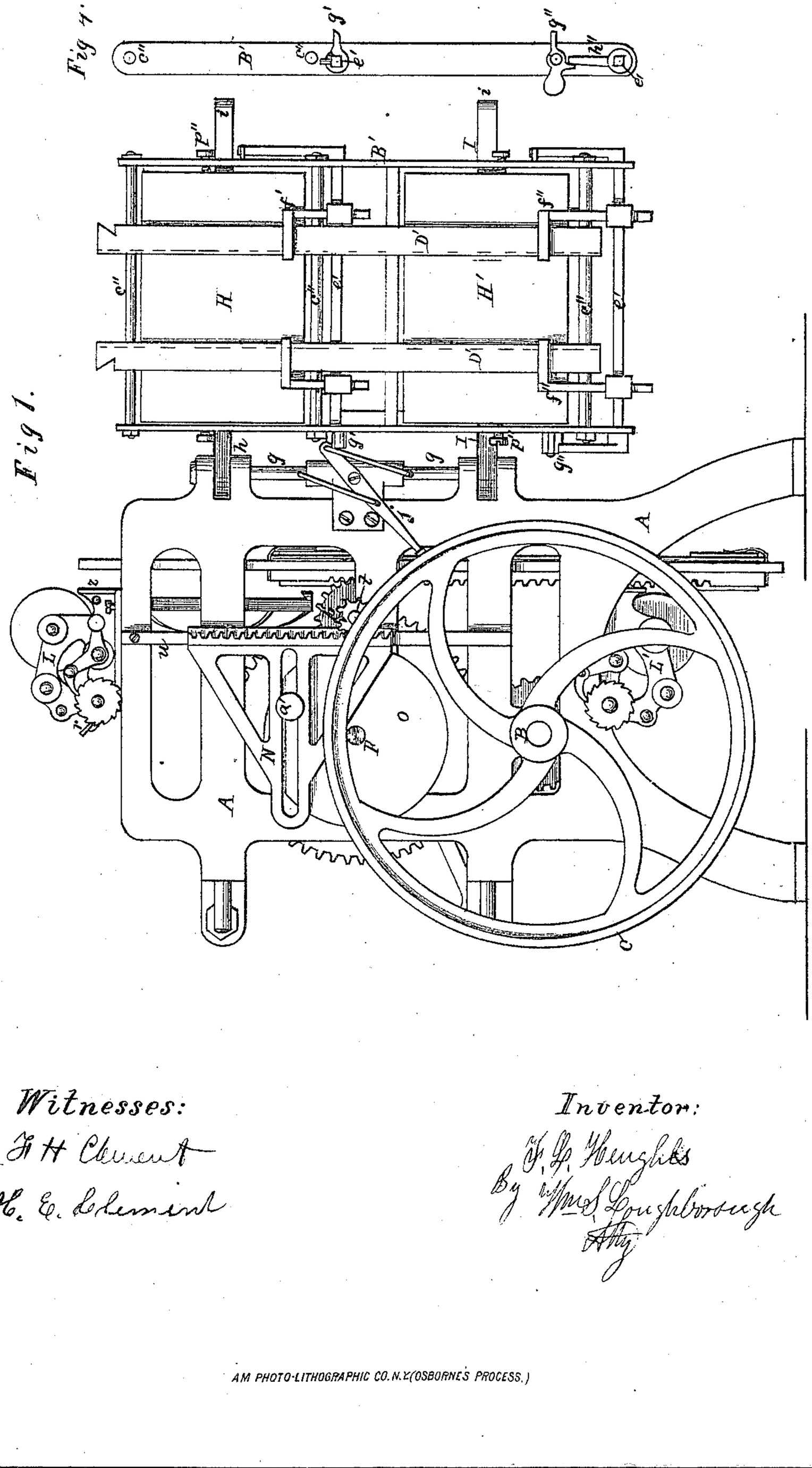
2 Sheets--Sheet 1.

F. L. HEUGHES.

Chromatic Printing-Presses.

No. 134,380. Patented Dec. 31, 1872.

Fig 1.



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2 Sheets--Sheet 2.

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Fig 3.

