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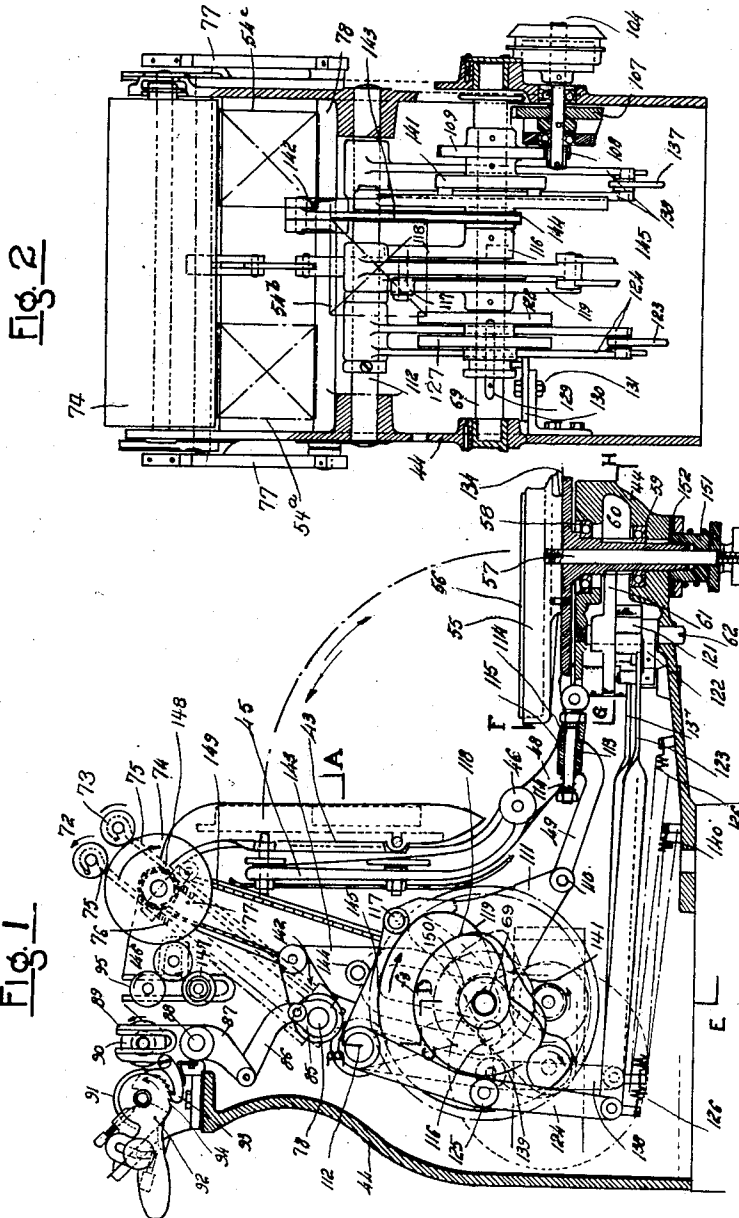
L. G. DUBUIT

