

G. W. WOODSIDE.  
Color-Printing Machine.  
No. 213,725. Patented Mar. 25, 1879.

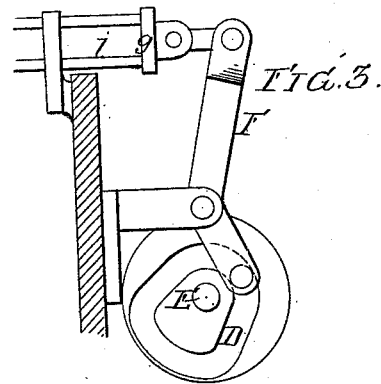
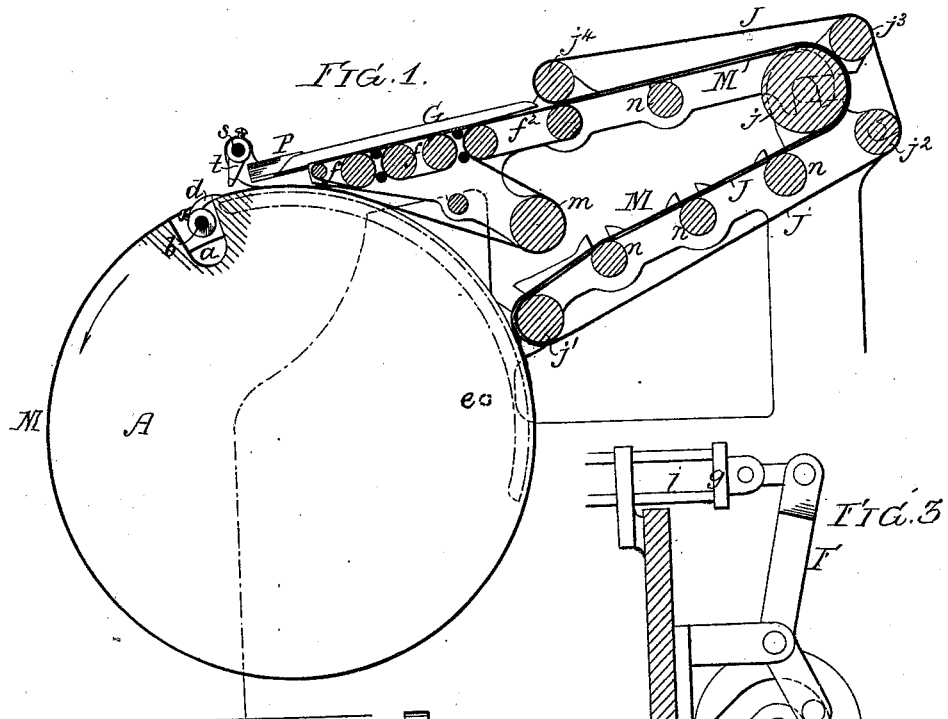
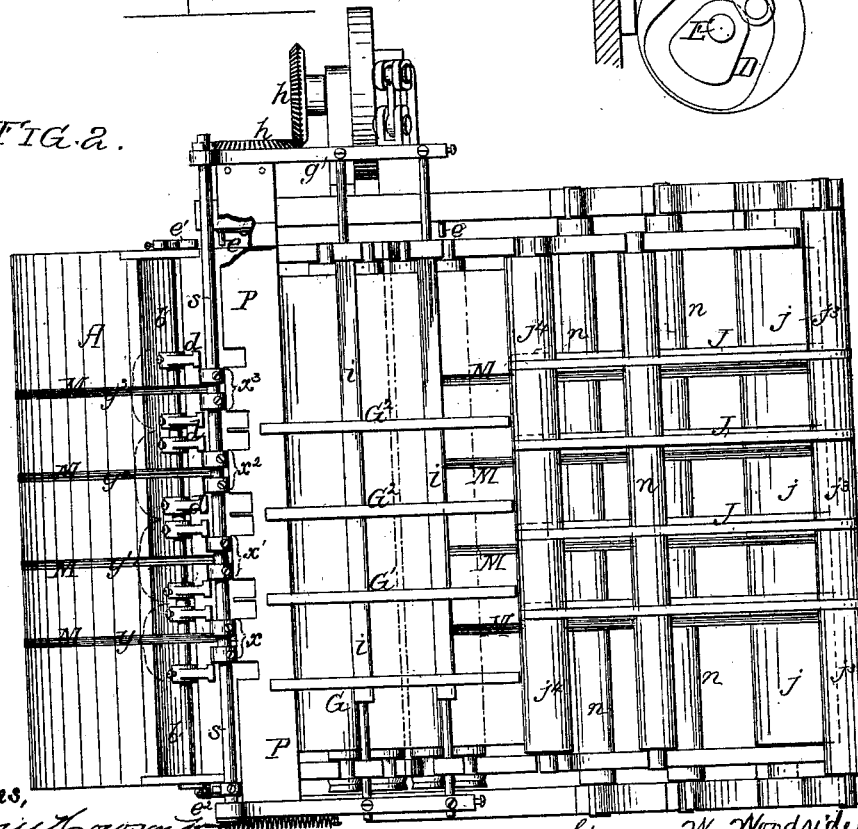


