

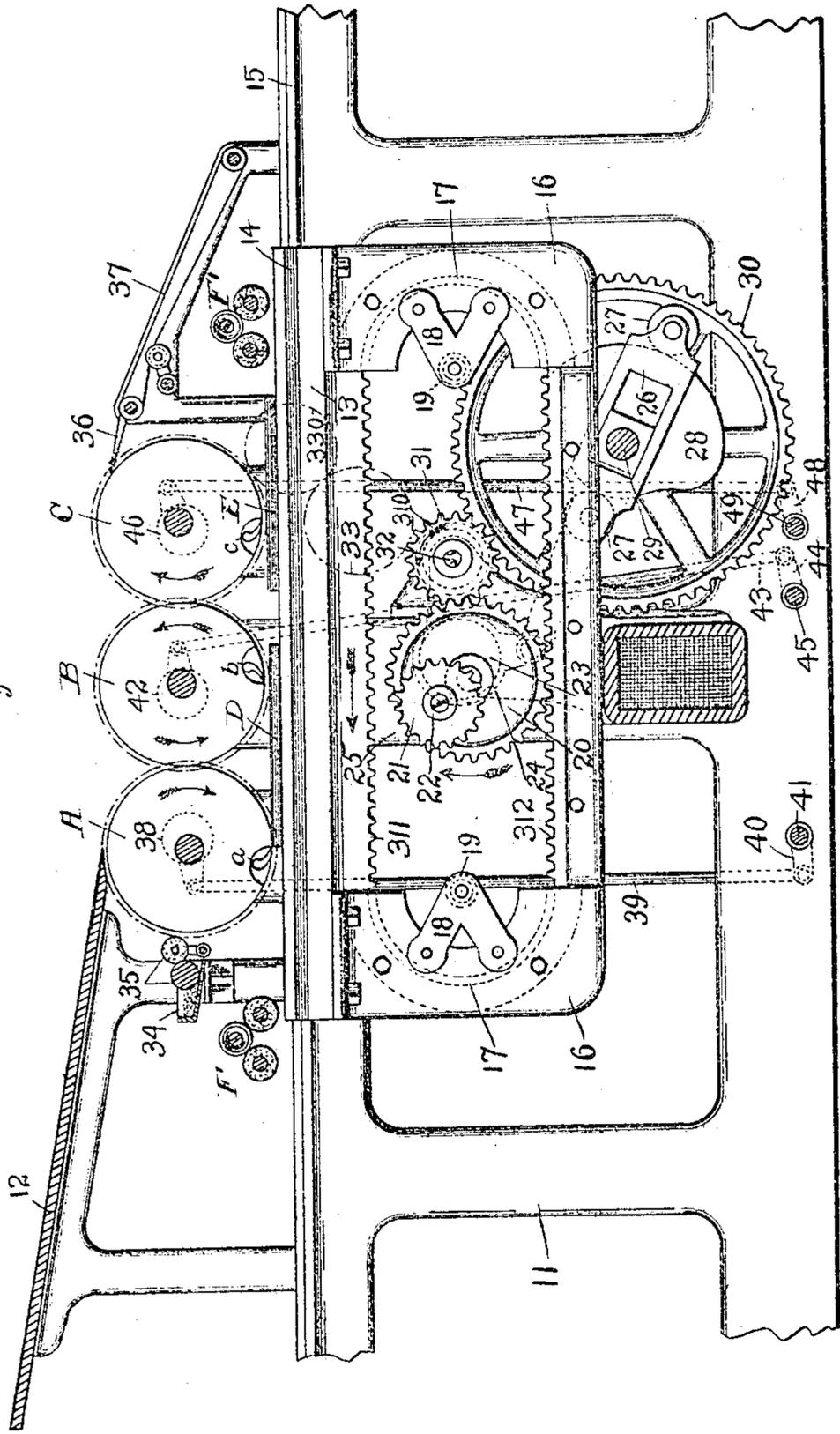
L. W. SOUTHGATE.

COMBINED PERFECTING OR TWO COLOR PRINTING MACHINE.

APPLICATION FILED NOV. 15, 1901. RENEWED JAN. 14, 1905.

3 SHEETS--SHEET 1.

Fig 1.



Witnesses.

C. F. Watson.  
W. E. Regan.

Inventor  
Louis W. Southgate.