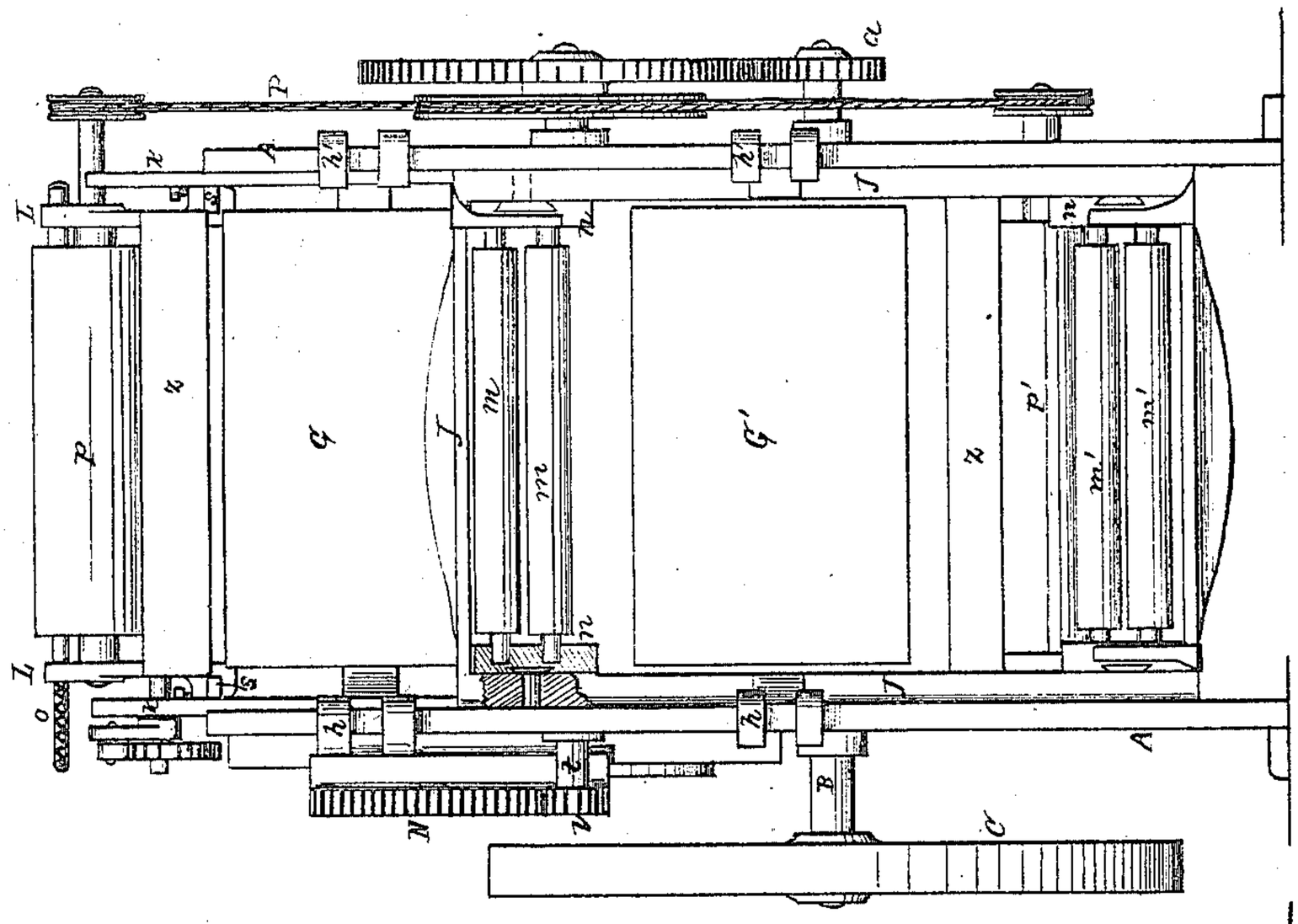
