

W. SCOTT.
MULTICOLOR PRINTING MACHINE.

No. 490,456.

Patented Jan. 24, 1893.

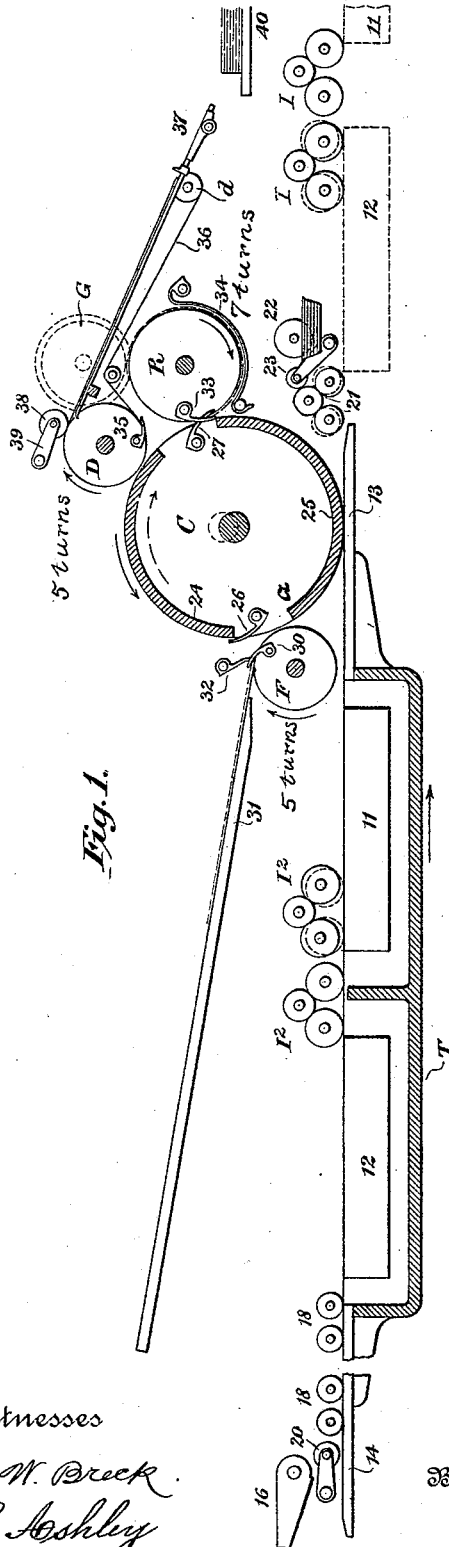


Fig. 1.

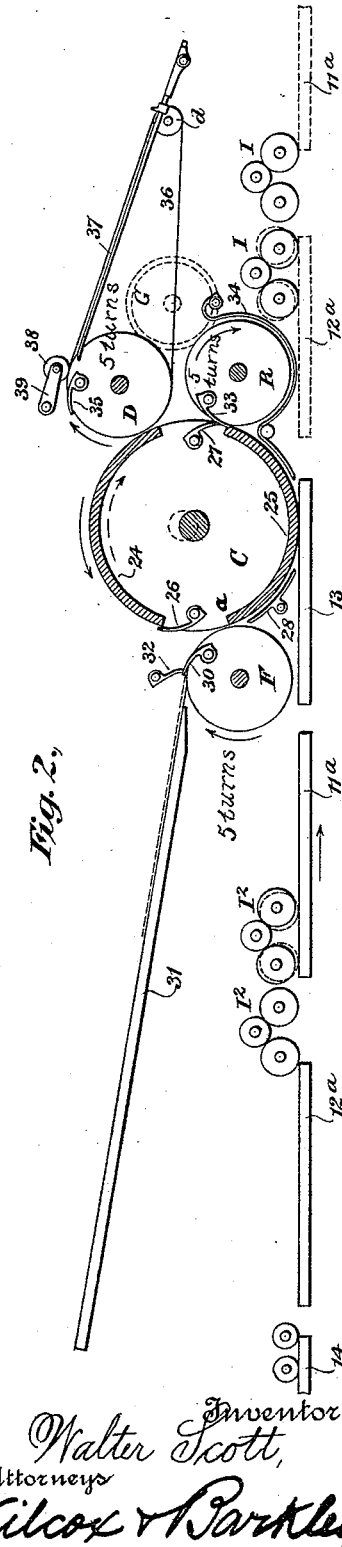


Fig. 2.