2,058,671

AUTOMATIC MULTICOLOR PRINTING MACHINE

Filed Aug. 23, 1935

3 Sheets-Sheet 1



INVENTOR
Louis Gilbert Dubuit
by
Byrnes, Stebbins & Blenko
his attorneys

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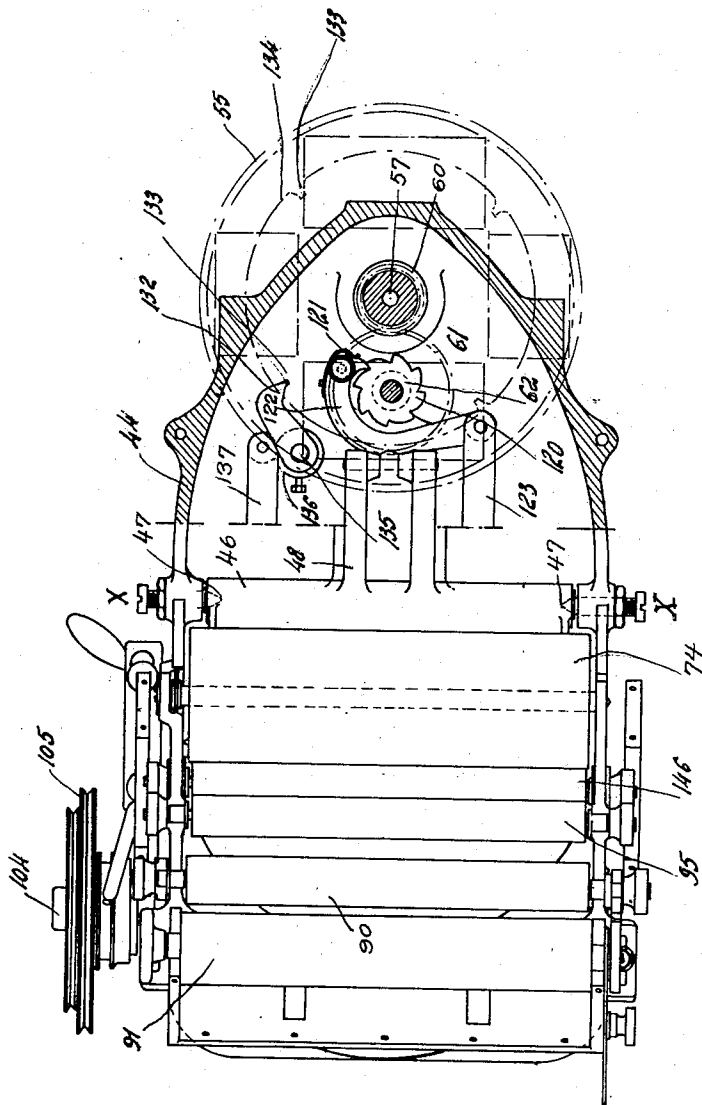
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3 Sheets-Sheet 2

Fig. 3



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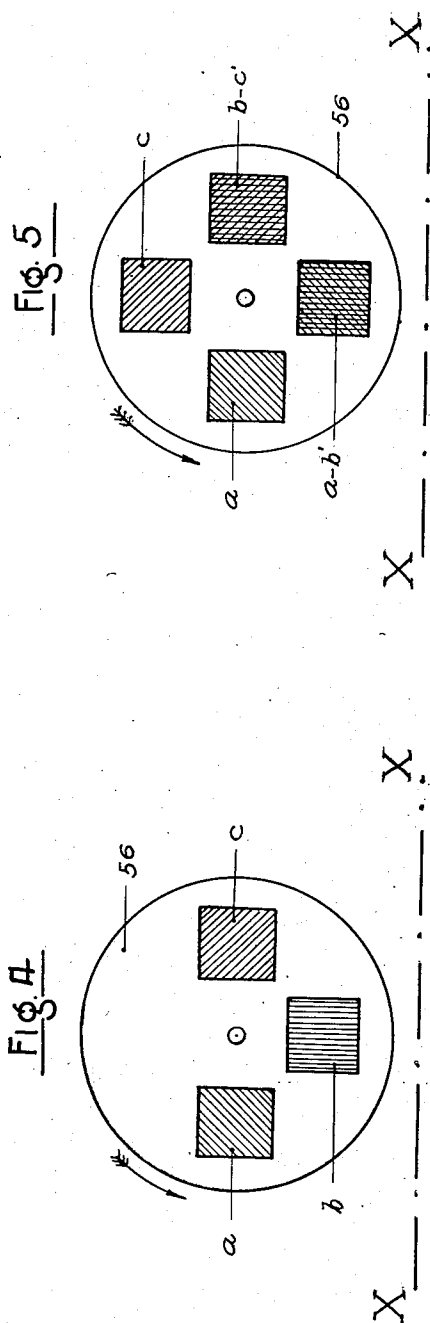
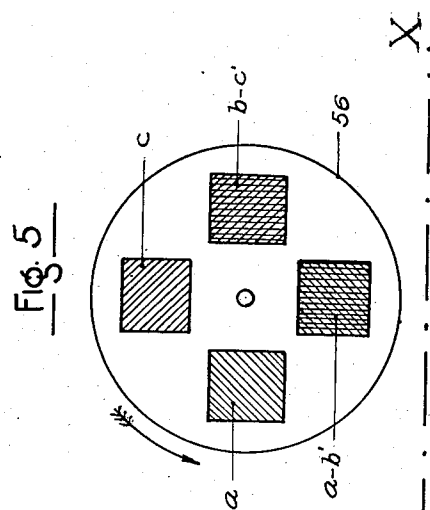
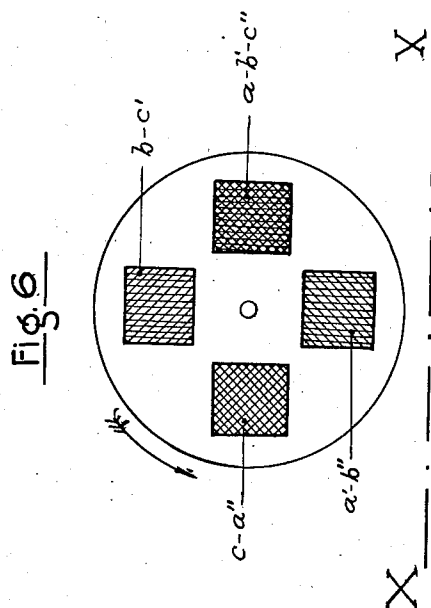
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UNITED STATES PATENT OFFICE