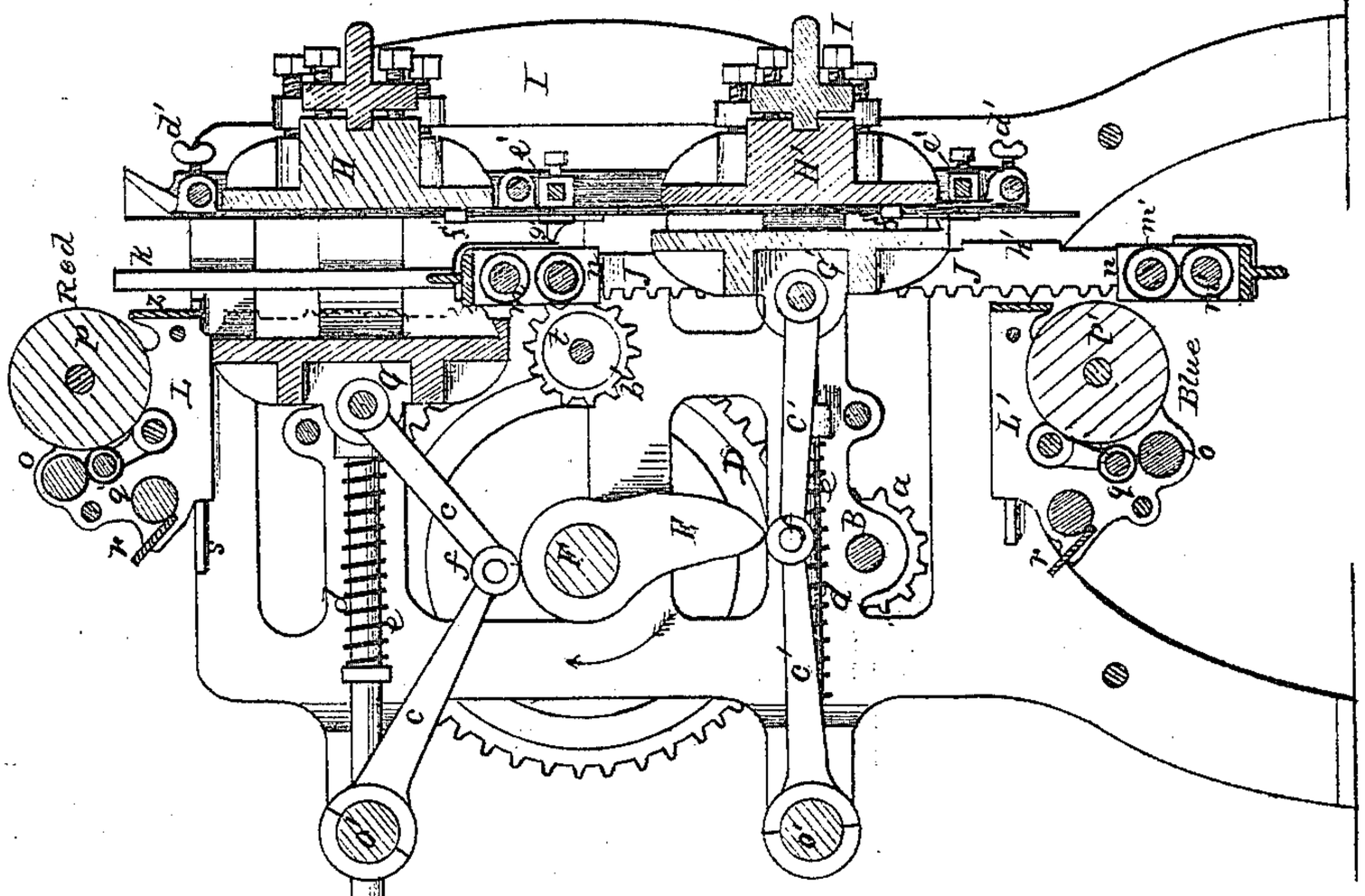


