V. L. REEVE.

OFFSET PRINTING MACHINE.

APPLICATION FILED SEPT. 21, 1917.

1,259,285.

Patented Mar. 12, 1918.

5 SHEETS—SHEET 1.

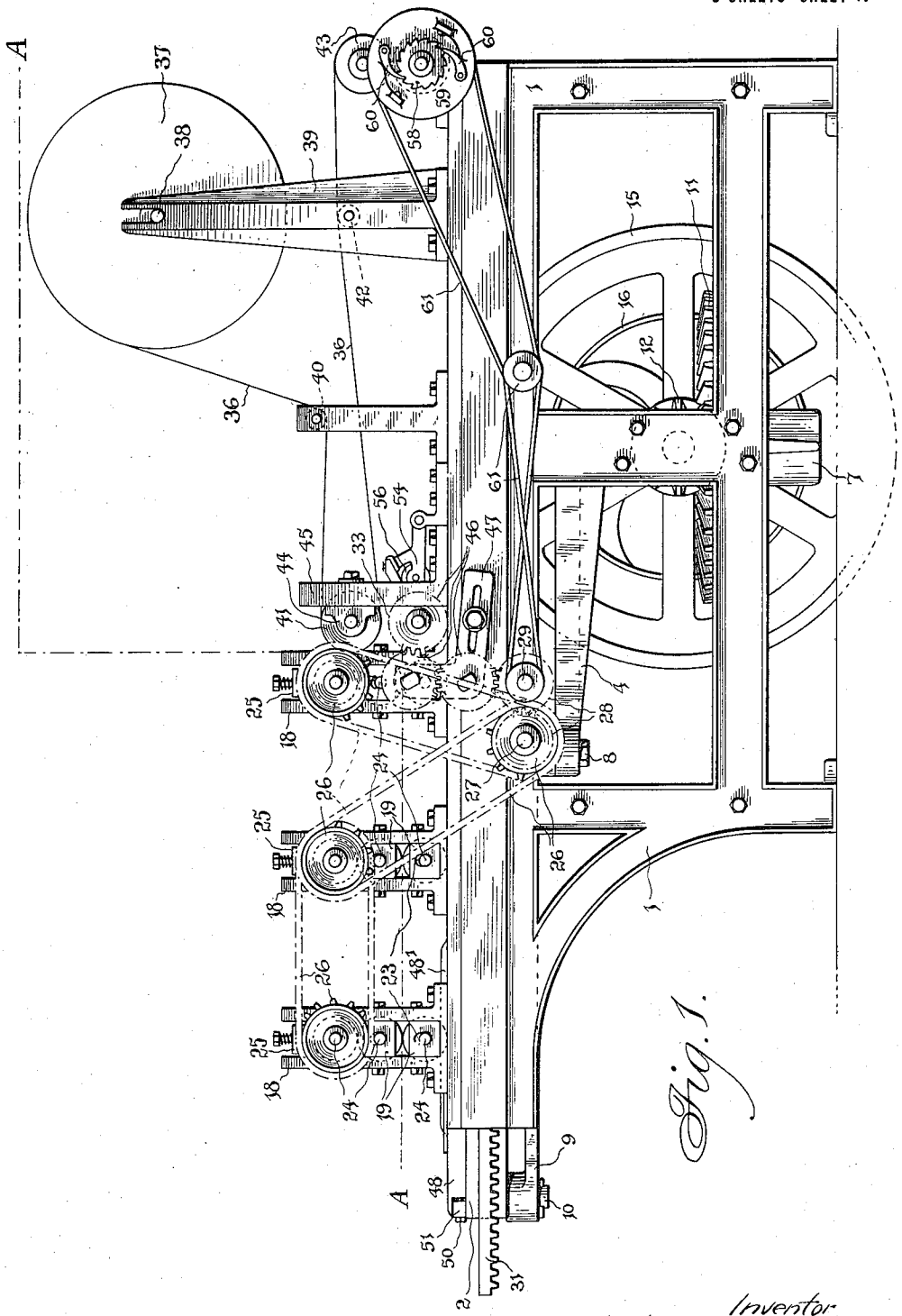


Fig. 1.

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5 SHEETS—SHEET 2.

