

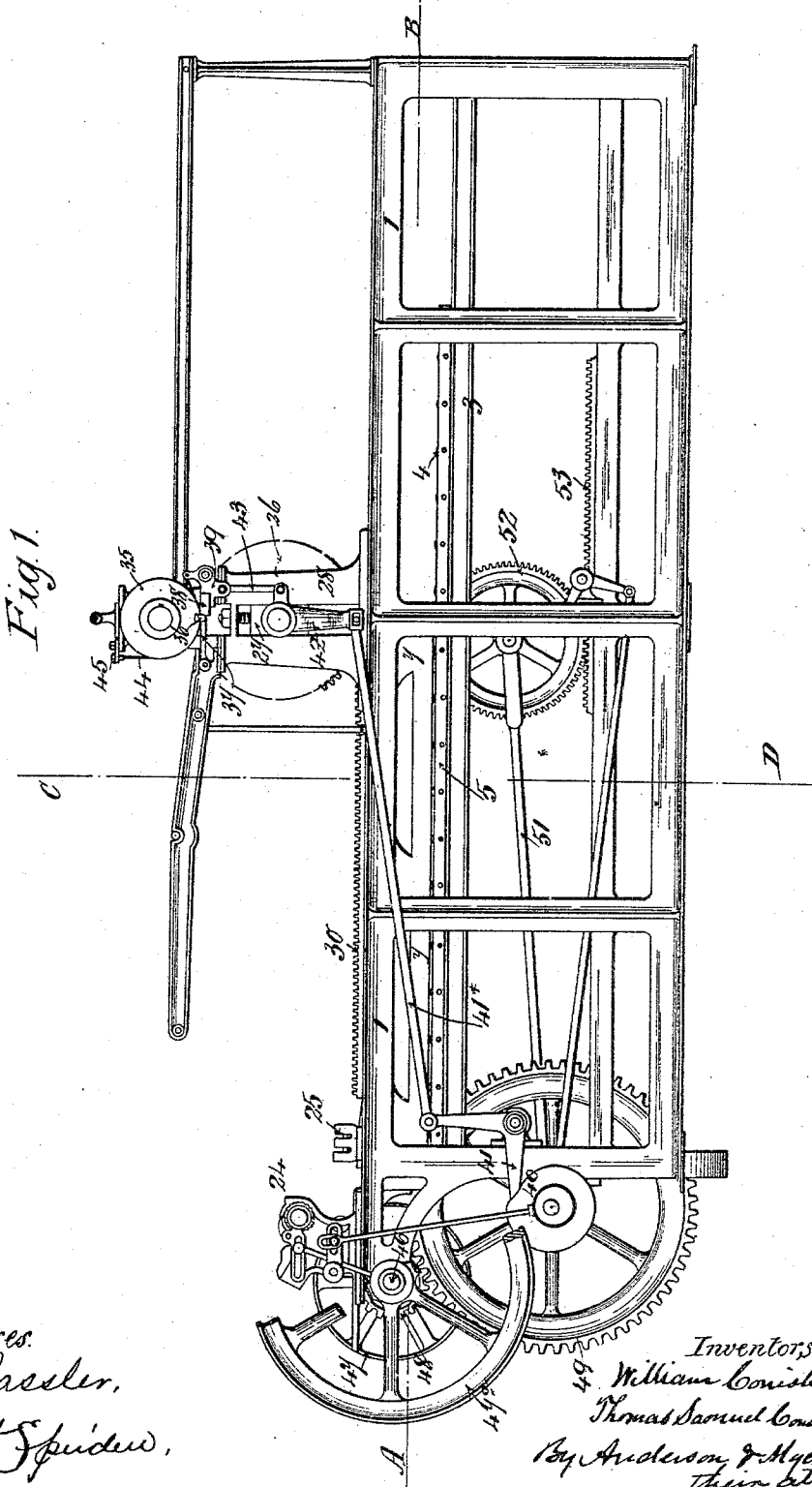
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4 Sheets—Sheet 1.

# W. & T. S. CONISBEE. COLOR PRINTING MACHINE.

No. 412,072.

Patented Oct. 1, 1889.



Witnesses.  
*J. H. Baseler,*  
*Albert Spieder,*

Inventors.  
*William Conisbee,*  
*Thomas Samuel Conisbee*  
 By *Anderson & Myers,*  
*their attys.*

(No Model.)

