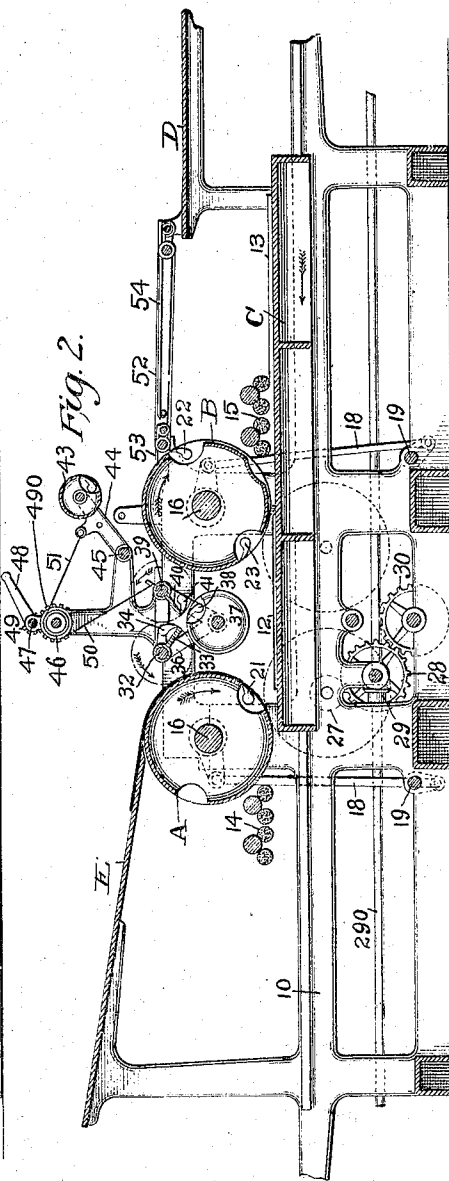
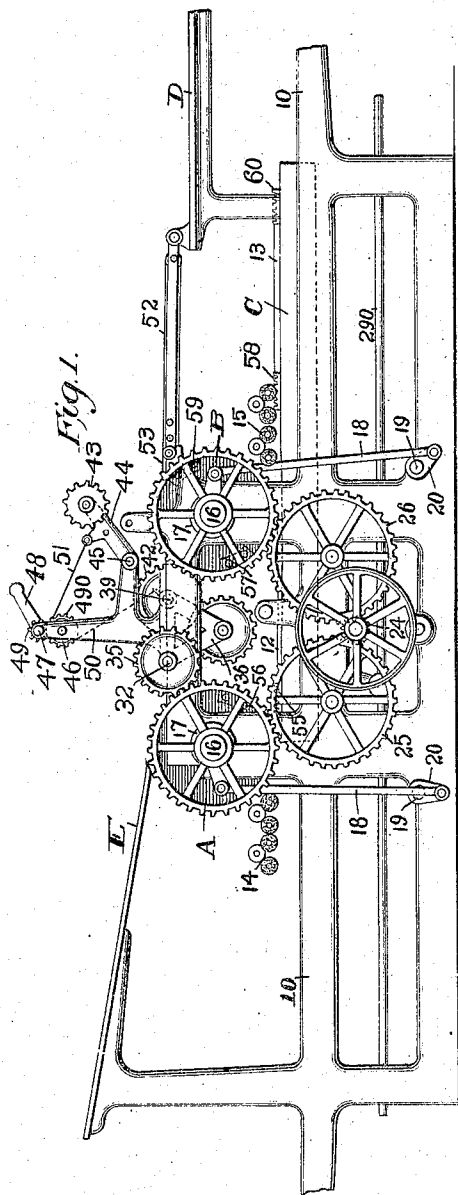


H. A. W. WOOD.
 COMBINED PERFECTING OR TWO COLOR PRINTING MACHINE.
 APPLICATION FILED NOV. 15, 1901. RENEWED MAR. 26, 1907.

941,598.

Patented Nov. 30, 1909.