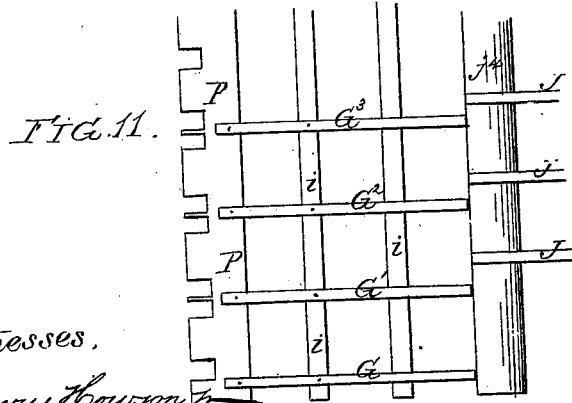
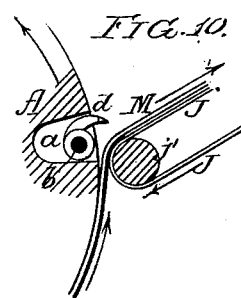
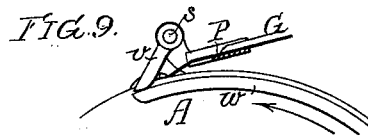
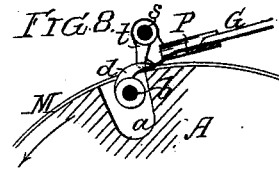
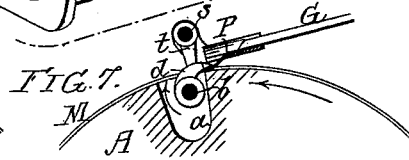
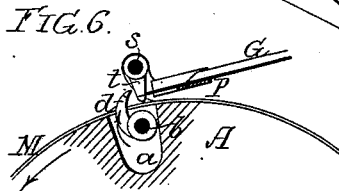
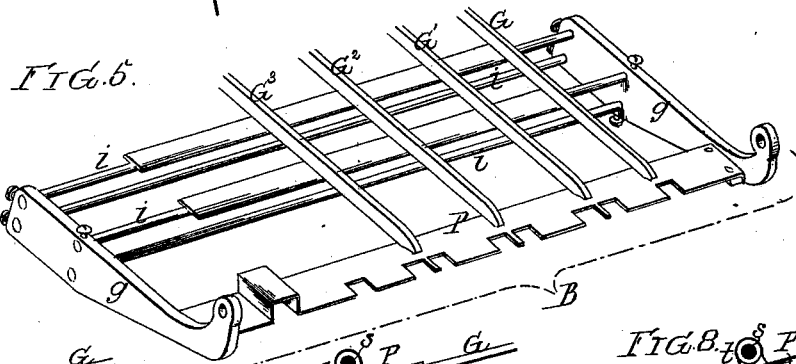
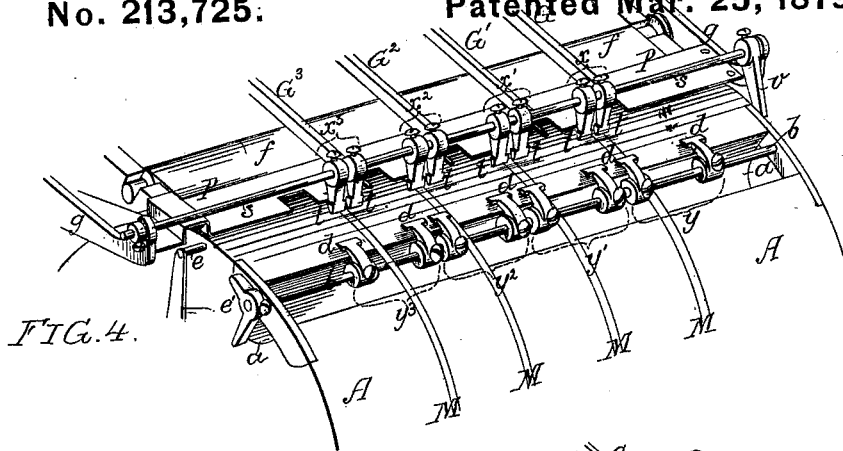
FIG. 2.



