(No Model.)

F. J. BALL.

SHEET STRAIGHTENER FOR PRINTING PRESSES.

No. 306,459. Patented Oct. 14, 1884.

Fig. 1.

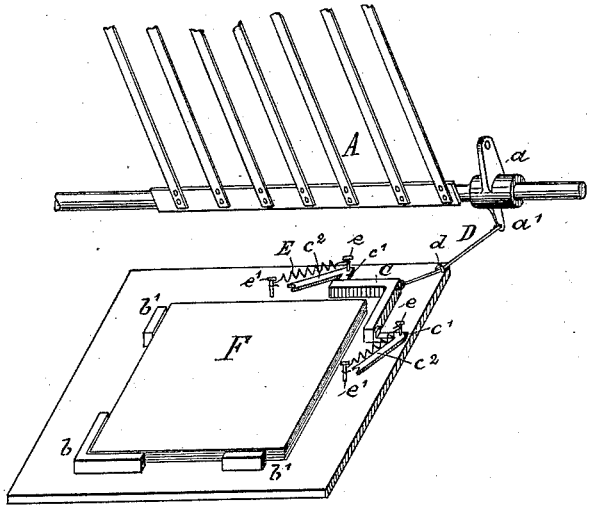


Fig. 2.

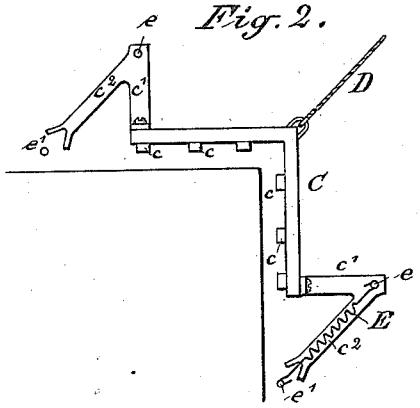


Fig. 5.

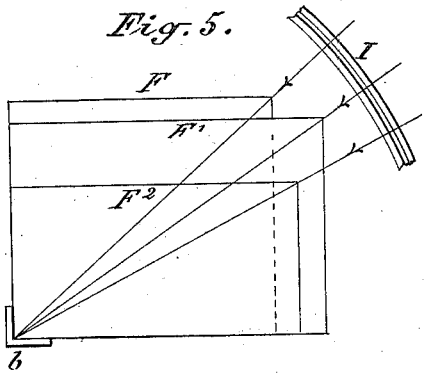


Fig. 3.

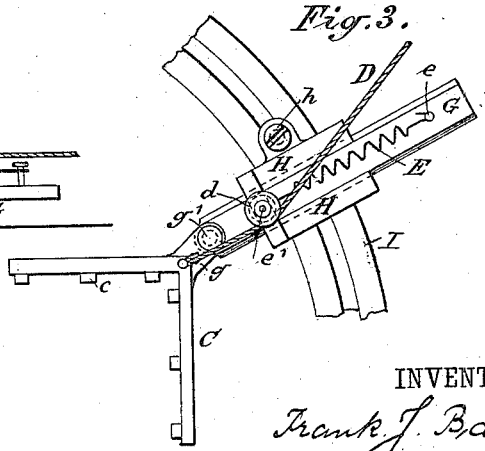
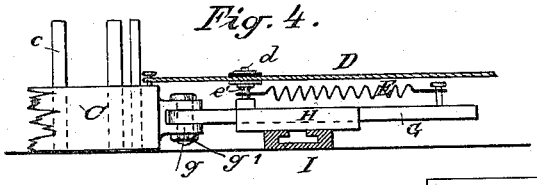


Fig. 4.



WITNESSES:

Edward Arfelt

Robt. W. Matthews

INVENTOR

Frank J. Ball

BY A. P. Almquist

ATTORNEY

UNITED STATES PATENT OFFICE.

FRANK J. BALL, OF BROOKLYN, NEW YORK.

SHEET-STRAIGHTENER FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 306,459, dated October 14, 1884.

Application filed April 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. BALL, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Sheet-Straighteners for Printing-Presses, of which the following is a specification.

The object of my invention is to provide an improved automatic device to be used in connection with the delivery portion of a printing-press, for so adjusting in the delivery the position of each successive sheet that its edges shall be exactly flush with the edges of each preceding sheet, thereby straightening or rendering even, without manual labor, the edges of each pile of printed sheets of paper before its removal from the delivery-table of the press.

In the accompanying drawings, Figure 1 represents a perspective view of my improved device in working position upon the delivery-table of a printing-press, and operated by connection from the oscillating fly-shaft. Fig. 2 is a plan view of the same. Figs. 3 and 4 are respective plan and elevational views of a means for guiding and adjusting the device to move always in line with the diagonal of the sheet regardless of the proportion between length and breadth of the latter, and Fig. 5 is a view explanatory of the said diagonal adjustment.

Like letters of reference indicate like parts in the several figures.