3 SHEETS—SHEET 1.



Witnesses:

W. F. Wasson.
 W. E. Ragan.

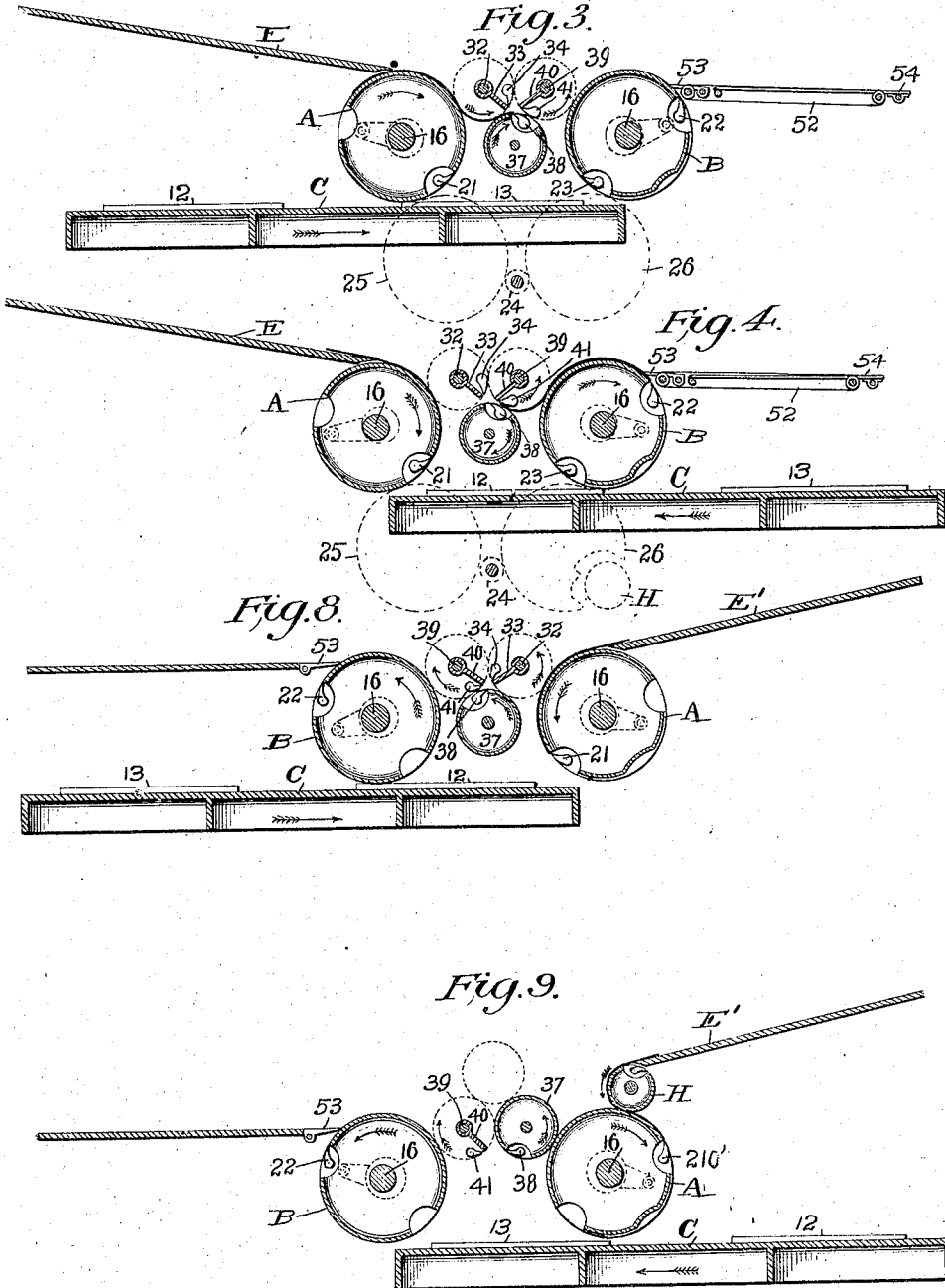
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 3 SHEETS—SHEET 2.



Witnesses:

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3 SHEETS—SHEET 3.