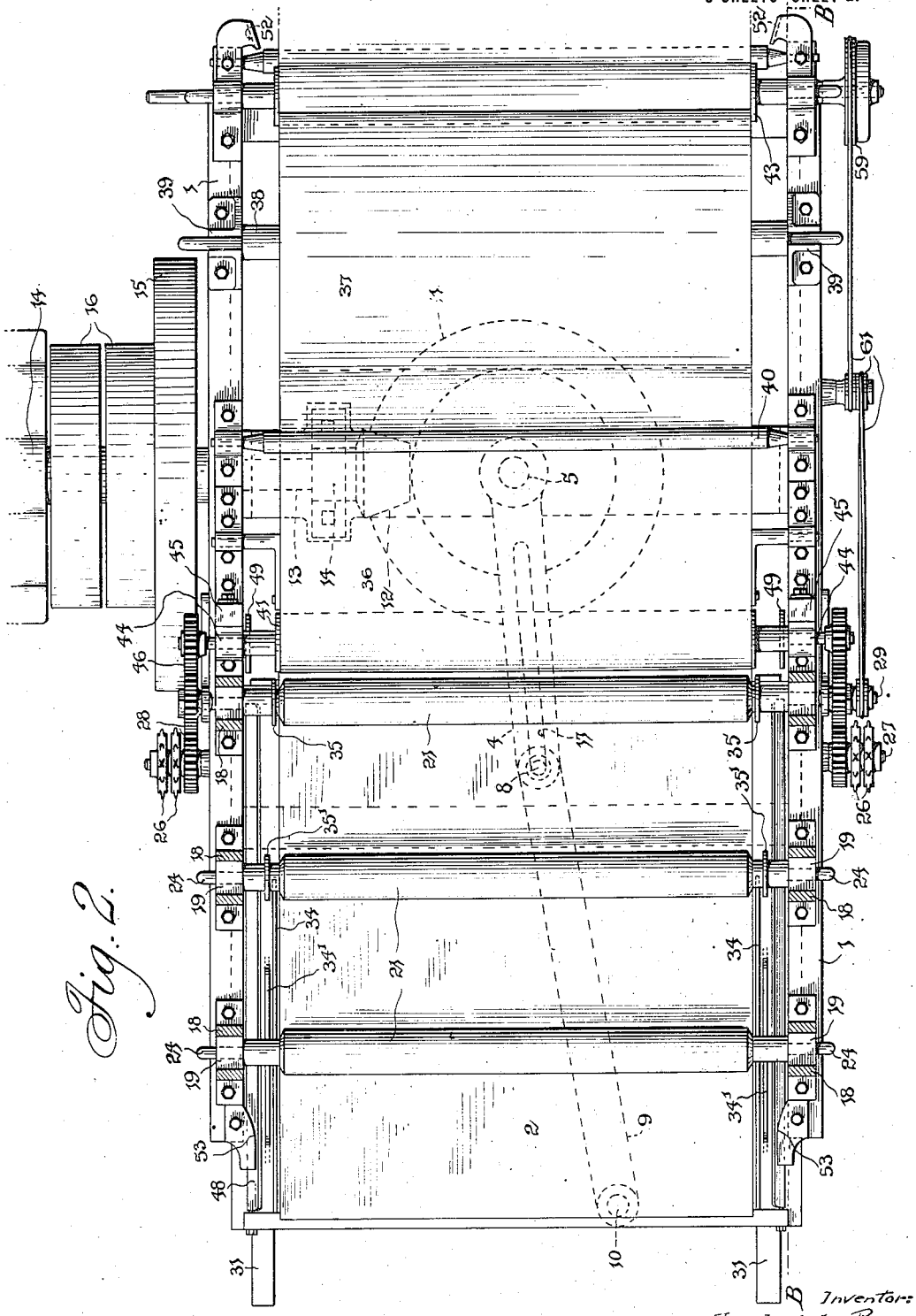


Fig. 2.

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5 SHEETS—SHEET 3.