Witnesses,  
Henry H. Brown  
Harley Smith

Inventor, George W. Woodside  
by his Attorneys Howard Austin

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Color-Printing Machine.  
No. 213,725. Patented Mar. 25, 1879.



Witnesses,  
Henry Houson  
Harry Smith

Inventor  
George W. Woodside  
by his Attorneys  
Houson and Son

# UNITED STATES PATENT OFFICE.

GEORGE W. WOODSIDE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO S. EUGENE GUMPERT AND JACOB D. WOLF, OF SAME PLACE.

## IMPROVEMENT IN COLOR-PRINTING MACHINES.

Specification forming part of Letters Patent No. 213,725, dated March 25, 1879; application filed October 9, 1878.

*To all whom it may concern:*

Be it known that I, GEORGE W. WOODSIDE, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Color-Printing Machines, of which the following is a specification:

My invention relates to certain improvements in or attachments to a printing-press, whereby the latter is adapted to the automatic production of chromatic printing—that is, printing in two or more colors.

In the accompanying drawings, Figure 1, Sheet 1, is a longitudinal vertical section of sufficient of a cylinder printing-press to illustrate the application of my invention thereto; Fig. 2, a plan view of the same; Fig. 3, Sheet 1, and Figs. 4 and 5, Sheet 2, detached views of parts of the press; and Figs. 6 to 11, views illustrative of the operation of the apparatus.

A represents the impression-cylinder of an ordinary cylinder printing-press, the said cylinder A carrying the sheet or sheets of paper to be printed, and acting in conjunction with a reciprocating type-bed in a manner which it has not been deemed necessary to illustrate in the drawings, as it is well known to those skilled in the art.

The cylinder has the usual transverse recess *a*, through which extends the shaft *b*, carrying the gripping-fingers *d*, the operation of which at the proper intervals is effected through the medium of fixed pins *e*, which act upon the arms of a bell-crank lever, *e*<sup>1</sup>, secured to one end of the shaft *b*, the opposite end of said shaft carrying a crank, the pin of which is connected to a spring, *e*<sup>2</sup>, the tendency of the latter being to maintain the shaft in either of its extreme positions. This mechanism is common in ordinary cylinder-presses, and forms no part of my invention.

