P. BIERI.

AUTOMATIC PAPER LAYER FOR PRINTING MACHINES.

APPLICATION FILED JULY 31, 1919.

1,331,977. Patented Feb. 24, 1920.

3 SHEETS—SHEET 1.

Fig. 1.

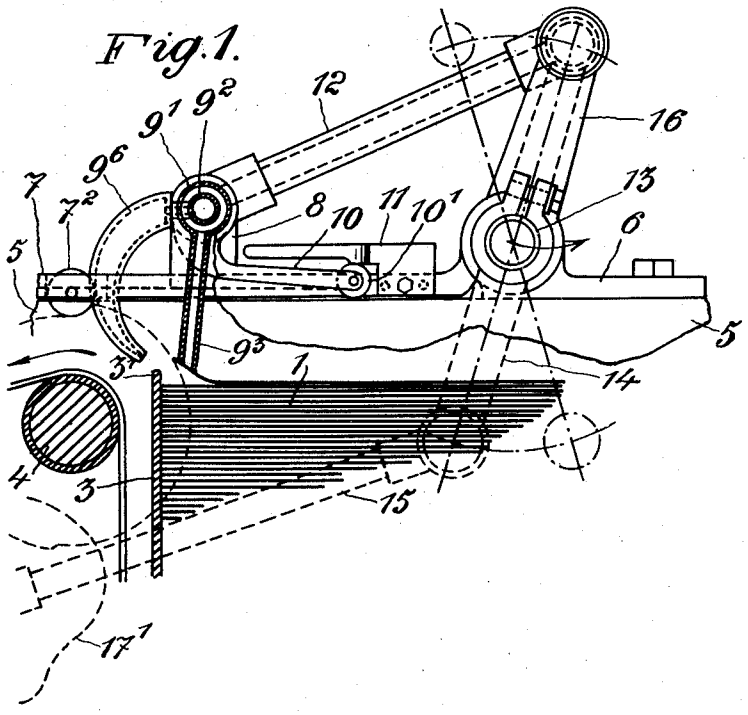
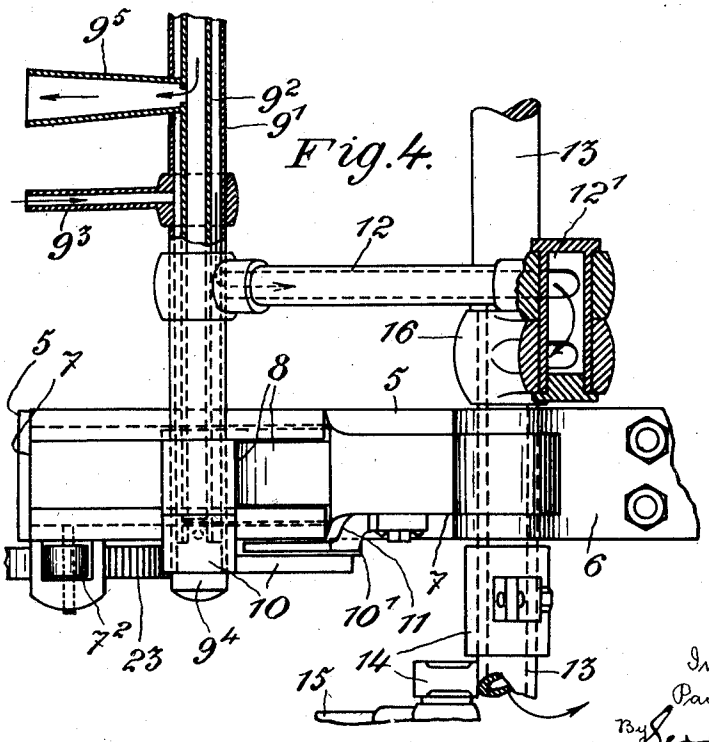


Fig. 4.