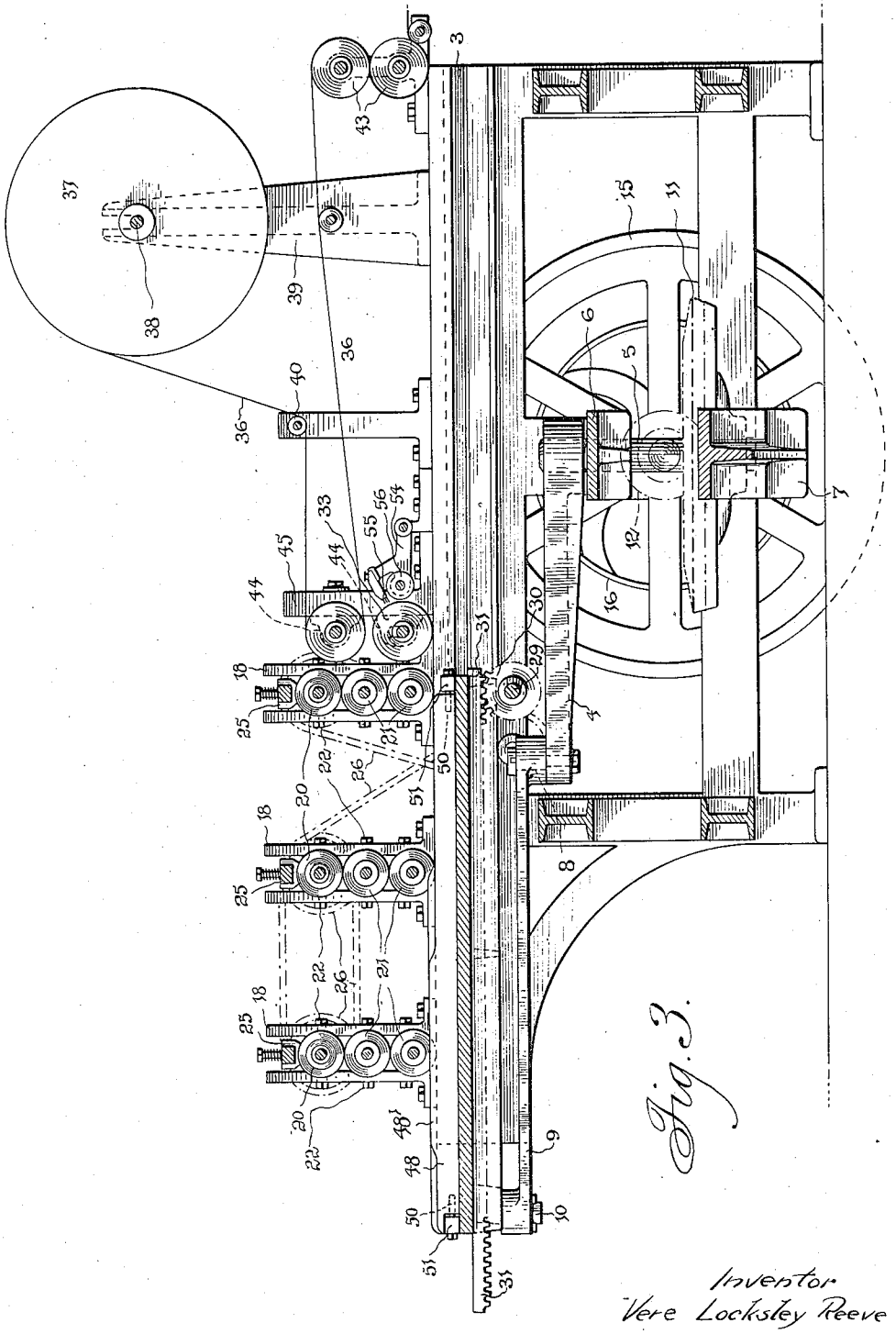


Fig. 3.

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5 SHEETS—SHEET 4.