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AUTOMATIC MULTICOLOR PRINTING
MACHINE

Louis Gilbert Dubuit, Paris, France

Application August 23, 1935, Serial No. 37,549
In France September 24, 1934

7 Claims. (Cl. 101—171)

The present invention relates to machines for printing by transfer, in which a pad of gelatine fixed on the platen of the machine receives firstly the imprint of the block after which the article to be printed is presented by hand against the pad to receive this print by transfer.

The primary object of the invention is to provide such machines with an automatic mechanism permitting the printing in several colors of any articles, and more particularly cylindrical articles or articles with plane surfaces. This mechanism is intended in particular to produce upon the pad of gelatine a complete print comprising all the designs or markings of different colors to be printed upon the article, so that the transfer upon this article may be carried out by means of a single presentation of the said article.

Another object of the invention is to ensure after each partial actuation of the machine the making of a complete print which the worker can transfer onto one of the articles to be printed, usefully employing the time of stopping of the machine, the result of which is a rapid working without loss of time.

Briefly described, the machine according to the invention comprises a platen carrying the transfer pad and which is mounted upon the base of the machine so as to be able to turn intermittently in its own plane, and a block carrier carrying several blocks corresponding respectively to the designs in different colors which compose the complete impression, the said block carrier being pivoted on the base so as to be able to move towards and away from the platen for the application of the blocks upon the transfer pad. The mechanism ensuring automatically the intermittent rotation of the platen and the alternate approach and withdrawal of the block carrier is adapted to bring each of the prints already received by the transfer pad successively in front of each block.

The device controlling the intermittent rotation of the platen consists of a series of cams of which any one may be at will brought into engagement with the pivoted lever with a spring capable of producing, according to the angular displacements which are imparted to it by the cams and by the intermediary of a ratchet mechanism for example, a rotation of the platen for a predetermined fraction of a turn corresponding to the angular spaces of two adjacent blocks upon the block carrier or to twice this angular spacing. A cam device acting likewise upon a pivoted spring lever may serve to ensure the lock-

ing of the platen after each of its partial rotations.

