

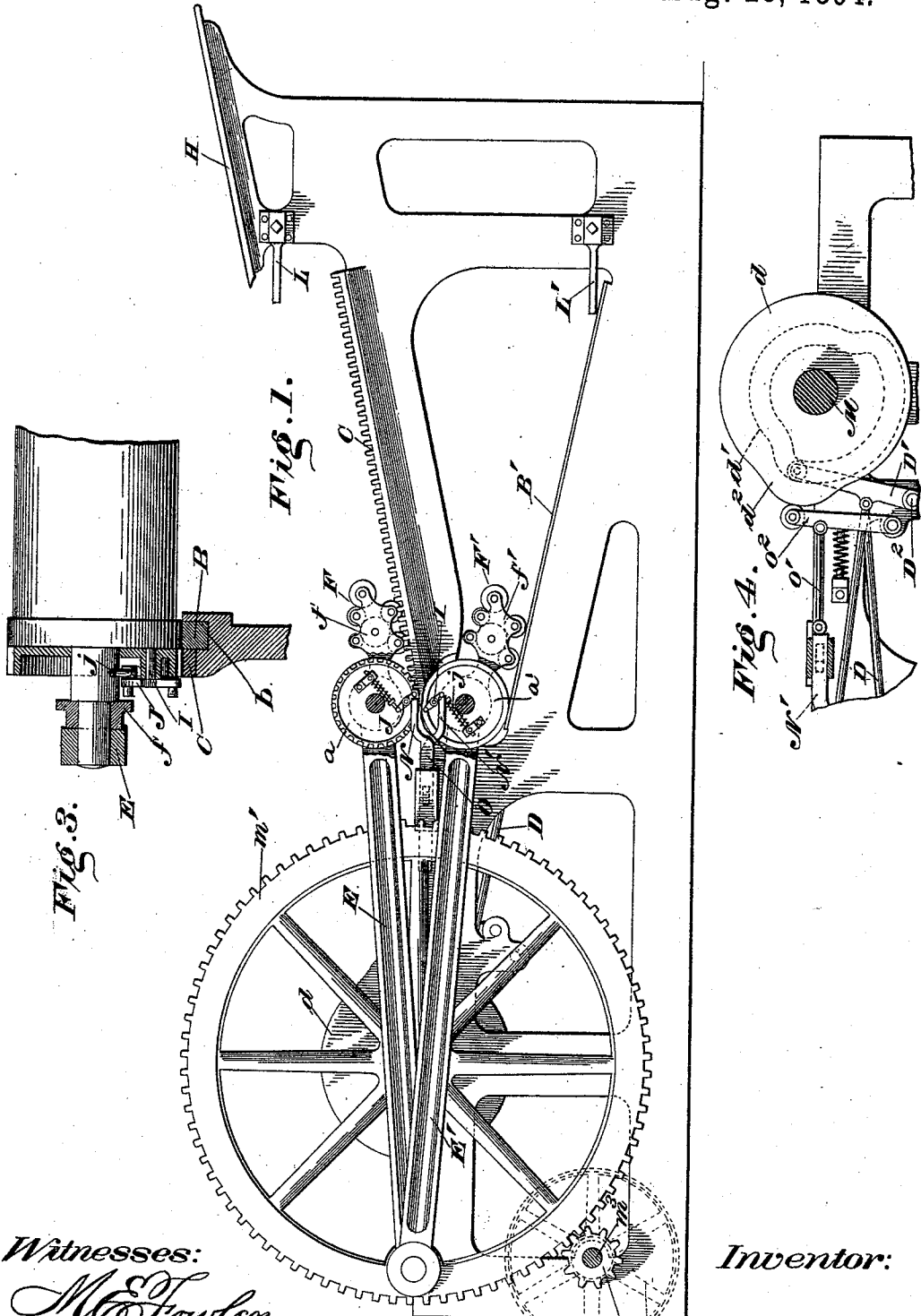
(No Model.)

3 Sheets—Sheet 1.

J. L. COX.
FLAT BED PERFECTING PRESS.

No. 525,136.