A is the fly of a printing-press, and B the delivery-table. Upon the delivery-table are secured an angular cleat, *b*, and lateral cleats *b'*, against which the papers, sheet after sheet, are pushed up so as to get their edges even. Instead of cleats *b b'*, pins or other projections may be used to act as stops for the said purpose.

In order to provide a simple means of doing this work automatically, I attach to the fly-shaft or form upon the hub of the fly-crank *a*, oppositely to the said crank, another crank, *a'*, and connect the same by a suitable cord, D, (guided through a pulley or staple, *d*, on the table B,) to a block, C, made in the shape of an ordinary right angle, and having on the inside vertical slats or strips *c*, which may be made of any length corresponding to the desired height of the pile of paper.

To the outside of the ends of the angular block C, I secure arms *c'*, having other arms, *c²*, projecting inward from their outer ends in a direction parallel with the diagonal of the sheet in the line of motion of the straightener or adjuster C, which arms *c' c²* form together one solid piece or bracket.

At the end of each arm *c'* is a pin, *e*, and in a line drawn from the said pin parallel with the aforesaid diagonal is another pin, *e'*, which is secured upon the table B. A spiral spring, E, is fastened with its ends to the aforesaid pins *e e'*, and tends to draw the edges always toward the cleat *b*.

In order that the said adjuster will not be drawn any farther than is needed for the size of the sheet, the ends of the arms *c²* are forked, as shown in Figs. 1 and 2, so as to embrace and stop against the pin *e'*.

The operation will be understood with a glance at Fig. 1. When the fly descends to deliver the sheet F on the table B, the crank *a'* pulls the adjuster C away from the pile sufficiently so as not to interfere prematurely with the edge of the just delivered sheet, and when the fly again rises the springs E draw the adjuster C against the outer corner of the just delivered sheet, pushing it until its diagonally-opposite corner comes in contact with the cleat *b* and its other edges with the cleats *b'*, thus evening the edges of the pile by successively evening the edges of each sheet delivered with the edges of the preceding one delivered.

If, after finishing a certain amount of work, an order is received for which paper is needed varying greatly in difference between length and breadth to the order of those just finished, it is evident that the position of the adjuster C on the table B may very easily be changed to suit a new size, the said change in fact being made so easily that it is hardly necessary to use any more complex construction than the simple device shown in Figs. 1 and 2. I have, however, shown in Figs. 3 and 4 a special mode of adjusting the position of the straightener to suit sheets of paper of various proportions.

Referring to Fig. 5, it will be easily understood that the best direction in which to adjust

the motion, whether the sheet has the shape of the square F or the rectangles $F' F^2$, is in the line of the diagonal ending in the inner angle of the cleat *b*. In order to adjust it easily to work in said diagonal direction, I attach upon or to the table B a curved segment, I, and fit to slide in a groove in the said segment a block, H, securable in the said groove at any position by a small screw, *h*. The block H is provided in its turn with ways or a groove radially transverse to the curved segment I, and in the latter groove is fitted a slide, G, to whose inner end is pivoted by a lug, *g*, and securable by a screw, *g'*, the aforesaid angle-block C, so that by the said screw *g'* the sides of the angle-block C may easily be adjusted parallel to the adjacent edges of the sheet, after first adjusting the guide-block H on the segment I in position to make the slide G move in line with the diagonal of the sheet.

To a cross-piece upon the guide-block H, over the slide G, I attach the aforesaid pin *e'*, to which one end of the spring E is attached, and a little higher up on the said pin I pivot the pulley *d*, on which the cord D runs. The pin *e*, to which the other end of the spring E is attached, I fasten upon the slide G near its outer end. The slide being guided in the block H, it is only necessary to use one spring E, instead of the two shown in Fig. 1. The cord D is attached to the corner of the angle-block C, as before.

It is evident that the outer end of the cord D, instead of being secured to the crank *a'* of the fly-shaft, may be connected to any other kind of machinery upon or outside of the press, so long as its movement is timed to withdraw the adjuster C in the delivery of the sheet of paper, and cause it to move forward immediately after said delivery.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In combination with the delivery-table B, provided with stop-cleats *b b'*, or their described equivalents, the adjuster C, constructed to embrace the two sides of the angle of the sheet diagonally opposite to the cleat *b*, and means, substantially as described, for withdrawing the said adjuster in the delivery of the sheet, and moving it forward immediately after said delivery, substantially as hereinbefore set forth.

2. In combination with the delivery-table B, having stops *b b'*, the grooved segment I, the guide-block H, adjustable on the said segment, the slide G, the adjuster C, adjustable on the said slide, the spring E, attached with one end to the slide G and with the other to a stationary point, *e'*, and means, substantially as described, for withdrawing the adjuster C in the delivery of the sheet, substantially as hereinbefore set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 14th day of April, 1883.

FRANK J. BALL.

Witnesses:
ROBT. W. MATTHEWS,
EDUARD ARFETS.