The automatic movement of the block carrier towards and away from the platen takes place due to a series of cams acting alternately upon a rocking member connected to the block carrier by any suitable transmission so as to produce at one time the displacement of this member in one direction (and consequently the approach of the block carrier), and at another time the displacement of this member in the opposite direction (and consequently the withdrawal of the block carrier).

Furthermore the printing machine comprises advantageously an automatic inking device for the blocks working in connection with the mechanism which serves to produce the approach and withdrawal of the block carrier and the platen.

This inking device ensures an inking such that the succession of the impressions of different colors upon the gelatine cushion is ensured correctly. This result is obtained in particular by applying each color upon a fraction of the inking roller or rollers.

In the attached drawings there is shown by way of non-limiting example one embodiment of a machine for printing according to the present invention, and intended for printing in three colors.

In these drawings:

Figure 1 is a sectional elevation with partial transverse section of the machine;

Figure 2 is a section along A—B—C—D—E of Figure 1.

Figure 3 is a plan view with a section along F—G—H of Figure 1.

Figures 4, 5 and 6 are diagrammatic views of the rotary platen in three of the positions which it is caused to occupy.

In this example, the block carrier 43 is pivoted upon the base 44 of the machine by means of a member 45 carrying a sleeve 46 which pivots upon points 47 arranged along an axis X—X. At its middle this sleeve comprises a fork 48 in which is pivoted a link 49, which is pivoted at its other end at 110 to a member 111, itself pivoted at 112 upon the base of the machine. The link 49 is pivoted upon the fork 48 through the intermediary of an elastic connection constituted by a rod 113 upon which slides, between two adjustable springs 114, a sleeve 115 integral with this link. Upon the member 111 are mounted one upon one side and the other upon the other side of the cam two rollers 116, 117 upon which act cams 118 and 119 mounted upon the spindle 69. 55

This spindle 69 receives as will be seen later a rotary movement in the direction of the arrow 73 and the form of the cams 118, 119 is such that during this rotation there is produced through the intermediary of the rollers 116, 117 of the member 111 pivoted at 112, of the link 49, of the fork 48, and of the arms 45, an alternate rocking of the block carriers 43 from the substantially vertical position shown in the drawings to a substantially horizontal position and vice versa, with a sufficiently long period of stopping in the raised position.

Upon the block carrier 43 are here fixed in an adjustable manner three blocks 54a, 54b, 54c suitably spaced with respect to one another and intended respectively for the impression of a print of determined color.

The platen 55 carrying the transfer pad 56 is mounted for rotation upon the base 44 opposite the block carrier 43 by means of a spindle 57 turning in ball bearings 58, 59. The arrangement is such that when the block carrier 43 is lowered the blocks are applied with the desired pressure upon the transfer pad 56.

Upon the axis 57 of the platen 53 is fixed a pinion 60 with which engages a pinion 61 keyed upon an intermediary spindle 62. This spindle 62 carries a ratchet wheel 120 upon which acts a spring biased pawl 121 pivoted to the end of a curved arm 122 pivoted at 62. At the free end of this latter is pivoted a link 123, pivoted on the other hand to the end of a lever 124, pivoted at 112, and carrying at a point of its length a roller 125. A spring 126 tends to bring back constantly the lever 124 towards the right of Figure 1. Upon the roller 125 one or other of the two cams 127 or 128 integral with one another may act, the assembly of which is mounted slidingly by the intermediary of a long spline 129 upon the spindle 69. A fork 130 pivoted at 131 and actuated by a lever (not shown) allows, by displacing the assembly of the cams 127, 128 along the spindle 69 in either direction, one or other of these cams to act upon the roller 125. The cams 127 and 128 are formed so that at each turn of rotation of the shaft 69 the platen 55 undergoes, according as to whether one or other of these cams is in contact with the roller 125, an angular displacement of a quarter turn respectively or a half turn, occurring through the intermediary of a roller 125, of the lever 124, of the connecting rod 123, of the arm 122, and of the pawl 121 acting upon the ratchet wheel 120, of the axis 62, and gears 61 and 60.