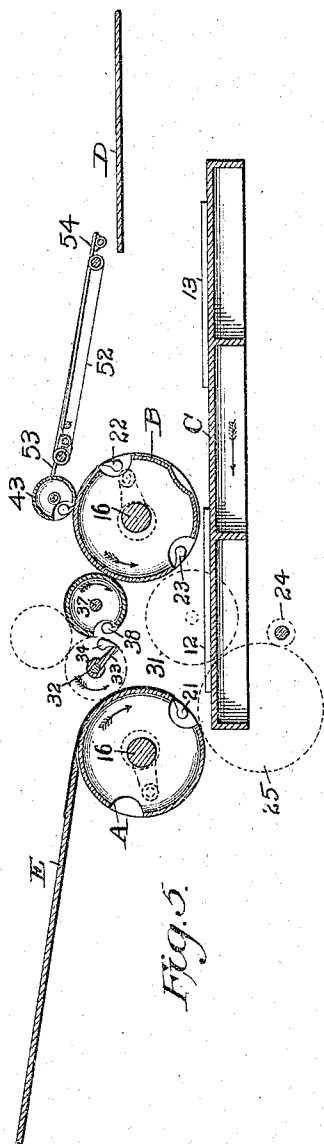


Fig. 5.

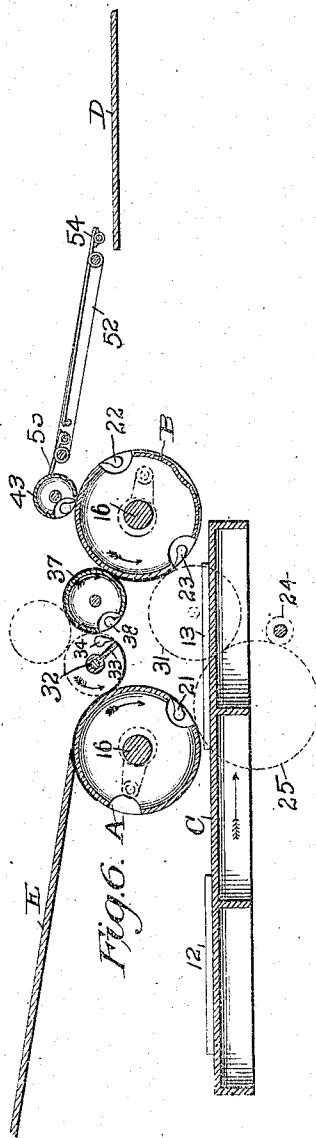


Fig. 6.

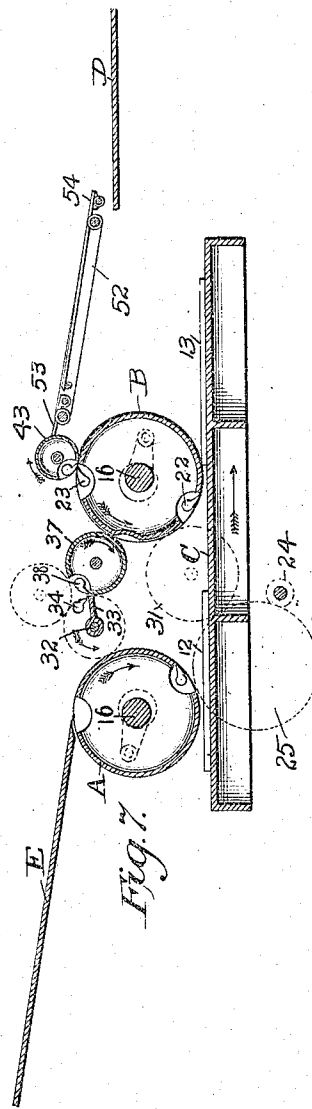


Fig. 7.

Witnesses:

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Inventor:
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UNITED STATES PATENT OFFICE.

HENRY A. WISE WOOD, OF NEW YORK, N. Y., ASSIGNOR TO CAMPBELL PRINTING PRESS & MFG. CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

COMBINED PERFECTING OR TWO-COLOR PRINTING-MACHINE.

941,598.

Specification of Letters Patent.

Patented Nov. 30, 1909.

Application filed November 15, 1901, Serial No. 82,434. Renewed March 26, 1907. Serial No. 364,648.

