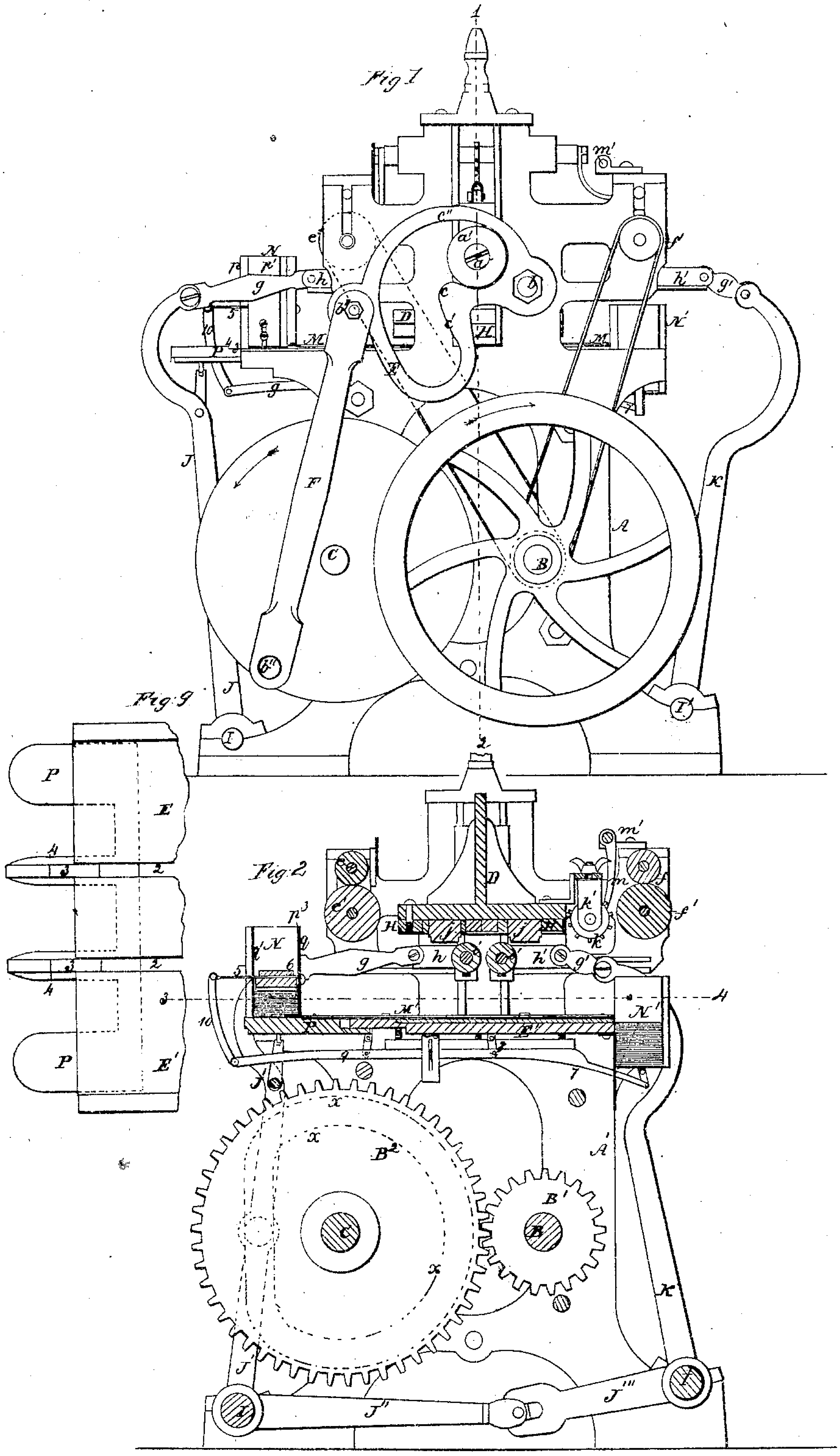
G. J. Hill & S. Greene. Sheet 1. 2 Sheets.

Printing Press.

No. 57634. Patented Aug. 28. 1866.



Witnesses:

Wm Albert Steel

J. H. Horace Gooding

Inventor:

G. J. Hill & S. Greene. Sheet 2. 2 Sheets.

Printing Press.