Patented Aug. 28, 1894.



Witnesses:
M. E. Taylor
Jas. R. Mansfield.

Inventor:
Joseph L. Cox

By his Attorneys:
Alexander & Donnell

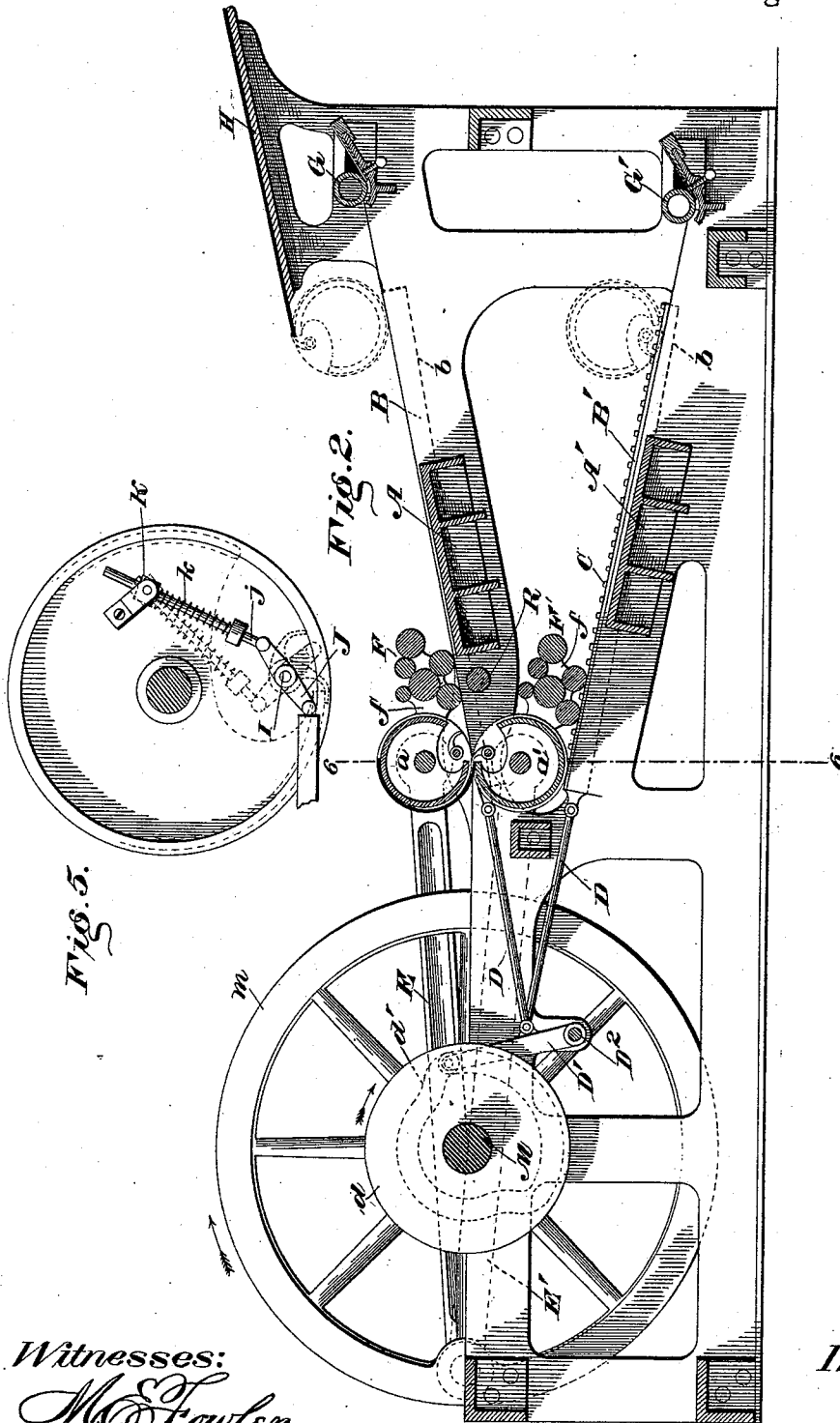
(No Model.)