To all whom it may concern:

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Combined Perfecting or Two-Color Printing-Machine, of which the following is a specification.

The aim of this invention is to provide a single printing press, which may be used advantageously either for perfecting sheets or for twice printing on the same side of sheets.

Two separate machines are now commonly employed to accomplish these two ends; one, the well known perfecting printing machine, by which sheets are printed on both their sides in the passage through the machine, and the other the well known two-color printing machine by which the sheets are twice printed on the same side in the passage through the machine.

The aim of my invention is to provide a single machine of improved construction which will perform both operations.

By this invention, a printer will have both machines combined in such a way that he will have at his disposal in the space of one machine all the advantages of the two separate machines, together with a greater opportunity to keep the machine continuously employed, for it is often the case in a printing office where individual two-color and perfecting machines are used, that one will be idle at times, because it cannot be adapted to any other than the peculiar work for which it is intended.

Another special advantage from the use of my improved machine arises from the fact that what is known as three-color work is becoming very common, that is, work that is printed in three colors on one side and with one color or letter-press matter on the other. This class of work can be especially advantageously turned out on my improved machine herein described, because the same can be used first to put say two colors on one side of the sheets, the machine being set as a two-color machine, and then the sheets can be run through again with the machine set as a perfector, so as to put the third color on the first printed side, and to print the sheets on the other side or perfect the same; or the alternate course could be followed of

first perfecting the sheets and then putting on the two colors.

The especial construction of my improved machine consists in providing two impression cylinders, printing means for presenting flat forms thereto, said means preferably comprising a reciprocating bed cooperating with said cylinders, and means so arranged that the sheets may be presented by said impression cylinders to the printing means to be either twice printed on the same side or perfected.

The preferred form is to use two two-revolution impression cylinders, to gear one of the said cylinders so that it may be rotated in either direction, and to provide intermediate carrier mechanism so that the sheets may be carried from the first to the second impression cylinder to be either again printed on the same side, or perfected by the second cylinder.

The preferred form of intermediate carrier mechanism consists of two sets of rotating grippers and a transfer cylinder so arranged that the three instrumentalities may be used to transfer the sheets from the first to the second cylinder, or so that two instrumentalities may be used.

In the accompanying five sheets of drawings, I have shown enough of my improved machine to illustrate fully what I consider to be the best form for carrying out the invention, referring to which,

Figure 1 is a side elevation from the gear side of the machine, Fig. 2 is a sectional elevation thereof, Figs. 3 and 4 are diagrams illustrating the operation when the machine is used for two-color work, Figs. 5 to 7 inclusive are diagrams illustrating the operation when the machine is used for perfecting, and Figs. 8 and 9 are sectional views illustrating a modification hereinafter referred to at length.

Referring to the drawings and in detail, 10-10 represent the usual side-frames.

A designates what I will term the first impression cylinder, and B the second impression cylinder.

C designates the reciprocating bed, which may be mounted in the frame in any of the usual manners, and which may have any of the ordinary printing press movements connected therewith to give the same its forward and backward reciprocation in the

well known manner, the details of the mounting of the bed and of the bed-driving mechanism not being necessary to show in the case.

5 The impression cylinders A and B are preferably made as what are known as two-revolution cylinders; that is, they will continuously turn in the same direction in the operation of the machine, and make two
10 complete revolutions for each complete excursion of the bed.

The bed C is arranged so as to carry two sets of forms, the first 12 being set to co-operate with the impression cylinder A, and
15 the second 13 being set to coöperate with the second impression cylinder B.

An inking apparatus is arranged at each end of the machine in any of the ordinary manners, the form-inking rollers of the rear
20 inking device being indicated by the reference 14, and the form inking rollers of the front inking device being indicated by the reference 15.

The shafts 16 of the impression cylinders
25 A and B are eccentrically journaled in the ordinary manner in bushes 17, which latter are journaled in the main frames of the machine. These bushes have extending arms, to which are connected links 18, which links
30 connect to shafts 19 by means of suitable levers 20 in the ordinary way, so that the impression cylinders A and B may be raised and lowered in the ordinary manner. A suitable tripping mechanism is provided to
35 actuate the shafts 19, the details of which it is not thought necessary to show in this case.

