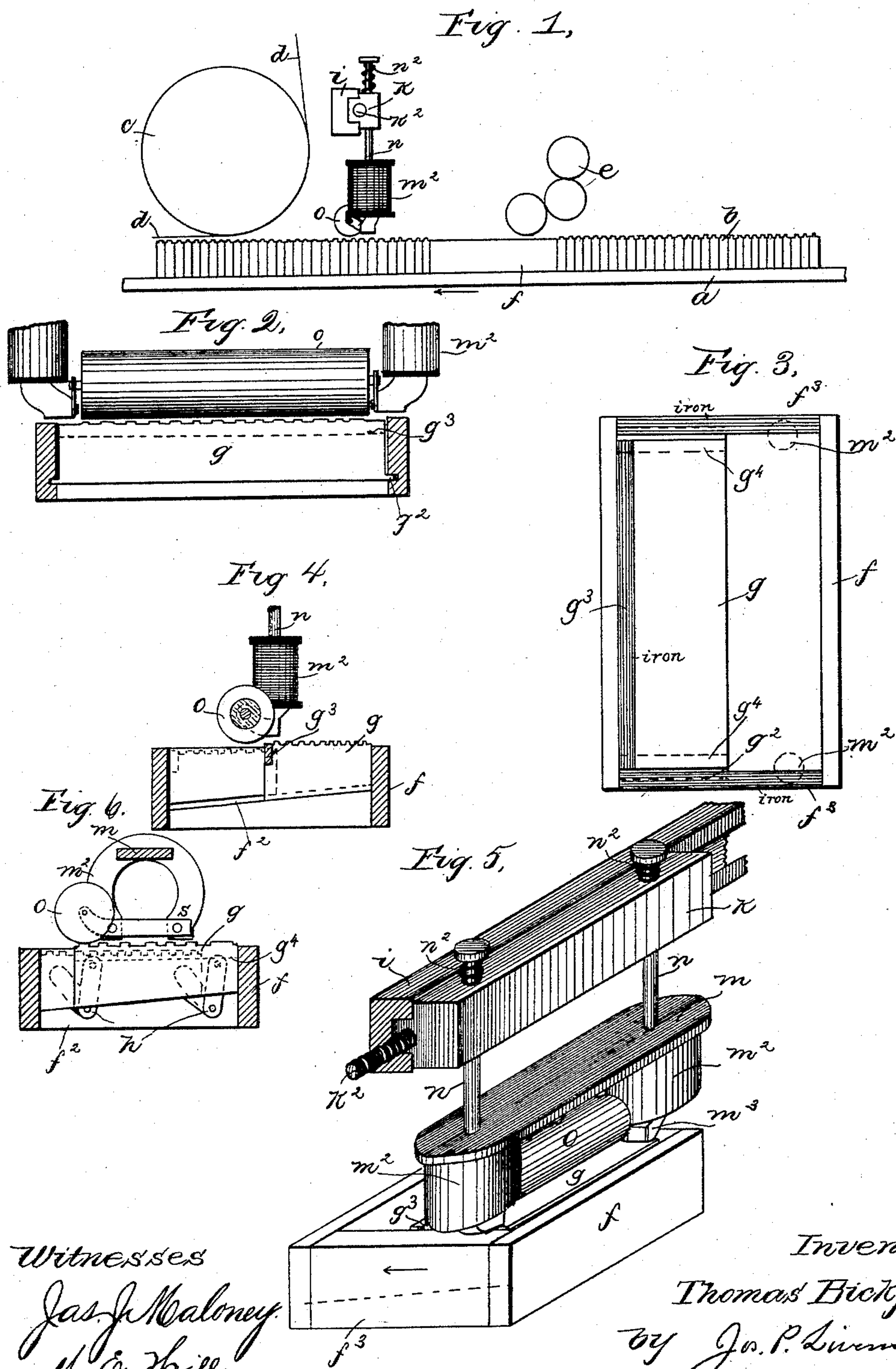


(No Model.)