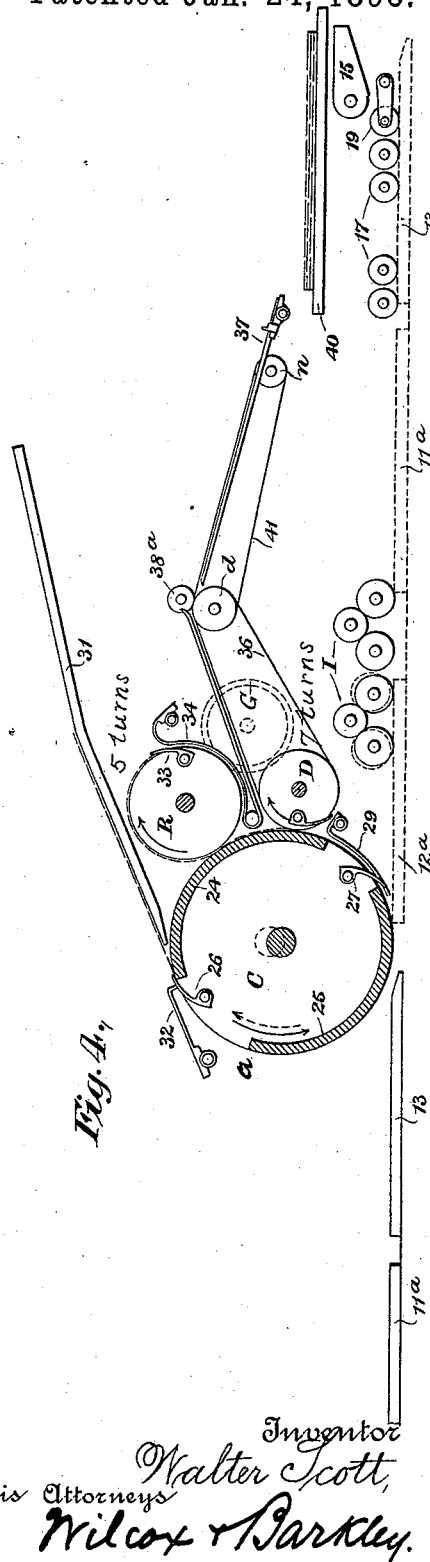
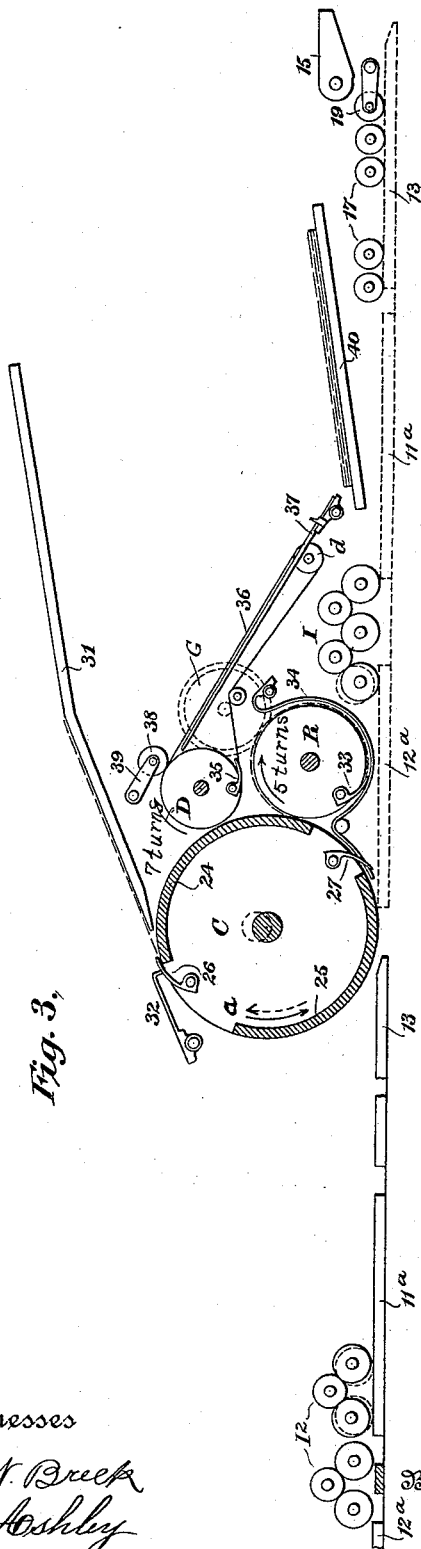
Witnesses
Geo. W. Brock
C. E. Ashley