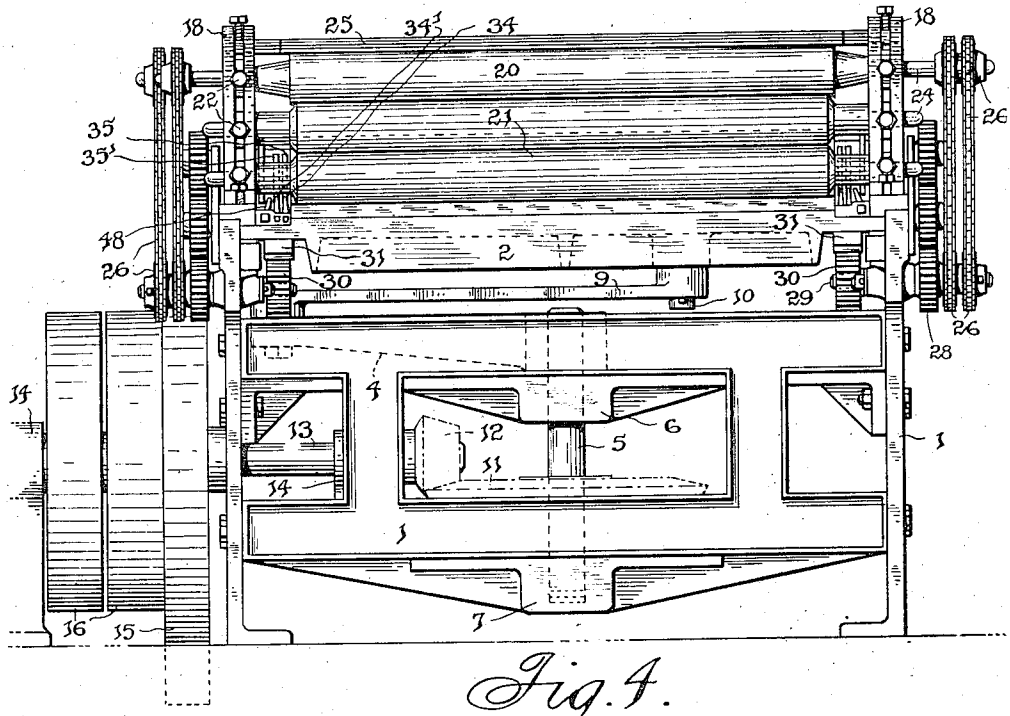


Fig. 4.

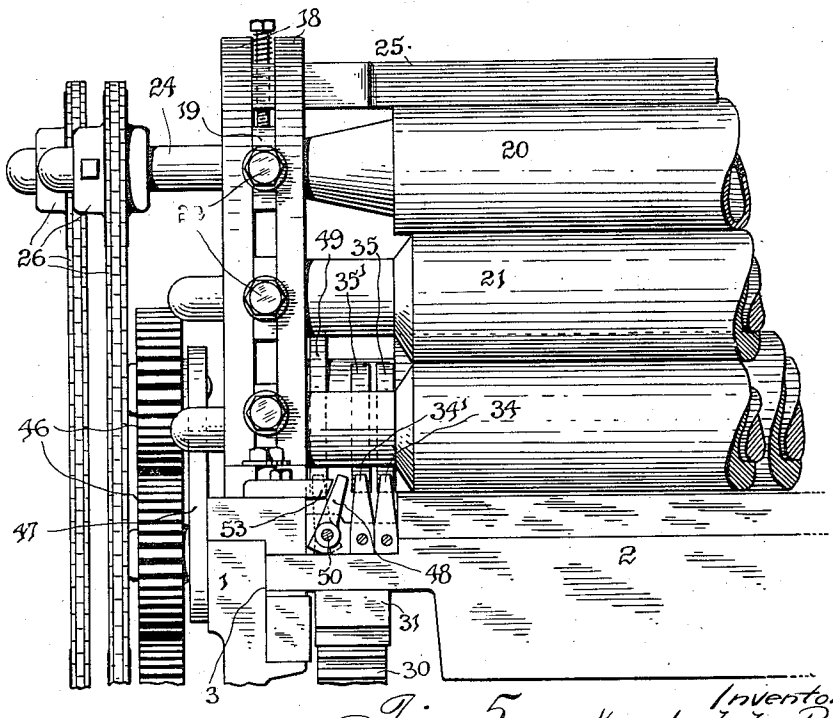


Fig. 5.

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5 SHEETS—SHEET 5.

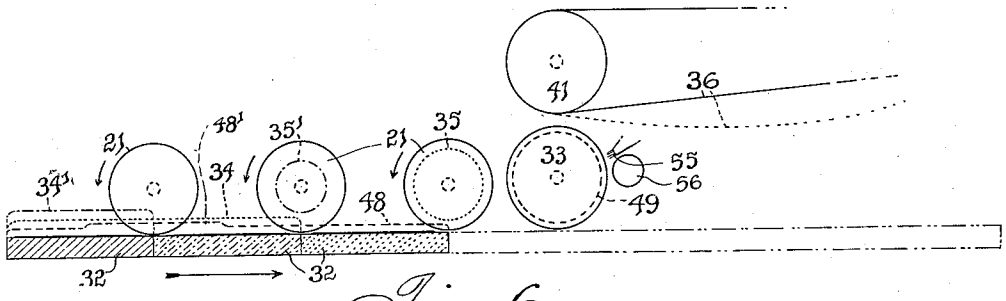


Fig. 6.