The stopping of the platen 55 at positions strictly determined is obtained by a finger 132 which engages successively in the holes 133 provided upon the edge of a plate 134 integral with this platen. The finger 132 is mounted upon a spindle 135 pivoted upon the base 44 and upon this spindle is keyed a lever arm 136 to the end of which is pivoted a link 137 the other end of which is pivoted upon a lever 138 pivoted at 112 and carrying a roller 139. A spring 140 tends to bring back constantly the lever 138 towards the right of Figure 1. Upon the roller 139 acts a cam 141 mounted upon the spindle 69.

The inking mechanism of the blocks comprises two rollers 72, 73 co-operating with a cylindrical inking table 74 which receives the colors from an arrangement analogous to that which is currently used in printing. The said rollers are mounted by the intermediary of rods 75 subjected to the action of springs 76 upon two arms 77 placed on either side of the base 44 and pivoted upon

this latter by means of a spindle 78. This spindle carries a lever arm 142 to the end of which is pivoted a fork 143 enclosing with a certain play the spindle 69. Upon this fork 143 is fixed a roller 144 upon which acts a cam 145 mounted upon the spindle 69. This cam is formed so that at each rotation of the spindle 69 the fork 143 undergoes a certain alternating angular displacement and transmits to the arms 77 carrying the inking rollers 72, 73 an angular displacement which brings these rollers into contact with the blocks 54a, 54b, 54c.

Upon the spindle 78 of the arms 77 there is moreover fixed a bearing 85 in which pivots a link 86 connected to a lever 87 keyed on a transverse spindle 88; upon this latter are fixed two oscillating supports 89 carrying a roller 90 which, under the effect of the oscillations communicated to the supports 89 by the angular displacements of the spindle 78, comes into contact with a roller 91 mounted in the trough 92 containing the ink. One of the supports 89 carries moreover a pawl 93 which co-operates with a ratchet wheel 94 integral with the roller 91 and imparts to this latter an intermittent rotating movement. The roller 90 separating from the roller 91 comes into contact with an intermediate roller 95 pivoted upon the base 44 and which is itself in contact with a roller 146, in contact itself with a roller 147. The roller 146 deposits on the inking table 74 the ink which it has itself received from the oscillating roller 90 through the intermediary of the intermediate roller 95.

The rollers 95 and 147 are mounted upon a spindle upon which they have, by the intermediary of a finger engaging in a slot, a lateral movement intended to equalize and properly distribute the ink.

Upon the spindle 97 of the roller 74 is keyed a pinion 148 which is connected by a chain 149 to a pinion 150 keyed upon the shaft 69, this latter may thus transmit a continuous rotary movement to the roller 74. To ensure upon this latter and consequently upon the rollers 72, 73 intended to coat the blocks 54a, 54b, 54c, a suitable distribution of the color corresponding respectively to the said blocks, the trough 92 is divided in its length into three distinct compartments by means of partitions. The actuation of the cam shaft 69 may be produced, starting from a shaft 104 carrying a control pulley 105 through the intermediary of a train of gears 106, 107, 108, 109.

The partial rotations of the platen 55 may be damped with the aid of a spring 151 (Figure 1) which fixes a plate of fibre or other material 152 between a metallic plate 153 and the base 44.

The machine operates in the following manner when the cam 127 coacts with the roller 125:—

At the beginning of the inking of the blocks the members occupy the position shown in Figure 1. The cam 145 acting upon the roller 144 produces the lowering of the arms 77 which brings the rollers 72—73 into contact with the three blocks 54a, 54b, 54c respectively coated with a different color. Continuing its rotation the cam 145, by always acting upon the roller 144, determines the raising of the rollers 72, 73 up to the inking roller 74.

During these movements the block carrier 43 remains raised, the rollers 116, 117 of the member 111 being in contact with the circular part of each of the cams 118, 119.