Inventor
Walter Scott,
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Witnesses
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(No Model.)

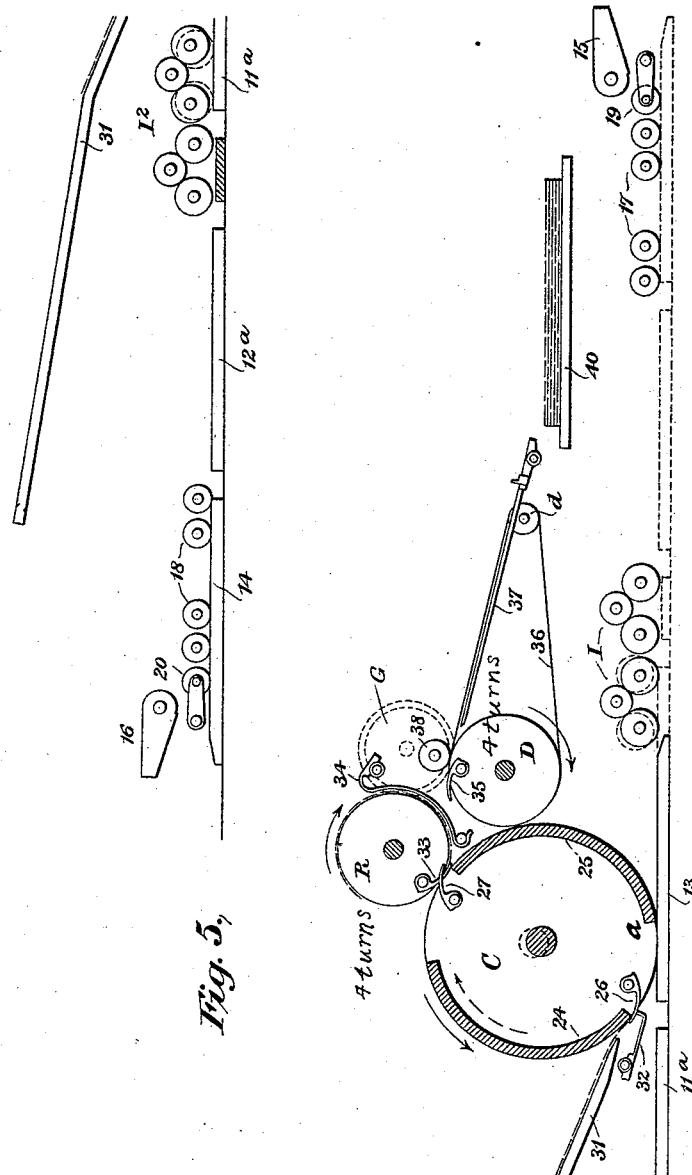
3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

MULTICOLOR-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 490,456, dated January 24, 1893.

Application filed April 8, 1891. Serial No. 388,164. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Multicolor-Printing Machines, of which the following is a specification.

My invention relates to that class of printing machines which print two colors, and consists in combinations of devices hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings forming a part of this specification Figure 1 is a side elevation of one form of my present invention. Fig. 2 is a side elevation of a modification. Figs. 3, 4 and 5 are side elevations of other modifications thereof; the said Fig. 5 being in two parts, the sections joining on to each other end to end to complete the machine.