Fig 2.



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UNITED STATES PATENT OFFICE.

FREDERICK L. HEUGHES, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN CHROMATIC-PRINTING PRESSES.

Specification forming part of Letters Patent No. **134,380**, dated December 31, 1872.

To all whom it may concern:

Be it known that I, FREDERICK LEE HEUGHES, of Rochester, in the county of Monroe and State of New York, have invented certain Improvements in Chromatic-Printing Presses, of which the following is a specification:

The object of my invention is to provide a press for printing in several colors at the same time, and also one that can be worked at a high speed on one color; and it consists more especially in the combination of a series of type-beds and platens corresponding in number to the number of colors desired to be used, and arranged in a common vertical or nearly vertical line, the inking apparatus of each being entirely distinct, but operated by mechanism common to all.

In the drawing, Figure 1 is a side elevation of my invention, showing the platen-gate open. Fig. 2 is a vertical section in a plane parallel with the elevation, Fig. 1, with the platen-gate closed. Fig. 3 is a front elevation with the platen-gate removed.

A, Figs. 1, 2, and 3, is a supporting-frame, to which the various parts of my press are attached. B is the driving-shaft, provided with a fly-wheel, C, and having a pinion, *a*, Figs. 2 and 3, meshing into a gear, D, upon the shaft F, Figs. 1 and 2. The shaft F is parallel with B, and is provided with a cam, E, which in its revolution actuates alternately the knee-levers *c* and *c'*. G G', Figs. 2 and 3, are type-beds, which move horizontally upon ways or guides *d* attached either to the beds or to the frame of the press, as desired. These beds are alternately forced toward the platens H H' by means of the knee-levers *c c'*, which are hinged to the type-beds and to strong cross-ribs *o'* of the frame A, and are in turn actuated by the cam E. Springs *e*, Fig. 2, operate to withdraw the type-beds and by this means also the friction-rollers *f*, which, at the central joint of the toggles, are kept in constant contact with the face of the cam E, whereby said toggles may be worked at a high speed without concussion. The platens H H' are attached in a suitable manner to a frame or gate, I, Figs. 1 and 2, which is hinged at one side to lugs *h'*, Fig. 3, on the main frame A, and is retained in operating position by the sliding bolts *g*, Fig. 1, which move in the lugs *h* and enter openings in the ears *i* upon the platen-frame, when it is swung into place. The bolts *g* are shown as operated simultaneously by the hand-lever *j*; but any other suitable or convenient means may be adopted for forcing them into place. By this plan of hinging the platen-gate to the frame, both type and platens may be very quickly exposed to view, as indicated in Figs. 1 and 3, and any adjustment or alteration readily made.

The inking apparatus is shown more clearly in Figs. 2 and 3, the roller-frame J moving upon ways K, which are parallel with the faces of the type-beds and platens. It is provided at or near each end with sets of inking-rollers *m m'*, having bearings in adjustable boxes *n*. As the roller-frame reciprocates upon its ways, the sets *m* and *m'* of inking-rollers come in contact alternately with the fountain-distributers *p* and *p'*, from which they receive ink and convey it to the face of the types upon the beds G and G'. The rollers *p* and *p'* have bearings upon light frames L L', which also support the traveling-rollers *o*, the carrier-rollers *q*, fountains *r*, and "flat distribution" *z*, all of which may be constructed and operated in the manner usual in printing-presses. The frames L L' are made to slide upon ways *s* upon the frame of the machine, on which they are clamped by binding-screws. By this means any inking-fountain with its distributing apparatus may be removed in a few minutes and replaced by another containing a different colored ink.

Motion is communicated to the roller-frame J by means of the shaft *t*, Figs. 1 and 2, having pinions *b'* meshing into racks upon the side bars of the frame, as indicated, and this shaft is in turn actuated by a reciprocating rack, N, Fig. 1, which meshes into a pinion, *v*, Figs. 1 and 3, on the extremity of said shaft. The rack N moves vertically upon a guide, *u*, upon the frame of the machine, and is thus operated by means of a crank, O, upon the cam-shaft F, the pin *a'* of which works in a horizontal slot in said rack. The pinions *b'* and *v* and the stroke of the crank O are so proportioned that the requisite reciprocation of the roller-frame J is pro-