T. BICKFORD.
COLOR PRINTING APPARATUS.

No. 456,466.

Patented July 21, 1891.



Witnesses

Jas. J. Maloney.
W. E. Hill

Inventor.

Thomas Bickford.
by J. P. Livmore
Att'y.

UNITED STATES PATENT OFFICE.

THOMAS BICKFORD, OF BRANFORD, CONNECTICUT.

COLOR-PRINTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 456,466, dated July 21, 1891.

Application filed May 6, 1890. Serial No. 350,802. (No model.)

To all whom it may concern:

Be it known that I, THOMAS BICKFORD, of Branford, county of New Haven, State of Connecticut, have invented an Improvement
5 in Color-Printing Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 My invention is embodied in a printing apparatus of that kind, in which sheets are printed having portions of the impression in an ink of different colors from that used on the remainder of the sheet, the object being
15 to provide a simple, durable, and efficient apparatus capable of ready application to presses of ordinary construction, by which a section of the type or stereotype-plate may be inked with an ink of different color from the re-
20 mainder of the type.

The invention is embodied in an apparatus comprising a chase or frame which may be set up at any desired position in the main body of the type, the said chase containing a
25 movable type-form and support therefor, on which the type-form may be supported with its printing-face at different levels, said form being laterally movable in the chase to change it from a higher to a lower level and operat-
30 ing in combination with a special inking device, shown in this instance as comprising an inking-roller supported in a movable frame normally a short distance above the face of the type on the bed of the press, said roller-
35 frame being provided with a magnet which may be either a permanent steel magnet or an electro-magnet, the poles of which extend toward the type-face and co-operate with ar-
40 matures on the movable type-form and also on the chase if necessary, by which, when the said form travels below said inking mechanism, the latter is drawn down by the attrac-
45 tion of the magnet, bringing its inking-roll to the level of the type, said magnet also oper- ating to raise the movable type-form as the latter is approaching the point where the im-
50 pression is made, thus bringing it into position to be acted upon by the special inking-roll and also to make its impression, while the same device acts, when the bed is moving in the opposite direction, to lower the movable

type-form, so that it passes the main inking-rolls without receiving ink therefrom.

In the apparatus shown for illustrating the invention the special inking-roller has a
55 downward movement for the purpose of inking the special type-section, which is at the general type level while being inked; but it is obvious that it is essential only that the special type-section and its inking-roller shall
60 have such movement or such changes in relative position that the special inking-roller shall not touch the general type, but shall touch the special type-section, and the said
65 special type-section must not touch the general inking-rollers, but must be at general type level when passing the impression-rollers.

Figure 1 is a diagram view showing in longitudinal sectional elevation a sufficient portion of a printing-press to illustrate this invention; 70
Fig. 2, a longitudinal section of the chase and movable type-form, showing also a portion of the special inking mechanism; Fig. 3, a plan view thereof; Fig. 4, a transverse section of the movable type-form and special inking
75 mechanism; Fig. 5, a perspective view thereof, and Fig. 6 a transverse sectional elevation of the chase and movable type-form having a slightly modified construction.

The invention may be employed in connec- 80
tion with a press of any suitable or usual construction, being shown in Fig. 1 as applied to a press having a flat reciprocating bed *a*, that supports the usual type or printing plate *b*, and which, when moving in the direction of
85 the arrow, causes the said type, previously inked, to pass beneath the impression-roll *c*, by which the impression is made on the sheet *d*, which may be fed to the press in any suitable or usual manner. When the bed *a* is
90 moved back in the direction opposite to that of the arrow in Fig. 1, after the impression has been made, the type pass beneath the usual inking-rolls *e* and have the ink applied to their printing-surfaces preparatory to mak-
95 ing the next impression in the usual manner.