3 Sheets—Sheet 2.

J. L. COX.
FLAT BED PERFECTING PRESS.

No. 525,136.

Patented Aug. 28, 1894.



Witnesses:
M. S. Fowler
Jas. R. Mansfield

Inventor:
Joseph L. Cox
 By his Attorneys: *Alexander T. Swill*

(No Model.)

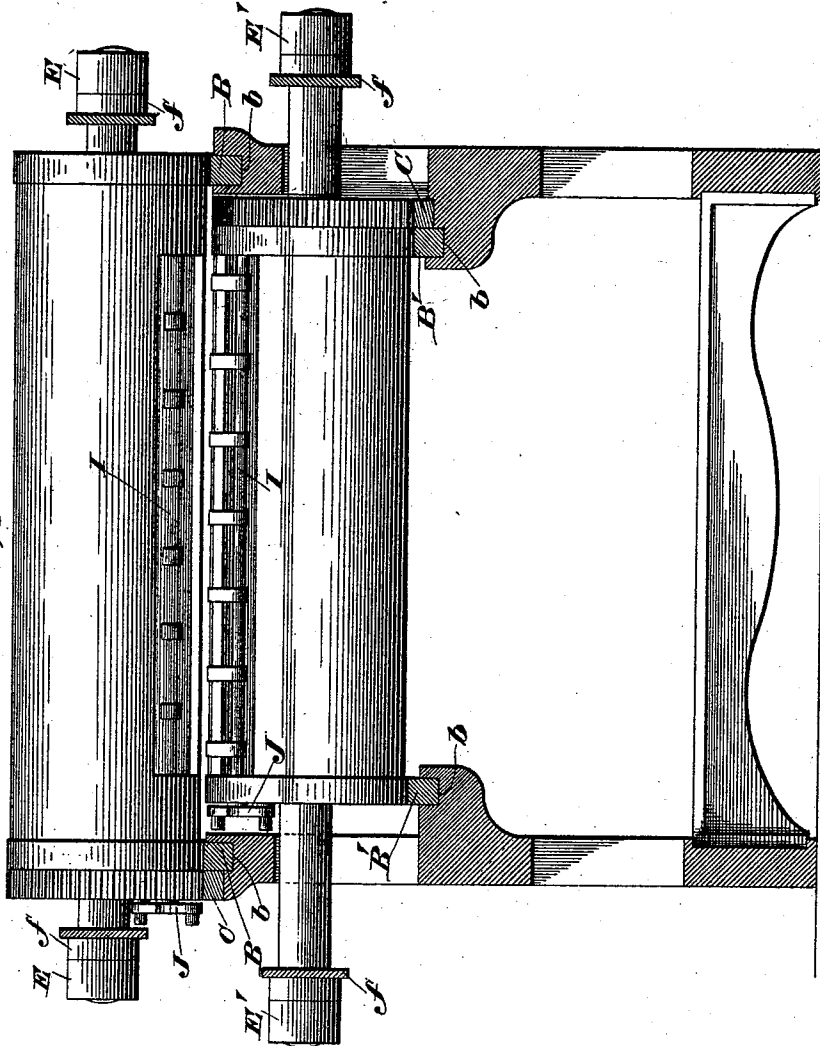
3 Sheets—Sheet 3.

J. L. COX.
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FIG. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH L. COX, OF BATTLE CREEK, MICHIGAN, ASSIGNOR TO THE DUPLEX
PRINTING PRESS COMPANY, OF SAME PLACE.

FLAT-BED PERFECTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 525,136, dated August 28, 1894.

Application filed October 21, 1893. Serial No. 488,796. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH L. COX, of Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Flat-Bed Perfecting-Presses; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to flat bed perfecting printing presses, and in operation prints and "perfects" severed sheets of paper from flat forms; the paper being fed either by hand, in the ordinary manner, or by any suitable automatic mechanism for feeding sheets from piles, or as severed from a web.

The main object thereof is to provide a new and simple arrangement of parts whereby a sheet of paper may be printed upon one side by one co-acting form bed and reciprocating traveling cylinder and immediately transferred to another reciprocating traveling cylinder and printed on its opposite side from another form of type; the said cylinders printing alternately while traveling over their respective form beds.