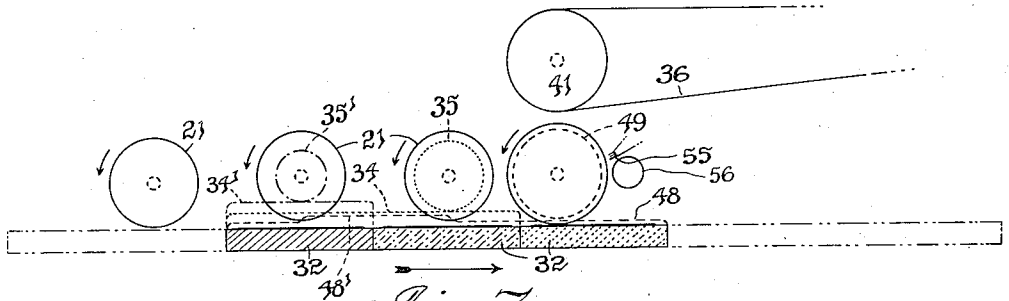


Fig. 7.

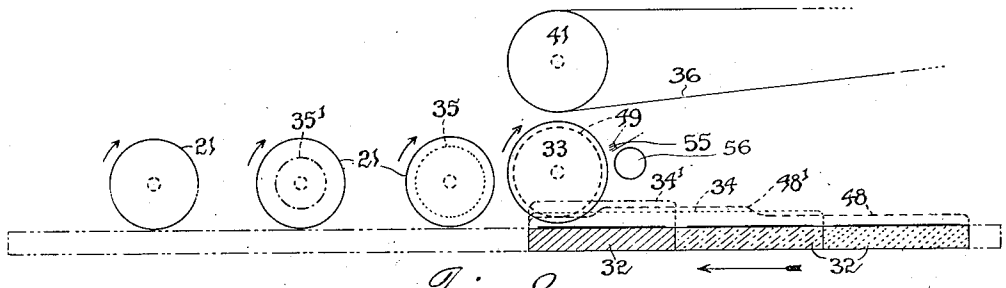
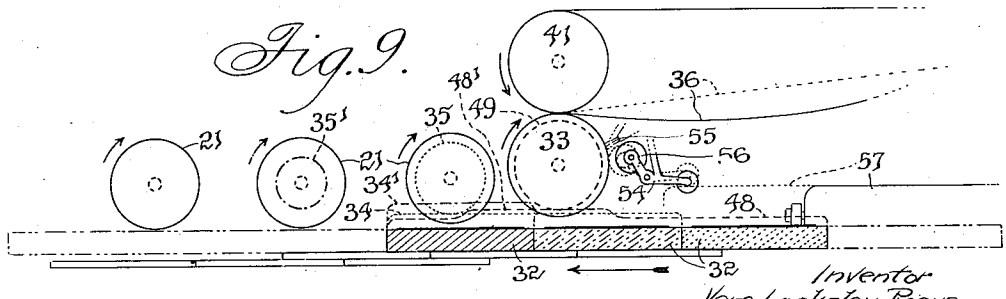


Fig. 8.

Fig. 9.



Inventor
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By Earl P. Gaebel
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UNITED STATES PATENT OFFICE.

VERE LOCKSLEY REEVE, OF BALLARAT EAST, VICTORIA, AUSTRALIA.

OFFSET-PRINTING MACHINE.

1,259,285. Specification of Letters Patent. Patented Mar. 12, 1918.

Application filed September 21, 1917. Serial No. 192,437.

To all whom it may concern:

Be it known that I, VERE LOCKSLEY REEVE, a subject of the King of Great Britain, residing at 66 Wills street, Ballarat East, in the State of Victoria, Commonwealth of Australia, have invented certain new and useful Improvements in Improved Offset-Printing Machines, of which the following is a specification.

This invention relates to an improved offset multi-color printing machine and it is directed particularly to the provision of a printing machine in which two or more colors can be placed in accurate register on the surface of the paper or other material in one impression.

The object of the invention is to provide a printing machine in which impressions of different colors are taken consecutively on to an offset printing roller in correct register from different sections of one or from two or more blocks, plates or forms of type and then transferred from the offset printing roller to the paper or other material with one impression.

This invention is applicable to the use of blocks, plates or forms of type and other impressing media or sections of the same and it will be understood that in this specification the term "blocks" will include all such devices for transferring on to the offset roller a film of ink representing the characters designs or engravings to be printed.

I accomplish this object by providing a printing machine consisting essentially of a frame having a reciprocatory table upon which are mounted one or more blocks each having one or more superimposed inking rollers and fountains for placing its own particular color of ink thereon as the table is moved forward and means for bringing the said blocks on the forward movement of the table consecutively into contact with the surface of an offset printing roller in such a manner and so timed that the impressions register accurately upon or alongside each other as desired and means for placing the offset printing roller in contact with the paper on its return movement to transfer the impressions thereon and for returning the table in such a manner that the blocks do not contact with the offset printing roller during the printing operation.