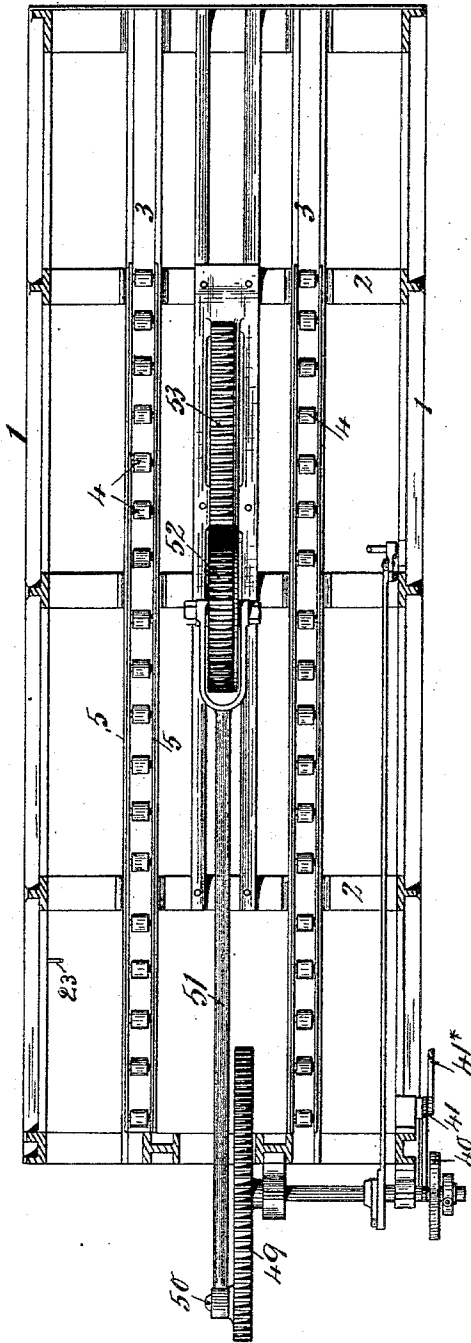
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*Fig. 2.*



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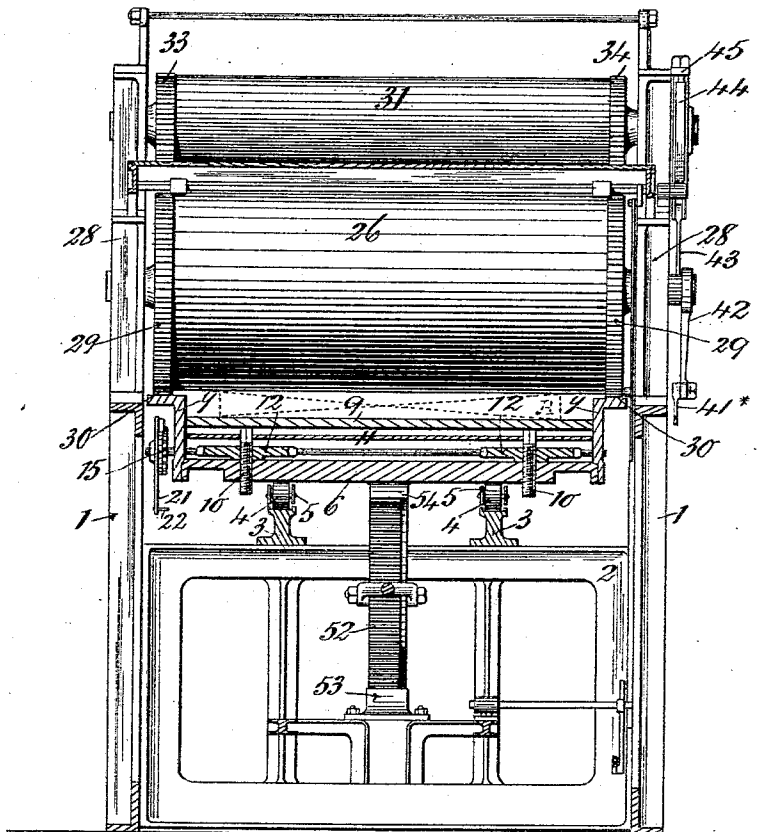
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*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

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## COLOR-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 412,072, dated October 1, 1889.