The minor objects of the invention, whereby this principal object is effected, are: first, to so arrange the beds in relation to each other that the sheet can be transferred direct from one locomotive cylinder to the other; second, to operate the cylinders back and forth over the beds simultaneously by simple means; third, to have one cylinder print while the other is "off impression" (out of printing contact with the type) and vice versa.

The invention once made known, could be readily applied and adapted with slight changes (not affecting the real merits of the invention) by those skilled in the art for printing upon a web, and such changes would not affect the relative arrangement or operation of the cylinders, beds, inking and cylinder driving mechanism, (and in a single acting perfecting press of the "throw off" mechanism.) I do not therefore consider my invention restricted solely to the employment

thereof for printing sheets. Furthermore, various "throw off" devices (that is means whereby the cylinder and forms are kept out of printing contact, such as lifting the cylinders or dropping the beds) could be readily contrived selected, and adapted to a press embodying the substantial features of my invention by those skilled in the art, and therefore I do not consider my invention limited to the employment of a "throw-off" mechanism such as is shown in the drawings and hereinafter described. Again, I have shown as a means for transferring a sheet from one cylinder to the other one form of cylinder gripping devices by which the sheet can be transferred and reversed, from one reciprocating traveling cylinder, to the other, but certainly do not consider my invention restricted to any specific form of gripper mechanism. Nor do I consider my invention restricted to the particular relative inclination of the form beds.

Referring to the drawings:—Figure 1 is a side elevation of a press embodying my invention. Fig. 2 is a longitudinal vertical sectional view therethrough. Fig. 3 is a detail sectional view. Fig. 4 is a detail face view of the right hand bearer and gripper actuating devices. Fig. 5 is an end view of the cylinder showing the gripping devices. Fig. 6 is a vertical transverse sectional view on line 6—6 Fig. 2.

Referring to the drawings by letters, the frame of the press is of any desired and suitable construction. Two type beds A, A', are secured transversely in the frame, near one end thereof, and located one above the other, face uppermost, and inclined toward each other at their inner ends. At each side of the beds are cylinder bearers B, B', and racks C the latter meshing with gears on the ends of the cylinders as usual, said bearers and racks being in parallel planes with their respective beds.

In the press shown in the drawings, the cylinders *a, a'* are designed to print only while moving in one direction, and a "throw-off" is necessitated. For this purpose I have made the bearers B, B', of the upper and lower beds,

respectively, longitudinally movable, and slightly tapered from end to end on their lower faces, and place them in similarly, but oppositely, tapered grooves *b* in the main frame (see Figs. 1 and 3). Furthermore the bearers of the upper bed are tapered oppositely to those of the lower end. Obviously therefore if these bearers be moved longitudinally they will either raise or lower the cylinders, and in practice both bearers would be moved simultaneously in the same direction, consequently one cylinder would be "thrown off" impression and the other cylinder "thrown on" impression, so that if the cylinders move simultaneously one prints and the other does not. The bearers may be shifted as described by means of pitmen *D*, pivoted at one end to the inner ends of the bearers and at the other end to vibrating levers *D'*, pivoted on a rock shaft *D*², and having friction rollers on their upper ends engaging cam grooves *d'* in cam disks *d* fixed on the main shaft *M* at the end of the machine opposite the beds, obvious from the drawings. On said shaft are keyed crank driving wheels *m*, *m'*, at opposite sides of the press, to each of which are connected two pitman rods *E*, *E'*, the other ends of which are connected to the journals of the locomotive reciprocating cylinders *a*, *a'*, respectively operating over beds *A*, *A'*. If desired the cylinders may be journaled in cross heads or carriages (not shown) to which the pitmen are connected, this however forms no part of the present invention. It will be seen from the drawings that for each revolution of the main shaft the cylinders are moved once back and forth over the type beds. The crank wheel *m'* may have its periphery toothed and meshed with a pinion *m*² on an auxiliary driven shaft *m*³, to which motion is transmitted from any suitable power, in any suitable manner. A set of form inking and distributing rolls *F*, *F'*, is provided for each cylinder, at the side opposite the driving mechanism, said rolls may be journaled in webs *f*, *f'*, strung upon the cylinder shafts, as indicated in the drawings, or connected to the cylinder in any suitable manner to travel therewith, ink being supplied to each set of rolls from fountains *G*, *G'*, secured in the main frame opposite the outer end of each bed as indicated in the drawings.

