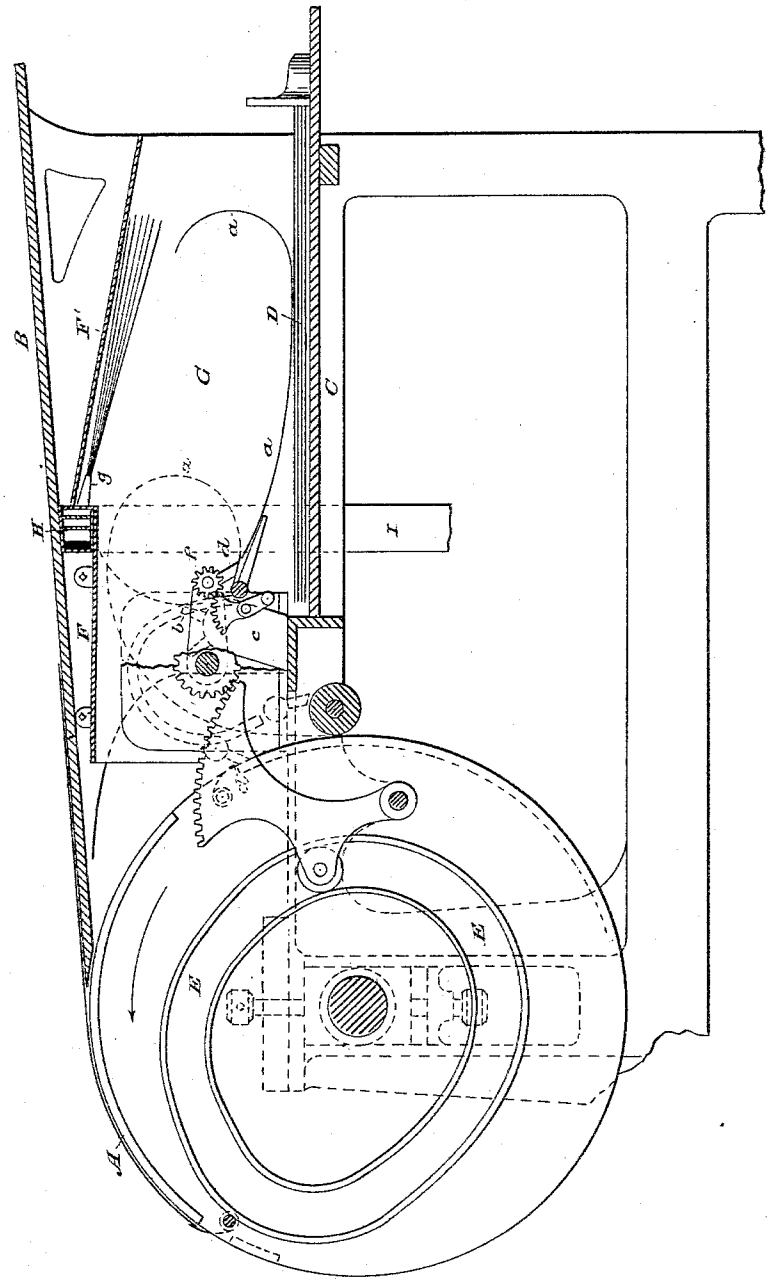
(No Model.) 2 Sheets—Sheet 1.

A. CAMPBELL.

DELIVERY APPARATUS FOR PRINTING MACHINES.

No. 323,394. Patented Aug. 4, 1885.

Fig. 1.



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INVENTOR:

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N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. CAMPBELL.

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Fig. 6.

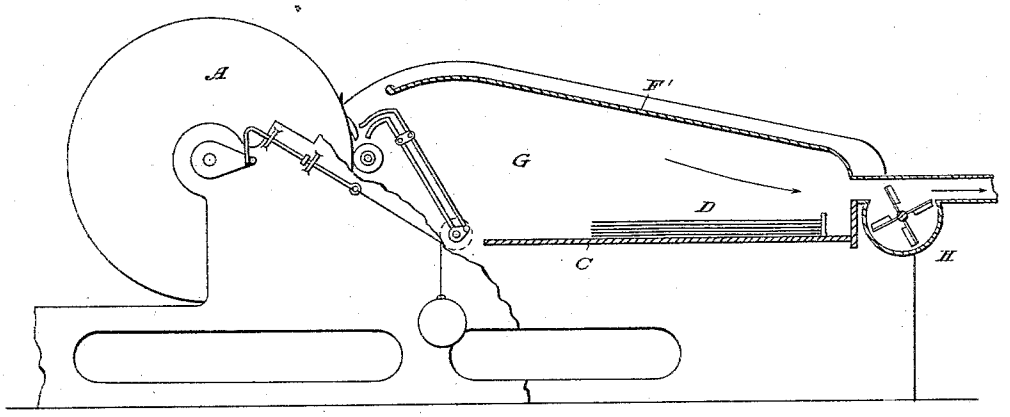


Fig. 5.