By

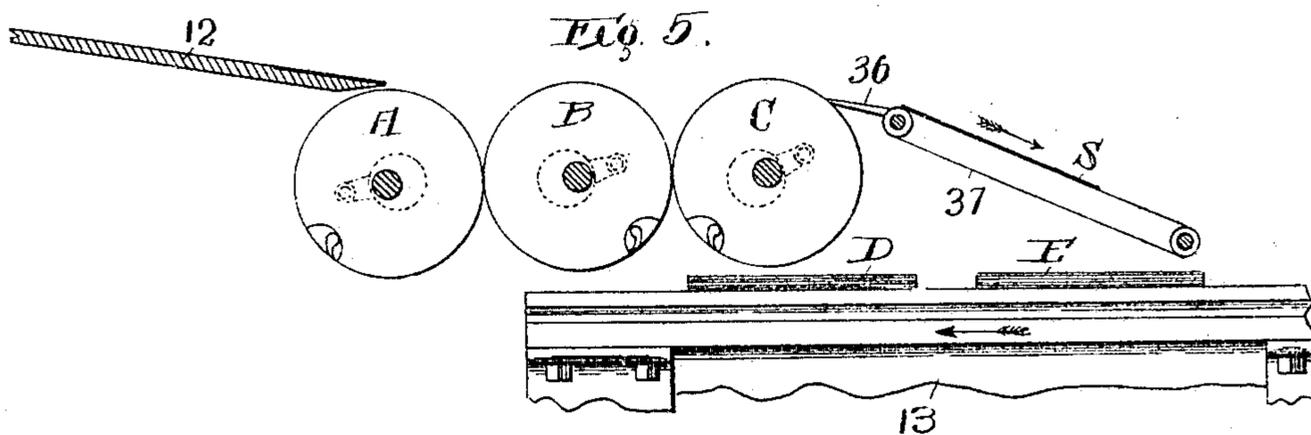
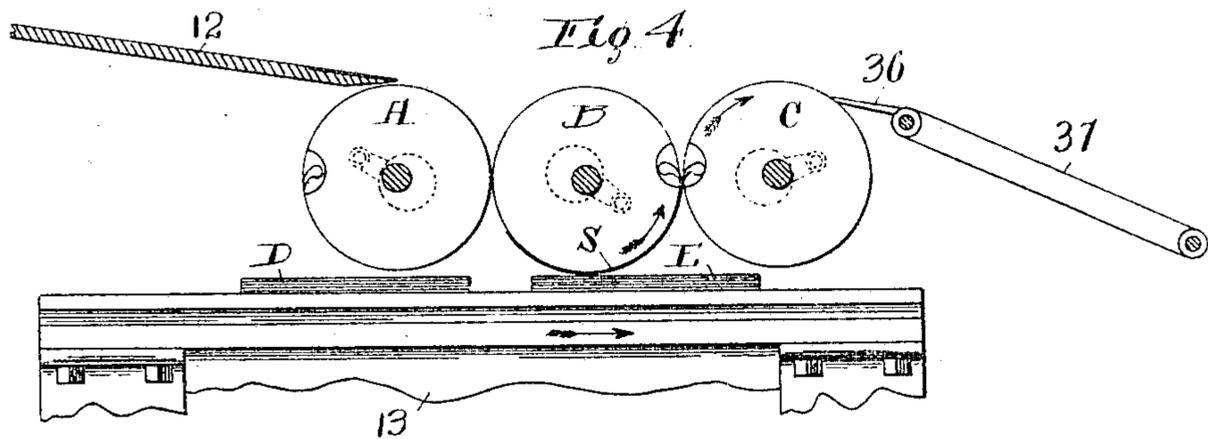
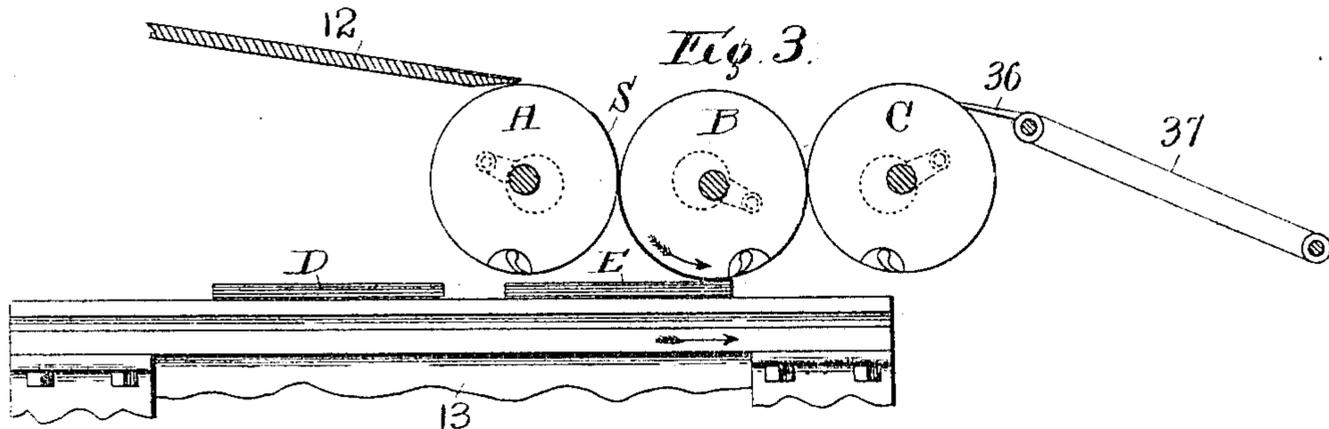
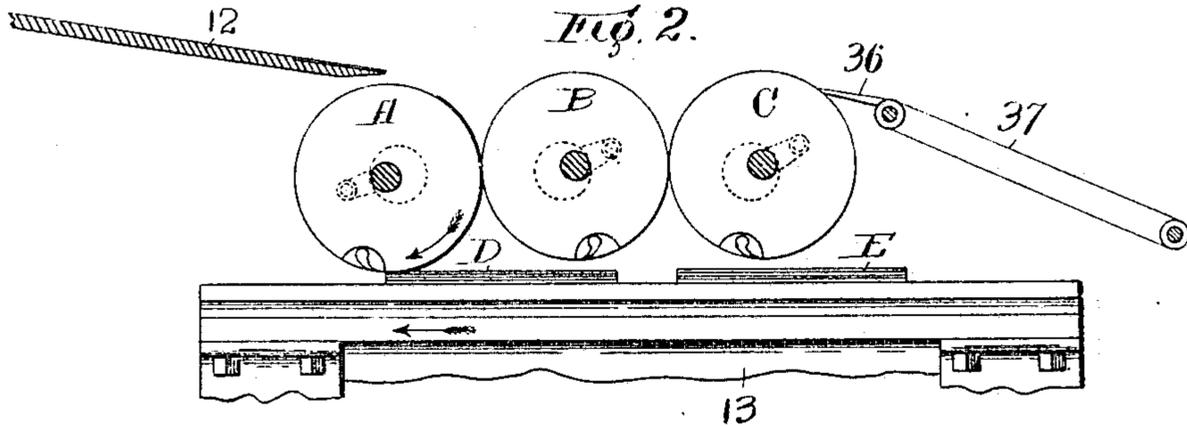
Southgate & Southgate  
Attorneys.