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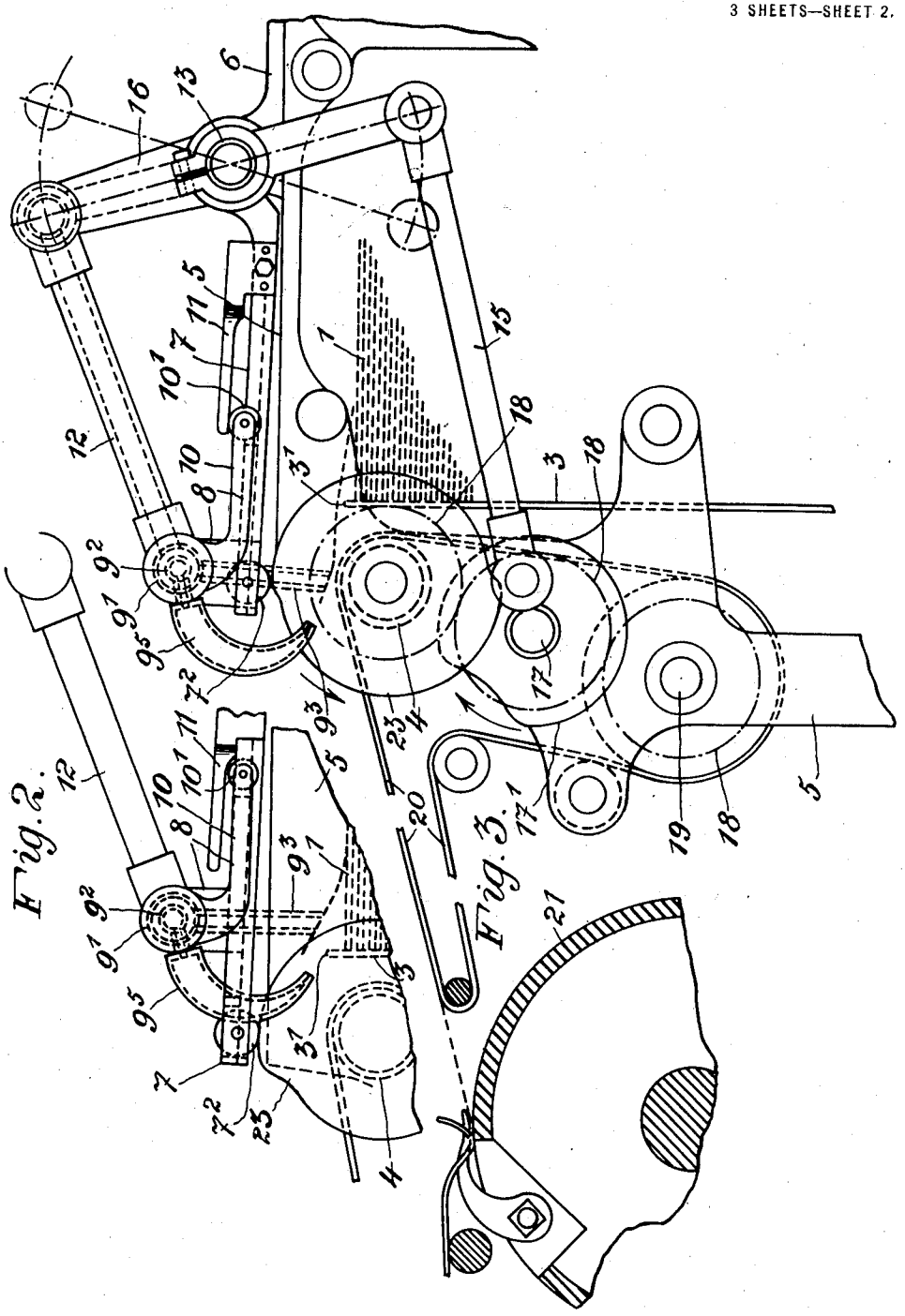


Fig. 2.

Fig. 3.

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3 SHEETS—SHEET 3.