The type bed T is reciprocated by any suitable means, such for instance as a crank, connecting rod, rolling gear wheel, a rack on the stationary frame, and a rack on the bottom of the bed with which racks the gear wheel engages. The oscillating impression cylinder C is geared to and driven by the type bed T by racks and gears (not shown) in a well known manner.

The type bed T carries two forms, which may be letter press forms or lithographic stones, or other forms for multi-color printing.

The machine shown in Fig. 1 has a first color stone 11, and a second color stone 12, ink tables 13, 14. In all the figures the table 13 is inked from a fountain 15 and by means of distributing rollers 17, and a ductor 19; the table 14 is supplied with ink from the fountain 16 by ductor 20, and has distributing rollers 18. The first color form is inked by rollers I and the second color form is inked by rollers I². The inner two of the rollers I are lifted as the second color form approaches them so as not to apply ink thereto, and the inner two of the rollers I² are lifted as the first color form approaches them so as not to apply ink thereto by any suitable means, such for instance as shown in my patent No. 430,889, dated June 24, 1890. When the machine is being used for lithographic purposes I em-

ploy water rollers 21, which are supplied from a fountain 22 by a ductor roller 23. These water rolls wet both forms on the forward stroke of the bed and are lifted to clear each ink table and also during the return stroke of the bed. If desired similar rolls may be placed between the ink rollers I² and the impression cylinder, as in a prior application filed by me. These water rolls may be lifted by means similar to those commonly used.

The oscillating impression cylinder C makes rather more than one complete revolution to each stroke of the bed. The cylinder C has two impression surfaces 24 and 25, and grippers 26 and 27 to co-operate with these surfaces. Guides 28, 29 may be employed to hold the paper from falling away from the cylinder.

The feed may be by hand from a feed board, or by tapes from cutting cylinders, or it may be to an intermediate feed cylinder from a feed board. The feed may be located as shown in Figs. 1, 2 and 5, or as in Figs. 3, and 4. In Figs. 1 and 2, I have shown a feed cylinder F having grippers 30, which take the sheet from a feed board 31 and gages 32 at the proper times, and deliver the same to the grippers 26 of the first impression surface 24 of the cylinder C, as hereinafter described. The transfer of a sheet, after being printed in one color, from one impression surface of the impression cylinder to the second impression surface thereof may be accomplished by suitable means. I am aware that this transfer has heretofore been proposed by another in the case of a rotary impression cylinder. For this purpose I preferably use a retaining cylinder, but it is evident that an arrangement of tapes, rollers and guides may be used for this purpose, and I consider such an arrangement as an equivalent of the cylinder shown. The retaining cylinder R is furnished with grippers 33, and takes the sheet already printed in one color from the first impression surface and delivers it to the second impression surface of the cylinder C. Guides 34 prevent the sheet from falling away from the retaining cylinder. After the sheets have been printed a second time they are delivered from the second impression surface. I preferably use a delivery cylinder D

having grippers 35 for taking the sheet from the impression cylinder, and in connection therewith to use tapes, as 36, and fliers 37, to lay the sheet upon a delivery board 40. The
 5 tapes 36 pass about the cylinder D and rollers *d*. Pressure rollers 38 acting in conjunction with the cylinder D, feed the sheets forward onto the fliers after the grippers 35 of the cylinder D have opened. The rollers 38
 10 may be upon pivoted arms 39. Weights or springs may be used to produce the desired amount of pressure between the rollers 38 and the cylinder D.

It is to be observed that while the cylinder
 15 C oscillates, the feed, retaining and delivery cylinders each have a rotary motion the direction of which is indicated by arrows. For giving these cylinders their rotary motion any suitable devices may be used, such for
 20 instance as are set forth in my Letters Patent dated July 28, 1891, and numbered 456,741.

In Figs. 1 and 2 the cylinders F and D would be driven from the cylinder C by the means referred to, and the retaining cylinder
 25 R is driven from the cylinder D by a gear as G. In Figs. 3, 4 and 5, either of the cylinders R and D may be driven by the described means and the other be driven by the gear G. It must be noted that the surface speeds
 30 of the cylinders F, D and R are the same as that of the cylinder C.

