

J. L. FIRM.

DELIVERY APPARATUS FOR PRINTING-PRESSES.

No. 176,401.

Patented April 18, 1876.

Fig. 1.

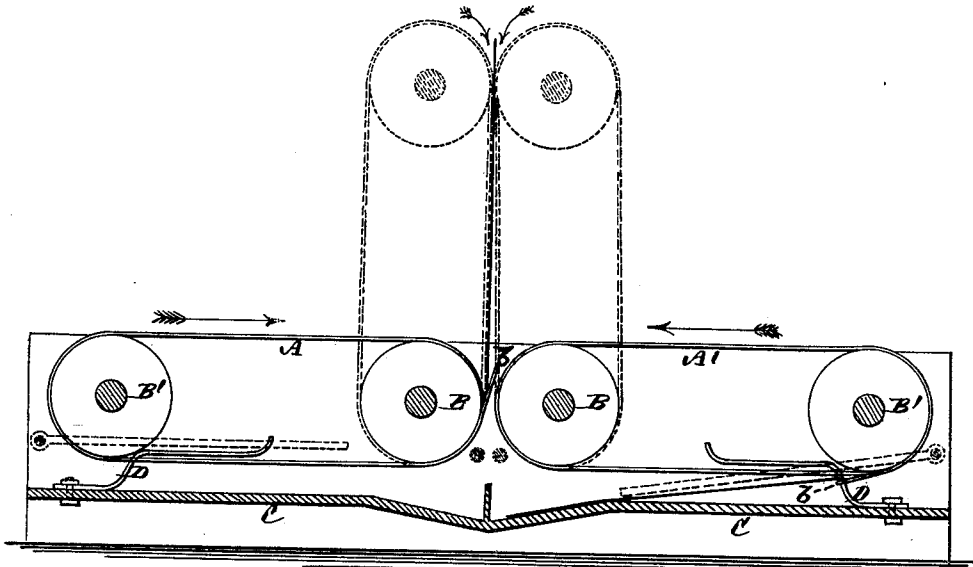


Fig. 2.

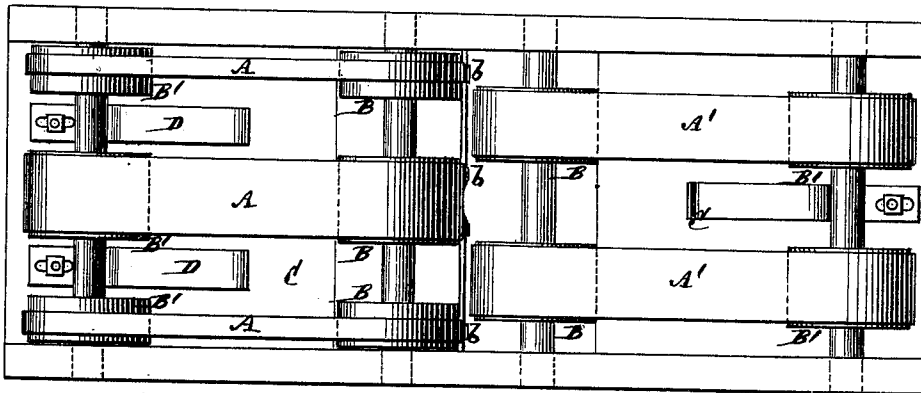


Fig. 3.

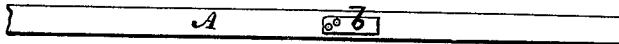


Fig. 4.



Fig. 5.

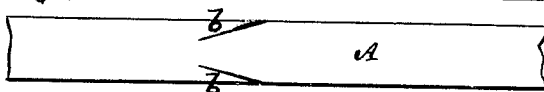


Fig. 6.

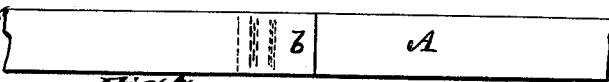
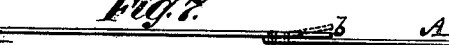


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH L. FIRM, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF HIS RIGHT TO CALVERT B. COTTRELL AND NATHAN BABCOCK, OF WESTERLY, RHODE ISLAND.

IMPROVEMENT IN DELIVERY APPARATUS FOR PRINTING-PRESSES.

Specification forming part of Letters Patent No. **176,401**, dated April 18, 1876; application filed February 3, 1876.

To all whom it may concern:

Be it known that I, JOSEPH L. FIRM, of the city, county, and State of New York, have invented a new and useful Improvement in Delivery Apparatus for Printing-Presses; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms a part of this specification.

This invention is more particularly designed to be applied to rotary printing-presses.

The object of the invention is to provide simple and efficient means for removing and rapidly and regularly piling printed sheets of paper from a rotary or other suitable printing-press.

The invention consists in one or more endless traveling belts, bands, or aprons made of any suitable flexible material, and constructed or provided with one or more tongues positively attached to or forming part of said belts, and arranged so that without mounting them on spindles having special mechanism to open and close them, they automatically operate as nippers to receive, hold on to, and deliver the sheet as the tongued portions of the belts are alternately flexed and straightened by their travel over end pulleys or curved surfaces, and in an intermediate straight path or course between said surfaces. The invention also consists in a combination with one or more of such endless and tongued belts, operating as automatic sheet-delivering devices, of one or more guides or stops, arranged to arrest the sheet at its forward edge, as the tongues of the belts commence to open to liberate the sheet, to complete the delivery of the latter.

