

No. 633,967.

Patented Sept. 26, 1899.

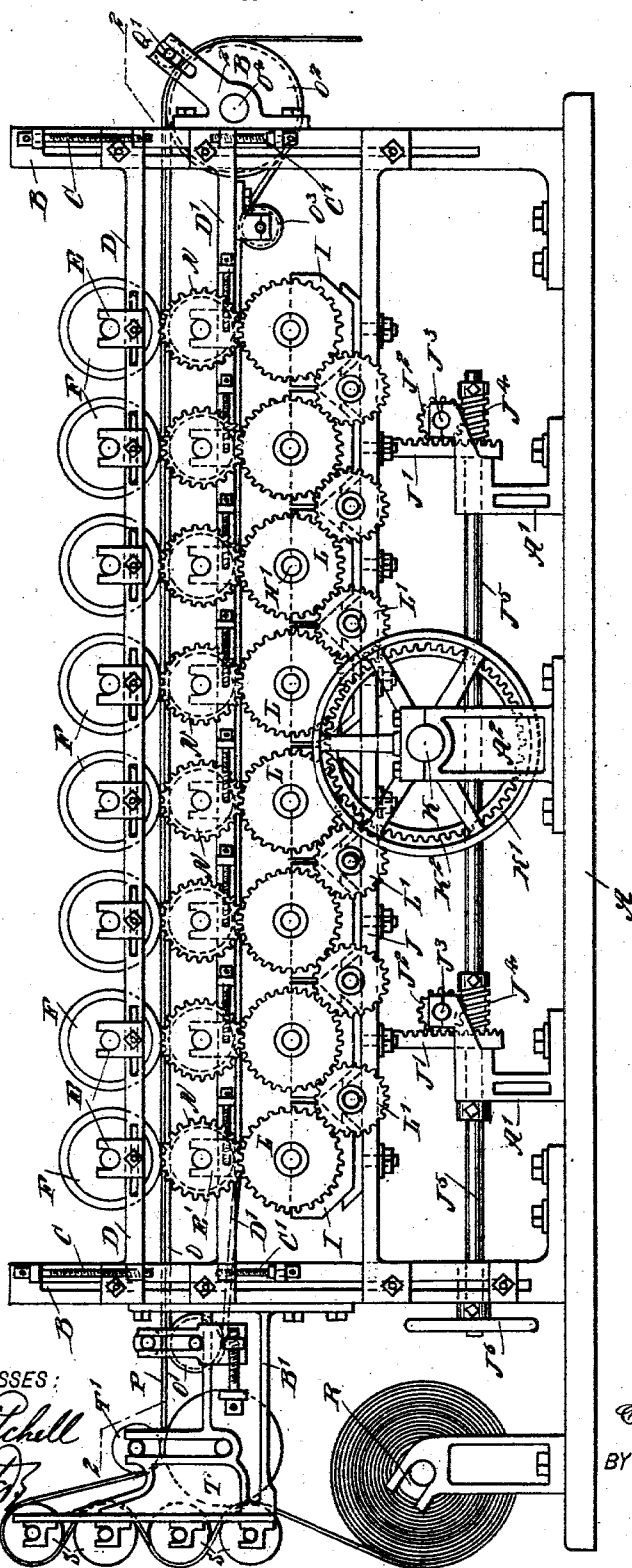
E. G. SMITH.
PRINTING MACHINE.

(Application filed Jan. 11, 1899.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.



WITNESSES:

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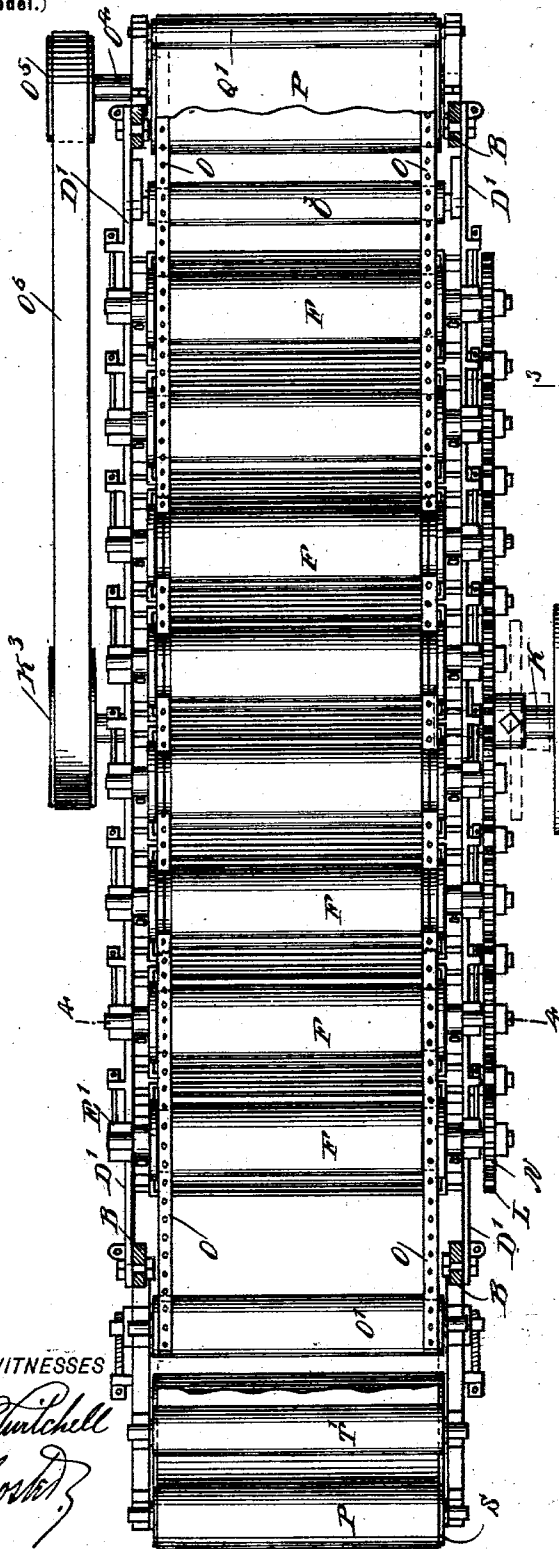
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2 Sheets—Sheet 2.

FIG. 2.



WITNESSES

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FIG. 4.

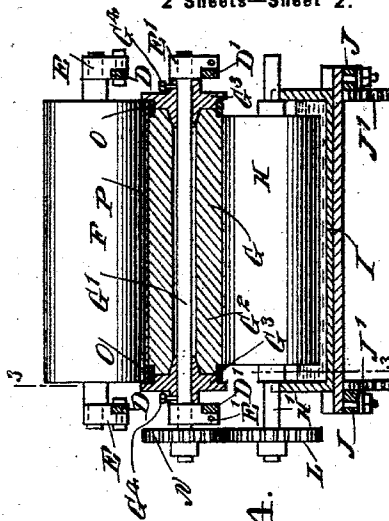
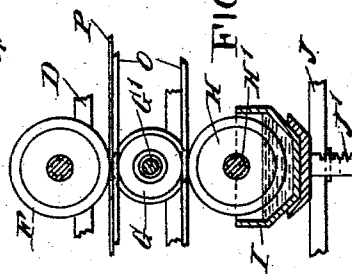


FIG. 3.



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UNITED STATES PATENT OFFICE.

EDWARD G. SMITH, OF NEW YORK, N. Y.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 633,967, dated September 26, 1899.

Application filed January 11, 1899. Serial No. 701,842. (No model.)

To all whom it may concern:

Be it known that I, EDWARD G. SMITH, of the city of New York, borough of Manhattan, in the county and State of New York, have
5 invented a new and Improved Printing-Machine, of which the following is a full, clear, and exact description.

The invention relates to multicolor-printing machines for printing wall-paper, textile
10 fabrics, and other endless webs; and the object of the invention is to provide a new and improved printing-machine arranged to permit of passing the web to be printed through the machine at a high rate of speed and to
15 print the web with the desired design and in any number of colors.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then
20 pointed out in the claims.

A practical embodiment of my invention is represented in the accompanying drawings, forming a part of this specification, in which
25 similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement. Fig. 2 is a sectional plan view of the same on the line 2 2 in Fig. 1. Fig. 3 is a
30 sectional side elevation of part of the improvement on the line 3 3 in Fig. 4, and Fig. 4 is a transverse section of the same on the line 4 4 in Fig. 2.