The first impression cylinder A has a set of grippers 21, which may be operated in
40 any of the usual ways.

The impression cylinder B has two sets of grippers 22 and 23, which face in opposite directions, as shown, and which are placed at the opposite ends of that part of
45 the cylinder B which is used as the impression surface.

24 designates a driving pinion, which may be driven by any of the usual tight and loose pulleys to impart power to the machine. Meshing with this driving pinion is
50 an intermediate 25, which meshes with a gear secured on the shaft of the impression cylinder A in the ordinary manner. Also meshing with said pinion 24 is a removable
55 intermediate 26, which meshes with a cylinder gear arranged on the shaft of the second impression cylinder B in the ordinary manner.

The shaft of the intermediate 25 may be
60 carried through the machine, and have arranged thereon a pinion 27, which may mesh with a gear 28, which, by means of bevel gears 29 may communicate power to a shaft
65 290 arranged parallel to the side-frames, from which shaft 290 the various parts of

the inking mechanism, etc., may be driven. A gear 30 is also meshed with the gear 28, and this gear may be used to operate the tripping mechanism.

The gear 26 is made removable so that a
70 gear 31 can be inserted in place of the same on a suitable stud projecting from the side-frame, so that power may be communicated from the intermediate 25 to the cylinder gear on the impression cylinder B, as indicated in dotted lines in the third sheet of
75 the drawings to wit, in Figs. 5 to 7 inclusive.

The gear 26 in some cases may be made simply to slip in closer to the side-frame out
80 of mesh with the gear 25 and the gear on the cylinder B, and the gear 31 then intermeshed. This gearing is provided so that, when arranged as shown in Fig. 1, the two impression cylinders will turn in the same
85 direction, but so that, when the gear 31 is used, as shown in the third sheet of the drawings to wit, in Figs. 5 to 7 inclusive, the two impression cylinders will turn in opposite directions for a purpose hereafter
90 noted.

A shaft 32 is journaled in the main frames, and carries a gripper-bar 33, which has a coacting set of grippers 34. This shaft 32
95 carries a gear 35, which meshes with the gear on the shaft of the impression cylinder A. This gear 35 is made one-half the size of the gear on the shaft of the impression cylinder A. Loosely hung on this shaft 32 are two triangular frames 36. Journaled
100 in these frames is a transfer cylinder which has a set of grippers 38, and also journaled in these frames is a shaft 39, which carries a gripper-bar 40 and a set of grippers 41.

The shaft 32 is geared to the transfer cylinder 37 at one end of said transfer cylinder, and the transfer cylinder is geared to the shaft 39 at the other end of the transfer cylinder by gears 42, as indicated. By this means, the two shafts 32 and 39 will be
110 turned in the same direction, and the transfer cylinder 37 will be rotated in the opposite direction.

The transfer cylinder is made one-half the size of the impression cylinders, and will
115 therefore make four turns in each cycle.

43 represents a delivery cylinder or rotating switch which is mounted in arms 44 pivoted on a shaft 45 secured in the main frames.
120

A gear is arranged on the end of the shaft of the delivery cylinder so that the same will mesh with the gear on the end of the shaft of the second impression cylinder when the delivery cylinder is lowered to coöperate
125 with the second impression cylinder.

46 represents a suitable winch, which is journaled in the side frames. Arranged above the same is a shaft 47, which has a suitable handle 48. Also mounted on the
130

shaft 47 is a pinion 49, which engages with a gear 490 arranged on the winch. Connections 50 are arranged between the winch and the triangular frames 36. Connections 51 are arranged between the winch and the arms 44. These connections to these two instrumentalities are passed around the winch in opposite directions, so that, when the winch is operated, one will be raised and the other lowered, and vice versa.

52 represents a set of delivery tapes, which are mounted on suitable pulleys arranged in suitable arms in the ordinary manner. In the ends of these arms is journaled a stripper 53, which may be operated in any of the usual ways.

Arranged so as to take the sheets from the tapes 52 is a suitable fly 54, which will fly the sheets on a suitable delivery table D.