In the press shown the cylinders are provided with grippers, and when the upper cylinder is at the extreme limit of its outward stroke it stands with the grippers uppermost in position to receive or take a sheet of paper from the feed board *H*, or other suitable supply. As it moves inward the sheet is imprinted, and the cylinder making one revolution and a half stops at the other extreme of its stroke, at the same time the lower cylinder reaches the extreme limit of its inward movement and stops with its grippers uppermost. While the cylinders are in about this posi-

tion the gripper fingers of the upper cylinder release the sheet, and simultaneously the gripper fingers of the lower cylinder catch it, and as the cylinders move back on their outward strokes the sheet is transferred to, and reversed on the lower cylinder and thereby imprinted on the lower form and subsequently taken from the lower cylinder by any suitable delivery mechanism, not shown. While the cylinders are at the inner adjoining ends of the beds, the "throw off" is operated so that the upper cylinder will not contact with the forms and the lower cylinder will during their outward stroke, and after the cylinders have passed over the forms on their outward stroke the "throw off" is again operated, so that during the inward stroke of the cylinders the upper cylinder will contact with the forms and the lower one will not, thus the cylinders print alternately, and the sheet is imprinted on opposite sides from upper and lower forms by the respective cylinders, the forms being freshly inked after each impression by the form rollers.

From the foregoing it will be seen that the important feature in the operation is that the locomotive cylinders simultaneously move respectively toward the feed and delivery, one in impression and one out of impression, and simultaneously moved inward toward each other so that at a certain point the sheet is transferred from one locomotive cylinder to the other, and reversed in the transfer, a sheet being perfected for each complete reciprocation of the cylinders.

The gripping devices and their actuating mechanism may be of any desired kind. In the drawings I have illustrated one form which can be employed. The gripper fingers are mounted on rods *I* journaled in the ends of the cylinder as usual,—on the outer ends of the rods are secured cross-pieces *J*, and one end of the cross-piece is pivotally connected to a rod *j* playing through a rocking eye *K* attached to the end of cylinder, a spring *k*, interposed between this eye and a collar on the rod, serving to push the rod outward and to hold the fingers closed or unclosed, as indicated in Fig. 5 after the cross-piece is turned (with the rod *I*) so that the joint between rod *j* and the cross-piece, passes the direct line between the rod and eye. When the cylinders reach the outer limit of their stroke the cross-pieces are struck by tappet pieces *L*, *L'*, respectively secured to the frame as indicated in Fig. 1, and the fingers of the upper cylinder closed, and those of the lower cylinder opened. When the cylinders are at the inner limit of their stroke, and preferably after they come to rest, the cross-pieces are struck by tappets *N*, *N'*, mounted on a slide *O*, which is operated by means of a pitman *O'* and spring controlled lever *O*² from a cam projection *d*² on the periphery of one cam disk *d*, see Figs. 1, 4 and 5. The tappet *N'* (as shown) is on the inside of the frame and *O'* on the outside,

N' being attached to slide O by an arm or lug extending over or through a slot in the side frame, see Figs. 4 and 6, this being necessary in the press shown as the lower cylinder is shorter than the upper cylinder. The tap-

pets are arranged so as to contact either the inner or outer ends of cross-pieces J, according to whether the fingers are to open or close. R designates a roller journaled beside the inner end of the upper bed, its function being to prevent contact of the sheet with the upper bed while the sheet is being transferred from one cylinder to the other and to facilitate such transfer, it might perhaps be dispensed with. As shown in Fig. 6 the lower cylinder is shorter than the upper cylinder to permit the cylinder bed bearers to be moved as described without interfering with each other, and to allow the cylinders to be drawn close together at the inner end of their strokes, so that the lower cylinder can take the sheet from the upper cylinder. This is one way of providing for the approximation of the cylinders, and is sufficient for illustrating an operative construction.