L. W. SOUTHGATE.

COMBINED PERFECTING OR TWO COLOR PRINTING MACHINE.

APPLICATION FILED NOV. 15, 1901. RENEWED JAN. 14, 1905.

3 SHEETS-SHEET 2.



Witnesses  
*C. F. Wesson*  
*M. E. Regan*

Inventor  
*Louis W Southgate*  
 By  
*Southgate & Southgate*  
 Attorneys.

L. W. SOUTHGATE.  
COMBINED PERFECTING OR TWO COLOR PRINTING MACHINE.

APPLICATION FILED NOV. 15, 1901. RENEWED JAN. 14, 1905.

3 SHEETS—SHEET 3.

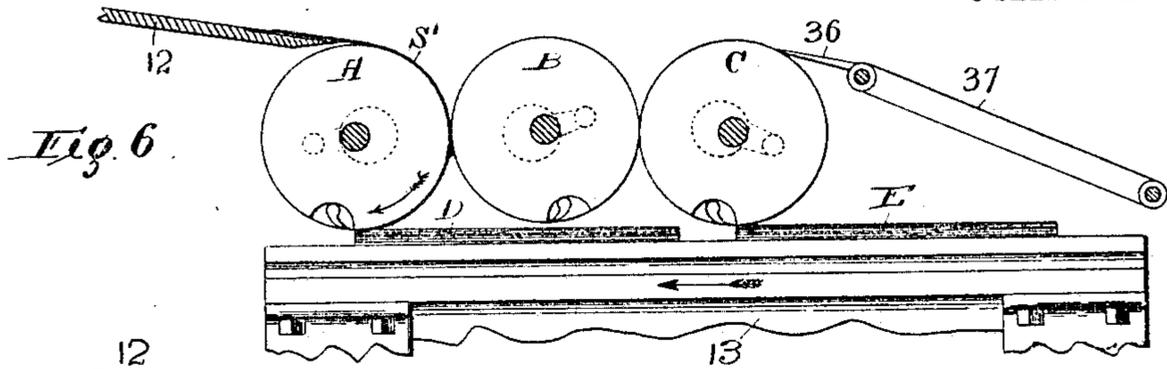


Fig. 6.