A multicolor printing machine constructed in accordance with the present invention is comparatively simple in construction and operation and as the paper or other material printed upon can be taken from a reel it can be worked at a high speed with very satisfactory results.

In order that the invention may be readily understood reference will now be had to the accompanying sheets of explanatory drawings wherein—

Figure 1 is a view in side elevation of a multi-color printing machine constructed in accordance with the present invention.

Fig. 2 is a view in plan, part being shown in section taken on the dotted line A—A of Fig. 1.

Fig. 3 is a view in sectional side elevation taken on the dotted line B—B of Fig. 2.

Fig. 4 is a view in rear end elevation of the improved printing machine parts being omitted for convenience of illustration.

Fig. 5 is a view in end elevation of portion of the machine drawn to a larger scale than the other figures and hereinafter will be fully described.

Figs. 6, 7, 8, and 9 are diagrammatic views illustrating the relative movements of the main parts of the machine in their correct sequence of operation.

In these drawings I have shown a printing machine furnished with three sets of inking rollers and blocks but it will be readily understood from the following description that two or more than three sets of inking rollers can be used and the machine adjusted to print any number of colors at one impression.

In the drawings the numeral 1 designates a rectangular frame having a reciprocatorily mounted table 2 supported by guideways 3 formed longitudinally in the frame.

The table is preferably made approximately half the length of the frame and is reciprocated by a crank 4 which is secured to a vertical shaft 5 mounted in a bracket 6 and footstep bearing 7. The crank 4 is fitted with a pin 8 connected by a link or pitman rod 9 to a stud 10 depending from the underside of the table and the shaft 5 is fitted with a crown wheel 11 gearing with which is a pinion 12 carried on a horizontal driving shaft 13. The driving shaft is mounted on bearings 14 and fitted with a fly wheel 15 and fast and loose belt pulleys 16.

The crank pin 8 is adjustably secured in a slot 17 in the crank and the said pin can be secured at any point in the length of the slot in order to permit of the reciprocatory movement of the table being varied to suit the particular sizes of work required.

The surface of the table is provided with any ordinary means for securing thereto a number of blocks, plates or forms of type corresponding to the number of colors desired to produce the effect desired in the work.

The top of the frame is provided with three vertical guides 18 which support journal bearings 19 for inking rollers 20 of polished metal and ink distributing rollers 21 covered with rubber or other suitable composition. The journal bearings 19 for the rollers 20 and 21 are secured at any desired point in the height of the guides 18 by means of set screws 22 and the said bearings are provided with slots 23 which permit the spindles 24 of the rollers rising therein.

An ink fountain 25 of any approved design is located above the inking rollers 20 and these fountains are kept in close contact with the said rollers by spring pressure and supply the different colored inks desired to produce the work required.

The inking rollers 20 are driven by chain and sprocket gearing 26 from spindles 27 which are revolubly supported in the frame and driven by gearing 28 from spindles 29 also mounted revolubly in the frame and provided on their inner ends with pinions 30 arranged to gear with racks 31 secured longitudinally to the under side of the table. The blocks 32 for transferring the different colored inks to the offset printing roller 33 are arranged as shown in Fig. 6 of the drawings and when the table 2 is moved forward each block is inked from its particular ink distributing roller 21.

When the rear ends of the blocks 32 are brought beneath the centers of their respective ink distributing rollers 21 the latter are raised by linear cams 34 and 34′ which are fitted adjustably on the table and bear against collars 35 and 35′ on the lowermost rollers of the first and second series in order to prevent them placing ink on to the next block as they move forward.

In its further forward movement the table brings the inked faces of the blocks 32 consecutively into contact with the offset printing roller 33 and the different colored inks are placed thereon in correct register.

The paper 36 upon which the printing is effected is preferably taken from a reel 37 which is carried on a spindle 38 supported by standard brackets 39 near the front of the frame. The paper 36 passes down from the reel beneath an idle roller 40 and then rearward to and around the cylinder 41 located above the offset printing roller 32. The paper after passing around the cylinder 41 is passed forwardly over an idle roller 42 supported by the brackets 39 to feed rollers 43 which are operated to draw the paper from the reel as desired.

The spindles of the rollers 33 and 41 are supported in bearings 44 fitted adjustably to brackets 45 which are mounted on the frame of the machine.

The offset printing roller 33 is operated by toothed gearing 46 from the gearing 28 on the spindles 29 at any desired rate of speed. The gearing 46 is provided with change gear wheels which are carried on studs fitted to plates 47 secured adjustably to the sides of the frame of the machine whereby the offset printing roller can be rotated at different speeds relatively to the movement of the table.