The improved printing-machine is mounted on a suitably-constructed base A, on which
35 are arranged the standards B, carrying at their upper ends screw-rods C, engaging longitudinally-extending rails D, carrying bearings E, in which are journaled the impression-cylinders F, each arranged in connection with
40 a printing-roller G, having the desired design to be printed on the web passed between an impression-cylinder and its printing-roller. The shaft G' of each printing-roller G is journaled in bearings E', longitudinally adjustable on rails D', fitted to slide vertically on the standards B, the same as the rails D are
45 vertically adjustable by suitable screw-rods C', carried on the standards.

Each printing-roller G is adapted to receive
50 the ink or color from a suitable inking device, preferably in the form of an inking-roller H, in peripheral contact with the printing-roller

and passing through the ink or color contained in the fountain I, on which the shaft H' of the inking-roller is journaled. The several foun-
55 tains I, with their inking-rollers H, are attached to longitudinally-extending rails J, mounted to slide vertically on suitable guide-ways on the standards B, and the said rails are provided with downwardly-extending
60 racks J', in mesh with wheels J², secured on transversely-extending shafts J³, each carrying a worm-wheel (not shown) in mesh with a worm J⁴, secured on a longitudinally-extending shaft J⁵, journaled in suitable bear-
65 ings held on brackets A', attached to the base A, the said brackets also carrying the shafts J⁶. (See Fig. 1.) One outer end of the shaft J⁵ carries a hand-wheel J⁶, under the control of the operator, to permit the latter to turn
70 the shaft J⁵ to cause the worms J⁴ to rotate the worm-wheels, and the shafts J³ and gear-wheels J² to impart an up-and-down sliding motion to the racks J' and the rails J, supporting the fountains and the inking-rollers.
75 Thus the inking-rollers are all moved simultaneously toward or from the printing-rollers to insure proper adjustment between the same for the proper delivery of the color to the printing-rollers and also to permit of
80 conveniently removing the printing-rollers from their bearings in case the design is to be changed—that is, when other printing-rollers replace the ones previously used.

In order to positively rotate the printing-
85 rollers G as well as the inking-rollers H, I provide a shaft K, journaled in suitable bearings A², carried on the base A, and the said shaft K is provided with fast and loose pulleys K', connected by a belt with other ma-
90 chinery for imparting a rotary motion to the shaft K. On the latter is secured a gear-wheel K², in mesh with two gear-wheels L, secured on the shafts of two inking-rollers H, as is plainly indicated in Fig. 1, and these
95 two gear-wheels L are connected by intermediate gear-wheels L' with gear-wheels L on the shafts H' of the adjacent inking-rollers, and a similar connection is made to all the other inking-rollers, so that when the shaft
100 K is rotated a simultaneous rotary motion is given to all the inking-rollers H of the machine. The gear-wheel L on each inking-roller H is in mesh with a gear-wheel N on

the shaft G' of a printing-roller G, so that the latter are rotated simultaneously with the inking-rollers to print the design on the web, as hereinafter fully described.

5 In order to feed the web between the several sets of impression-cylinders and printing-rollers, I provide two longitudinally-extending endless driven belts or bands O, passing at one end over a roller O' and at the
10 other end over a driven sprocket-roller O², the lower runs of the bands then extending upward to pass over a roller O³, journaled in bearings attached to the rails D'. The bearings for the roller O' are adjustable on a
15 bracket B', attached to the forward standard B, as is plainly shown in Figs. 1 and 2, while the bearing for the roller O² is in a bracket B², attached directly to the other standard B. The sprocket-roller O² is driven
20 from the main shaft K, and for this purpose one outer end of the shaft O⁴ of the said roller is provided with a pulley O⁵, over which passes a belt O⁶, also passing over a pulley K³, secured on the shaft K. Thus when the latter
25 is rotated a rotary motion is given to the sprocket-roller O² by means of the said rollers K³ O⁵ and the belt O⁶. The bands O are provided with sets of apertures for engaging sprockets on the roller O², so that when the
30 latter is rotated a positive motion is given to the bands, and consequently the web is positively fed through the sets of impression-cylinders and printing-rollers to insure a proper registry of the different designs. The upper
35 and lower runs of the bands O pass through annular recesses or grooves formed in the printing-rollers G, as is plainly indicated in Figs. 3 and 4, so that the web P, resting on top of the bands, lies flat between the contacting peripheral surfaces of the impression-cylinders and the printing-rollers G, as will
40 be readily understood by reference to Fig. 4, the bands O being in engagement with the web at the margin or selvage thereof. The annular grooves in the printing-rollers G are
45 arranged at the sides of the engraved portions of the peripheral printing-surfaces, so that the printing on the web takes place between the bands O and the selvage edges or
50 margins are left free.