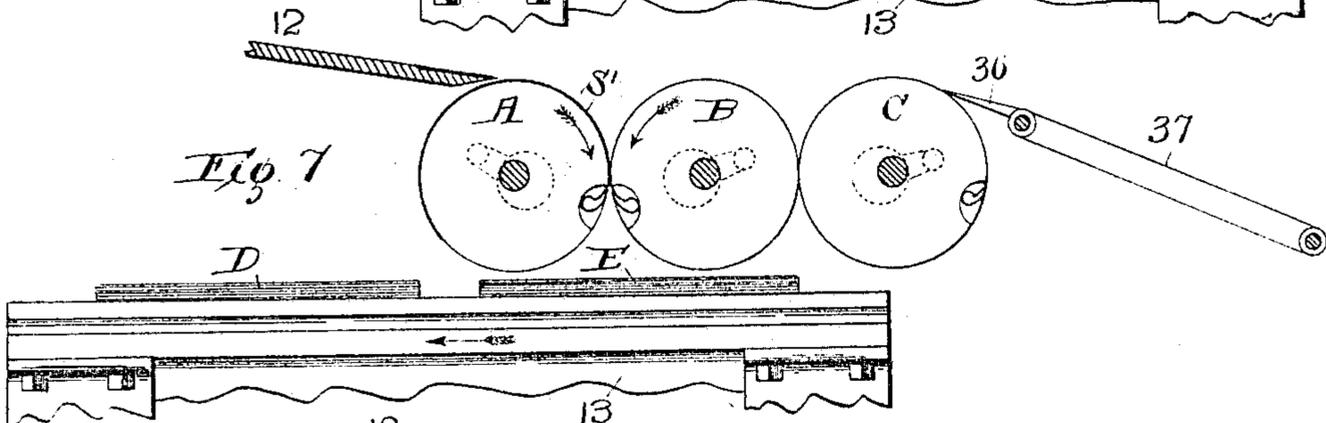


Fig. 7.

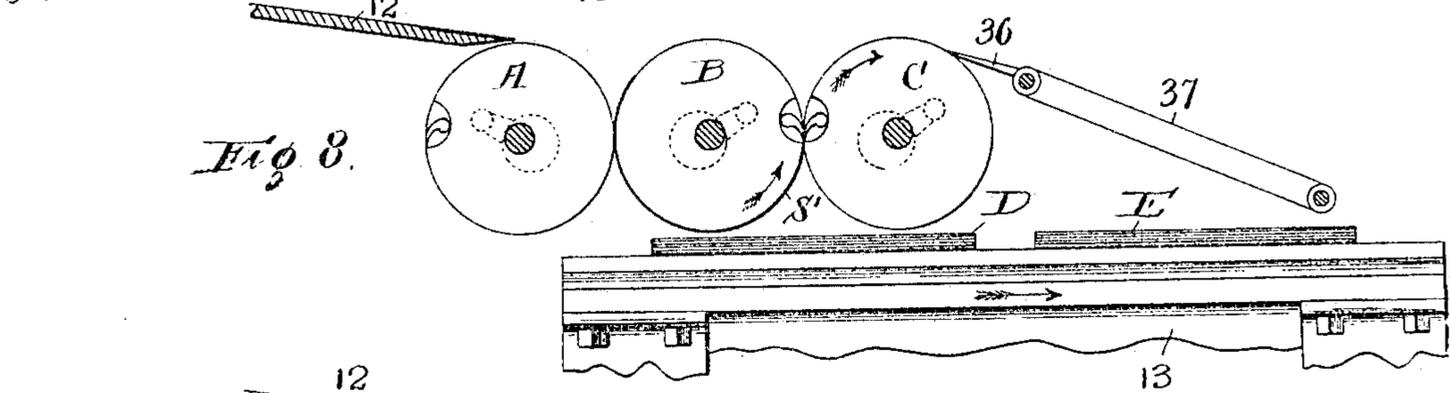


Fig. 8.