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

1. The combination of a pair of stationary type beds arranged one above the other, a pair of traveling impression cylinders respectively reciprocating over the upper and lower beds and paper gripping mechanism co-acting therewith, whereby a sheet of paper may be presented to printing forms and printed upon one side by the operation of the first reciprocating impression cylinder as it contacts with the forms of the first stationary bed; said sheet being thereafter immediately transferred from the first impression cylinder to, and reversed upon the periphery of the second impression cylinder, which latter in its operation over the forms of the second stationary bed "perfects the sheet," substantially as set forth.

2. The combination of a pair of type beds arranged at an angle to each other, with a pair of traveling cylinders respectively reciprocating over the said beds and means for transferring a sheet of paper from one cylinder to the other, substantially as set forth.

3. The combination of a pair of type beds arranged one above and at an angle to the other; a traveling cylinder for each bed, means for transferring the sheet from one cylinder to the other, and mechanism for throwing said cylinders on and off impression so that they print alternately, substantially as and for the purpose set forth.

4. The combination of two inclined type beds, two traveling cylinders co-acting therewith, and gripper mechanism whereby a sheet is directly transferred from one cylinder to the other when they are at the adjoining ends of the bed, substantially as specified.

5. The combination of a pair of type beds,

inclined with relation to each other, a traveling gripper cylinder for each bed, and means for simultaneously moving said cylinders back and forth over their respective beds, so that the cylinders alternately approach, and recede from each other, and a "throw off" mechanism whereby the cylinders are caused to print alternately, respectively upon the forward and backward strokes thereof, substantially as and for the purpose set forth.

6. The combination of two inclined type beds, two traveling cylinders co-acting therewith, and mechanism whereby a sheet is directly transferred from one cylinder to the other when they are at the adjoining ends of the beds, and longitudinally movable bearers for each cylinder whereby the cylinders may be caused to print alternately, respectively on the forward and backward strokes, substantially as described.

7. The combination of two stationary type beds each arranged face uppermost and inclined toward the other at one end one bed facing the back of the other; with a traveling cylinder for each bed, and mechanism for simultaneously reciprocating said cylinders, and means for transferring a sheet from one cylinder to the other, substantially as specified.

8. The combination of two type beds inclined toward each other, one bed facing the back of the other, a traveling cylinder for each bed, inking rollers beside and traveling with the respective cylinders, the ink fountains and the main shaft, crank wheels thereon, and pitman connections between said wheels and cylinders for reciprocating the latter, and means for transferring a sheet from one cylinder to the other, substantially as specified.

9. The combination of the inclined type beds, the traveling cylinders co-acting with said beds, means for transferring the sheet from one cylinder to the other, and the guard roller at the end of one bed, all constructed and arranged to operate substantially as and for the purpose set forth.

10. The combination of the oppositely inclined type beds arranged one over the other; with a traveling cylinder for each bed, the lower cylinder being shorter than the upper, and means for transferring a sheet from one cylinder to the other, substantially as and for the purpose described.

11. The combination of the oppositely inclined type beds arranged one over the other with a traveling cylinder for each bed the lower cylinder being shorter than the upper; and "throw off" mechanism whereby one cylinder prints on the forward stroke, and the other on the backward stroke, and means for transferring a sheet from one cylinder to the other, all constructed substantially as and for the purpose set forth.

12. A pair of type beds, arranged one above and at an angle to the other substantially as

described and facing in substantially the
same direction, a pair of traveling cylinders
respectively co-acting with type forms on the
respective beds, and a "throw off" mechan-
5 ism whereby each cylinder prints while mov-
ing in one direction only, substantially as
described.

In testimony that I claim the foregoing as
my own I affix my signature in presence of two
witnesses.

JOSEPH L. COX.

Witnesses:

E. D. AUSTIN,
A. L. FOGG.