In order to provide for printing a section of type occupying any desired part of the main printing-surface in accordance with the present invention the special type-form or
100 printing-surface that is to make its impression in a different color is contained in a

chase or frame f , provided with a support f^2 for the special type-section g , said support being shown as an inclined ledge, which, in the construction shown in Figs. 2, 3, and 4, is at the lower edge of a groove formed in the end portions f^3 of the chase and receives a corresponding projection or flange g^2 at the lower edge of the movable type-section g , which is capable of sliding freely on the said support from one to the other side of the chase and in such movement has its printing-surface raised and lowered slightly, as will be readily understood from Fig. 4, in which it is shown in full lines in highest position and in dotted lines in lower position. The chase f is a trifle lower than the main printing-surface b , as shown in Fig. 1, and the movement of the type-form or printing-section g therein is such as to bring its printing-surface up to the level of the main printing-surface b , when such special type-form is in highest position on the support f^2 , and to carry it below the level of the main printing-surface b when in lowest position, so that as the chase f passes the main inking-rollers e , with the movable section g in lowest position, it receives no ink from the main inking-rollers.

In the construction shown in Fig. 6 the movable type-section has a slightly different connection with the chase, being connected therewith by a pair of parallel links h at each end, which determine its movement in passing from the highest to the lowest position on the support f^2 , which in this construction is merely a shoulder or ledge formed on the end pieces of the chase.

In order to provide the special inking-section g with ink of a different color from that supplied to the main printing-surface b by the inking-rollers e , a special inking mechanism is used, which is supported on a cross-beam i , applied to the frame-work of the press between the impression device c and the main inking-rollers e , as shown in Fig. 1, the said mechanism being connected with a carriage k , which may be adjusted on said beam i transversely of the press by any suitable means, as by a screw-shaft k^2 , working in a thread formed in the said carriage k or a nut connected therewith, so as to bring the special inking mechanism supported on the said carriage k in line with the chase f wherever it may be desired to set up the latter in the main printing-surface. The said carriage k supports a vertically-movable frame m , provided with one or more magnets m^2 , which may be either permanent magnets or electro-magnets, it being essential only that their poles m^3 should stand nearly over the ends of the chase f^3 and of the special section g as the latter passes beneath them in the movement of the bed a of the press, the position of said poles being indicated in dotted lines at m^3 , Fig. 3.

The frame m is provided with guides n , working in suitable guideways in the carriage

k , and is acted upon by a spring or springs n^2 , tending to keep the entire frame raised, so that the poles of the magnet and the periphery of the special inking-roller o (which is also supported in suitable bearings on or connected with said frame m) normally stand a short distance above the level of the main printing-surface b , so that the latter may pass beneath the said special inking mechanism without receiving from its roll o , which may be supplied with ink of a different color from that applied to the main rolls e in any usual manner.

As the special inking-section is usually small and usually prints in colored aniline ink, the special inking-roller o may be made mainly of felting or absorbent material, capable of retaining a sufficient supply of ink for the number of impressions required without any further ink-reservoir, although the special section is not necessarily limited to any specific size, and any suitable or usual device may be employed for supplying the special inking-roller o with ink.

From the description thus far described it will be understood that in the construction shown the special type-section g must be at the general type level on its support in the chase when passing under the impression-roll c in order to make its impression, and also that the special inking-roller o must be moved downward when the special type-section g is passing beneath it in order to apply ink thereto, and should be moved downward only at this time in order that it may not ink the main printing-surface b . These operations are effected by providing at or near the end portions f^3 of the chase pieces of iron to constitute an armature for the magnet m^2 , so that when the chase passes beneath the poles of the magnet the attraction draws the magnet and its frame downward, overcoming the springs m^2 , and also drawing the roller o downward, practically to the level of the main printing-surface b , although at this time none of the main printing-surface will be beneath said roll. As shown in this instance the end pieces f^3 of the chase are made of iron. The special type-form is also raised and lowered by the magnetic attraction of the magnet m^2 , said type-form being provided with one or more pieces g^3 g^4 of iron, which also act as an armature for said magnet, which tends to hold and retain said armature beneath its poles.

