

No. 640,633.

Patented Jan. 2, 1900.

J. R. CORBIN.
PRINTING MACHINE.

(Application filed Mar. 7, 1899.)

(No Model.)

2 Sheets—Sheet 1.

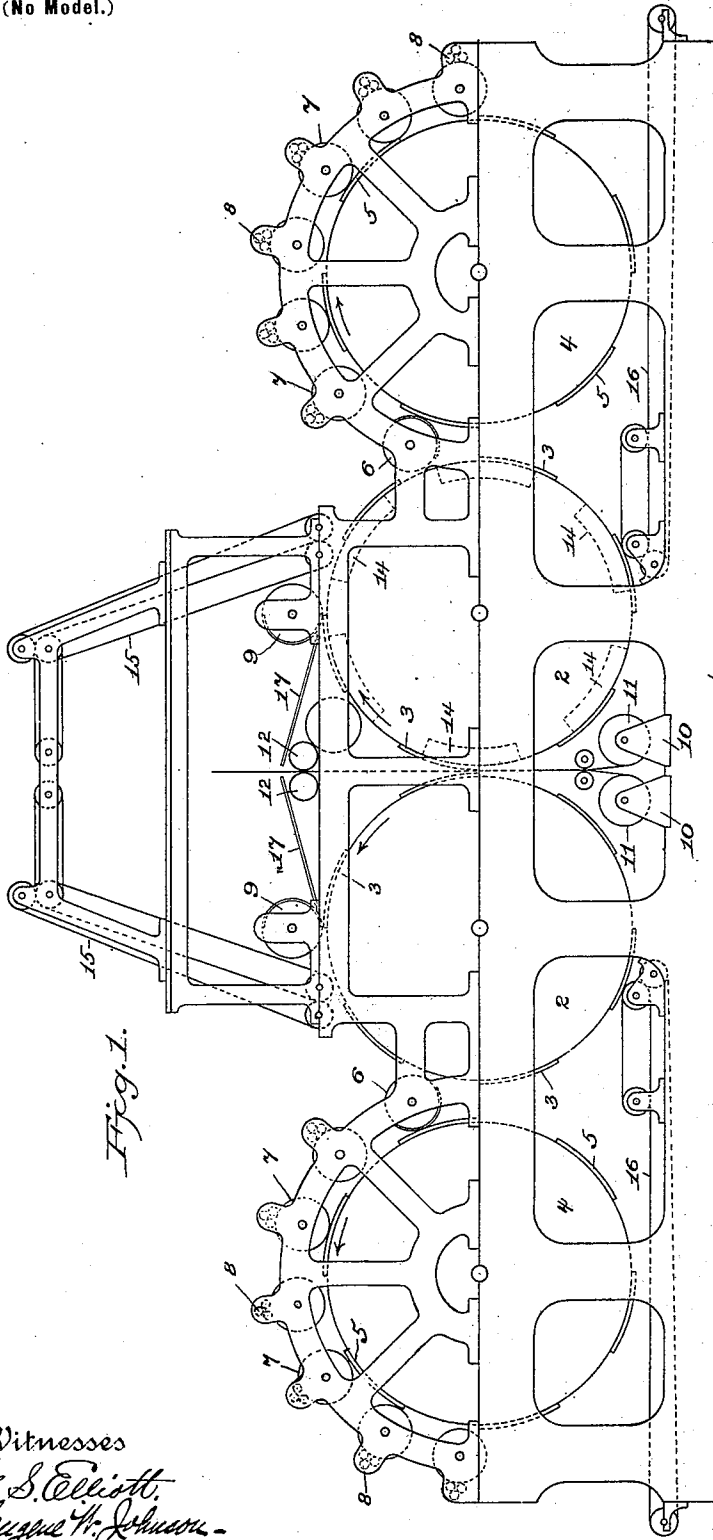


Fig. 1.