When the table commences its return stroke the offset printing roller 33 is partially raised by linear cams 48 which are placed longitudinally on the table and bear against collars 49 on the ends of the said roller in order to move the face thereof away from the surfaces of the blocks 32. When the offset printing roller has been rotated half a revolution and the edge of the picture or other matter being printed is brought directly beneath the center of the cylinder 41 the said roller 33 is raised by the high part 48′ of the cams 48 into contact with the paper 36 passing around the cylinder and kept bearing thereagainst until the offset printing roller has completed one revolution.

The offset printing roller is partially lowered after transferring the impression on to the paper and is lowered to its normal position after the blocks have all passed therebeneath when the operations above described can be repeated to make another impression.

In Fig. 6 of the drawings the blocks 32 are shown at the commencement of their forward movement and in Fig. 7 the blocks are shown passing beneath the offset printing roller and with the first and second ink distributing rollers raised to clear the second and third blocks respectively.

In Fig. 8 the blocks 32 are shown near the commencement of their return stroke and the offset printing roller partially raised while Fig. 9 shows the said roller raised and in the act of transferring the impression to the paper.

The arrows shown in Figs. 6, 7, 8 and 9 indicate the direction of movement of the table and rollers of the machine.

The first and second set of ink distributing rollers are raised by their respective cams 34 and 34′ on the rearward movement of the table in the reverse order to that in which they are raised during the forward movement of the table.

The linear cams 48 for raising the offset

printing roller are pivoted at their ends on pins 50 which are carried in lugs or brackets 51 fitted to the table.

The said linear cams 48 are arranged to tilt sidewise into the positions as shown in full lines in Fig. 5 when the table reaches the end of its return movement and when the table reaches the end of its forward movement the forward ends of the cams strike inclined abutments 52 which cause them to tilt outward into their operative positions as indicated by the dotted lines in the said figure.

The linear cams 48 are tilted inwardly when the table reaches the end of its return movement by inclined abutments 53 fitted to the rear end of the frame of the machine.

A cleaning device 54 comprising a brush 55 and a felt covered roller 56 is employed to clean the face of the offset printing roller 33 after each impression and the said device can be operated by a linear cam 57 as shown in Fig. 9 of the drawings or in any other approved way.

The paper 36 is unwound intermittently from the reel 37 by the tension placed thereon during the time when the offset printing roller is making a revolution in contact with the cylinder to place the multicolor impression on the paper. The feed rollers 43 are operated intermittently on the return movement of the table to take up the sag of the paper between the offset printing roller and the said feed rollers during the previous printing operations.

The intermittent unwinding of the paper from the reel permits of ample time for the drying of the ink before the impressions are passed between the feed rollers.

One of the spindles of the feed rollers is fitted with a fixed ratchet wheel 58 and a revolubly mounted pulley 59 having spring operated pawls 60 on the side thereof adapted to be kept in engagement with the ratchet wheel. The pulley 59 is operated by belt and pulley gear 61 from one of the spindles 29 carrying a pinion 30 which engages with one of the racks 31. The ratchet and pawl device is arranged to operate the feed rollers 43 sufficiently on the forward movement of the table to take up the sag of the paper formed during the previous printing operation and to permit of the pulley 59 running freely during the return movement of the table.

While I have described in the foregoing specification the preferred construction and arrangement of parts of the invention as adapted to three color printing it will be obvious that the invention may be employed to print various classes of jobbing work in one or more colors and that various modifications and adjustments and rearrangements of parts may be made to suit any particular class or work without departing from the spirit and scope of the invention and I therefore do not wish to be understood as limiting myself to the precise terms employed in the description excepting such as the state of the art may require.

I claim—

1. A multicolor printing machine comprising a supporting frame, a series of inking mechanisms arranged in succession for carrying inks of different colors respectively, an offset printing roller, a reciprocatory table movable in said frame, a series of impression blocks disposed in succession on said reciprocatory table, means operative to reciprocate said table and move said impression blocks successively past said inking mechanisms on the movement thereof in one direction and into contact successively with said offset printing roller on the movement in the opposite direction, means operative automatically to adjust and retract said inking mechanisms individually into and out of the path of said blocks respectively, an impression roller, and means for causing said printing and impression rollers to coöperate in the printing operation.