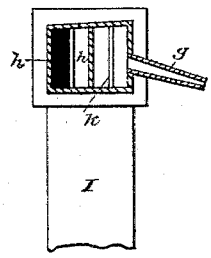


Fig. 4.

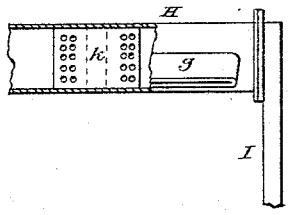


Fig. 3.

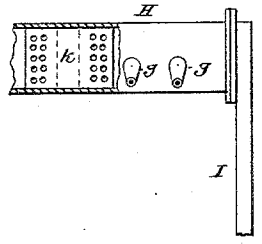
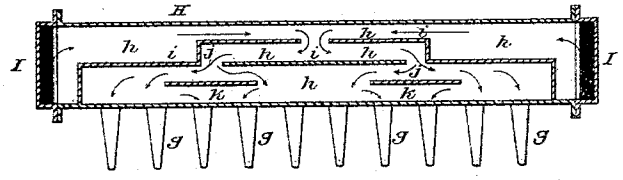


Fig. 2.



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UNITED STATES PATENT OFFICE.

ANDREW CAMPBELL, OF BROOKLYN, ASSIGNOR TO JOHN AND EDMUND McLOUGHLIN, OF NEW YORK, N. Y.

DELIVERY APPARATUS FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 323,394, dated August 4, 1885.

Application filed December 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, ANDREW CAMPBELL, a citizen of the United States, residing in Brooklyn, Kings county, New York, have invented certain Improvements in Delivery Apparatus for Printing-Machines, being a means for effecting the delivery of the printed sheet from the printing-cylinder, of which the following is a specification.

In my Letters Patent No. 283,201, of August 14, 1883, I showed a device or mechanism designed to accomplish the above result. In that device the advancing edge of the sheet is taken by suction-nozzles and carried by a rolling motion back to the delivery-point, while jets of air under the sheet bear it up and assist in turning it over. That device operates quite well with some qualities of paper, but I find that, owing to the bank or mass of inert air in front of the sheet as it is being turned, and through which the sheet must be forced, the tail or corners of the sheet are apt to be folded back or reflexed. It is therefore difficult, with some kinds of paper, to lay the sheet smoothly and uniformly on the pile on the receiving-table.

My present invention is designed to remove the above-described difficulty and render the operation of the delivery uniformly perfect, whatever may be the quality or kind of paper used. In carrying out my invention I may employ the same mechanism for taking the edge of the sheet and turning the sheet over with its printed side uppermost and for bearing it up with jets of air as I have shown in my former patent; and I have shown in Figure 1 of the accompanying drawings this same mechanism, but I add thereto a jet apparatus designed to produce a partial vacuum in front of the sheet as it is being turned, whereby the bank or mass of inert air which would otherwise oppose itself to the movement of the sheet is removed or partially removed and a current generated in the direction of movement of the sheet. In my present construction I do not consider the use of air-jets under the sheet to bear it up as essential, but I usually employ them as a precautionary measure. The jets of air over and in front of the sheet, in connection with the mechanism for delivering the sheet from the cylinder, will ordinarily be sufficient. I may also employ other mechanism than that shown in my former patent for delivering the sheet—as, for example, some suitable form of grippers in lieu of the suction-nozzles therein shown, and other means for operating said grippers or the nozzles.

In the drawings which serve to illustrate my invention, Figure 1 is a sectional elevation of a printing-press provided with my improved delivery mechanism. Fig. 2 is a horizontal section of my improved jet apparatus detached and enlarged. Fig. 3 is a front elevation of one end of said apparatus, drawn to the same scale as Fig. 2. Figs. 4 and 5 illustrate a modified form of the jet apparatus. Fig. 6 illustrates another modification, in which the suction-nozzles are replaced by grippers and the blast apparatus by an exhaust apparatus.

It will only be necessary to briefly describe the general features of the mechanism, as these are all fully shown and described in my former patent, and are merely reproduced here in Fig. 1.

A is the impression-cylinder; B, the feed-board, and C the receiving-table, on which is shown a pile of printed sheets, D.

E is the cam on the cylinder, which actuates the mechanism for taking the advancing edge of the sheet *a* and carrying it over to the delivery-point. The jet-tubes *b* are connected through an air-trunk, *c*, with a blast-fan, and the blast is controlled by any suitable valve. The suction-nozzles *d* swing radially around a shaft, *e*, but have an independent oscillation or swing around another axis, *f*, which movements are effected by suitable mechanism, as fully described in my former patent. The advancing edge of the sheet is taken by the suction-nozzles just as the grippers release it, (see dotted lines,) and the nozzles then carry the edge of the sheet over to the delivery-point, (see full lines,) when it is released. The edge of the sheet is rolled as it is borne over in such a manner that the sheet is eventually turned with the printed face uppermost on the pile. The turning of the sheet is facilitated by the rotation of the printing-cylinder, which delivers it somewhat faster

than it is carried over, thus causing it to form the arch indicated by the dotted lines. The jets of air under and behind the sheet bear it up and assist in the turning. The full lines in Fig. 1 show a sheet turned and nearly laid flat on the receiving-table.