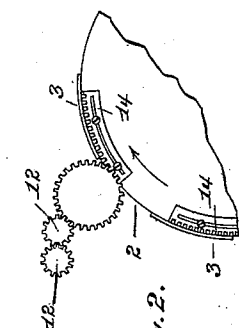


Fig. 2.

Witnesses
G. S. Elliott.
Clyde W. Johnson.

Inventor
Johnson Ross Corbin
By Lucy B. Hill.
Attorney

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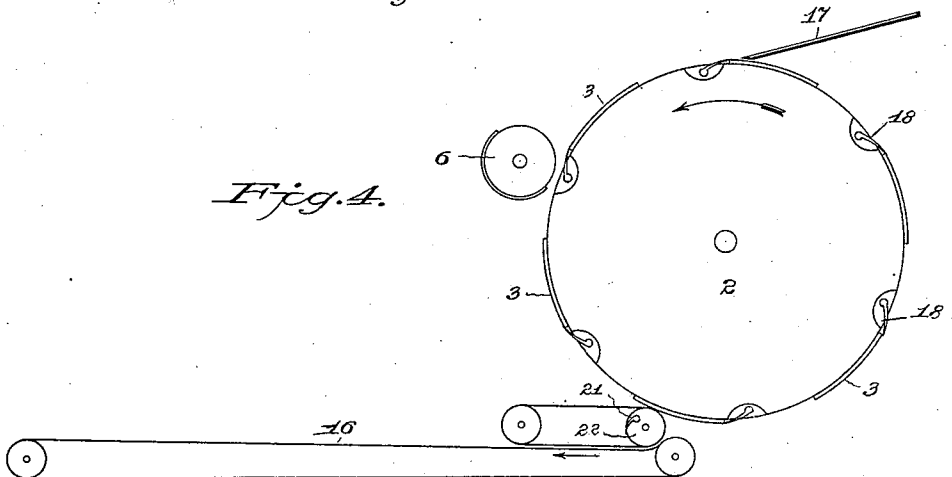
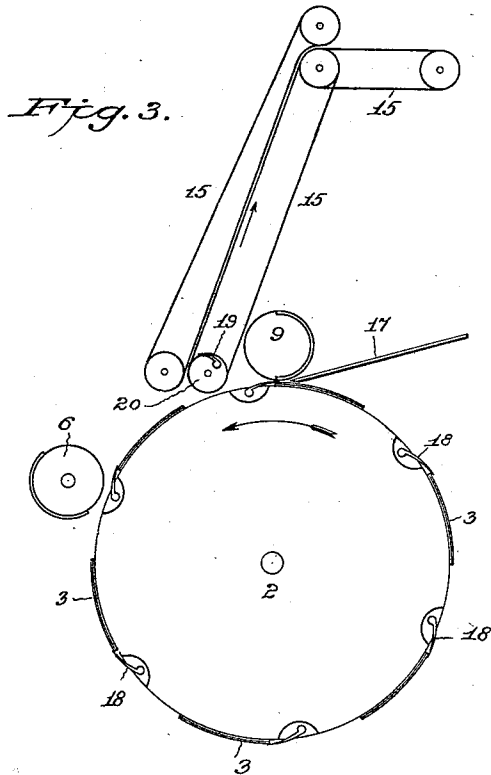
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2 Sheets—Sheet 2.



Witnesses
H. S. Elliott.
Ally, Scott

Inventor
Johnson Ross Corbin
By *Lucy B. Hills*
Attorney

UNITED STATES PATENT OFFICE.

JOHNSON ROSS CORBIN, OF PHILADELPHIA, PENNSYLVANIA.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 640,633, dated January 2, 1900.

Application filed March 7, 1899. Serial No. 708,129. (No model.)

To all whom it may concern:

Be it known that I, JOHNSON ROSS CORBIN, a citizen of the United States, residing in Philadelphia, in the county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification.