Application filed May 3, 1888. Serial No. 272,730. (No model.) Patented in England October 13, 1887, No. 13,874; in France April 17, 1888, No. 190,042; in Belgium May 2, 1888, No. 81,675, and in Canada May 19, 1888, No. 29,196.

*To all whom it may concern:*

Be it known that we, WILLIAM CONISBEE and THOMAS SAMUEL CONISBEE, subjects of the Queen of Great Britain and Ireland, both residing at York Road, Lambeth, in the county of Surrey, Kingdom of Great Britain and Ireland, have invented Improvements in Color-Printing Machines, (for which we have obtained Letters Patent in Great Britain, No. 13,874, October 13, 1887; in Belgium, No. 81,675, May 2, 1888; in France, No. 190,042, April 17, 1888, and in Canada, No. 29,196, May 19, 1888,) of which the following is a specification.

This invention has reference to printing-machines designed to produce a picture or illustration in any required number of colors by one feeding to and passage through the machine of the material to be printed upon.

Color-printing machines have heretofore been employed in which a color-block was used that in itself contained the color—that is to say, a block consisting of a number of moist colors placed side by side and each extending through the thickness of the block, the several colors being so relatively arranged as to correspond throughout the thickness of the block with the desired picture or illustration to be printed. In other words, the block, as seen in any section thereof parallel to the surface intended to yield an impression, would correspond as regards design and arrangement of the several colors with the illustration to be produced. In such machines the printing has been effected by direct contact of the material to be printed with the surface of the color-block, and no provision has been needed to automatically compensate for the gradual reduction in thickness of the block due to printing. With such machines, however, satisfactory results have not been obtained, because, owing to slight differences in the texture or quality of different sheets of paper or the like to be printed, and also to difference in the pressure used in applying successive sheets of such material to the color-block, an equal amount of color could not be taken off the color-block at each impression,

and consequently uniform printing could not be effected.

In a color-printing machine according to this invention we employ a color-block of the kind hereinbefore referred to in conjunction with a cylinder for transferring color from the surface of the block to the material to be printed, which is held upon another cylinder, means being provided for automatically adjusting the height of the color-block to compensate for the gradual consumption thereof due to printing. The arrangement and operation are such as to admit of producing a picture or illustration in any required number of colors by one feeding to and passage through the machine of the material to be printed upon. In conjunction with the color-block a key-block (wood or stereo) inked in the ordinary way may in some cases be employed, that may be an electrotype, wood, or zincographic block employed to give outline to and fill in details of the colored groundwork of the picture produced from the plastic color-block; or in lieu of a key-block a second color-block may be sometimes employed to give an even tone or tint to the picture produced by the first block.

In order to enable this invention to be carried into effect a multiple-color-printing machine according thereto is illustrated by way of example in the accompanying drawings, in which—

Figure 1 is a side view of the machine with part of the fly-wheel broken away to more clearly show inking mechanism. Fig. 2 is a horizontal section on the line A B, Fig. 1, with a double box or "coffin," with tables (hereinafter described) removed. Fig. 3 is a transverse section on the line C D, Fig. 1. Figs. 4 and 5 are respectively a side view and a plan or top view of a double box or coffin for carrying the color-blocks or a color-block and a key-block. Figs. 3, 4, and 5 are drawn to larger scales than Figs. 1 and 2.

1 1 are the side frames of the machine, connected by cross-frames 2, on which are secured two ribs 3, that extend the whole length of side frames. On the ribs 3 are placed a

series of anti-friction rollers 4, mounted in side frames 5, which keep the rollers a fixed distance apart. On these rollers is placed a double box or coffin that carries the color-block and key-block. It comprises a plate 6, with side cheeks 7, connected by three cross-ties 8, Fig. 5, so as to form two distinct boxes or coffins.