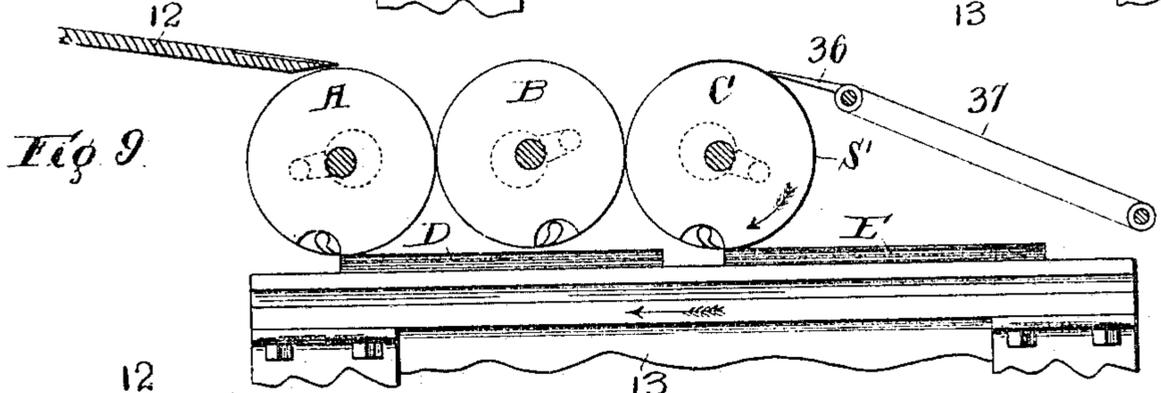


Fig. 9.

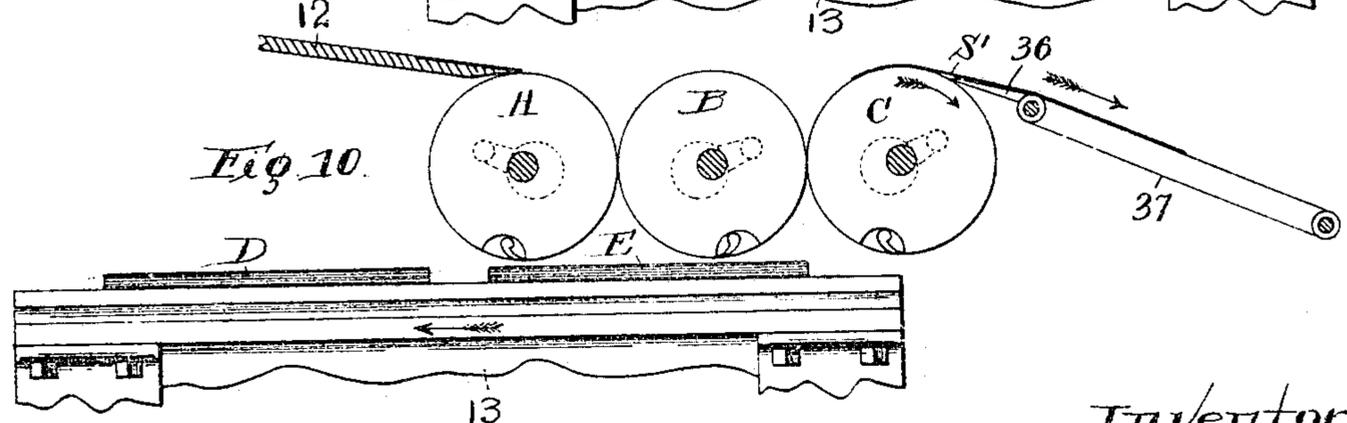


Fig. 10.

Witnesses.  
C. F. Wesson.  
M. E. Regan.

Inventor.  
Louis W. Southgate.  
By  
Southgate & Southgate  
Attorneys.

# UNITED STATES PATENT OFFICE.

LOUIS W. SOUTHGATE, OF WORCESTER, MASSACHUSETTS.

## COMBINED PERFECTING OR TWO-COLOR PRINTING-MACHINE.

No. 801,816.

Specification of Letters Patent.

Patented Oct. 10, 1905.

Application filed November 15, 1901. Renewed January 14, 1905. Serial No. 241,003.

*To all whom it may concern:*

Be it known that I, LOUIS W. SOUTHGATE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, 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-machine which may be used either as a sheet-perfecting or as a multi-color-printing machine.

Referring to the accompanying three sheets of drawings, forming part of this specification, and which illustrate the construction of the machine embodying this invention, Figure 1 is a sectional elevation just inside of one of the side frames of enough of the parts of a printing-machine to illustrate the invention. Figs. 2 to 5 are diagrammatic views illustrating the operation when the machine is used for perfecting, and Figs. 6 to 10 are diagrams illustrating the operation when the device is used as a multicolor-machine.