No. 57634. Patented Aug. 28. 1866.

Fig. 3

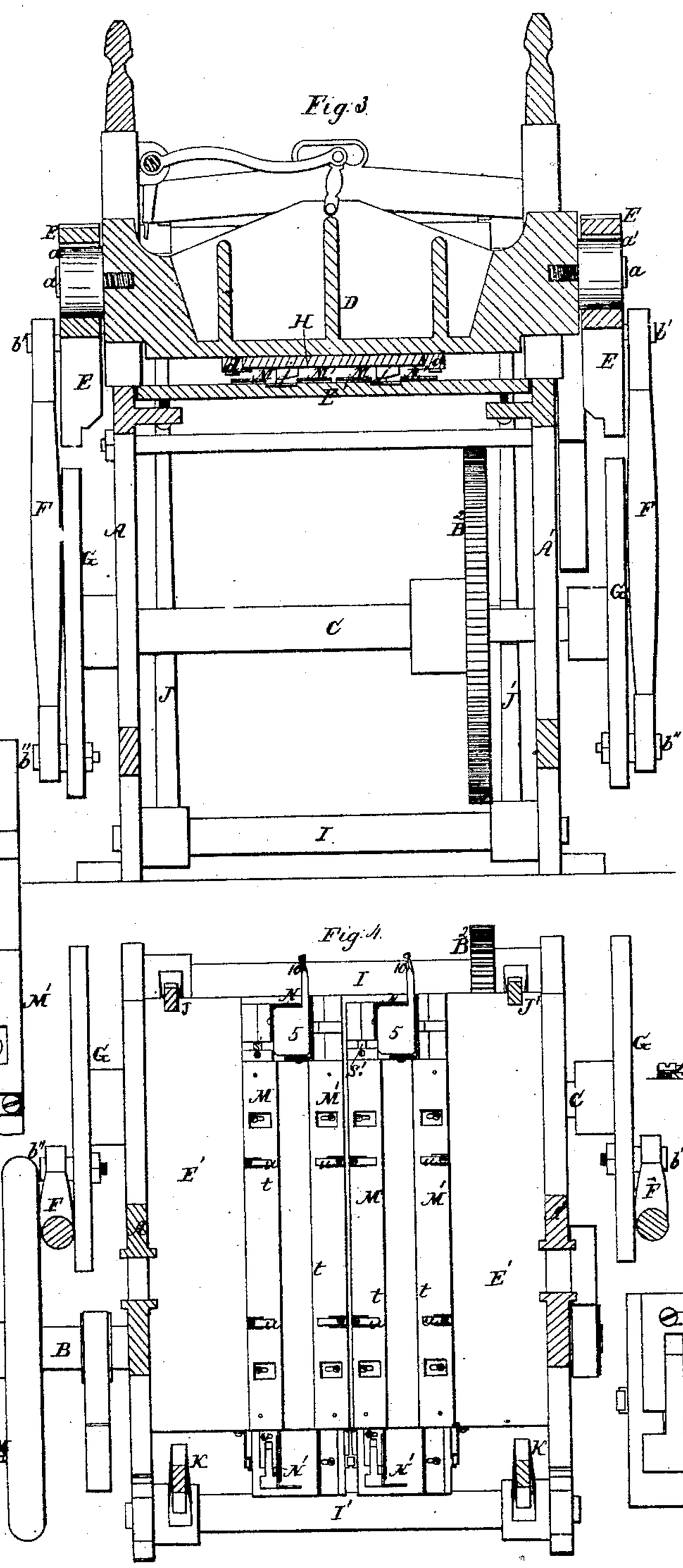


Fig. 5.

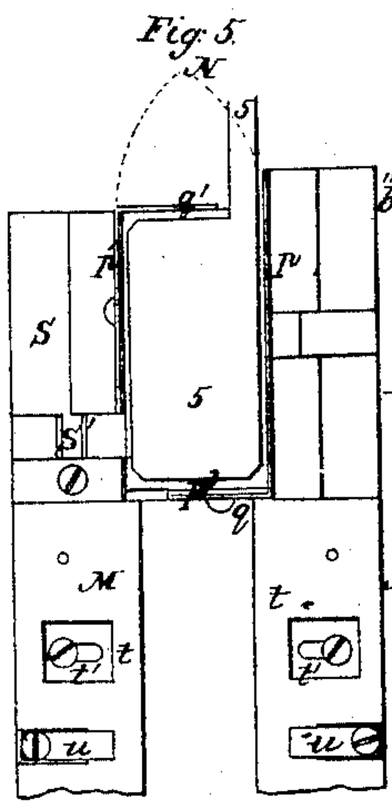


Fig. 4.