The machines shown in Figs. 2, 3, 4, and 5 have first color forms 11^a and second color forms 12^a. These forms may be ordinary letter
 35 press or other desired forms. In Figs. 3, 4 and 5 the feed shown is direct from a feed board 31 and gages 32 to the grippers 26 of the first impression surface of the cylinder C. In Figs. 3 and 4 the board 31 is located above
 40 the impression cylinder, while in Fig. 5 it is to one side of and below the cylinder C.

The delivery cylinder may be above or below the retaining cylinder, as may be desired. In Figs. 1, 2 and 3, I have shown it above, and
 45 in Figs. 4 and 5 I have shown it below the retaining cylinder.

In Fig. 4, the delivery cylinder D and tapes 36 run the printed sheet between pressure rollers 38^a and rollers *d* onto tapes 41 and the
 50 fliers 37, which deliver the same to the board 40. The tapes 41 pass about the rollers *d* and *n*.

In Fig. 3 are shown but three rollers I to ink the first color form and the inner one only
 55 of these rollers is lifted to clear the second color form.

The grippers of the various cylinders, the feed gages, the fliers, the tapes, and the duct or rollers are all operated at the proper times
 60 by the mechanisms commonly employed for that purpose. I have not shown such mechanisms, as their construction is well known.

Premising that in practice there would be a sheet on the retaining cylinder R (as shown
 65 by the broken line in Fig. 1) when the parts

are in the position shown, the operation of the parts shown in Figs. 1 and 2 is as follows:—The bed T moves to the right rotating cylinder C in the direction of the arrow in
 70 full lines. The grippers 27 of cylinder C close and take the sheet, printed in one color, from cylinder R, whose grippers 33 open at the same time. The grippers 30 of the cylinder F close and receive a sheet from the
 75 board 31, and gages 32 at or about the time the cylinder C begins to move in the direction indicated by the said arrow. Next, the grippers 26 of the cylinder C close at the time the leading edge of the sheet from board
 80 31 is on or near the plane of the axes of cylinders C and F and grasp the sheet, the grippers 30 opening simultaneously. The inner two of inking rolls I² are dropped to the positions shown in dotted lines as soon as the
 85 first color form has moved from under them. The cylinder C is lowered as soon as the ink table 13 has moved from under it. The first color form now begins the first impression on the sheet on the surface 24. When grippers
 90 26 of cylinder C approach the plane of the axes of cylinders C and R, they open and the grippers 33 of cylinder R close and grasp the sheet and the sheet is transferred to the cylinder R, the grippers of which remain closed until the beginning of the next forward stroke
 95 of the bed. The sheet on impression surface 25, which is already printed in one color, in practice, next takes an impression from the second color form. When grippers 27 approach the
 100 plane of the axes of the cylinders C and D, they open and grippers 35 close and grasp the sheet, and the sheet is transferred to the cylinder D. It will be understood that grippers 27 remain closed the first time they pass cylinder D. As soon as the second color form
 105 has given the impression, the cylinder C is raised to clear the inking table 14, and remains up during the return stroke of the bed, and after, as hereinafter described. The grippers 35 of delivery cylinder D open as soon as
 110 they pass the pressure roller 38, and the sheet is run upon the fliers 37 by the tapes 36. The fliers 37 lay the sheet upon the delivery board 40. As the second color form approaches the inking rolls I, the inner two rolls are lifted
 115 to the positions shown in dotted circles. On the return stroke of the bed the cylinder C is moved in the direction of the broken arrows (in all the figures) by the bed, but is clear of the bed, the cylinder being in its raised position
 120 indicated by broken circles over and on the journals of cylinder C. The inner two of rolls I are lowered as soon as the second color form is from under them. The inner two of inking rolls I² are raised as the first color form
 125 approaches them. At the end of the return stroke, the parts are in the positions shown.

The lifting of the inking rolls described above, may be accomplished by the means shown in my patent No. 430,889, dated June 130

24, 1890. Like means may be used to lift the water rolls, if desired.

It will be understood that the grippers of the various cylinders, when idle, open back into the cylinders, or close down to their working positions, whichever may be desired, so as to clear the passing portions of other parts.

The operations of the modifications shown in Figs. 3, 4 and 5, will be understood readily without further explanation, being analogous to that just described.