The invention comprises a sheet-printing machine having three impression-cylinders, which preferably are made of the type known as "three-revolution"—that is, the impression-cylinders are geared to turn continuously, and each impression-cylinder makes three revolutions for each cycle—and reciprocating means for presenting flat forms to said impression-cylinders. The cylinders have the usual sets of grippers, so that the sheet is taken by the first impression-cylinder, from the first impression-cylinder by the second impression-cylinder, and from the second impression-cylinder by the third impression-cylinder, and is passed from the third impression-cylinder to a delivery mechanism. The impression-cylinders are so arranged that either the second or third impression-cylinder can be suspended from operation. By this arrangement the first and second impression-cylinders can be used, so that the sheets will be perfected, the third impression-cylinder remaining inoperative and acting as a delivery-cylinder to take the sheet from the second impression-cylinder and pass the same to the delivery mechanism. By suspending the operation of the second or intermediate cylinder the first and third cylinders can be used, so that the sheet in passing through the machine will be twice printed on the same side, the second or inter-

mediate cylinder in this arrangement forming simply a carrier-cylinder to take the sheet from the first to the third impression-cylinder.

In the drawings I have omitted many of the details of the machine, these details being of the ordinary construction well understood by a printing-press designer, and I have shown only in a general way enough of the mechanism to illustrate clearly how my invention may be practiced.

In detail, A, B, and C represent three impression-cylinders. These impression-cylinders are preferably made of the same size and are geared together, as indicated in dotted lines in Fig. 1, so that the first and third impression-cylinders will turn in the same direction and the second or intermediate cylinder will turn oppositely to the first and third cylinders.

The impression-cylinders A, B, and C are provided with any of the usual forms of grippers, as *a*, *b*, and *c*. These grippers are set so that the sheet can be taken from the first by the second impression-cylinder and from the second by the third impression-cylinder in the manner now practiced in two-cylinder perfecting printing-machines.

11 represents one of the side frames of the machine.

12 designates a feed-board which may have the usual appurtenances, so that the sheets may be fed therefrom to the grippers *a* of the first impression-cylinder A.

13 designates the reciprocating bed, which may have grooves 14 on the sides thereof fitted to ways 15, formed on the side frames, so that the bed is capable of a reciprocating movement on the side frames. This way of mounting the bed is used for the purpose of illustration merely, in practice the bed being mounted on the side frames in any of the usual manners well understood. Depending from each end of the bed is a bracket 16, which carries a curved rack 17. Secured to each bracket 16 is a frame 18, which carries a roller 19 concentric with a curved face formed on the bracket 16.

20 designates the driving-gear for the bed, secured to the side of which is a reversing-pinion 21, which carries a roll 22.

The shaft of the driven gear 20 is mounted eccentrically in a bushing 23, which bushing is journaled in a bracket 24, secured on a girder 25. Connected to the eccentric bushing is a yoke 26, which carries suitable rollers

27, which engage cam 28, mounted on the shaft 29. Arranged on the shaft 29 is a gear 30. A pinion 31, mounted on the shaft 32, is set to engage the driving-gear 20. This shaft 32 may constitute the driving-shaft of the machine and may also carry a gear 310, as indicated in dotted lines, which meshes with the gear 30. This driving mechanism thus referred to constitutes a well-known form of bed-driving mechanism which is commonly employed in the so-called "Campbell presses" and is specifically shown and described in the patent to Winfield S. Huson, No. 680,433, granted August 13, 1901.

The main gear 30 is raised and lowered to engage racks 311 and 312, carried by the bed to impart the main forward and backward movement to the bed, and the pinion 21 is set to run around the curved racks to reverse the bed in either direction, the roll 22 engaging one of the rollers 19 and one of the curved faces formed on the bracket 16 to keep the pinion properly in mesh during the reversing movement. The driving-gear shown in this movement is what is known as a "three-revolution gear"—that is, the same makes three revolutions to each forward and backward movement of the bed—that is, one complete revolution in mesh with either the racks 311 or 312 and a half-revolution to each reversal of the bed. On the end of the shaft 32 is arranged a pinion or gear of the same size as the pinion 31, which by means of suitable intermediates 33 and 330 is geared to the impression-cylinder C, the gears on the impression-cylinders being of the same size as driving-gear 20. By this gearing the cylinders will turn at the same speed as the main driving-gear 20, and hence will make three revolutions to each reciprocation of the bed.