My invention relates to printing-machines, more particularly of the rotary type, and has for its objects to provide certain novel embodiments in the construction and operation of the same, more particularly relating to multicolor-printing, as will be hereinafter more definitely set forth, and embraced in the claims appended hereto, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a rotary printing-machine embodying my improved construction. Fig. 2 is a detail side elevation of a portion of one of the cylinders carrying the printing and impression surfaces and the gearing connecting with the web-feeding rollers, showing the means for operating the latter from the former. Fig. 3 is an enlarged detail view illustrating more fully the mechanism for printing on separate sheets of paper and for carrying away said sheets. Fig. 4 is a similar view illustrating the mechanism for printing directly from the design-surface onto separate sheets of paper and for carrying away said sheets.

In the said drawings the numeral 1 denotes the frame of the machine, in which are mounted two cylinders 2, identical in size and construction, each of which is adapted to carry on its periphery a plurality of adjustable yielding planographic surfaces 3, preferably six in number for each cylinder, said surfaces being adapted for use either as printing or impression surfaces, or both, as will be hereinafter described. When the surfaces on cylinders 2 are used as impression-surfaces when printing direct from the design-cylinder 6, the yielding planographic surface is too yielding and must be replaced by a hard surface, and the method and means of printing direct from the design must be as usual.

Mounted in the same horizontal plane with cylinders 2 are two cylinders 4, preferably identical in size with said cylinders 2 and each also carrying on its periphery a plurality

of yielding planographic surfaces 5, preferably six in number, the same constituting ink-transferring surfaces. Intermediate said cylinders 2 and 4 are two design-carrying cylinders 6, smaller in diameter than cylinders 2 and 4 and each adapted to contact with the yielding surfaces 3 and 5 of its cylinders 2 and 4.

A series of cylinders 7, carrying what I term "pattern-design forms," is provided for each cylinder 4, preferably six in number, each pattern-design form receiving its ink from an independent inking-train 8, as shown.

Above each cylinder 2 is mounted a small cylinder 9, having a yielding surface and adapted for use either as a printing or impression cylinder, or both, as will be hereinafter described.

Suitable bearings 10 are provided for the shafts of paper-rolls 11 beneath the meeting-point of cylinders 2, as shown, while above said meeting-point are located two feed-rollers 12, geared together and rotated intermittently through an intermediate gear-wheel 13, that in turn receives intermittent impulses from adjustable toothed segments 14 on one of cylinders 2, as shown in detail in Fig. 2. Suitable tapes 15 and 16 and feed-boards 17 are also provided for a purpose hereinafter to be described.

The various operations of my improved construction will now be described in detail. When it is desired to print different designs simultaneously upon opposite sides of a web of paper and in a plurality of colors—say six in number—the web from one of the rolls 11 is led up between rollers 12. The design to be printed on one side of said web is produced in relief on a plate carried by one of the design-cylinders 6, and the design to be printed on the other side of said web is similarly produced in relief on a plate carried by the other design-cylinder 6. The surfaces of the pattern-design forms on cylinders 7 on each end of the press are previously cut away in a predetermined pattern design, so that each pattern-design form will receive its particular colored ink from its inking-train 8 and deposit the same on each yielding surface 5 as it passes in contact therewith, the design and cutting away being so arranged that each surface 5 will receive the different inks in patches