Fig. 7.

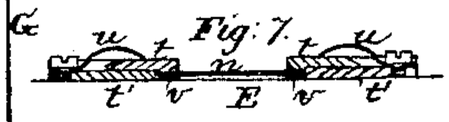


Fig. 6.

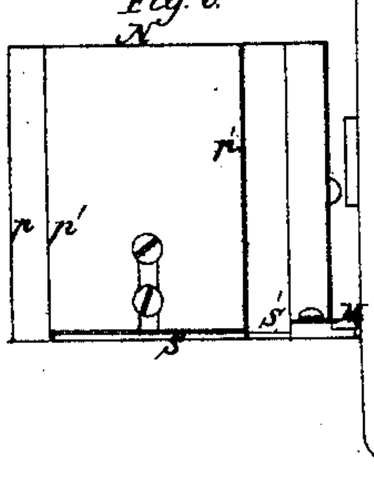
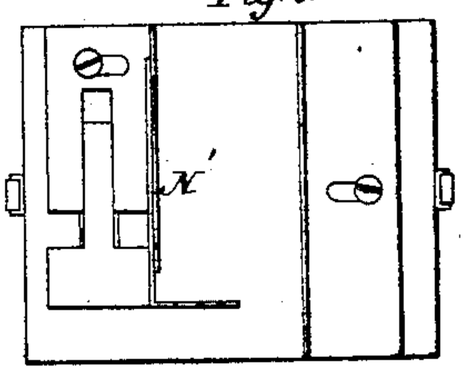


Fig. 8.



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By their Attys
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UNITED STATES PATENT OFFICE.

GEORGE J. HILL, OF BUFFALO, NEW YORK, AND STEPHEN GREENE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO STEPHEN GREENE AND H. G. LEISENNING, OF SAME PLACE.

IMPROVEMENT IN PRINTING-PRESSES.

Specification forming part of Letters Patent No. **57,634**, dated August 28, 1866.

To all whom it may concern:

Be it known that we, GEORGE J. HILL, of Buffalo, New York, and STEPHEN GREENE, of Philadelphia, Pennsylvania, have invented certain Improvements in Printing-Presses; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Our invention consists of certain mechanism, fully described hereinafter, for printing cards and other objects, the invention being especially adapted to the printing of cards in different colors with rapidity and accuracy.

In order to enable others skilled in the art to make and use our invention, we will now proceed to describe its construction and operations.

On reference to the accompanying drawings, which form a part of this specification, Figure 1, Drawing No. 1, is a side view of our improved printing-press; Fig. 2, a vertical section of the same; Fig. 3, Drawing 2, a transverse vertical section on the line 1 2, Fig. 1; Fig. 4, a sectional plan on the line 3 4, Fig. 2; Figs. 5, 6, 7, 8, and 9, detached views of parts of the machine.

A and A′ are the side frames of the machine, in which turns the main driving-shaft B, having a pinion, B′, gearing into a wheel, B^2, on the shaft C, which also turns in the side frames.

D is the cross-head carrying the form of types, and E′ a bed-plate, the former being arranged to slide vertically in guides formed in the opposite side frames, and the bed-plate being firmly secured between the latter.

On each end of the cross-head is a pin, *a*, on which turns a roller, *a′*, the latter projecting into the opening of a cam-lever, E, one of which is hung by a pin, *b*, to the outside of each of the side frames A and A′.

The outer end of each cam-lever has a pin, *b′*, embraced by the upper end of a connecting-rod, F, the lower end of which is connected to a pin, b^2, on a crank-wheel, G, one of which is secured to each end of the shaft C.

It will be observed that the cam-levers are of peculiar form, for the purpose of imparting an intermittent reciprocating motion to the cross-head.