9 is a table or plate for supporting the color-block A. (Shown in dotted lines in Fig. 3.) This table or plate, which is planed true on both sides, is placed between the cheeks 7 and cross-ties 8, and is automatically adjusted in height to compensate for the consumption of the color-block due to each printing operation. For this purpose it rests in the arrangement shown upon the upper ends of four screw-threaded bolts 10, that are connected and prevented from turning by a rectangular frame 11. Upon each bolt 10 is fitted a worm-wheel 12, the boss of which is screw-threaded internally to serve as a nut to the bolt upon which it is fitted, so that when the wheel is turned the bolt upon which it works, and which is prevented from turning, will rise or fall, according to the direction in which the wheel is turned. Into the worm-wheels 12 gear worms 13, carried by spindle 14, each of which is provided at one end with a toothed wheel 15. Between the spindle 14 is placed another spindle 16, provided with a toothed wheel 17, that gears into the two toothed wheels 15. On the spindle 16 is also placed a ratchet-wheel 18, that is intermittently operated by a pawl 19, carried by the arm 20 of a lever journaled on the spindle 16, and the other arm 21 of which carries a pin 22. This pin acts against a fixed projection 23 just before the double box or coffin reaches the limit of its travel to the left, Fig. 1, and thereby operates the lever and mechanism hereinbefore described and automatically raises the table and color-block a short distance to compensate for the layer of color used in the preceding printing operation. The lever-arm 21 is provided with a series of holes 21<sup>x</sup>, in order that the position of the pin 22 and the extent of movement imparted to the lever and connected mechanism, and consequently to the table 9 and color-block thereon, may be varied according to requirement. The other box or coffin is also fitted with four screw-threaded bolts 10 for elevating a table placed thereon, and which may or may not carry either a key-block or a second color-block, as desired. These bolts may be automatically and simultaneously operated by gearing similar to that in the first box or coffin, as shown in Fig. 5. When a key-block is used, it must be raised by means of its bolts 10 to the requisite impression-level before commencing to print and will not need to have its height adjusted afterward. When a second color-block is employed, the table that supports it must be operated in a similar manner to that carrying the first color-block.

At 24 is represented inking mechanism, comprising an ink-duct and printing-rollers of ordinary construction for inking the key-block when such block is used.

25 are ink-distributing rollers, also of ordinary construction.

26 is a printing-cylinder mounted in adjustable bearings 27, carried by side frames 28. It is provided with toothed wheels 29, that gear with and are operated alternately in opposite directions by racks 30, secured to the top of the side cheeks 7, and is covered or coated with suitable material—such as celluloid—for taking the colors from the color-block and key-block.

31 is a second cylinder located above and having a diameter one-half that of the cylinder 26. It is mounted in adjustable bearings carried by the side frames 28. This cylinder is provided with grippers, operated in the ordinary manner, for taking and holding the material to be printed, and is covered with a printer's blanket.

33 and 34 are toothed wheels mounted on the same shaft as the cylinder 31 and gearing with the toothed wheels 29. They are so arranged that the cylinder 31 always rotates in the same direction. For this purpose the wheel 33 is loosely mounted on its shaft and carries a pawl that engages with a tooth or catch on the adjacent end of the cylinder 31 when the wheel rotates in one direction, but slips over the tooth or catch when the wheel moves in the reverse direction and leaves the cylinder 31 free. The wheel 34, which is fixed to the cylinder 31, has its circumference cut away at one part, in order that it may become disengaged from the corresponding wheel 29 when this wheel rotates in a backward direction. This special construction and arrangement of mechanism for preventing backward rotation of the cylinder 31 is well known in printing machinery and is not fully shown in the drawings.

35 is a brake-pulley secured to the shaft of the cylinder 31. It is provided at its circumference with a projection 36, against one side of which a spring-stop 37 acts to prevent rotation of the cylinder 31 in a backward direction.

38 is a brake-block that acts against the other side of the projection 36 and arrests the motion of the cylinder 31 during the backward motion of the cylinder 26, at which time the material previously printed is removed from the cylinder 31 and fresh material applied thereto. The brake-block is carried by a lever 39, that is operated at the required times by a cam 40 through the intervention of a lever 41, rod 41<sup>x</sup>, lever 42, and rod 43.

44 is a brake-strap secured at one end to a fixed support 45, and connected at its other end to one arm of the lever 39, and is so arranged that it acts against the periphery of the brake-pulley 35 when the lever 39 is operated to apply the brake-block 38.

46 is a driving-shaft provided with fast and

loose pulleys 47, a fly-wheel 47<sup>a</sup>, and a pinion 48. This pinion gears into a toothed wheel 49, provided with a crank-pin 50, which is journaled in one end of a connecting-rod 51, the other end of which is forked and connected to a toothed wheel 52. This wheel works in a fixed rack 53 and in a rack 54, secured to the under side of the double box or coffin 7 8. By rotating the driving-shaft 46 the wheel 52 will impart the necessary longitudinal to-and-fro movements to the double box or coffin and the color and key blocks carried thereby, the cylinder 26 being consequently rotated in alternate directions, the cylinder 31 being rotated only during the forward motion of the platform or table and held stationary during the backward motion thereof by the brake mechanism hereinbefore described.