When the rollers 72, 73 have come back to their upper position the cam 118 produces pressure upon the roller 116 so as to cause the member 75

111 to undergo an angular displacement towards the left of Figure 1 and to produce sequently the lowering of the block carrier upon the platen 55, this being maintained stationary by the engagement of the finger 132 in one of the holes 133. The blocks are then applied upon the pad 56 which receives thus three imprints *a, b, c*, of different colors as is shown diagrammatically in Figure 4. Then under the action of the cam 119 acting upon the finger 116 of the member 111 the block carrier 43 is raised. At this moment the cam 141 acting upon the roller 139 draws the link 137 and raises the finger 132 which leaves the housing 133. Then the cam 127 acting in its turn upon the roller 125 causes the platen 55 to undergo, through the intermediary of the link 123, of the arm 122 and of the pawl, a rotation of 90°. The finger 132 then comes under the action of the spring 140 acting upon the lever 138, the connecting rod 137 and the arm 136 to engage in the next hole 133.

The process of inking the blocks takes place again as above, and the block carrier 43 is lowered again upon the platen 55. The pad 56 receives three new prints *a', b', c'* (as shown in Figure 5), the prints *a', b'* being combined with the previous prints *b, c*, which the rotation of the platen 55 has brought opposite the blocks 54a, 54b. When the block carrier is lowered a third time, the platen 55 has undergone a new rotation of 90° and the prints *a'', b'', c''* applied by the blocks upon the pad 56 combined with the preceding ones (as indicated in Figure 6) so that one of the imprints formed comprises at the same time the three colors corresponding to the three blocks. The worker may then profitably employ the following inking phase during which the block carrier 43 and the platen 55 are stationary, for presenting the article to be printed to this complete impression. The same operations are repeated indefinitely. A complete print is always available for transfer, this occurring at each fresh lowering of the block carrier, starting from the three first times which constitute the priming of the machine.

When the other cam 128 coacts with the roller 125, the platen 55 undergoes, as previously stated, a rotation of 180° for each complete rotation of the shaft 69. In this case the block carrier 43 only carries two blocks and these are diametrically opposed, while the transfer pad only has two inking zones each of which receives for each double rotation of the shaft two superposed prints, against each of which an article is presented at suitable intervals.

I claim:

1. A machine for multi-color printing of various articles comprising a frame, an impression transfer platen mounted upon the frame so as to be able to turn in its own plane; a block carrier; a plurality of printing blocks fixed on the block carrier and corresponding respectively to the designs of different colors which compose the complete impression, the said block carrier being mounted upon the frame so as to be able to move towards and away from the transfer platen for the application of the printing blocks upon the transfer platen; means for inking said printing blocks; and means for automatically ensuring an intermittent rotation of the transfer platen and an alternate approach and withdrawal of the block carrier with respect to the platen such that the prints of the several printing blocks are superposed successively upon the transfer

platen to constitute the complete imprint to be printed on the article.

2. A machine for multi-color printing of various articles comprising a frame, an impression transfer platen mounted upon the frame so as to be able to turn in its own plane; a gelatine transfer pad fixed upon said transfer platen; a block carrier; a plurality of printing blocks fixed on the block carrier and corresponding respectively to the designs of different colors which compose the complete impression, the said block carrier being mounted upon the frame so as to be able to move towards and away from the transfer platen for the application of the printing blocks upon the gelatine transfer pad; means for inking said printing blocks; and means for automatically ensuring an intermittent rotation of the transfer platen and an alternate approach and withdrawal of the block carrier with respect to the platen such that the prints of the several printing blocks are superposed successively upon the transfer pad to constitute the complete imprint to be printed on the article.