A feed-board E is arranged so that sheets may be fed to the first impression cylinder A. A suitable starter segment 56 is secured on the side of the impression cylinder A to coact with a suitable starter segment 55 arranged on the bed at the head of the forms 12.

Two segments 57 and 59 are secured to the side of the impression cylinder B to co-operate with segments 58 and 60 secured at both ends of the forms 13.

The triangular frames 36 are hung on the shaft 32 so as to fit very closely to the side-frames, and they may be secured in their raised or lowered position by means of suitable removable cotter-pins which may be driven through the side-frames into the triangular frames. Similar cotter-pins may be used to hold the arms 44 accurately in place when the delivery cylinder is used.

In the first three sheets of the drawings, the machine is set so as to operate as a two-color printing machine. The gearing is set to turn the impression cylinders A and B in the same direction. The triangular frames 36 are so set that both gripper bars and the transfer cylinder are used to carry sheets from the first to the second impression cylinders. The delivery cylinder 43 is in its inoperative position. The stripper 53 is set to coact directly with the second impression cylinder. With this arrangement, a sheet fed from the feed-board E will first be carried around the impression cylinder A and printed on one side from the form 12. The head of the sheet will then be passed by the grippers 34 to the grippers 38 of the transfer cylinder. The sheet will then turn around with the transfer cylinder. The head of the sheet will then be taken by the grippers 41 and passed to the grippers 22 of the second impression cylinder. The second impression cylinder will then take the sheet and carry the same around so that the head of the sheet will meet the head of the form 13 on the next forward stroke of the bed C.

Thus, with this arrangement, while the machine is in operation, there will be a sheet presented by each impression cylinder to each form on the bed as the bed makes its forward stroke, while, on the backward stroke, the cylinders will be raised so that neither will operate. In this way, sheets may be twice printed on the same side, and this operation is clearly indicated in the diagrams in Figs. 3 and 4. It will be noticed that when the sheet is on the intermediate transfer cylinder, the printed side will be outermost, so that there will be no blur on the sheet in the transfer. The sheet is finally delivered by the cylinder and fly in the ordinary manner.

The second impression cylinder B is not started in operation until a sheet has been printed by the first cylinder and passed over to the second impression cylinder. The sheets will remain on the transfer cylinder for one turn of the same, and this will give the necessary distance between the two sets of grippers 21 and 22 so that the sheets will properly be carried through the mechanism.

In the third sheet of drawings, to wit, in Figs. 5 to 7 inclusive, the machine is shown as set for a perfecting press. When the machine is used for this purpose, the gear 26 is rendered inoperative, and the gear 31 is used to turn the second impression cylinder B so that the impression cylinders A and B will turn in opposite directions, as indicated by the arrows. The triangular frames 36 are raised so that the transfer cylinder 37 will be swung into position to coöperate with the second impression cylinder B, as shown.

If desired, the second impression cylinder may have a slight indentation in its non-impression surface, as indicated, so that the transfer cylinder may be swung into proper position. If desired, when in this position, the gripper-bar 40 may be thrown out of operation by slipping its gear 42 on the shaft 39 out of engagement with the gear on the transfer cylinder, although this is not absolutely necessary. Then, when the intermediate carrying mechanism is set in this position, only the first gripper-bar and the transfer cylinder are used. With this operation, the grippers 23 of the second impression cylinder are used. As the intermediate carrier mechanism is adjusted in this manner, the delivery cylinder 43 or rotating switch is brought into proper relation with the second impression cylinder B, and the stripper 53 and the fly 54 are set to coöperate with the delivery cylinder. With the machine thus set, sheets fed from the feed-board E to the grippers 21 of the first impression cylinder A will be printed on one side, as the bed makes its forward or left-hand stroke, and will then be carried by the gripper-bar 33 and transfer cylinder 37 to the grippers 23 of the second impression cylinder.

der B, so that, as the bed makes its return or stroke to the right, the sheets will be printed on the other side, or perfected. The sheets will then be carried from the second impression cylinder by the delivery cylinder 43 or rotating switch, and delivered by the fly on the delivery table C. By this mechanism, a sheet will be perfected and delivered for every excursion of the bed.