A fountain 34 may be arranged under the feed-board 12, adjacent to the first impression-cylinder A, and may have a suitable ductor 35, arranged in the ordinary manner, so that, if desired, an offset-preventing medium, such as powdered talc, may be deposited on the first printed side of the sheet, while the same is still on the first impression-cylinder, so that set-off on the second cylinder will be prevented.

Coacting with the third impression-cylinder C is a set of strippers 36, which may be operated in the ordinary way to strip the sheet from the third impression-cylinder C and pass the same down onto suitable delivery-tapes 37, from which the sheet may be delivered by any of the usual mechanisms, such as a fly or tape delivery.

The impression-cylinder A is mounted eccentrically in bushings 38, journaled in the main frames. These bushings 38 connect by rods 39 to levers 40, mounted upon a suitable shaft 41.

The cylinder B is eccentrically mounted in bushings 42, which connect by rods 43 to

levers 44, mounted on shaft 45. The cylinder C is also eccentrically mounted in bushings 46, which are connected by rods 47 to levers 48, mounted on the shaft 49. These shafts are oscillated by any suitable mechanisms, so that the impression-cylinders will be raised and lowered at the proper times, one suitable mechanism that may be adapted for this purpose being shown in the patent to Winfield S. Huson, granted September 28, 1897, No. 590,617.

The impression-cylinder B may be rendered inoperative for printing purposes by disconnecting the rods 43 and leaving the same in its raised position.

The impression-cylinder C may be rendered inoperative, so far as the printing operation is concerned, by disconnecting the rods 47 and leaving the same in its highest position.

The printing-machine is provided with two sets of inking apparatus, the form-rollers F of one set being arranged under the feed-board and adjacent to the first impression-cylinder A, and the form-rollers F' of the other being arranged under the delivery mechanism and adjacent to the third impression-cylinder C. The grippers *b* of the second impression-cylinder B are preferably so arranged that the sheet will be kept on the second impression-cylinder for one and one-half revolutions.

I will now describe the operation of my improved machine when the same is used as a perfecting printing-machine. In this operation the third impression-cylinder C is left in its highest position and rendered inoperative, so far as the printing operation is concerned. In Fig. 2 the sheet S is shown as taken by the grippers *a* and as carried around so as to coact with the first form D of the reciprocating bed 13 as the same makes its movement to the left. In Fig. 3 the cylinders are shown as having made one turn from the position shown in Fig. 2, when the head of the sheet will be carried by the grippers *b* of the impression-cylinder B and presented to the second form E of the reciprocating bed 13 as the same makes its stroke to the right. In Fig. 4 the cylinders are shown as having made one-quarter turn from the position shown in Fig. 3. The sheet S is preferably kept on the second impression-cylinder B for another turn thereof, so that when the cylinders again reach the position shown in Fig. 4 the sheet will be transferred to the grippers *c* of the impression-cylinder C, which remains in the raised position, and carried by the same out to the delivery mechanism, as shown in Fig. 5. When the cylinders thus again reach the position shown in Fig. 4, the impression-cylinder B of course is raised. It is not necessary to keep the sheet for one and one-half revolutions of the impression-cylinder B,

but this is the preferred construction, as it eliminates any adjustment of the grippers. Thus it will be seen that the first and second impression-cylinders A and B with this arrangement will act substantially as the cylinders act in the ordinary two-cylinder perfecting printing-machine and that the sheet carried through the machine in this manner will be perfected or printed on both sides.

10 In Figs. 6 to 10, inclusive, I have shown the machine when the same is adjusted to print twice on the same side of the sheet. In this arrangement the impression-cylinder B is set so as to be inoperative, so far as the printing operation is concerned, and so as to remain in its raised position, the cylinder B thus forming a carrier-cylinder between the cylinders A and C. In Fig. 6 the sheet S' is shown as taken by the grippers *a* of the first impression-cylinder and carried around so that the same will be printed from the form D as the bed makes its stroke to the left. In Fig. 7 the impression-cylinders have made three-quarters of a turn from the position shown in Fig. 6 and the sheet is being transferred from the first to the second impression-cylinder. In Fig. 8 the impression-cylinders are supposed to have made one and one-half revolutions from the position shown in Fig. 7 and as just being taken by the grippers *c* of the impression-cylinder C. In Fig. 9 the parts are supposed to have made three-quarters of a turn from the position shown in Fig. 8 and the sheet S' is now being presented by the third impression-cylinder C to the second form E. This position of course is the same position as shown in Fig. 6—that is, if a second sheet has been fed at the proper time to the impression-cylinder A the same would be carried by the impression-cylinder A just to engage the first form D as the bed coöperates with both the first and third impression-cylinders on its forward movement. In Fig. 10 the sheet is shown as passing out to the delivery mechanism. In this operation the second impression-cylinder becomes merely a carrier-cylinder for the sheet.