3. A machine for multi-color printing of various articles comprising a frame, an impression transfer platen mounted upon the frame so as to be able to turn in its own plane; a block carrier; a plurality of printing blocks fixed on the block carrier and corresponding respectively to the designs of different colors which compose the complete impression, the said block carrier being mounted upon the frame so as to be able to move towards and away from the transfer platen for the application of the printing blocks upon the transfer platen; means for inking said printing blocks; an oscillating member connected to the block carrier; a set of cams acting upon the said oscillating member to ensure an alternate approach and withdrawal of the block carrier with respect to the transfer platen; and means ensuring an intermittent rotation of the transfer platen such that each of the prints received by said transfer platen is brought in front of each of the blocks.

4. A machine for multi-color printing of various articles comprising a frame, an impression transfer platen mounted upon the frame so as to be able to turn in its own plane; a block carrier, a plurality of printing blocks fixed in a circle around a common axis on the block carrier and corresponding respectively to the designs of different colors which compose the complete impression, the said block carrier being mounted upon the frame so as to be able to move towards and away from the transfer platen for the application of the printing blocks upon the transfer platen; means for inking said printing blocks; means for automatically ensuring an intermittent rotation of the transfer platen by a fraction of turn corresponding to the angular spacing of two adjacent blocks on the block carrier, and means for automatically ensuring an alternate approach and withdrawal of the block carrier with respect to the transfer platen such that the prints of the several printing blocks are superposed successively upon the transfer platen to constitute the complete imprint to be printed on the article.

5. A machine for multi-color printing of various articles comprising a frame, an impression transfer platen mounted upon the frame so as to be able to turn in its own plane; a block carrier; a plurality of printing blocks fixed in a circle around a common axis on the block carrier and corresponding respectively to the designs of different colors which compose the complete impres-

sion, the said block carrier being mounted upon
 the frame so as to be able to move towards and
 away from the transfer platen for the applica-
 tion of the printing blocks upon the transfer
 5 platen; means for inking said printing blocks; a
 ratchet mechanism connected to the transfer
 pad; a spring biased pivoted lever controlling
 the said ratchet mechanism; a cam acting upon
 the said lever for automatically producing an
 10 intermittent rotation of the transfer platen by a
 fraction of turn corresponding to the angular
 spacing of two adjacent blocks on the block car-
 rier; and means for automatically ensuring an
 alternate approach and withdrawal of the block
 15 carrier with respect to the transfer platen such
 that the prints of the several printing blocks are
 superposed successively upon the transfer platen
 to constitute the complete imprint to be printed
 on the article.
 20 6. A machine for multi-color printing of va-
 rious articles comprising a frame, an impression
 transfer platen mounted upon the frame so as to
 be able to turn in its own plane; a block carrier;
 a plurality of printing blocks fixed on a circle
 25 around a common axis on the block carrier and
 corresponding respectively to the designs of dif-
 ferent colors which compose the complete im-
 pression, the said block carrier being mounted
 upon the frame so as to be able to move towards
 30 and away from the transfer platen for the ap-
 plication of the printing blocks upon the transfer
 platen; means for inking said printing blocks; a
 ratchet mechanism connected to the transfer
 pad; a spring biased pivoted lever controlling the
 35 said ratchet mechanism; a plurality of cams
 mounted on a common axis; means to bring one
 of said cams in cooperation with the spring biased

pivoted lever for producing an intermittent rota-
 tion of the transfer platen by a fraction of turn
 corresponding to the angular spacing of two ad-
 jacent blocks on the block carrier; and means
 for automatically ensuring an alternate approach 5
 and withdrawal of the block carrier with respect
 to the transfer platen such that the prints of the
 several printing blocks are superposed successively
 upon the transfer platen to constitute the com-
 plete imprint to be printed on the article. 10

7. A machine for multi-color printing of va-
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 be able to turn in its own plane; a block carrier;
 15 a plurality of printing blocks fixed in a circle
 around a common axis on the block carrier and
 corresponding respectively to the designs of dif-
 ferent colors which compose the complete im-
 pression, the said block carrier being mounted
 upon the frame so as to be able to move towards 20
 and away from the transfer platen for the appli-
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