The sizes of the feed, retaining and delivery cylinders relative to that of the impression cylinder can be varied as may be desired without departing from my invention. In all the cases shown, while the cylinder C makes rather more than one revolution to each stroke of the bed T (that is, it is revolved far enough to take the already printed in one color sheet from the retaining cylinder, print another color on it and pass it to the delivery cylinder), the number of turns of the feed, delivery and retaining cylinders varies. In Fig. 1, the feed and delivery cylinders each make seven turns and the retaining cylinder five turns to one turn of the driving crank. In Fig. 2 all three cylinders make five turns to one turn of the crank. In Figs. 3 and 4, the delivery and retaining cylinders make seven and five turns respectively to one turn of the crank; and in Fig. 5, each makes four turns to one turn of the crank. Other proportions may be adopted if desired.

It will be noted that the retaining cylinder takes the once printed sheet from the first impression surface during the printing movement of the impression cylinder; (i. e., during the forward stroke of the type bed) and retains it until the next printing movement of the impression cylinder, when it gives the sheet to the second impression surface.

The feed, retaining and delivery cylinders are practically at rest at the moments when the impression cylinder is reversing its motion; it is at one of these times that the feed cylinder takes a sheet from the feed board, but only when the impression cylinder is beginning its printing movement, and not when it is beginning its reverse or non-printing movement. Other dampening devices than those shown may be employed without departing from this invention.

The impression cylinder shown in all the figures has its second impression surface in juxtaposition to the bed and ink table. To take an impression on the sheet on this surface, the cylinder C must revolve once and as much more as will cause the end *a* of the surface 25 to pass the vertical through axis of cylinder C. Thus in Figs. 1 and 2, it must revolve about once and a quarter, in Figs. 3 and 4 about once and a third and in Fig. 5 about once.

I do not herein claim the combination of an impression cylinder and a feed cylinder both coming to rest at intervals, with a feeder from

which the feed cylinder takes sheets while it is at rest, as the same is the subject matter of a claim in my prior application for Letters Patent Serial No. 385,241, filed March 16, 1891.

Having thus fully described my invention, what I desire to secure by Letters Patent is—

1. In a multicolor printing machine, the combination of an oscillating impression cylinder having first and second impression surfaces, with a retaining cylinder taking the once-printed sheet from the first impression surface during a forward movement of the impression cylinder and delivering the same to the second impression surface after the impression cylinder has made its backward movement, substantially as and for the purposes described.

2. In a multi-color printing machine, the combination of an oscillating impression cylinder having first and second impression surfaces, grippers for each surface, a retaining cylinder taking the once-printed sheet from the first impression surface during the forward movement of the impression cylinder and delivering the same to the second impression surface after the impression cylinder has made its backward movement, and a delivery cylinder taking the twice printed sheet from the second impression surface, substantially as described.

3. In a multi-color printing machine, the combination of a reciprocating type bed carrying two forms, with an oscillating impression cylinder having first and second impression surfaces, and geared to the bed and making one turn to each stroke of the bed, and a retaining cylinder taking the once printed sheet from the first surface during a forward movement of the impression cylinder and delivering the said sheet to the second surface after the impression cylinder has made its backward movement, substantially as described.

4. In a multi-color printing machine, the combination of a reciprocating type bed carrying two forms, an oscillating impression cylinder having first and second impression surfaces and grippers therefor, feed means substantially as described for supplying sheets to the first impression surface and a retaining cylinder taking the once printed sheet from the first surface during a forward movement of the impression cylinder and passing the same to the second surface during the next forward movement of the impression cylinder, substantially as and for the purposes described.

5. In a multi-color printing machine, the combination of a reciprocating type bed carrying two forms, an oscillating impression cylinder having first and second impression surfaces and grippers therefor, a feed cylinder supplying sheets to the first impression surface, a retaining cylinder taking the once printed sheet from the first impression sur-

face during a forward movement of the impression cylinder and passing the same to the second impression surface during the next forward stroke of the said cylinder, and a delivery cylinder taking the twice printed sheets from the second impression surface and delivering the same, substantially as described.