As seen in Fig. 1, the roller *a′* occupies a position in a recess in the cam-lever, the cross-head being at the limit of its downward movement when the cam-lever and roller bear this relative position to each other. On moving the crank-wheels in the direction of the arrow the cam-levers will be simultaneously elevated, and, owing to the abrupt projection *c*, which bears against the periphery of the roller, the cross-head must be suddenly elevated. As soon as the rounded end of this projection approaches the limit of its upward movement that of the cross-head ceases, although that of the cam-lever continues, owing to the portion *c′* of the cam-lever forming a part of the circumference of a circle of which the pin *b* is the center.

It will thus be seen that after the cross-head reaches the limit of its upward movement it remains stationary for a sufficient length of time to enable the inking-rollers, described hereinafter, to perform their duty, the cross-head still hesitating after the cam-levers have commenced their downward movement, and until the projection *c* reaches the point above alluded to, after which the descent of the cross-head will be rapid, and on approaching the limit of its downward movement will be acted on by a continually-increasing force until the impression has been made. This is owing to the edge c^2 of the cam acting on the periphery of the roller with a continually-increasing leverage until the downward movement of the cross-head has been completed.

It should be here understood that the cross-head is balanced, so that it requires as much power to depress it as to elevate it.

It will also be understood that the cam-levers E, connecting-rods F, rollers *a′*, and crank-wheels G are the same on both sides of the machine.

The chase H, containing the form, is retained in its proper position against the under side of the cross-head by guides *d d*.

The machine has two distinct inking apparatus, operating in unison—one for one color, the other for another.

In the front of the machine are the two distributing-rollers *e* and *e'*, and at the rear of the machine two similar rollers, *f f'*. The former may be supposed to be used for distributing red ink, and the latter for black ink. The operation of these rollers may be similar to those of other printing-presses, and they may be driven by suitable belts or gearing from the main shaft of the machine.

I and I' are two rock-shafts adapted to bearings in the opposite side frames of the machine, and to the shaft I are secured the two arms J and J', (see Figs. 2 and 3,) and on the arm J' is a pin carrying a roller which projects into a cam-groove formed in one side of the cog-wheel B^2, the form of this groove being indicated by dotted lines *x x*, Fig. 2.

From the rock-shaft I projects an arm, J^2, which is coupled, in the manner illustrated in Fig. 2, to an arm, J^3, on the rock-shaft I', to which also are secured the two arms K K.

Each of the arms J and J' is connected by a rod, *g*, to a block, *h*, and each of the arms K K by a rod, *g'*, to a block, *h'*, each block being arranged to slide horizontally in guides on the inside of the adjacent frame.

The journals of the inking-roller *i* turn in, and are carried by the opposite sliding blocks *h*, and the journals of the inking-roller *i'* turn in the opposite sliding blocks *h'*.

In the present instance four forms are used—two for the red ink, and two for the black; but a greater number of forms may be used for each color. In Fig. 2 but two forms, *j* and *j'*, appear, the former for the red ink and the latter for the black.

Through the cam-groove in the cog-wheel B^2, and through the system of arms described above, such a simultaneous movement is imparted to the whole of the sliding blocks *h h'* that the red ink is conveyed by the roller *i* from the roller *e'* to the form *j* during the same time in which the black ink is conveyed by the roller *i'* from the roller *f'* to the form *j'*.

At the rear of the machine may be arranged any desired number of numbering-wheels *k*, which revolve in hangers secured to the cross-head D, motion being imparted to these wheels by pawls *m* on a rod, *m'*, in a manner which will be readily understood by those familiar with this class of machinery.

I will now proceed to describe the mechanism by which the cards to be printed are fed to the press, in doing which it will be necessary to refer to the enlarged views, Figs. 5, 6, 7, 8, and 9.

The cards are, in the first instance, cut to the desired size and deposited in a box, N, consisting of the plates *p* and *p'* and *q* and *q'*, the latter forming a part of the plate *p'*, and the plate *q* forming a part of the plate *p*, the four plates inclosing, or nearly inclosing, a space just large enough to admit the cards. (See Fig. 5.)