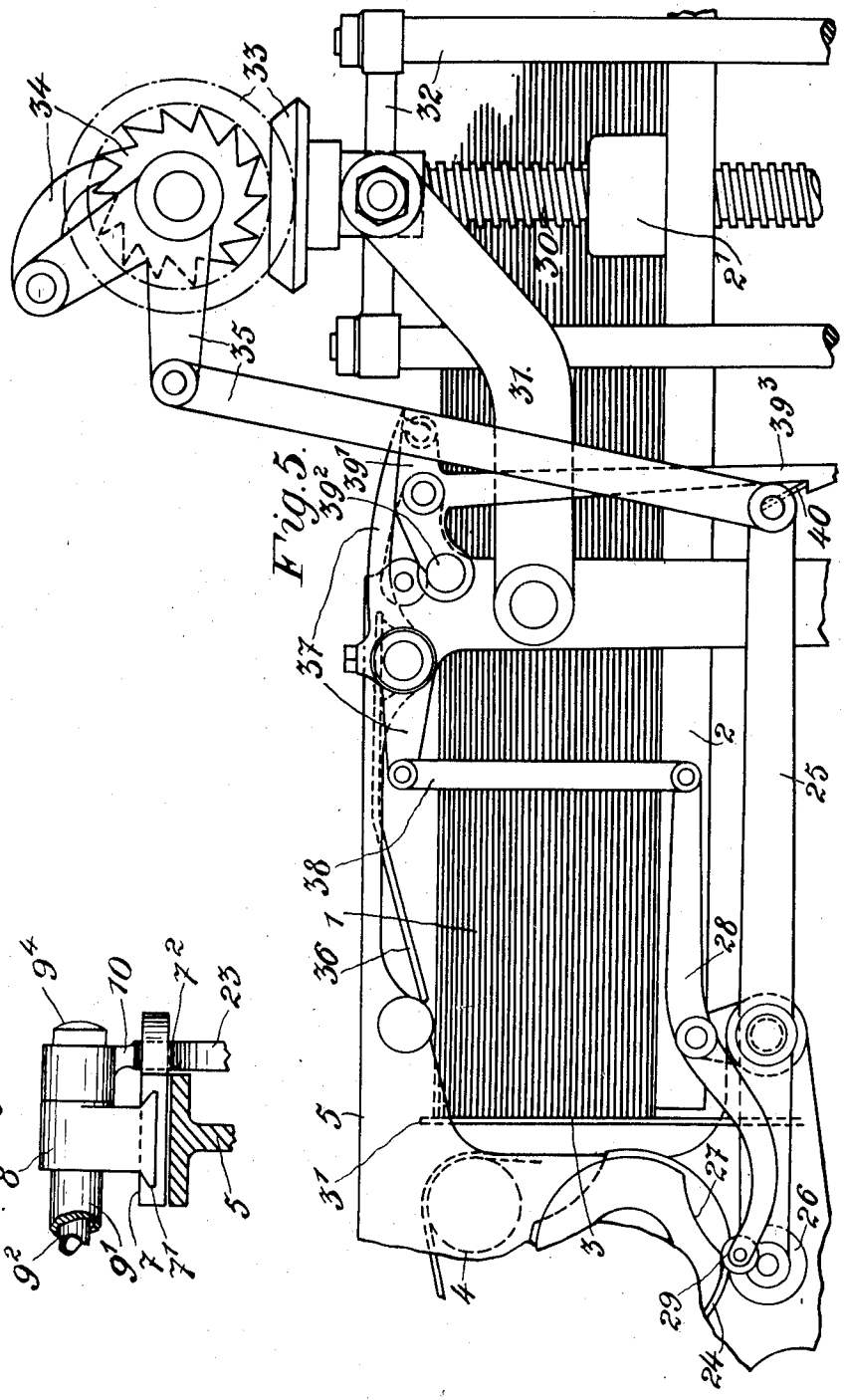


Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

PAUL BIERI, OF GENEVA, SWITZERLAND.

AUTOMATIC PAPER-LAYER FOR PRINTING-MACHINES.

1,331,977. Specification of Letters Patent. Patented Feb. 24, 1920.