in accurate register, the whole constituting a complete inking, and will in the further rotation of cylinders 4 deposit said complete inkings upon the relief designs carried by cylinders 6, which will in turn deposit complete designs in multicolor upon each yielding surface 3 on cylinders 2, it being understood that for each rotation of cylinders 4 the cylinders 6 will have received and deposited six impressions, one on each of the surfaces 3 on cylinders 2. Said surfaces 3 will in the rotation of cylinders 2 successively contact with opposite sides of the web passing therebetween, thus simultaneously transferring the designs thereon to said web always in accurate register with each other and at the same time feed said web along. The necessary interval on the web between the successive impressions is obtained by the intermittent feed of rollers 12, actuated by gear-wheel 13 from the adjustable toothed segments 14, as will be readily understood. It will be understood that the same design may be printed on both sides of the web and in accurate register by producing the same design on both cylinders 6, while the same or different designs may be printed on opposite sides of two webs by passing said second web up between cylinders 2 and rollers 12, whereby the two webs will receive their impressions simultaneously. So, also, when it is desired to print but one side of a single web, either the inking-trains 3 or cylinder 6 on one end of the machine may be moved out of contact and the opposite end only will print, the surfaces 3 on the non-printing end then acting purely as impression-surfaces.

I have described a series of six surfaces 3 for each cylinder 2, one for each surface 5 on cylinders 4; but it is frequently desired to impart to the paper a heavy inking, in which event each alternate surface 3 may be removed from the cylinders 2, the result being that the relief design on each cylinder 6 will receive an inking from two of its surfaces 5 before contacting with each remaining surface 3. So, also, when a still heavier inking is desired, all but two of the surfaces 3 on each cylinder 2 may be removed, whereby three inkings are imparted to cylinders 6 for each impression given, while by removing all but one of the surfaces 3 on each cylinder 2 six inkings will be imparted to cylinder 6 for each impression given. It will of course be understood that when but one side of the paper is to be printed the above-described changes need be made on that end of the machine only.

When it is desired to print on one side of separate sheets of paper instead of on a web, the rolls 11 are removed and sheets fed from the feeder-boards 17 between impression-cylinders 9 and the surfaces 3, as shown in detail in Fig. 3, the printed sheets being seized by the grippers 18 on cylinders 2 in the usual manner when the same are deposited on the surfaces 3 and then seized by the grippers 19

on rollers 20 and carried away by the tapes 15 in a manner well understood. So, also, when it is desired to print the same design on both sides of the sheets in accurate register, as described in my application for Letters Patent filed February 8, 1899, Serial No. 704,887, the same may be accomplished by feeding a sheet from board 17 to each alternate surface 3, the intermediate surface 3 thus previously depositing its inked design onto the yielding planographic surface on cylinder 9, which will in turn deposit said design on the upper side of the paper simultaneously with the deposit of the same design on the under side of said sheet from surface 3, the surface on cylinder 9 thus becoming both a printing and an impression surface. When thus printing on sheets, as above described, from one end of the machine, it will be understood that with the cylinders 2 geared as shown it is necessary to remove all of the surfaces 3 from the non-printing cylinder 2 or disconnect the gearing of cylinders 2 so as to throw one end of the machine out of operation; but the machine may be used for printing onto sheets from both ends at the same time by shifting the gearing on one of cylinders 2, so that said cylinder 2 and its cylinder 4, together with all their mechanism on that end of the machine, will continue to rotate as before with respect to each other, but will rotate with respect to the opposite cylinders 2 and 4 in such manner that the surfaces 3 on the one cylinder 2 will not come in contact with surfaces 3 on the other cylinder 2. The same result may be accomplished by removing each alternate surface 3 from cylinders 2 in such manner that those remaining shall not contact with each other during rotation, though this method reduces the capacity of the machine by one-half, but at the same time insures a double inking for the design-cylinders 6 before each ink design is transmitted. It will be understood, however, that when any of the surfaces 3 are removed the speed of the machine may be correspondingly increased, so that the product of the machine is not lessened and at the same time the additional inkings are secured.

It is sometimes desired to print directly from the design-surface on one or both of cylinders 6, which may be accomplished, as shown in detail in Fig. 4, by removing or raising cylinders 9, substituting hard impression-surfaces in place of yielding surfaces 3 and feeding the sheets from feeder-boards 17 onto said hard impression-surfaces, where they are seized and retained by the grippers 18, the sheets being carried in direct contact with the inked design-cylinders 6, whereby the impression is imparted to the paper direct. With this operation the printed sheets are then seized by grippers 21 on rollers 22 and transferred to and carried away by tapes 16 in the usual and well-known manner.

