder, thus dispensing with the tapes B and accessories.

It is immaterial what means be employed for reciprocating the roller D, as the described arrangement of the support and the ligament U suffice to rotate it.

It is obvious that many changes in the arrangement of parts, substitutions of equivalents, &c., may be made without departing from the spirit of the invention. Accordingly I do not limit myself to the form thereof shown in the drawings and hereinbefore described.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a sheet-delivery for printing-presses, the combination of a delivery-board, a roller, a discontinuous sheet-supporter connected at its ends to said roller and the framework of the machine, a ligament connected to said roller and the framework of the machine said roller being rotated by said support and said ligament, and mechanism for moving said roller bodily to and fro over the said board, substantially as described.

2. In a sheet-delivery for printing-presses, the combination of the delivery-board, a hollow roller, a discontinuous sheet-supporter connected at its ends to said roller and to the frame, said roller being rotated by said ligament and said support, a shaft within said hollow roller, pinsions N on said shaft, fixed racks O with which said pinsions mesh, and means for rotating the shaft, substantially as described.

3. In a sheet-delivery for printing-presses, the combination of the delivery-board, a roller moving to and fro above and over the board, the discontinuous sheet-supporter fast at its ends to said roller and the frame of the machine, and a roller-operating ligament fast at one end to said roller and connected at its other end to the frame of the machine, substantially as described.

4. In a sheet-delivery for printing-presses, the combination of a delivery-board, the hollow roller D, the supported to-and-fro-movable shaft M loose within said roller D, the large and small pinions N, P, on said shaft, the fixed and movable racks O and R meshing respectively with said pinions N and P and mechanism for reciprocating rack R, with a discontinuous sheet-supporter connected to the roller D and the framework, and a ligament connected to said roller D and the framework, substantially as described.

5. In a sheet-delivery for printing-presses, the combination of an extensible collapsible sheet-support, mechanism including a reciprocating roller T, for operating said support a connecting-rod pivoted to said rack, and a lever provided with a curved slot in which the other end of the rod is pivoted and adjustable the said slot being curved on a radius equal to the length of the rod, substantially as described.

6. In a sheet-delivery, the combination of a flexible sheet-supporter fast at one end to a fixed part of the machine, a to-and-fro-movable roller to which the other end of said supporter is fast, mechanism for moving said roller to and fro and rotating it while so doing, guides carried by the stationary framework of the machine and overlying said supporter to retain the sheets thereon, said supporter moving to and fro under said guides, and a delivery onto which the sheets fall as said supporter is rolled up from under them, substantially as described.

7. In a sheet-delivery for printing-presses, the combination of the delivery-board, a roller moving to and fro above and over the board, the discontinuous sheet-supporter connected at its ends to said roller and to the frame of the machine, guides overlying the supporter for retaining sheets thereon, and a ligament connected at its ends to said roller and to the frame for operating the roller substantially as described.

8. In a sheet-delivery, the combination of a to-and-fro-movable roller, a sheet-supporter connected to said roller and the framework, a roller W journaled on the framework, a spring connecting the roller W with the frame, and a ligament for connecting the roller W with the movable roller aforesaid, substantially as described.

9. The combination of a delivery-board stops for the sheets adjustable toward and from a delivery-roller, and a to-and-fro-moving delivery-roller the length of whose to-and-fro motion from the initial point is adjustable substantially as described.

10. The combination of an impression-cylinder the carrying-tapes B, guides and rollers above the tapes an extensible collapsible sheet-support means for varying the throw or to-and-fro motion of the support guide-
rods above the support and adjustable stops for the sheets on the delivery-table.

11. The combination of an impression-cylinder a reciprocating collapsible sheet-support means for rendering the support's motion adjustable as to its length from the receiving-point, and adjustable stops for regulating the distance the sheet travels substantially as described.

12. The combination of an impression-cylinder a reciprocating delivery adjustable as to the length of its stroke from the initial point, adjustable end stops for the sheets and side guides for the sheets adjustable in two directions substantially as described.

13. In a sheet-delivery, the combination of an impression-cylinder, a reciprocatory delivery-roller, and driving mechanism for said roller including a rack, a lever provided with a curved slot extending along said lever, and a rod adjustably connected with said slotted lever and also connected with said rack, and the radius of the curve of said slot being equal in length to said rod, substantially as described.

14. In a sheet-delivery the combination of the reciprocating delivery member and driving mechanism therefor including a lever provided with a curved slot the rod provided with the stud for engagement with said slot, the screw-threaded rod pivotally connected with said stud the nut and a hand-wheel on said rod whereby the distance of travel of the said delivery member may be regulated while the machine is in motion.

Signed at New York, in the county of New York and State of New York, this 18th day of May, A. D. 1897.

WALTER SCOTT.

Witnesses:

R. W. BARKLEY,

CHAS. A. BRODEN.