I will now describe my improvements whereby the turning of the sheet is facilitated and all danger of its being folded back at the tail or corners avoided.

F is a roof-plate arranged over the turning mechanism. F′ shows the extension of same to the rear, and G are side plates or boards, which, with the roof-plates, form a trunk that extends out about to the end of the receiving-table C.

H is an air trunk or pipe arranged crosswise of the press above the sheet-turning mechanism, which trunk is arranged to receive a blast of air from any kind of air compressing or forcing mechanism. This trunk is provided with jet-tubes *g g*, directed downward and backward toward the rear of the press, under plate F′, substantially as shown. The purpose of this jet apparatus is to remove the bank or mass of inert air in front of the sheet as it is being delivered, so that it will meet with no opposition. The effect is to form a partial vacuum in front of the sheet and induce a flow of air toward the rear of the press. I also find that by creating or effecting a constant change in the air over the sheets on the receiving-table my device tends to dry the ink on the sheets more rapidly than it would otherwise be dried, and the sheets are so lifted and lightened by the exhaust that they press more lightly on each other when laid, whereby the ink does not set-off so readily as where there is pressure.

Figs. 2 and 3 illustrate the preferred construction of the air-trunk H, whereby the air is admitted to all of the jets with the same or nearly the same volume and force. The air is admitted at both ends of the trunk by conduits I I, coming from any quarter and supplied from some air-forcing apparatus, and is distributed to the different jet-tubes through channels *h*, produced by partitions *i* in the trunk. Opposite the outlets *j* are placed dash-plates *k*, which may be perforated at their ends to further equalize the distribution of the air to the various jet-tubes.

I may supply the air through my jet apparatus continuously or intermittently; or, if continuous, it may vary in quantity at different times, so as to produce an undulating current. A continuous current of uniform quantity and strength is, however, sufficient.

In lieu of the construction of trunk shown in Fig. 2, I may employ any construction that will equalize or nearly equalize the blast through the various jet-tubes, and I may vary the number and arrangement of the partitions in the trunk at will.

I prefer to employ the roof-plates F F′ and side plates, G, to form a species of trunk and prevent side currents of air which would interfere with the operation of delivering the sheets. Only one of the side plates G is shown in the drawings.

It is obvious that, in lieu of the trunk H, each jet-pipe *g* might be connected with a blower by a separate pipe, or groups of two or more might be supplied by independent pipes; but, ordinarily, there is not room enough in the press available for the space this construction would require, and therefore I prefer a trunk supplied at its end or ends, as shown.

Figs. 4 and 5 illustrate a modification of the air-trunk H and its jet-tubes *g*. In this construction the air is ejected through a long and narrow slit, in place of through jet-tubes.

Fig. 6 illustrates a modification of my invention in which an exhaust-fan, H′, is placed at the rear of the press, and suction is employed to remove the air in front of the sheet, the air being drawn out of the trunk instead of forced out from same, as in Fig. 1.

The mechanism for taking the sheet from the cylinder and delivering it is substantially the same as that shown in the United States Patent No. 246,514, of August 30, 1881, and is merely embodied herein to show the adaptation of my invention to a delivery wherein grippers are employed in lieu of suction-nozzles.

I am well aware that it has been proposed, in devices for delivering sheets from printing-presses, to arrange inclined air-jet nozzles obliquely at the sides of the path along which the gradually-enlarging loop formed by the bight of the sheet passes, and that, as the bights of the sheets follow each other, the air is injected from opposite sides into the bights of two sheets at the same time. This method and construction, however, differ greatly from mine, in that the air forced into the loop formed by the leading sheet from opposite sides, so far from rarefying the air or reducing the air-pressure in front of the sheet that follows, really increases the tension of the bank or mass of air in front of the said sheet. This method and construction I do not claim, and their use would defeat the object I seek to attain.

Having thus described my invention, I claim—

1. As a means for delivering a sheet from a printing-press, the combination, with means, substantially as described, for taking the advancing edge of the sheet and carrying it back to the delivery-point, of an apparatus for rarefying the air or creating a partial vacuum in front of the sheet as it is being turned, substantially as set forth.

2. As a means for delivering a sheet from a printing-press, the combination of a mechanism, substantially as described, for taking the advancing edge of the sheet and carrying it back to the delivery-point, substantially as described, a trunk formed of a roof-plate and side plates, arranged substantially as shown, and an air-rarefying mechanism, substantially as described, constructed to rarefy the air

within said trunk in front of the sheet as it is being turned, substantially as set forth.

3. The combination, in a sheet-delivery for printing-presses, of the trunk comprising the roof-plate and side plates, substantially as described, and the air-trunk constructed and adapted to be connected with an air-forcing apparatus and provided with an air-outlet or jet-tubes *g*, with chambers *h*, and with dash-plates *k*, either perforate or imperforate, said air-trunk being arranged with respect to said trunk, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ANDREW CAMPBELL.

Witnesses:
ARTHUR C. FRASER,
HENRY CONNETT.