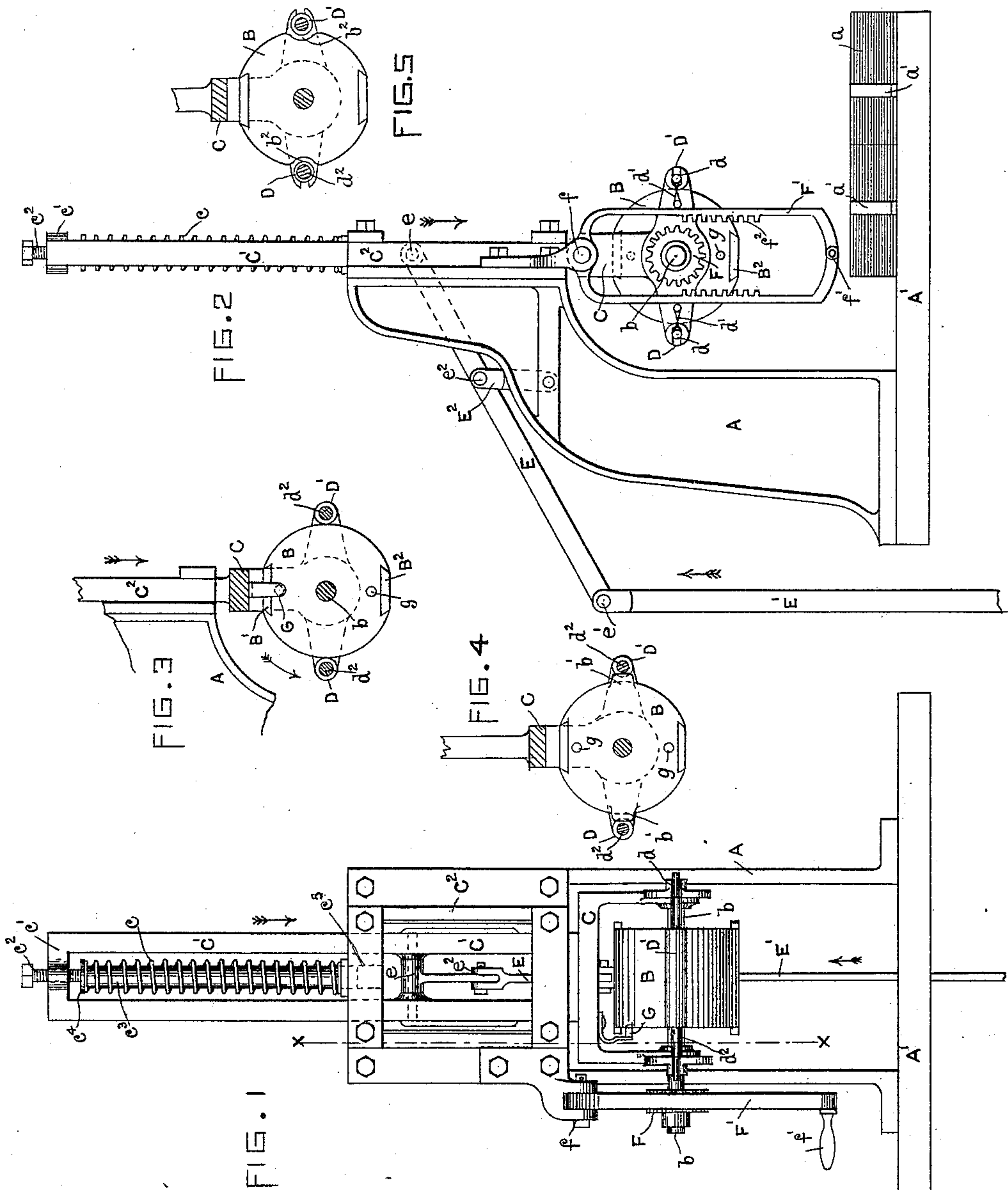


(No Model.)

F. C. BARKER & R. F. SPROULE.
PRINTING MACHINE.

No. 432,257.

Patented July 15, 1890.



Witnesses.

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UNITED STATES PATENT OFFICE.