It will of course be understood that when less than the maximum number of colors rep-

represented by the pattern-design-form cylinders 7 is desired to be used, any one or more of the inking-trains 8 and cylinders 7 may be thrown out of operation and the pattern-design forms prepared on those cylinders 7 that remain in operation changed accordingly, so that the surface of the designs on cylinders 6 will be properly inked in the pattern design so prepared in the desired number of colors, and this is equally true when but one color—say black—is desired to be used. In the latter event, moreover, two or more of said inking-trains may supply the one colored ink to the ink-transferring surfaces, so that the design-surface will receive an augmented supply of ink at each inking. So, also, when less than the full complement of colors is to be used, two or more of said trains may supply the same color or colors in the same spot or spots, or each may supply the same color in different spots.

I also wish it to be understood that, if preferred, the ink-transferring means on the periphery of cylinders 4, instead of consisting of a plurality of separate surfaces 5, as shown, may each consist of one continuous yielding surface, covering the entire periphery of its cylinder 4, in which event the result obtained will be practically the same as where a plurality of separate surfaces are employed, the pattern-design-form cylinders 7 depositing on a plurality of predetermined spots on said continuous surfaces.

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

1. In a printing-machine, a plurality of inking-trains, a plurality of ink-transferring surfaces, each adapted to successively receive a complete supply of ink for a single impression from said trains, a design-surface receiving successive complete inkings from each of said transferring-surfaces, and means for transferring the inked designs from said design-surface onto the paper to be printed.

2. In a printing-machine, a plurality of inking-trains, a plurality of ink-transferring surfaces adapted to receive inks of different colors in register from said trains, a design-surface receiving successive complete inkings from each of said transferring-surfaces, and means for transferring the inked designs from said design-surface onto the paper to be printed.

3. In a printing-machine, a plurality of inking-trains, a plurality of ink-transferring surfaces adapted to receive inks from said trains, a design-surface receiving successive complete inkings in register from each of said transferring-surfaces, and means for transferring the inked designs from said design-surface onto the paper to be printed after any predetermined number of inkings.

4. In a printing-machine, a plurality of inking-trains, a plurality of ink-transferring surfaces adapted to receive inks of different colors in register from said trains, a design-sur-

face receiving successive complete inkings in register from each of said transferring-surfaces, and means for transferring the inked designs from said design-surface onto the paper to be printed after any predetermined number of inkings.

5. In a printing-machine, a plurality of inking-trains, a plurality of ink-transferring surfaces adapted to receive inks from said trains, a design-surface receiving successive complete inkings from each of said transferring-surfaces, and printing-surfaces adapted to successively receive inked designs from said design-surface and impart them to the paper to be printed.

6. In a printing-machine, a design-surface, means for imparting successive inkings in register to the entire surface of said design, and printing-surfaces adapted to successively receive inked designs from said design-surface after any predetermined number of inkings.

7. In a printing-machine, a design-surface, means for imparting successive inkings in multicolor design in register to the entire surface of said design, and printing-surfaces adapted to successively receive inked designs from said design-surface after any predetermined number of inkings.

8. In a printing-machine, a plurality of inking-trains, a plurality of ink-transferring surfaces adapted to receive inks from said trains, a design-surface receiving successive inkings in register over its entire surface from said transferring-surfaces, and printing-surfaces adapted to successively receive inked designs from said design-surface after any predetermined number of inkings.

9. In a printing-machine, a plurality of inking-trains, a plurality of ink-transferring surfaces adapted to receive inks of different colors in register from said trains, a design-surface receiving successive inkings in multicolor design in register over its entire surface from said transferring-surfaces, and printing-surfaces adapted to successively receive inked designs from said design-surface after any predetermined number of inkings.