The plates *p'* and *q'* are secured to, or form a part of, the base *s*, which rests on the bed-plate of the machine, and which has a dove-tailed projection, *s'*, adapted to slide into a dovetailed recess in the under side of the guide M, as seen in Fig. 5, the plates *p* and *q* of the card-box being secured directly to the guide M'. Each of these guides consists of two metal strips, *t* and *t'*, (best observed on reference to the transverse section, Fig. 7,) the lower strips being secured directly to the bed-plate E' of the press, and the upper strips, *t*, being so adjusted to the lower strips that the former cannot move either longitudinally or laterally independently of the latter. The upper strip is, however, self-adjusting, vertically, to the thickness of the cards which traverse beneath its inner edge, springs *u*, secured to the under strip, bearing on the upper strip, as seen in Figs. 5 and 7. Each lower strip has a thin lip, *v*, on which the traversing cards rest.

Beneath the box N is the feeding-plate P, a plan view of which is represented, partly in dotted lines, in Fig. 9, the plate extending across the press, and being arranged to slide beneath and in contact therewith, the ends of the plate being adapted to suitable guides.

It should be understood that in the present instance the press is furnished with two feeding apparatus, to suit two sets of printing-forms, and that there may be additional feeders and additional forms, in accordance with the capacity of the press.

Two slots, 2 2, Fig. 9, are cut in the bed of the machine for the reception of the bars 3 3, on which are formed shoulders 4 4, of a depth sufficient to push the cards forward.

A reciprocating motion is imparted to the feeding-slide, in the present instance, from the arms J, in a manner which it is not necessary to describe minutely.

The cards, as before described, are deposited in the box N, beneath a plate, 5, Fig. 2, on which is a weight, 6, and the cards are delivered into a box, N', which is so guided that it can move vertically only, and which is connected to a lever, 7, hung to the under side of the bed-plate E', this lever being connected to another lever, 9, also hung to the bed-plate, and the latter lever being connected to the above-mentioned plate 5 by a rod, 10, this arrangement of levers being such that on a card being pushed from the box N the descent of the plate 5 and that of the box N' will be simultaneous and equal in extent—that is, equal to the thickness of the card. By thus causing the position of the box N' to be controlled by the quantity of cards in the box N, the cards received into the former box will be arranged in a uniform mass.

On the feeding-slide being moved forward the shoulder 4 will strike the lowest card and push it forward from and clear of the box N, so that the next card can at once take the place previously occupied by that pushed out, the latter occupying a position between, and being held by, the two plates *t* and *t'* of the guides until another card is pushed forward, when the first card is also moved to the extent of its own length, and this is continued until

it is in a proper position to receive the desired impression, after which it is again moved forward, as before, until it is dropped into the box. A continuous succession of cards are thus acted upon and printed in two colors as the press operates.

It will be seen, on referring to Fig. 5, that the box N admits of ready adjustment to suit cards of varying sizes. Thus, when longer cards have to be printed, the portion of the box composed of the plates p' and q' is moved outward to the desired extent; and when wider cards have to be printed the guides M and M′ are moved apart from each other the proper distance, carrying with them their respective portions of the box. The box, too, admits of ready adjustment to suit cards of different thicknesses, for a plate, p^3, Fig. 5, fits against and is so secured to the plate q of the box as to be adjusted vertically and secured after adjustment. It is the proper distance of the lower edge of this plate from the upper surface of the lip v of the guides which prevents more than one card being moved from the box at one time.

It should be understood that a blanket extends along the bed of the press between and under each pair of guides, so as to afford a proper yielding-surface for the cards while they are receiving their impressions.

Without confining ourselves to the precise arrangement of the several parts herein described—

We claim as our invention, and desire to secure by Letters Patent—

1. The vibrating cam-levers, constructed and arranged for the operating of a guided cross-head, D, substantially as herein set forth.

2. The guides M M′, composed of plates constructed and arranged for vertical self-adjustability to suit cards differing in thickness, and for the retention and guidance of the cards, substantially as set forth.

3. The combination of the said guides M and M′ with the ticket or card box N.

4. The movable receiving-box N′, when the vertical position of the same is controlled by the quantity of cards in the box N, through the medium of the devices herein described, or any equivalent to the same, for the purpose specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEORGE J. HILL.
STEPHEN GREENE.

Witnesses:
CHARLES E. FOSTER,
JOHN WHITE.