FRANCIS C. BARKER AND ROBERT FRITH SPROULE, OF DUBLIN, IRELAND.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 432,257, dated July 15, 1890.

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To all whom it may concern:

Be it known that we, FRANCIS CONST BARKER and ROBERT FRITH SPROULE, both subjects of the Queen of Great Britain, residing at Dublin, in the county of Dublin, Ireland, have invented certain Improvements in Printing-Machines, of which the following is a specification.

This invention relates to printing-machines, and more especially to small machines applicable to printing monograms, crests, or other small devices upon envelopes, note-paper, cards, labels, or the like, the object of the invention being to produce a simple and cheap machine of this kind which shall be able to print such devices in two colors in perfect register, and which may be worked rapidly either by hand or other power.

The invention consists, essentially, of a printing cylinder, prism, or its equivalent having two printing-blocks or their equivalents and each placed at diametrically-opposite points on its periphery, and each adapted to be inked with the proper color by a relatively-stationary roller or set of rollers which bear upon a certain portion of the periphery of the cylinder, such cylinder being capable of two movements—one a reciprocatory movement bodily (in common with the inking-rollers) to and from a table supporting the blanks and in a direction perpendicular to the cylinder-axis for the purpose of effecting the printing operation, and the other movement about its axis for the purpose of bringing each printing-block successively into the printing position and for simultaneously inking the device on each block with its particular color by bringing it in contact with its respective ink roller or rollers.

In the accompanying drawings, which serve to illustrate our invention, Figure 1 is a front elevation, and Fig. 2 a side elevation, of a machine constructed according to the invention, only such parts of such machine being shown as are necessary to fully illustrate the invention. Fig. 3 is a sectional view of a portion of the machine, the plane of the section being indicated by the dotted line $x x$ in Fig. 1. Fig. 4 is a view similar to Fig. 3, showing a cam arrangement, which we will hereinafter describe, for preventing the two inks from overlapping on the cylinder. Fig. 5

is a view similar to Fig. 4, illustrating a modification.

A is an overhanging standard, which is mounted upon a table or bed-plate A', this again being supported in any suitable manner at a convenient height for the operator. The blanks a are placed upon the table A' and held in position by suitable guides a' .

B is a cylinder or prism or other body of suitable shape in cross-section, having its sides parallel to its axis, such part being hereinafter called the "printing-cylinder." It is fixed upon a horizontal shaft b , which is capable of oscillating in bearings within a forked frame C. The latter is attached to or formed in one with a slide or plunger C', which is capable of being reciprocated in or upon vertical guides C² on the standard A. The slide C', the printing-cylinder B, and the frame C and parts supported thereby, as hereinafter described, are held normally in their highest position by a suitable counterbalancing device—such as a spiral spring c —which is inserted between the top of the standard A and the cross-head c' of the slide, or an adjusting-screw c^2 therein. The spring is retained in position by a sliding stem c^3 , which has a collar c^4 at its upper end, adapted to abut against the upper end of the spring, the lower end of the stem being adapted to slide within a hole c^5 in the top of the standard A. The tension of the spring may be adjusted by the set-screw c^2 .

B' B² are two sets of type, or stereos, blocks, dies, or equivalent devices, hereinafter called "printing-blocks," which are secured or attached to or formed upon the periphery of the printing-cylinder B at two diametrically-opposite points. When the blocks are formed of separate pieces, they may be secured to the cylinder in any suitable manner, such as by letting into dovetail recesses therein, as shown in Figs. 2 and 3.

At either side of the cylinder B there are mounted one or more inking-rollers D D', which are capable of revolving about their axes by reason of their contact with the cylinder, as before described, but have no movement bodily about the axis of the cylinder. These rollers are mounted in suitable bearings d in the forked frame C and partake of the vertical reciprocating movement of the

cylinder and frame. The rollers are held in yielding contact with the periphery of the cylinder and the type by springs or elastic bands d' , connected with the outer ends of the rollers, as seen in Fig. 2, and each roller or set of rollers is supplied with ink of a different color or shade. The ink may simply be placed from time to time upon the cylinder with a palette-knife, being distributed thereon and conveyed to the type, as herein-after described, by the rollers, or it may be conveyed indirectly to the surface of the cylinder or rollers by any well-known distributing arrangement.