The web P to be printed on unwinds from a reel R and then passes between a series of tension-rollers S to and between guide-rollers T and T', all journaled on the bracket B',
55 previously mentioned, the web then passing over the roller O', with its sides on the bands O, to be thus carried forward by the bands between the first printing-cylinder F and the corresponding printing-roller G to receive the
60 first impression by the printing-roller G. On the further forward movement of the web it passes between the next set of impression-cylinders and printing-rollers to receive a second printing, according to the predetermined
65 design, and this is repeated through the machine between the following sets of impression-cylinders and printing-rollers

until the web finally leaves the last set of impression-cylinders and printing-rollers to then pass off the machine over the roller O² 70 to be hung up to dry in the usual manner.

Each of the printing-rollers G is provided with a wooden cylindrical body G², on the peripheral surface of which is engraved the design in the usual manner, and the ends of 75 the body G² are provided with heads G³, having inwardly-extending conical offsets engaging corresponding bores leading to the central bore, through which passes loosely the shaft G' of the printing-roller. (See Fig. 4.) 80 The heads G³ are longitudinally adjustable on the shaft G' and are secured thereon by set-screws G⁴ or other suitable means, so as to fasten the body G² firmly in position on the heads and the latter securely on the shaft 85 G'. The adjacent ends of the heads and the body G² of the printing-cylinder are formed with registering recesses to produce the annular groove for the passage of the upper and lower runs of the bands O, as will be readily 90 understood by reference to Fig. 4. The impression-cylinder is of such a length as to extend to the outer edges of the bands O, while the inking-roller H extends only over the engraved surface of the printing-roller 95 G, so that no ink or color is fed onto the lower runs of the bands.

As a positive feeding of the web is had, it is evident that the machine can be run at a very high rate of speed, and any desired number of sets of impression-cylinders and printing-rollers may be employed, according to the number of colors intended to be given to the article. 100

By running the web in a straight line 105 through the sets of impression-cylinders and printing-rollers it is evident that no undue strain is given to the web, and consequently the latter readily takes up the ink or color delivered to the web by the printing-rollers, 110 which are spaced a suitable distance apart to insure proper registration of the several designs.

Having thus fully described my invention, I claim as new and desire to secure by Letters 115 Patent—

1. A printing-machine, provided with a longitudinally-disposed row of impression-cylinders, a printing-roller for each cylinder, and driven endless feed-bands passing be- 120 tween the cylinders and the printing-rollers, to carry the web at its margin or selvage between the sets of printing-cylinders and printing-rollers, the bands passing through annular grooves formed on the printing-rollers, to hold the web in proper position be- 125 tween the opposite contacting portions of the cylinders and rollers, substantially as shown and described.

2. A printing-machine, comprising a series 130 of impression-cylinders, a printing-roller for each cylinder, an inking-roller for each printing-roller, color-fountains in which the inking-rollers have their journal-bearings, side

rails on which the several fountains are mounted, racks extending downward from said rails, pinions meshing with the racks and worm-gearing for rotating the pinions, for
5 raising and lowering the rails and the parts carried thereby, substantially as specified.

3. A printing-roller, comprising a cylindrical body, heads for the said body and having cones for engaging the correspondingly-
10 bored ends of the body, and a shaft passing

loosely through the central bore of the body and on which the heads are adjustable, and the web-feeding bands engaging in annular grooves in the heads and in the body, substantially as shown and described.

EDWARD G. SMITH.

Witnesses:

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