The inclination of the supporting-shoulder f^2 for the movable type-form is such that its lowest end is forward when the end is moving in the direction of the arrow, Fig. 1, and, assuming that the type-form g is in its lowest position—i. e., dotted-line position, Fig. 4—when it arrives beneath the poles of the magnet the attraction of the latter on the said armature g^3 will tend to hold the type-form g beneath the said magnet, and as the press continues its movement in the direction of the arrow the type-form g will have a relative rearward movement and will pass from the

lower to the higher portion of the supporting-shoulder, so that its surface is brought to the level of the main printing-surface *b*, and is also acted upon by the special inking-roller *o*.

5 As the chase is carried by the movement of the bed *a* beyond the poles of the magnet toward the inking-roll *o*, the magnet is no longer attracted and the springs *n*² immediately raise the frame *m*, so that the roll *o* does
10 not come in contact with any of the main printing-surface *b*. The chase is then carried by the bed *a* beneath the impression-roll *c*, with the special section *g* remaining in highest position, so that it makes the impression
15 on the sheet *d*, as required. In the return movement of the bed *a*, after the impression has been made, the magnetic attraction again draws the frame *m* downward and the attraction between the magnet and the armature *g*³
20 again tends to retain the special section beneath the poles of the magnet or to move it in what is then the rearward direction on the chase *f*, thus carrying it from the lowest position, so that it passes beneath the main ink-
25 ing-rolls without receiving ink therefrom.

With the construction of the movable type-form and support illustrated in Figs. 2, 3, 4, and 5 the iron armature-piece *g*³ extends
30 lengthwise of the movable type-form, reaching from the field of one to the field of the opposite pole of the magnet, and the inking-roller *o* is set a short distance at one side of the poles of the magnet, so as to engage with the surface of the special inking-section after
35 it has been raised by the action of the magnet, as just described.

In the construction shown in Fig. 6, in which the type-form is connected with the chase by links, the type-form may be provided with
40 two iron pieces *g*⁴, one at each end, in the position shown in dotted lines, Fig. 3, as in this construction the action of the magnet in lifting the type-form is more of a direct lifting action than in the construction shown in the
45 other figures.

It is obvious that the whole chase may be made of iron to act as an armature for the magnet, or that the iron may be confined to any desired portion in order to insure the
50 proper up-and-down movement of the special inking mechanism with relation to the traversing movement of the bed below, or the attraction of the magnet with the armature-pieces *g*⁴ may be sufficient to both depress the
55 frame *m* and operate the special type-section, in which case it will not be necessary to provide additional armature-pieces on the chase itself.

The invention is not limited to the specific features of construction shown in all particulars, the main essential features being the operation of the special type-section and its inking mechanism with relation to the main printing-surface by magnetic action so controlled that the special inking mechanism is
60 out of the way of the main printing-surface and does not ink the same, and also the operation of the movable type-section by magnetic action so controlled that the said type-section is below type level in passing the main
65 inking-rolls, so as not to receive ink therefrom, but is brought up to type level when passing the point at which the impression is made and is brought into contact with the special inking-roller while passing the same. 75

I claim—

1. The combination of a chase provided with inclined shoulders extending wholly across the same with a type-section supported on said shoulders, said type-section being narrower than the chase and movable therein
80 from the lower to the higher end of said supporting-shoulders, substantially as described.

2. The combination of the chase and movable type-section therein, the chase having a
85 portion composed of iron, with a special inking-roll and supporting-frame therefor, movable toward and from the bed of the press, and a magnet on said frame for which the iron portion of said chase constitutes an ar-
90 mature, substantially as described.

3. The combination of the chase with a movable type-form contained within said chase, said type-form being provided with an iron portion combined with a magnet which
95 co-operates with the iron portion of said type-form to raise and lower it in said chase, substantially as described.

4. The combination of the chase provided with an inclined support, of the type-form
100 contained within the said chase and movable from one to another position on said support, said type-form being provided with an iron portion, combined with a special inking-roll and a movable support therefor provided with
105 a magnet which co-operates with the iron portion of said type-form, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of
110 two subscribing witnesses.

THOMAS BICKFORD.

Witnesses:

JOS. P. LIVERMORE,
M. E. HILL.