2. A multicolor printing machine comprising a supporting frame, a series of inking mechanisms arranged in succession for carrying inks of different colors respectively, a bodily movable offset printing roller, a reciprocatory table movable in said frame, a series of impression blocks disposed in succession on said reciprocatory table, means operative to reciprocate said table and move said impression blocks successively past said inking mechanisms on the movement thereof in one direction and into contact successively with said offset printing roller on the movement in the opposite direction, means operative automatically to adjust and retract said inking mechanisms individually into and out of the path of said blocks respectively, an impression roller, and means for shifting said offset printing roller into coöperative relation with said impression roller.

3. A multicolor printing machine comprising a frame having guideways, a reciprocatory table movable in said guideways and provided with cams of different heights, a series of inking mechanisms arranged in succession on said frame for carrying inks of different colors respectively, an offset printing roller supported on said frame, a series of impression blocks disposed in succession on said reciprocatory table, an impression roller, and means operative to reciprocate said table and move said impression blocks successively past said inking mechanisms and into contact successively with said offset printing roller, said movements causing said cams to shift said inking mechanisms and printing roller respectively into and out of operative positions.

4. In a multicolor printing machine the combination of a frame having a table mounted to reciprocate thereon, an offset printing roller mounted transversely on the frame above the path of movement of the table, linear cams placed longitudinally on and having their ends pivoted to the table, and means for tilting the cams sidewise into their operative and inoperative positions constructed and arranged whereby the offset printing roller will remain in its normal position on the forward movement of the table and be partially raised for one half a revolution and then completely raised into contact with the paper carrying cylinder for a complete revolution after which it is partially lowered and then returned to its normal position when the table is near the end of its return movement.

5. A multi-color printing machine comprising a frame having a table mounted to reciprocate thereon, ink distributing rollers supported adjustably on the frame above the table, an offset printing roller mounted on the frame, a felt covered roller, and a brush on the table for cleaning the offset printing roller, and a linear cam on the table for placing the brush and roller in contact with the offset printing roller after the same has made an impression on the paper, substantially as described.

6. A multi-color printing machine comprising a frame, a table mounted to reciprocate thereon, impression blocks in said table, means for reciprocating the table longitudinally on the frame, sets of inking rollers on one end of the frame each set having a superposed ink fountain, an offset printing roller arranged parallel with and in advance of the inking rollers, a paper carrying cylinder adjacent to the offset roller, linear cams on opposite sides of the table for raising the inking rollers on the forward and rearward movements of the table to clear said blocks, and linear cams on the table for raising the offset printing roller only upon the rearward movement of the table to print on the paper carried on the cylinder substantially as described.

7. A multi-color printing machine comprising a frame, a table mounted to reciprocate thereon, impression blocks in said table, sets of independent inking rollers mounted on the frame and corresponding in number to said blocks, an offset printing roller mounted in advance of the inking rollers, means for bringing the blocks consecutively into contact with the surface of the offset printing roller in a determinate manner to register the impressions correctly thereon, means for placing the offset printing roller in contact with a sheet of paper to transfer the impressions thereto, and means for returning the table to its normal position whereby the blocks do not contact with the offset printing roller during the printing operation, substantially as described.

8. In a multi-color printing machine the combination of a frame, a table mounted to reciprocate thereon, a series of inking rollers located at one end of the frame, linear cams on the table adapted to raise the inking rollers on the forward and rearward movements of the table, an offset printing roller located in advance of the inking rollers, linear cams placed longitudinally on and having their ends pivoted to the table, inclined abutments on the front end of the frame to tilt the linear cams into their operative positions whereby the offset printing roller is raised on the return movement of the table, and abutments on the rear end of the table for tilting the linear cams into their inoperative positions as and for the purposes herein set forth.

9. A multi-color printing machine comprising a frame, a table mounted to reciprocate on the frame, a series of inking rollers located at one end of the frame, linear cams on the table, collars on the lowermost roller of each series, an offset printing roller located in advance of the inking rollers, linear cams placed longitudinally and having their ends pivoted to lugs on the table, inclined abutments on the ends of the frame to tilt the pivoted linear cams into their operative and inoperative positions, collars on the offset printing roller arranged in line with the pivoted linear cams, a cylinder located above the offset printing roller, a bracket for supporting a reel of paper, intermittently operated feed rollers for drawing the paper from the reel around the cylinder located above the offset printing roller, gearing for imparting motion to the table, gearing for operating the inking rollers, and gearing for operating the feed rollers, substantially as described and for the purposes herein set forth.

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

VERE LOCKSLEY REEVE.

Witnesses:
H. C. CURWEN WALKER.
FRANK GALE.