50 With the inking mechanism shown in the drawings a somewhat longer sheet can be twice printed on the same side than can be perfected, and the relative length of the forms that can be used is substantially indicated in the second and third sheets of the drawings.

The machine thus described has many advantages. It can be used for either of the operations described. The only change necessary is to disconnect the proper impression-cylinder and put the proper ink in the inking apparatus. The path of the sheet through the machine is not changed. The grippers always act in the same way, no matter which operation is being performed.

65 The details herein described can of course

be modified and changed as suggested by a skilled designer without departing from the scope of my invention as expressed in the claims.

Having thus fully described my invention, 70 what I claim, and desire to secure by Letters Patent, is—

1. A printing-press comprising three coacting impression-cylinders, and reciprocating printing means coacting therewith, arranged so that sheets can be either perfected or twice printed on the same side. 75

2. A printing-machine comprising three coacting impression-cylinders, and a reciprocating bed coacting therewith, arranged so that the sheets can be either perfected or twice printed upon the same side. 80

3. A sheet-perfecting or two-color printing-machine comprising three three-revolution impression-cylinders, and printing means operating therewith. 85

4. A sheet-perfecting or two-color printing-machine having three coacting impression-cylinders so arranged that two adjacent cylinders may be used for perfecting, or the first and third for twice printing on the same side of the sheet, and reciprocating printing means coöperating with the impression-cylinders. 90

5. A sheet-perfecting or two-color printing-machine having three impression-cylinders so arranged that the first and second may be used for perfecting, or the first and third for twice printing on the same side of the sheet, and reciprocating printing means coöperating with the impression-cylinders. 95

6. A printing-machine comprising three coacting impression-cylinders, a reciprocating bed coacting with said impression-cylinders, a feed-board arranged so that the sheets may be fed to the first impression-cylinder, a delivery mechanism arranged in connection with the third impression-cylinder, and connections whereby the first and second impression-cylinders may be used to perfect the sheets, or the first and third impression-cylinders to print twice on the same side of the sheets. 100

7. A sheet-perfecting or two-color printing-machine having three three-revolution impression-cylinders geared together, and having printing means coöperating with the impression-cylinders. 115

8. A sheet-perfecting or two-color printing-machine having three three-revolution impression-cylinders of the same size, and printing means coöperating therewith. 120

9. A sheet-perfecting or two-color printing-machine having three three-revolution raising and lowering impression-cylinders geared together, provided with grippers so arranged that the sheet will remain one and one-half revolutions on the second impression-cylinder, and printing means coöperating with the cylinders. 125

10. A sheet-perfecting or two-color printing-machine having three three-revolution raising and lowering impression-cylinders, and a reciprocating bed cooperating therewith.

11. A sheet-perfecting or two-color printing-machine having three three-revolution raising and lowering impression-cylinders geared together, provided with grippers so arranged that the sheet will remain one and one-half revolutions on the second cylinder, and a reciprocating bed cooperating with the cylinders.

12. A sheet-perfecting or two-color printing-machine having three impression-cylinders, raising and lowering mechanism for said cylinders which may be disconnected so that two adjacent cylinders may be used for perfecting, or the first and third for two-color work, and printing means cooperating with the cylinders.

13. A sheet-perfecting or two-color printing-machine comprising three impression-cylinders so arranged that the second impression-cylinder may be used simply as a carrier between the first and third, or the third simply as a delivery-cylinder for the

first and second, and reciprocating printing means cooperating with the impression-cylinders.

14. A printing-machine comprising three coating raising and lowering impression-cylinders, inking-rollers arranged adjacent to the first and third impression-cylinders, a reciprocating bed coating with the impression-cylinders, and connections arranged so that the sheets may be either perfected or twice printed on the same side.

15. A printing-machine comprising three coating raising and lowering impression-cylinders, a reciprocating bed coating therewith, means for depositing an offset-preventing medium on the sheets while on the first impression-cylinder, and connections arranged so that the sheets may be either perfected or twice printed on the same side.

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

LOUIS W. SOUTHGATE.

Witnesses:

M. E. FORDE,  
M. E. REGAN.