Above the cylinder is the feed table or platform, on which the sheets to be printed are laid preparatory to being gripped by the fingers *d*. This table or platform consists, in the present instance, of three endless belts, *f*, *f*<sup>1</sup>, and *f*<sup>2</sup>, each of which passes round a pair of rollers located at suitable distances apart, the

rollers being so geared together that the surfaces of the three belts will travel at a uniform speed and in the same direction.

There is sufficient space between the belt *f*<sup>1</sup> and the belts *f* and *f*<sup>2</sup> for the reception and free lateral movement of two pairs of rods, *i* *i*, which are guided in the side frames of the press, and, in connection with end strips, *g*, form a frame, B, Fig. 5, to which a lateral reciprocating movement is imparted by means of a cam, D, on a shaft, E, the latter receiving its movement, by means of bevel-gearing *h*, from the shaft of the cylinder A, while the cam D acts on the frame B through the medium of a lever, F. (See Fig. 3.)

The rods *i* of the frame B carry a series of parallel strips, G, G<sup>1</sup>, G<sup>2</sup>, and G<sup>3</sup>, and to bearings in the side frames of the press, in the rear of and above the cylinder A, are adapted rollers *j*, *j*<sup>1</sup>, *j*<sup>2</sup>, *j*<sup>3</sup>, and *j*<sup>4</sup>, round which pass a series of narrow endless belts, J, another series of narrow endless belts, M, passing round the cylinder A, thence, with the belts J, round the pulleys *j*<sup>1</sup> and *j*, thence round one of the pulleys of the belt *f*<sup>2</sup>, and, finally, round a pulley, *m*, as shown in Fig. 1.

Rollers *n* serve to support the belts J and M, and prevent the sagging of the same.

On the front end of the frame B is a slotted strip, P, and a shaft, *s*, the latter having a series of fingers, *t*, and being acted upon by a spring, *u*, the tendency of which is to maintain the lower ends of the fingers *t* in contact with the edge of the strip P. The shaft *s* also carries at one end an arm, *v*, which, under the circumstances described hereinafter, is acted upon by a segmental rib, *w*, on the end of the cylinder A.

The ends of the fingers *t*, and also of the gripping-fingers *d*, are enlarged, as shown in Figs. 2, 4, 7, and 8, for a purpose rendered apparent hereinafter.

The operation of the above-described mechanism is as follows: The frame B being in the position shown in Fig. 2, and the fingers *d* and *t* in the position shown in Fig. 6, a sheet of paper is laid on the belts *f*, *f*<sup>1</sup>, and *f*<sup>2</sup>, between

the strips G and G' of the frame, the lower edge of the strip of paper resting against the ends of the first set,  $x$ , of the fingers  $t$ . As the cylinder A moves in the direction of the arrow, the shaft  $b$ , carrying the fingers  $d$ , is released, and the fingers spring round in the direction of the arrow, as shown in Fig. 7, the first set,  $y$ , of these fingers  $d$  grasping the end of the strip of paper.

The movement of the cylinder continuing, the enlarged ends of the fingers  $d$  act on the enlarged ends of the fingers  $t$  and press the latter backward, as shown in Fig. 8, so that they will not interfere with the free movement of the strip of paper with the cylinder. Just as the fingers  $t$  are released from the control of the fingers  $d$  the arm  $v$  on the shaft  $s$  is brought under the influence of the rib  $w$  on the cylinder, as shown in Fig. 9, so that the fingers  $t$  are held up clear of the strip of paper as the latter is carried around by the cylinder A. When the strip has passed from under the fingers, however, the end of the rib  $w$  will have been reached, and the arm  $v$  will be released, thereby permitting the fingers  $t$  to spring back again to the position shown in Fig. 6.