The printing-cylinder and its frame may be reciprocated by any suitable mechanism worked either by hand or other power.

In the arrangement shown in the drawings a lever E is pivoted at one end, as at e , to the slide C' , and at the other end e' is jointed to a connecting-rod E' , which is connected with any suitable treadle device, (not shown,) preferably in a manner that a downward pressure on the treadle effects the downward stroke of the cylinder.

E^2 is a short link, which supports the lever-pivot e^2 in such a movable manner as will permit the forward end of the lever to partake of the rectilinear movement of the slide C' .

A pinion or hand-wheel F is fixed on one end of the cylinder-shaft b for the purpose of enabling the operator to oscillate the cylinder and bring each of the printing-blocks $B' B^2$ alternately into position for printing. Any suitable device may be employed for holding the cylinder exactly in its two printing positions. In the drawings, Figs. 1 and 3, there is shown for this purpose a pointed spring-stop G , which is mounted on the frame C , and is adapted to enter one or other of the holes or indentations g , located at opposite points on the cylinder end.

One of the two blocks $B' B^2$ bears in relief only that portion of the device which is to be printed in one of the colors employed, the remaining portion of the device being borne by the other block, and the two portions are so arranged with respect to one another that they print in exact register. It will be obvious, however, that certain parts of the devices on the two blocks may overlap one another, if desired.

It will be seen that when two colors are employed—say, for instance, blue and red—the blue is distributed, say, by the roller D over one half of the circumference of the cylinder, including one of the printing-blocks—say B' —while the red is distributed by the roller D' upon the other half of the cylinder, including the other block B^2 . To prevent the blue-color roller from overlapping the red color on the adjacent half of the cylinder, or the red-color roller from overlapping the blue color when the cylinder is in or is approaching either of its printing positions, as in Figs. 2, 3, and 5, we provide a suitable cam arrangement which oscillates with the cylinder, and by means of

which the rollers are lifted off the surface of the cylinder at the proper moment. The details of such cam arrangement will vary according to the number of rollers employed in each set—that is, for each color. Where only one roller is employed for each color, as in the machine shown, we provide each end of the cylinder or its shaft with two cam-pieces b' , (see Fig. 4,) of a suitable width and placed diametrically opposite one another. As the cylinder in its oscillation approaches either of its printing positions, the cam-pieces b' engage the roller-shafts d^2 , or suitable bosses or collars thereon, in which position they are held until the cylinder is turned in the reverse direction.

In place of the above arrangement the cylinder may simply be cut away at two opposite sides, as shown at b^2 in Fig. 6, to such a depth that the rollers, even when their shafts are resting against the inner ends of their bearings, do not come in contact with the cylinder in the position indicated.

The mode of operation is as follows: The pile of blanks a having been adjusted upon the table A' and held in position by the dogs or guides a' , the cylinder and ink-rollers are supplied with inks of the colors required, and the cylinder is then oscillated a few times by the wheel F through an angle sufficient to distribute the inks upon its surface. The cylinder is then turned through half a revolution—say in the direction of the arrow—whereby the device on its blocks $B' B^2$ is inked by their respective rollers $D D'$, and that on the block B' is brought into a printing position, being held therein by the spring-stop G . The cylinder is now depressed by means of the treadle device or its equivalent down onto the uppermost blank. On releasing the treadle the cylinder rises by means of the spring c to the top of its stroke. During its ascent or descent, or while it is at the top of its stroke, the cylinder is again turned, as before, through half a revolution, but in an opposite direction, so that the devices on the blocks $B' B^2$ are inked, as before, by their respective rollers $D D'$, and that on the block B^2 is brought into the printing position. The cylinder is again brought down upon the blank and again released. The top blank is now removed, the cylinder again turned in the reverse direction, and the above circle of operations repeated as often as required.