Application filed July 31, 1919. Serial No. 314,435.

To all whom it may concern:

Be it known that I, PAUL BIERI, citizen of Switzerland, residing at 26 Rue des Bains, Geneva, in the Confederation of Switzerland, have invented certain new and useful Improvements in Automatic Paper-Layers for Printing-Machines, of which the following is a specification.

This invention relates to an automatic paper layer for printing machines, for lifting off the cut sheets from a table and lifting the said sheets over paper stop and placing them on a transport roller, and the invention comprises substantially a cross-bar intended to seize the paper and constituted by two tubes or pipes inserted into each other and provided with nozzles, one being a compressed air pipe and one a suction air pipe, the said cross-bar being supported in brackets, and moving parts driven from one and the same driving shaft and intended to impart to the cross-bar a horizontal swinging motion combined with a tipping motion, and to advance the paper table.

A construction according to the invention is illustrated by way of example in the accompanying drawing in which—

Figures 1–3 show three characteristic positions of the apparatus,

Fig. 1 showing in partial side elevation and section the lifting off of a paper sheet from the paper stop,

Fig. 2 shows in partial side elevation the carrying of the said sheet over the stop, and

Fig. 3, in partial side elevation, the placing of the said sheet on the transport device.

Fig. 4 is a plan, partly in section, of the parts shown in Figs. 1–3, the tubes or pipes of the cross-bar being turned so as to show the connections.

Fig. 5 shows in side elevation the operation of the paper stop by the same driving shaft as effects the paper transport or conveying.

Fig. 6 is an end view of a bracket of the cross-bar on the right hand side of the machine.

The general arrangement of the paper layer is the same as usual heretofore, the cut sheets 1 being placed in a properly arranged layer on a table 2 which is successively raised as the sheets are lifted off. When in position on the table the front edges of the sheet lie against a stop 3. The apparatus is intended to lift the sheets singly and to carry them over the edge 3^1 of the stop on to the conveyer device 4.

In the following description the expressions "left" and "right" are to be understood to refer to the direction of movement of the paper.

5 shows the left hand frame of the apparatus. To the same is screwed a hinge part 6 to which is hinged a guide rail 7. In dove-tailed guides 7^1 of the said rail 7 is adjustably mounted a bracket 8 which forms a support for a cross-bar rotatably mounted in the same and consisting of two tubes or pipes 9^1 and 9^2 inserted into each other. The said cross-bar extends over the whole width of the paper and is supported on the right hand side by a similar bracket on a similar guide rail. The guide rails 7 at both sides of the machine are provided at their free ends with laterally arranged guide rollers 7^2, and rest with the same on the circumference of cams 23, but in such a manner that in their lowest position they are parallel to the upper edge of the frame, with a small clearance. The outer tube 9^1 of the cross-bar has for instance ten downward nozzles 9^3 intended to suck up the paper sheets, the said nozzles being secured to the tube, which is closed at the ends by means of caps 9^4 on the inner tube. The latter is provided at its front side with a number of nozzles 9^5 intended for the escape of compressed air, the said nozzles being secured to the tube and carried in an air-tight manner through the tube 9^1 and curved backward in such a manner that the jet of compressed air blows under the openings of the suction air nozzles which to this end are obliquely cut at the side facing the compressed air nozzles, so that the sheet end sucked up by them, is raised obliquely, and the compressed air jet blows under it. The inner tube 9^2 projects at the right hand side of the machine, not shown, out of the corresponding closing cap for the tube 9^1 and there forms a connection for a rubber tube supplying the compressed air. The outer tube 9^1 for the suction air in addition to being supported in the brackets is moreover loosely rotatable in connecting rods 12 and projects with its two ends beyond the brackets 8. At these ends are secured tipping levers 10 which form at the same time lateral guides for the cross-bar and are provided at their inner ends with friction rollers 10^1, by means of which and owing to

the weight of the nozzles 9^3 9^5 they rest against the guides surfaces of curved parts 11 screwed laterally to the guide rails 7. Owing to the shape of the said curved parts which are interchangeable, the suction nozzles, at the beginning of the advance movement of the brackets 8 in their guides 7^1, assume with their ends a somewhat oblique position directed forward, so that the end of a sheet sucked up by them, is directed upward and therefore can be carried over the edge 3^1 of the stop in a reliable manner, that is to say without striking against it. This position of the sheet end assists also the blowing under the sheet, and the loosening of the same, as well as the holding down of the next following sheet. This position is shown in Fig. 1.