Figure 1 represents a vertical section of a duplicate sheet-delivery apparatus constructed according to my invention, and with the endless delivery-belts arranged to occupy a horizontal position. Fig. 2 is a plan of the same, showing a pair of sheet-delivery belts on the one side of such duplicate apparatus, and three sheet-delivery belts on the other side thereof. Figs. 3, 4, 5, and 6 are face views of my improved sheet-delivery endless belt, showing modified constructions of the same as regards its tongues or automatic nip-

pers. Fig. 7 is an edge view of the belt shown in Fig. 6.

Although the invention is here shown applied to a duplicate delivery apparatus having a right-and-left hand series of endless and tongued belts, operating alternately to remove the printed sheets, and pile them alternately to the right and to the left underneath said belts, the invention is not restricted to such an arrangement, but admits of various changes. Thus, for example in part, when the apparatus is a duplicate one, the sheet-delivery belts of the two portions of the apparatus may be arranged one above the other, or otherwise, and when the apparatus is either a single or double one—that is, constructed to make either a single pile or duplicate and separate piles of the printed sheets, said belt or belts instead of being horizontal might be arranged to occupy either upright or inclined positions.

It will suffice here, however, to describe the invention as shown in the drawing, and to refer to each delivery device of the duplicate apparatus there shown as consisting of two or more parallel endless and tongue belts or bands, although a single belt or band or apron of any desired width, and having any number of tongues arranged at suitable distances apart, both transversely and longitudinally, might be used.

Referring, in the first instance, or more particularly to Figs. 1 and 2 of the drawing, A and A' represent two series of horizontal endless belts or bands, arranged respectively to the right and to the left hand of the apparatus, each series constituting a sheet-delivery device of itself. These two series of belts or bands travel in reverse directions to each other, but on like levels, around, and with pulleys B B and B' B' at opposite ends of the belts, the pulleys B B being in approximately close relation with each other. The shafts carrying the pulleys should be geared together to secure the proper relative action of the two series of belts or bands, each series operating alternately to take a printed sheet as it is brought down from the press between tapes or otherwise, and to convey said sheets

alternately to right and left hand fly-boards C C, arranged beneath the two series of belts, and on which the sheets are laid in two separate piles.

To insure the proper relative action of these two series of sheet-delivery belts, the tongues with which they are constructed or provided are arranged, so that the tongues of the one series of belts are receiving a sheet while the tongues of the other series are releasing a delivered sheet. In Figs. 1 and 2 of the drawing, the tongues *b* of the one series of belts or bands A are represented as in a position to receive a sheet as said tongue portions of the belts are flexed and opened by their travel around and with the pulleys B of said series, and the tongues *b* of the other series of belts A' are shown as in a position to deliver a sheet onto the fly-board C beneath them, as said tongued portion of the belts A' are flexed and opened by their travel around and with the pulleys B' of such series of belts. Such are the actions of each series of belts or bands A A', alternately, the tongues *b* of the belts being closed, and holding onto the sheet during its lower straight line of travel with either series of belts A A', between the pulleys B B'. Thus the tongues *b* operate as automatic nippers or grippers to take hold onto and deliver the sheet.

A fly-frame, which may be made up of a series of fingers, shown by dotted lines in Fig. 1, should be applied to each series of delivery belts or bands to insure the regular deposit of the sheets on the fly-board, as the tongues of the belts open to deliver; and to further insure this, and to secure a straight or even piling of the sheets, there is arranged at or near the outer end of either series of belts one or more stops or guides, D, constructed so that the front end or edge of the sheet comes in contact with and is arrested by them, when the tongues *b* open to deliver the sheet and the fly-frame operates to deposit it. These guides D may be made adjustable in or out, to determine their period of action in relation with the tongues of the belts and with the fly-frame. Thus they may be attached by means of screws and slots to the main frame, as shown in Fig. 2.

The belts or bands A A', which may be made of sheet metal, leather, or other flexible material, and the pulleys B B', over and with

which they travel, should be pitched or constructed with teeth or projections to prevent slip of the belts, and to insure the proper timely action of the tongues *b*. These tongues are distinguishable from ordinary nippers or grippers by not being mounted on spindles or requiring any special mechanism to operate them apart from the devices which carry them, they being operated, as hereinbefore described, by the travel of the belts round the pulleys or other curved surfaces at the ends of the belts, and by their intermediate straight course of travel between said surfaces. Said tongues are in fact component parts of or positive attachments to the belt, and have no separate action but what is derived from the belt.

They may be made simple by incisions in the belt—as, for instance, by cutting into the belt from its opposite edges, firstly, in transverse directions, and then longitudinally, as at the left hand of Fig. 4; or, by cross and longitudinal cuts made in the body of the belt, as at the right hand of Fig. 4; or, by oblique cuts from opposite edges of the belts, as in Fig. 5; or, they may be formed by a protruding portion of the one end of the belt beyond the point of junction or union of the belt, as in Figs. 6 and 7; or, again, said tongues may be formed by riveting, sewing, or otherwise attaching them in a positive or fixed manner to the surface of the belt, as in Fig. 3.

I claim—

1. An automatic sheet-delivery belt or band composed of a flexible material, and constructed or provided with one or more tongues attached in a fixed or positive manner to the belt or band, or forming part of the same, in combination with the end pulleys or curved surfaces round, or with which said belt or band travels, substantially as and for the purpose herein set forth.

2. The combination of one or more guides or stops, D, with one or more endless and tongued belts or bands, A or A', and the pulleys or curved surfaces over or with which said belts or bands work, essentially as and for the purpose herein described.

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Witnesses:

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