The details of the mechanism used to operate the grippers and of the raising and lowering mechanism for the impression cylinders are not shown in this case, as it is thought that the same would only tend to complication. These details are well understood by all printing press builders, and are worked out as desired for any particular location.

By using a starter segment at the two ends of the form 13 and two starter segments on the cylinder B, the impression cylinder B will be started in proper register, either when the machine is set as a two-color machine, or as a perfecter.

In the second sheet in Figs. 8 and 9 of the drawings, I have shown a modification in that the delivery is kept substantially constant, and two sets of grippers 21 and 210 are provided in the first impression cylinder A, the first impression cylinder being the one which may be driven in opposite directions, an intermediate cylinder H being used when the device is to be used as a perfecter. This modification is substantially the same as the machine previously described, except that sheets are fed through the machine in the opposite direction, the feed-board E' of this device being raised and lowered so that the sheets may be fed either to the cylinder A or to the intermediate cylinder H. In this modification, the machine is shown as arranged for two-color work in Fig. 8, and as a perfecter in Fig. 9.

In Fig. 8 the sheets are first taken by the grippers 21 of the cylinder A, printed on one side from form 12, then transferred by grippers 34 to grippers 38 of cylinders 37, and thence by grippers 41 to the grippers 22 of cylinder B. This passage of the sheet will carry the same to the cylinder B, so that the same side thereof will be again printed from form 13.

In Fig. 9, the sheet is first taken by gripper cylinder H, and then by the grippers 210 of the first impression cylinder A, and printed on one side from form 12. The sheet is then taken by grippers 38 of the cylinder 37, and passed by grippers 41 to the grippers 22 of the second impression cylinder B. The sheet is then printed on its other side, or perfected from form 13. With this arrangement the cylinder A is driven in the opposite direction from that when the machine is used as shown in Fig. 8, and the intermediate gripper cylinder H

is interposed between the feed-board and the cylinder A, so that the sheets can be properly fed to the impression cylinder A.

Two oppositely arranged grippers 21 and 210 are preferably used in the cylinder A, only the set which is in operation, being shown in the particular figure.

I am aware that a machine for accomplishing the ends of my invention may be designed in many ways and with very different instrumentalities from what I have shown and described as the best form known to me for practicing my invention. Therefore, I do not wish to be limited to the details of construction, but

What I claim and desire to secure by Letters-Patent is:—

1. The combination in a printing machine, of two impression cylinders, a reciprocating bed for presenting flat forms thereto, and means arranged in said machine so that the sheets may be presented by said cylinders to the printing means, to be either twice printed on the same side, or perfected.

2. The combination in a printing machine, of two impression cylinders, a reciprocating bed cooperating therewith, and means arranged in said machine so that the sheets may be presented by said cylinders to forms carried by said bed, to be either twice printed on the same side, or perfected.

3. The combination in a printing machine, of two impression cylinders, a reciprocating bed for presenting flat forms thereto, and means arranged in said machine so that the sheets may be carried from one of said cylinders to the other, so that the sheets will be a second time printed on the same side, or perfected.

4. The combination in a printing machine, of two impression cylinders, a reciprocating bed cooperating therewith, gearing whereby one of said cylinders may be rotated in either direction, and carrier-mechanism arranged between said cylinders so that sheets may be twice printed on the same side, or perfected.

5. The combination in a printing machine, of two two-revolution impression cylinders, a reciprocating bed cooperating therewith, and intermediate transfer mechanism arranged between the two cylinders so that sheets may be twice printed on the same side, or perfected.

6. The combination in a printing machine of two two-revolution impression cylinders, a reciprocating bed cooperating therewith and adapted to carry two sets of forms longitudinally, and an intermediate transfer mechanism arranged between the two cylinders, so that the sheets may be twice printed on the same side or perfected.

7. The combination in a printing machine, of two two-revolution impression cylinders, a reciprocating bed, gearing ar-

5 ranged so that the second impression cylinder may be turned in either direction, and intermediate transfer mechanism arranged so that sheets may be twice printed on the same side, or perfected.

8. The combination in a printing machine, of two impression cylinders, a reciprocating bed, and three intermediate transferring devices between the cylinders, so arranged that two or three of the same may be used.