The interchangeability of the curved parts is a necessary condition in order to enable sheets of different thickness of paper to be fed with one and the same machine: for sheets of thin paper require curved parts milled out more deeply, and therefore ends directed upward at a greater angle than, say, cardboard-like sheets where a smaller inclination of the end of the sheet is sufficient, and a decided bending of the said end by suction would not be possible.

Owing to the further shape of the curved part, the suction nozzle, immediately after passing the edge 3^1, will again assume a vertical downward position owing to the rollers 10^1 moving upward. The end of the sheet will be thereby brought into a suitable position in order to be taken by the conveyer or transport parts.

The hinge parts 6 are used not only for hinging the guide rails 7, but also as bearings for a spindle 13 so that its ends form hinge pins of the hinges. These ends are moreover extended at both sides beyond the hinge parts and have secured to them there arms 14 connected by means of rods 15 to crank disks 17^1. Within the hinge parts 6 to the spindle 13 are moreover secured arms 16 connected to the connecting rods 12 and thus transforming the rotary motion of the crank disks into a reciprocating motion of the brackets supporting the cross-bar 9^1, 9^2. The left hand end of the said spindle, shown in Fig. 4, is bored through a certain depth and, like the arms 16 and the connecting rod 12, formed into a pipe for the suction air. The pipe 9^1 is provided at the point where it is engaged by the connecting rod 12, with a slot which remains in communication with the pipe of the connecting rod even during the tipping movement of the levers 10 and during the reciprocation of the brackets 8. The connecting rod 12 is provided at the point of its connection to the arm 16 with a wooden pin 12^1 secured to the head of the connecting rod which is in communication through an opening with the pipe of the latter and remains in communication through a slot with the pipe in the arm 16 also during its movements.

The outer end of the spindle 13 is then connected by means of a rubber tube to a suction air pipe not shown in the drawing.

The spindle of the crank disks 17^1 forms the driving shaft of the paper layer; by means of spur wheels 18 it is in engagement with a lower spindle 19 forming the driving spindle 17 of the conveyer device 20 for delivering the sheets to the printing rolls 21, and with an upper spindle 22, to the ends of which are keyed the cam disks 23 supporting the guide rollers 7^2 of the rails 7. These cam disks have two approximately diametrically opposite bosses, the larger of which is intended, at the moment when the nozzle ends with the sheet end arrive in front of the stop edge 3^1, to raise the rails 7 together with the cross-bars and to lift the nozzles without shock over the said edge, and the smaller boss is intended, at the moment when the end of a sheet arrives at the transport device 20 and is seized by the same, to lift the nozzles off the paper.

The crank disks 17^1 are at the same time also formed into cam disks intended to control the device for the adjustment of the paper table 2 after removal of each sheet. There are two cam disks arranged side by side. One of them, 24, which controls a roller 26 at the end of a lever 25 rotatably mounted in the frame, and a disk 27 which controls a roller 29 at the end of a thinner lever 28 rotatably mounted in the frame.

The paper table 2 is supported in the usual manner by means of nuts 2^1 on screws 30 held in vertical position in a frame 32 suspended by means of arms 31 pivoted to the main frame. These screws are provided at the top with bevel gears 33 which, by means of a ratchet wheel and pawl 34, are operated by rods 35 from the lever 25 after removal of each sheet and thus screws are turned and the table moved upward to the necessary extent.