6. In a multi-color printing machine, the combination of a reciprocating type bed carrying two forms, an oscillating impression cylinder having first and second impression surfaces grippers for each surface, a retaining cylinder taking the once printed sheet from the first impression surface during one forward movement of the impression cylinder and delivering the same to the second impression surface during the next forward movement of the impression cylinder, and a feed cylinder receiving sheets from the feed board while it and the impression cylinder are at rest, substantially as described.

7. In a multicolor printing machine, the combination with an oscillating impression cylinder having first and second impression surfaces and a feed cylinder at one side of said impression cylinder supplying sheets to the first surface, of a retaining cylinder taking the once printed sheets from the first surface and passing them to the second surface as described, and a delivery cylinder, both at the other side of the impression cylinder, substantially as described.

8. In a multi-color printing machine, the combination with an oscillating impression cylinder having first and second impression surfaces, and a feed cylinder at one side of said impression cylinder supplying sheets to the first surface, of a retaining cylinder taking the once printed sheet from the first surface and delivering the same to the second surface as described and a delivery cylinder, both at the other side of the impression cylinder, the delivery cylinder being above the retaining cylinder, substantially as described.

9. In a multi-color printing machine, the combination with an oscillating impression cylinder having two impression surfaces and grippers therefor, of a retaining cylinder taking the sheet from one impression surface and delivering the same to the other impression surface, substantially as and for the purposes described.

10. In a multi-color printing machine, the combination with an oscillating impression cylinder having two impression surfaces and grippers therefor, of feeding means supplying sheets to one of said impression surfaces, and retaining devices, substantially as described, taking the sheet from one impression surface and delivering the same to the other impression surface, substantially as described.

11. In a multi-color printing machine, the combination with an oscillating impression cylinder having two impression surfaces and grippers therefor, of feeding means supplying sheets to one of said impression surfaces,

and a retaining cylinder receiving the once printed sheet from the first impression surface and delivering the same to the second impression surface, substantially as and for the purposes described.

12. In a multi-color printing machine, the combination with an oscillating impression cylinder having two impression surfaces and grippers therefor, of feeding means supplying sheets to one of said impression surfaces, retaining devices substantially as described, receiving the once printed sheet from the first impression surface and delivering the same to the second impression surface, and delivery mechanism receiving the twice printed sheet from the second impression surface and delivering the same, substantially as described.

13. In a multi-color printing machine, the combination with an oscillating impression cylinder having two impression surfaces and grippers therefor, of feeding means supplying sheets to one of said impression surfaces, a retaining cylinder receiving the once printed sheet from the first impression surface and delivering the same to the second impression surface, and delivery mechanism receiving the twice printed sheet from the second impression surface and delivering the same, substantially as described.

14. In a multi-color printing machine, the combination with an oscillating impression cylinder having two impression surfaces and grippers therefor, of retaining devices substantially as described, receiving the once printed sheet from the first impression surface and delivering the same to the second impression surface, and delivery mechanism receiving the twice printed sheet from the second impression surface and delivering the same, substantially as described.

15. In a multi-color printing machine, the combination with an oscillating impression cylinder having two impression surfaces and grippers therefor, of a retaining cylinder receiving the once printed sheet from the first impression surface and delivering the same to the second impression surface, and delivery mechanism receiving the twice printed sheet from the second impression surface and delivering the same, substantially as described.

16. In a multi-color printing machine, the combination of a reciprocating type bed having two forms, color rolls for each form, an oscillating impression cylinder having two impression surfaces, and retaining devices, substantially as described, taking the once printed sheet from one impression surface and delivering the same to the second impression surface, substantially as and for the purposes described.

17. In a multi-color printing machine, the combination of a reciprocating type bed having two forms, color rolls for each form, an oscillating impression cylinder having two impression surfaces, and a retaining cylinder

taking the once printed sheet from one impression surface and delivering the same to the other impression surface, substantially as and for the purposes described.

18. In a multi-color printing machine, the combination of a reciprocating type bed having two forms, color rolls for each form, an oscillating impression cylinder having two impression surfaces, feeding means supplying sheets to one of said impression surfaces, and retaining devices substantially as described, taking the sheet from the first impression surface and delivering the same to the second impression surface, substantially as described.