9. The combination in a printing machine, of two impression cylinders, printing means cooperating therewith, an intermediate transferring mechanism arranged between said cylinders, consisting of two rotating carriers, and a transfer cylinder, so arranged that all or two may be used so that sheets can be either twice printed on the same side or perfected.

10. The combination in a printing machine, of two impression cylinders, printing means cooperating therewith, and intermediate carrier mechanism arranged between the cylinders, comprising a transfer cylinder and two rotating gripper-bars geared together and so arranged that all three or two may be used.

11. The combination in a printing machine, of two impression cylinders, printing means cooperating therewith, a rotating gripper-bar, frames mounted on the shaft of said rotating gripper-bar, and a transfer cylinder and rotating gripper-bar journaled in said frames, whereby, by adjusting said frames, both gripper-bars and the transfer cylinder, or the first gripper-bar and transfer cylinder may be used.

12. The combination in a printing machine, of two impression cylinders, means for presenting flat forms thereto, intermediate carrier mechanism between the cylinders, gearing so arranged that one of said cylinders may be set to turn in either direction, and two sets of grippers arranged in this cylinder.

13. The combination in a printing machine, of two impression cylinders, means for presenting flat forms thereto, gearing so arranged that the second of said cylinders may be turned in either direction, intermediate transfer mechanism between the cylinders, and two sets of grippers arranged in the second cylinder.

14. The combination in a printing machine, of two impression cylinders, means for presenting flat forms thereto, a rotating gripper-bar driven from the first cylinder, frames pivoted on the shaft of this gripper-bar, a transfer cylinder and second gripper-bar journaled in these frames, and means for setting the frames so that the sheets will be transferred by the transfer cylinder to the second impression cylinder,

or by the second gripper-bar to the second impression cylinder. 65

15. The combination in a printing machine, of two impression cylinders, means for presenting flat forms thereto, intermediate carrier mechanism arranged so that said cylinders may either perfect, or twice print the sheets on the same side, gearing so arranged that the second impression cylinder may be turned either way, and delivery mechanism arranged to deliver the sheets. 75

16. The combination in a printing machine, of two impression cylinders, printing means cooperating therewith, intermediate carrier mechanism between the cylinders, gearing so arranged that the second cylinder may be turned in either direction, a delivery cylinder, and delivery means, which may be set to operate directly from the second cylinder, or from the delivery cylinder. 80

17. The combination in a printing machine, of two impression cylinders, means for presenting flat forms thereto, intermediate carrier mechanism, a delivery cylinder, and a winch oppositely connected to said carrier mechanism and delivery cylinder. 85

18. The combination in a printing machine, of two impression cylinders, printing means cooperating therewith, carrier mechanism between the impression cylinders, gearing whereby the second impression cylinder may be turned in either direction, a delivery cylinder, and a delivery frame and fly which may be set to cooperate either with the second impression cylinder, or with the delivery cylinder. 90

19. The combination in a printing machine, of two impression cylinders, a reciprocating bed cooperating therewith, transferring mechanism between the cylinders, gearing whereby one cylinder may be rotated in either direction, this cylinder having two starter segments and two starter segments secured to the bed at substantially opposite ends of the forms, which is to cooperate with this cylinder. 100

20. The combination with a printing couple comprising an impression cylinder and a reciprocating bed, of means for driving said couple in opposite directions, and a delivery mechanism operating in connection with the sheet carrying member of the couple having two sets of devices for removing the sheet from the sheet carrying member, one set operating when the couple is moving in one direction, and the other set operating when the couple is moving in the opposite direction. 105

21. The combination with a printing couple comprising an impression cylinder and a reciprocating bed, of means for driving it in opposite directions, and a delivery mechanism employing a set of sheet taking devices 125

and a switch, the switch operating to remove the sheet from the sheet carrying member of the couple when it is moving in one direction, and the sheet taking devices operating
5 to remove the sheet when said member is moving in the opposite direction.

In testimony whereof I have hereunto set

my hand, in the presence of two subscribing witnesses.

H. A. WISE WOOD.

Witnesses:

SEYMOUR CONOVER,
JAS. H. CRAFT.