The strip of paper is carried around by the cylinder and printed upon in the usual manner; but instead of being delivered, after the printing operation, to a fly or other discharging device, the strip of paper, as soon as it is released by the gripping-fingers  $d$ , is caught between the first of the series of belts J and M as they pass around the pulley  $j^1$ . These belts carry the sheet around, and finally deliver it again onto the feeding platform or table formed by the belts  $f, f^1$ , and  $f^2$ .

While the sheet was being printed, however, the frame B was moved laterally to the position shown in Fig. 11, so that the first set of belts J and M now coincides with the space between the bars G' and G<sup>2</sup> of the frame, into which space the printed sheet is fed by said belts, the lower edge of the sheet striking against the second set,  $x'$ , of the fingers  $t$ . The frame B is then moved laterally in a direction contrary to that above mentioned until it again assumes the position shown in Fig. 2, when the printed sheet is in condition for being grasped by the second set,  $y^1$ , of the fingers  $d$  and carried round on the cylinder A, so as to be presented to a second printing-form, by which a second color is imprinted upon the sheet. The sheet thus printed is delivered to the second set of belts J M, and by them conveyed to the space between the bars G<sup>2</sup> and G<sup>3</sup> of the frame B, which is reciprocated so as to present the sheet to the third set,  $y^2$ , of gripping-fingers  $d$ , by which the sheet is carried round so as to receive the third imprint, and the operation is repeated until the desired number of colors have been printed upon the sheet, when it is delivered to the usual fly or other discharging device.

The upper rods,  $i$ , of the frame B carry plates or strips, which span the spaces between the adjacent belts  $f, f^1$ , and  $f^2$ , as shown in Figs. 1 and 2, and serve by their friction upon the sheet to still further retard the same and prevent the action of the belts from crumpling the said sheet when its forward movement is arrested.

It should be understood that fresh sheets of paper are being supplied at regular intervals by the attendant, who places the sheets on the feed platform or table, between the bars G and G' of the frame B. This single feeding operation, however, is all that is required, even with the most elaborate work, as the succeeding adjustments of the sheet are all effected automatically.

It will be evident that the number of sets of fingers  $d$  and  $t$ , the number of bars G on the frame B, and the number of belts J and M will depend entirely upon the number of different printing-surfaces with which the press is provided, a greater or less number than that shown in the drawings being used as required.

My invention may be applied to any of that class of printing-presses in which gripping-fingers and delivery-tapes are used.

By making the feed table or platform of the press in the form of a series of endless belts, not only are spaces afforded for the passage of the transverse rods of the frame B, but the moving surface of the feed-table is reduced, so that there is not that tendency to crumple the sheet when its front end strikes the stop which might result if the sheet rested throughout its entire length upon a moving apron.

The strips G of the frame B, during the lateral movement of said frame, strike the edges of the sheets in advance, and thus bring said sheets into a position parallel with the strips, thereby insuring the proper adjustment of the sheets before they are gripped by the fingers  $d$ .

I claim as my invention—

1. The combination of the gripping devices of a printing-press with a reciprocating frame, B, and with devices, substantially as described, whereby the sheet, after having been once printed, is returned to said frame, which shifts the sheet laterally, so that it is again presented to the gripping devices, but in a different position laterally in respect to the printing surface or surfaces, the same face of the sheet, however, being presented for receiving the impression, all as set forth.

2. The combination of the cylinder A and its gripping devices, the laterally-reciprocating frame B, and the carrying-belts J and M, as specified.

3. The combination of the cylinder A and its gripping devices with a reciprocating frame, B, having strips G G', &c., as set forth.

4. The combination, in a feed table or plat-

form, of a series of short endless belts,  $f f^1$ , &c., with transverse friction plates or strips, which span the spaces between the adjacent belts, all as set forth.

5. The combination of the gripping-fingers  $d$ , having enlarged ends, with the fingers  $t$ , having ends similarly enlarged, as specified.

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

GEORGE W. WOODSIDE.

Witnesses:

HENRY HOWSON, Sr.,

HARRY SMITH.