Instead of oscillating the cylinder directly by means of the wheel F , it may be oscillated by the following mechanism: A swinging frame F' is suspended by its upper end upon a pivot f , carried by the standard A , its lower end being provided with a handle f' . The two vertical sides of the frame are each provided on their opposing inner faces with a rack f^2 of a length approximately equal to half the circumference of the pinion F . When the frame is hanging freely, neither of these racks can gear with the pinion during its vertical reciprocatory movement. On the

completion of each downward or upward stroke of the cylinder the operator swings the frame to one side or the other, so that the proper rack will come into gear with the pinion F during the succeeding up or down stroke and turn the cylinder in the right direction to bring the blocks B' B² into contact with their respective inking-rollers D D'. On the completion of the following down or up stroke the operator swings the frame F' in the opposite direction, so as to bring the other rack into gear during the next up or down stroke.

Having thus described our invention, we claim—

1. In a printing-machine, the combination of a reversible printing-cylinder bearing at two diametrically-opposite points of its periphery two different portions of the device to be printed, each adapted to print in exact register with the other, means for reciprocating said cylinder as a whole to and from the blanks, one or more inking-rollers mounted in proximity to one side of the cylinder and supplied with one color or shade of ink, a similar roller or rollers mounted in proximity to the opposite side of the cylinder and supplied with a different color or shade of ink, means for turning the cylinder upon its axis through half a revolution during each reciprocation of the cylinder and alternately in either direction, whereby the two portions of the said devices are brought into contact with their respective inking-rollers and alternately placed in the printing position, and an arrangement for holding the cylinder securely in position with either portion of said device opposite the blanks, substantially as described.

2. The combination, with the printing-cylinder B, the printing-blocks B' B², arranged, as described, on opposite sides of the cylinder, and means for supplying each block with ink of a different color or shade, of a reciprocating frame C C', carrying said cylinder, means for operating said frame, a pinion F on the cylinder-shaft, and a rack device adapted to engage said pinion and turn the cylinder through half a revolution during each reciprocation of said frame, substantially as described.

3. The combination of the vertically-reciprocating frame C C', the cylinder B, mounted on a horizontal axis on said frame, the printing-blocks B' B², arranged on opposite sides of the cylinder, as described, the ink-rollers D D', carried by the frame and adapted to bear against the opposite sides of the cylinder and to be supplied with two different kinds of ink, as described, the pinion F, movable with the cylinder, a rack device adapted to engage said pinion and turn the cylinder through half a revolution alternately in opposite directions during each reciproca-

tion of the frame C C', for the purposes described, and a device for holding the cylinder securely in position upon the frame with either of the printing-blocks opposite the blanks, substantially as described.

4. The combination, with the printing-cylinder B and the printing-blocks B' B², arranged on opposite sides thereof, as described, of a frame C C', carrying said cylinder and adapted to be reciprocated to and from the blanks to be printed, inking-rollers D D', mounted on said frame in contact with two opposite sides of the cylinder and adapted to be supplied with two different kinds of ink, as described, a pinion F on the cylinder-shaft, a pair of racks f² of suitable length, arranged on opposite sides of said pinion, and a swinging frame F', carrying said racks and adapted to be swung alternately in opposite directions during each alternate up or down stroke of the frame C C', whereby the cylinder is turned through half a revolution alternately in either direction and the two blocks B' B² are brought into contact with their respective inking-rollers D D' and alternately placed in position opposite the blanks a, substantially as described.

5. In a printing-machine, the combination, with a printing-cylinder having two different portions of the device to be printed arranged on two opposite points of its periphery, as described, and means for oscillating said cylinder upon its axis through half a revolution to bring either portion of such device into position for printing, of one or more inking-rollers arranged at one side of the cylinder and adapted at each such oscillation to distribute one color or shade of ink over approximately one-half of the cylinder's periphery, including one portion of said device, a similar roller or rollers arranged at the opposite side of the cylinder and adapted in a similar manner to distribute a different color or shade of ink over approximately the other half of the cylinder's periphery, including the other portion of said device, and a cam device movable synchronously with the cylinder and adapted as the latter approaches the extreme points of its oscillations to lift the rollers out of contact with the periphery, whereby the ink of one shade or color on the rollers is prevented from overlapping the ink of a different shade or color on the cylinder, substantially as described.

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

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