19. In a multi-color printing machine, the combination of a reciprocating type bed having two forms, color rolls for each form, an oscillating impression cylinder having two impression surfaces, feeding means supplying sheets to one of said surfaces, and a retaining cylinder taking the sheet from the first impression surface and delivering the same to the second impression surface, substantially as described.

20. In a multi-color printing machine, the combination of a reciprocating type bed having two forms, color rolls for each form, an oscillating impression cylinder having two impression surfaces, feeding means supplying sheets to one of said impression surfaces, retaining devices substantially as described, taking the once printed sheet from the first impression surface and delivering the same to the second impression surface, and delivery mechanism taking the twice printed sheet from the second impression surface and delivering the same, substantially as described.

21. In a multi-color printing machine, the combination with a reciprocating type bed having two forms, color rolls for each form, of an oscillating impression cylinder having two impression surfaces, feeding means supplying sheets to one of said impression surfaces, a retaining cylinder taking the once printed sheet from the first impression surface and delivering the same to the second impression surface, and delivery mechanism receiving the twice printed sheet from the second impression surface and delivering the same, substantially as described.

22. In a multi-color printing machine, the combination with a reciprocating type bed having two lithographic forms, of color rolls for each form, water rolls, an oscillating impression cylinder having two impression surfaces, and retaining devices, substantially as described, taking the once printed sheet from the first impression surface and delivering the same to the second impression surface, substantially as and for the purposes described.

23. In a multi-color printing machine, the combination with a reciprocating type bed having two lithographic forms, of color rolls for each form, water rolls, an oscillating im-

pression cylinder having two impression surfaces, and a retaining cylinder taking the once printed sheet from the first impression surface and delivering the same to the second impression surface, substantially as and for the purposes described.

24. In a multi-color printing machine, the combination with a reciprocating type bed having two lithographic forms, of color rolls for each form, water rolls, an oscillating impression cylinder having two impression surfaces, feeding means supplying sheets to one of said impression surfaces, and retaining devices, substantially as described, taking the once printed sheet from the first impression surface and delivering the same to the second impression surface, substantially as described.

25. In a multi-color printing machine, the combination with a reciprocating type bed having two lithographic forms, of color rolls for each form, water rolls, an oscillating impression cylinder having two impression surfaces, feeding means supplying sheets to one of said impression surfaces, and a retaining cylinder taking the once printed sheet from the first impression surface and delivering the same to the second impression surface, substantially as described.

26. In a multi-color printing machine, the combination with a reciprocating type bed having two lithographic forms, of color rolls for each form, water rolls, an oscillating impression cylinder having two impression surfaces, feeding means supplying sheets to one of said impression surfaces, retaining devices substantially as described, taking the once printed sheet from the first impression surface and delivering the same to the second impression surface, and delivery mechanism receiving the sheet from the second impression surface and delivering the same, substantially as described.

27. In a multi-color printing machine, the combination with a reciprocating type bed having two lithographic forms, of color rolls for each form, water rolls, an oscillating impression cylinder having two impression surfaces, feeding means supplying sheets to one of said impression surfaces, a retaining cylinder taking the once printed sheet from the first impression surface and delivering the same to the second impression surface, and delivery mechanism receiving the twice printed sheet from the second impression surface and delivering the same, substantially as described.

28. In a multi-color printing machine, the combination with a reciprocating type bed carrying two lithographic forms color rolls for each form, an oscillating impression cylinder having two impression surfaces, and a feed cylinder at one side of the impression cylinder, of a retaining and a delivery cylinder and water rolls at the other side of the impression cylinder, substantially as described.

29. In a multi-color printing machine, the
combination with an oscillating impression
cylinder having first and second impression
surfaces, and a feed cylinder at one side of
5 the impression cylinder, of a retaining and a
delivery cylinder and damping devices at the
other side of the impression cylinder, sub-
stantially as described.

Signed at New York, in the county of New
York and State of New York, this 6th day of 10
April, A. D. 1891.

WALTER SCOTT.

Witnesses:

F. GOODWIN,
R. W. BARKLEY.