Having described the nature of the invention and illustrated a suitable arrangement of machine for carrying it into effect we now proceed to explain the method of working when printing with this particular machine. The color-block containing (as already stated) the colors in itself, and therefore supplying its own color, is placed on the table 9 and raised to the impression-level. The key-block is also raised, and when it is at the required level it is fixed there, no further regulation being subsequently required. The ink for inking the key-block is placed in the ductor and distributed in the ordinary way, the key-block being inked by passing under the inking-rollers. When the double box or coffin is reciprocated, the color-block and key-block are passed under and in contact with the cylinder 26, thus imparting color to the covering on the cylinder, which then becomes the printing-cylinder, having the two impressions from the blocks thereon. The sheet of material to be printed is fed to and carried by the cylinder 31, which forces it against the cylinder 26, so as to cause it to successively take off the color previously imparted thereto from the color and key blocks. The cylinder 31 makes two revolutions while the cylinder 26 is making one, and the color and key blocks, and consequently the impressions therefrom on the cylinder 26, are so relatively spaced that the successive impressions on the material printed coincide or register, thus producing a complete picture or illustration in any required number of colors by one feeding to and passage through the machine of such material.

What we claim is—

1. In a color-printing machine, a table for supporting a color-block, in combination with means for adjusting same vertically in an automatic manner at each impression to compensate for consumption and consequent reduction in the thickness of said block.

2. In a color-printing machine, the combination of a table for supporting a color-block, a cylinder adapted to roll in contact with and

to remove color from a color-block on said table, and means, substantially as described, for adjusting said table in an automatic manner in relation to said cylinder to compensate for consumption and consequent reduction in thickness of said color-block.

3. In a color-printing machine, the combination of a table for carrying a color-block that is consumed during printing, means, substantially as herein described, for automatically adjusting the height of said table at each impression to compensate for consumption and consequent reduction in thickness of the color-block, a transfer-cylinder arranged to roll in contact with the color-block and remove color therefrom, and a cylinder for carrying material to be printed and pressing the same in contact with said transfer-cylinder, for the purposes set forth.

4. In a color-printing machine, the combination of a table for supporting a color-block, means, substantially as herein described, for automatically adjusting the height of said table, a second table for carrying a key-block or a second color-block, a transfer-cylinder adapted to roll in contact with said first-mentioned color-block and also with said key-block or with said second color-block and to remove color therefrom, and a cylinder for carrying the material to be printed in contact with said transfer-cylinder, so as to receive color therefrom, for the purposes set forth.

5. In a color-printing machine, the combination of a table for supporting a color-block, means, substantially as herein described, for automatically adjusting its height, a table for carrying a key-block, means, substantially as described, for reciprocating said tables, mechanism for inking said key-block, a transfer-cylinder arranged to roll in contact with said color-block and with said key-block and to remove color and ink, respectively, therefrom, and a cylinder for carrying the material to be printed in contact with said transfer-cylinder, substantially as herein described.

6. In a color-printing machine, the combination, with a table for carrying a color-block, means for reciprocating said table, a transfer-cylinder arranged to roll in contact with said cylinder, and a cylinder for carrying the material to be printed, of stop and brake mechanism, substantially as herein described, for keeping the cylinder that carries the material to be printed stationary during rotary motion of said transfer-cylinder in one direction, substantially as herein described, for the purposes set forth.

7. In a color-printing machine, the combination of a double box or coffin 6 7, adapted to carry one or two color-blocks or a color-block and a key-block, means, substantially as herein described, for reciprocating said box or coffin, means, substantially as herein described, for automatically adjusting the height of said color block or blocks, a transfer-cylinder 26, operated from said box or cof-

fin and adapted to roll in contact with said  
color block or blocks or with said color-block  
and key-block, and a cylinder 31, adapted to  
carry the material to be printed and to be  
5 operated in one direction only from said trans-  
fer-cylinder, all substantially as herein de-  
scribed, for the purposes set forth.

In testimony whereof we have signed our

names to this specification in the presence of  
two subscribing witnesses.

WILLIAM CONISBEE.

THOMAS SAMUEL CONISBEE.

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