duced at each revolution of the shaft F, and it will be observed that such reciprocation is thus simultaneous and corresponsive with the movements of the type-beds G G′. By reason of this construction of the parts and the proper relative arrangement of the crank O and cam E, the inking-frame J is at one extremity (and consequently at the slowest part) of its stroke, while the corresponding type-bed is being moved forward to make an impression. Furthermore, a considerable portion of the face of the cam E is made concentric with the shaft F, as indicated in Fig. 2, whereby one set of toggles and a type-bed are at rest during the forward movement of the other type-bed, such period of rest being sufficient to allow the sets of inking-rollers *m* or *m′* to pass over the form and return. Upon the platen-gate I, I provide a card-slide attachment, which consists mainly of a light frame, B′, Fig. 1, having cross bars or rods *c″* upon which the vertical guides D′ are adjustable by means of thumb-screws *d′*, Fig. 2, for the purpose of admitting cards of various sizes. This frame fits over the edges of the platens loosely, and is retained thereon by clamp-screws *p″*, whereby the whole may be removed from the platen-gate in a few minutes. The guides D′ have a slight groove upon their inner edges, terminating in a funnel at the top, to receive the cards in the usual manner. Rock-shafts *e′* have bearings upon the side bars of the frame B′, and the stops *f′* are adjustable longitudinally thereon to correspond with the adjustment of the guides D′. These stops extend over the inner edges of the guides and are held against the platens H H′ by slight springs. The card drops down the grooves in the guides D′ against these stops and receives the impression, when, by a slight oscillation of the rock-shafts *e′*, the stops are raised and the card passes down and eventually out of the machine. The oscillation of the rock-shafts is effected at the proper time by means of the toes *g′ g″*, Figs. 1, 2, and 4, the former acting upon its rock-shaft in a downward direction only and the latter upward only, both being free one way, as indicated in Fig. 4. A projection, *h′*, Fig. 2, upon the inking-frame J comes in contact with these toes alternately as said frame reciprocates, and allows the card to drop at the proper moment.

The operation of my machine is as follows: Suppose ink of a certain color to be supplied to one of the fountains *r* and a different color to the other, and the press to be set in motion. The inking-frame J passes down and the rollers *m′* receive ink from the lower fountain while the rollers *m* pass over the upper form and ink it. Upon the return of the inking-frame the bed G advances and makes the impression, a card having been dropped into the slide by the operator at the proper moment, which falls by its own weight and rests upon the stops *f′*. As the inking-frame begins to descend the projection *h′* upon it trips the toe *g′*, thus lifting the stops *f′* and allowing the card to drop by its own gravity to the next platen and rest upon the stops *f″*, in which position it receives an impression from the types upon the bed G′. At the next ascent of the inking-frame the toe *g″* is tripped and the card thus allowed to drop into a receptacle provided for it below the machine.

It will be observed that by the proper relative arrangement of the types in the two forms, as now practiced in color-printing by two distinct operations, the same work is performed at a single operation, the two beds and platens and their inking devices being entirely separate, but co-acting, as set forth. It will also be seen that by a multiplication of the type-beds and platens in the same general line three, four, or six or more colors can be printed in the same manner at a single operation, the parts being all actuated from a single driving-shaft.

Furthermore, the press is well adapted to plain work in one color by simply throwing one of the toggles out of contact with the cam E, and by means of the peculiar construction of the cam and toggles a speed equal to that realized upon a cylinder-press may be maintained without difficulty. A great advantage is also gained by the arrangement of the platens upon the swinging gate I, by which the types and the main working portions of the machine are rendered easy of access almost instantaneously.

For feeding sheets into a press of this character it is proposed to use an endless griper-carrier running over suitable wheels, and arranged to introduce, transfer, and deliver the sheet at the proper time by means of automatic devices provided for that purpose; and this portion of the press has been made the subject of a separate application for a patent.

What I claim as my invention is—

1. The combination, in a printing-press, of two or more type-beds, G and G′, with their separate inking apparatus *m* and *n* and *m′* and *n′*, and the platens H and H′, arranged in the same vertical or nearly vertical line, whereby the sheet or card to be printed may pass by its own gravity from one platen to the other when the pressure is removed therefrom, after an impression is given, the parts operating substantially as shown and described, for the purpose of printing upon the same sheet or card two or more distinct colors.

2. The combination, in a printing-press, of two type-beds, G G′, working alternately, platens H H′, and the reciprocating inking-frame J, operating conjointly, for the purposes set forth.

3. The platen-gate I constructed and arranged to be locked in position while the press is in operation, but swinging readily upon

hinges to permit easy access to the type-beds and platens, substantially as described.

4. The combination, in a printing-press, of two type-beds, G and G′, having sets of toggles *c c′* and revolving cam E common to both, arranged to operate substantially as described.

5. The card-slide frame B′ *c″* arranged to be attached to the platens by binding-screws *p″*, substantially as set forth.

6. The stops *f′ f″*, rock-shafts *e′*, and toes *g′ g″*, in combination with the tripper *h′*, operating substantially as set forth.

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