The lever 28 guided by means of the roller 29 on the surface of the cam disk 27 interrupts the advance or feed as soon as the surface of the paper stack 1 rises too high and touches a feeler 36 which is screwed to a beam 37 rotatably mounted on the frame; this balance beam is on the one hand connected by a rod 38 to the lever 28 and therefore is held by the feeler lever 36 resting on the paper, in such a manner that the roller 29 cannot even follow the recess of the disk 27, and on the other hand it rests on the arm 39^1 of a T-shaped lever 39, the second arm 39^2 of which is formed into a weight, and the third arm 39^3 of which, provided with a hook, prevents the end of the lever 25, connected to the pawl gear 34 and provided with a tooth 40, from sinking, and therefore

the roller 26 from dropping into the recess of the disk 24.

I claim as my invention:

1. In a printing press, the combination with a support, a member for determining the positions of sheets placed on the said support, and a conveyer, of a compressed air tube, a suction tube, nozzles secured in the said tubes, and means for imparting a reciprocating and rocking motion to the said tubes and nozzles for successively transferring sheets from the second support to the said conveyer.

2. In a printing press, the combination with a table, a stop member for determining the positions of sheets placed upon the table, and a conveyer, of a compressed air tube, a suction tube, nozzles secured to the said tubes, and means for imparting a reciprocating and rocking motion to the said tubes and nozzles for successively transferring sheets from the said table over the said stop and to the said conveyer.

3. In a printing press, the combination with a table, a stop member for determining the positions of sheets placed upon the table, and a conveyer, of a compressed air tube, a suction tube, nozzles secured to the said tubes, means for imparting a reciprocating and rocking motion to the said tubes and nozzles for successively transferring sheets from the said table over the said stop and to the said conveyer, and means for progressively advancing the position of the table as the sheets are taken therefrom.

4. In a printing press, the combination with a table, a stop member for determining the positions of sheets placed upon the table, and a conveyer, of telescoping tubes, one for compressed air and one for vacuum, nozzles secured to the said tubes, and means for imparting a reciprocating and rocking motion to the said tubes and nozzles for successively transferring sheets from the said table over the stop to the conveyer.

5. In a printing press, the combination with a table, a stop member for determining the positions of sheets placed upon the table, and a conveyer, of a compressed air tube, a suction tube surrounding the compressed air tube and concentric therewith, a straight nozzle depending from the suction tube, a curved nozzle passing through the suction tube and secured in the compressed air tube, and means for imparting a reciprocating movement to the said tubes and nozzles for successively transferring sheets from the said table over the stop to the conveyer.

6. In a printing press, the combination with a table, a stop member for determining the positions of sheets placed upon the table, and a conveyer, of a compressed air tube, a suction tube surrounding the compressed air tube and concentric therewith, a straight nozzle depending from the suction tube, a curved nozzle passing through the suction tube and secured in the compressed air tube, a reciprocating carriage in which the said tubes are mounted, means for rocking the said tubes so as to cause the edge of a sheet to be raised by the suction nozzle and to permit air under pressure to be blown beneath the said sheet, and means for moving the said carriage and tubes and nozzles for conveying the sheets successively from the said table over the said stop and to the said conveyer.

7. In a printing press, the combination with a table, a stop member for determining the positions of sheets placed upon the table, and a conveyer, of a compressed air tube, a suction tube surrounding the compressed air tube and concentric therewith, a straight nozzle depending from the suction tube, a curved nozzle passing through the suction tube and secured in the compressed air tube, a reciprocating carriage in which the said tubes are mounted, means for rocking the said tubes so as to cause the edge of a sheet to be raised by the suction nozzle and to permit air under pressure to be blown beneath the said sheet, means for moving the said carriage and tubes and nozzles for conveying the sheets successively from the said table over the said stop and to the said conveyer, and means for automatically advancing the said table as the sheets are taken therefrom to maintain the same distance between the said nozzles and the sheet to be withdrawn from the table.

In testimony whereof I affix my signature in presence of two witnesses.

PAUL BIERI.

Witnesses:
W. MIER,
ELMER SCHNEIDER.