10. In a rotary printing-machine, a cylinder carrying a plurality of yielding ink-transferring surfaces, a plurality of inking-trains, a plurality of pattern-design forms contacting with said surfaces to successively deliver ink thereto in predetermined forms from said inking-trains, a cylinder carrying a relief design also contacting with said surfaces to receive successive inkings therefrom over its entire design-surface, and means for transferring the inked designs from said design-surface onto the paper to be printed.

11. In a rotary printing-machine, a cylinder carrying a plurality of yielding ink-transferring surfaces, a plurality of inking-trains, a plurality of pattern-design forms contacting with said surfaces to successively deliver inks of different colors in register thereto in predetermined forms from said inking-trains, a cylinder carrying a relief design also con-

tacting with said surfaces to receive successive inkings in multicolor designs therefrom, and means for transferring the inked designs from said design-surface onto the paper to be
5 printed.

12. In a rotary printing-machine, a cylinder carrying a single relief design, means for imparting successive complete inkings to said design, a cylinder carrying a plurality of yielding planographic printing-surfaces adapted to successively contact with the design on said design-cylinder and receive ink-impressions therefrom, and means for printing from said printing-surfaces.

13. In a rotary printing-machine, a cylinder carrying a relief design, means for imparting successive complete multicolor inkings in register to said design, a cylinder carrying one or more yielding planographic printing-surfaces adapted to successively contact with the design on said design-cylinder and receive ink impressions therefrom, and means for printing from said printing-surface.

14. In a rotary printing-machine, a cylinder carrying a relief design, means for imparting successive complete inkings in register to said design, a cylinder carrying a series of removable yielding planographic printing-surfaces adapted to successively contact with the design on said design-cylinder and receive ink impressions therefrom, and means for printing from said printing-surface.

15. In a rotary printing-machine, a cylinder carrying a plurality of yielding planographic printing-surfaces, means for imparting ink designs to said surfaces, and a cylinder carrying a yielding planographic surface adapted to contact with said printing-surfaces between which paper may be fed to receive impressions.

16. In a rotary printing-machine, two cylinders rotating in unison and each provided with a plurality of yielding planographic surfaces adapted to contact, and means for imparting to said surfaces ink impressions, whereby a plurality of double impressions may be simultaneously imparted to paper fed therebetween for each rotation of said cylinders.

17. In a rotary printing-machine, two cylinders rotating in unison and each provided with a plurality of yielding planographic surfaces adapted to contact, a relief-design cylinder for each said cylinder and contacting with the surfaces thereon, means for inking said design-cylinder before the contact of each yielding surface therewith, and means for passing webs of paper between said yielding surfaces to receive impressions therefrom.

18. In a rotary printing-machine, two cylinders rotating in unison and each provided with a plurality of yielding planographic surfaces adapted to contact, means for imparting to said surfaces ink impressions, means for passing webs of paper between said yielding surfaces, and means for intermittently feeding along said webs between impressions.

19. In a rotary printing-machine, two cylinders rotating in unison and each provided with a plurality of removable yielding planographic surfaces adapted to contact and between which the paper to be printed may be fed, a design-cylinder for each said cylinder and contacting with said surfaces, a cylinder for each design-cylinder carrying a plurality of yielding ink-transferring surfaces adapted to contact with said design-cylinder, a plurality of pattern-design forms contacting with said ink-transferring surfaces, and a plurality of inking-trains, one for each pattern-design form, whereby inks of different colors may be imparted to said pattern-design forms and from them to the ink-transferring surfaces in predetermined forms to constitute a single complete inking on each ink-transferring surface, said inkings being transferred in turn to the design-cylinder, from which an inked design is transferred to each planographic surface, from which it is imparted to the paper to be printed.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHNSON ROSS CORBIN.

Witnesses:

WILLIAM Y. JACKSON,
THOS. R. MARIS.