No. 636,862. Patented Nov. 14, 1899.

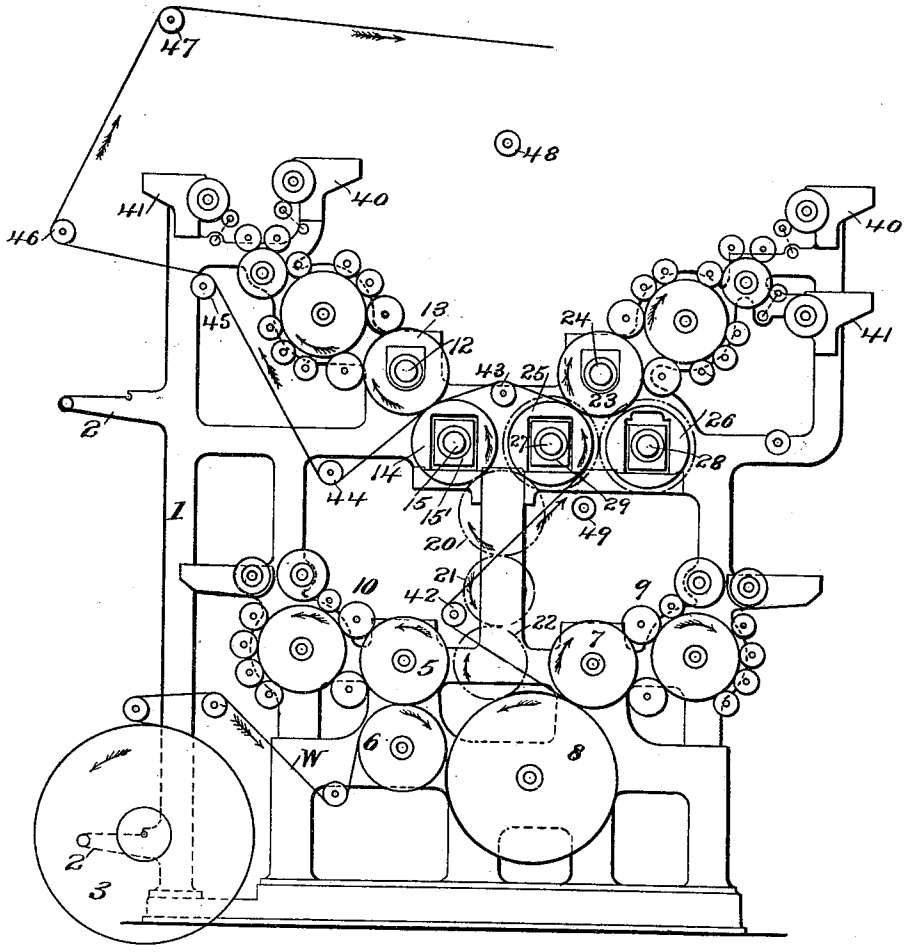
W. SPALCKHAVER.

PRINTING MACHINE.

(Application filed Oct. 14, 1898.)

(No Model.) 5 Sheets—Sheet 1.

Fig. 1.



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No. 636,862. Patented Nov. 14, 1899.

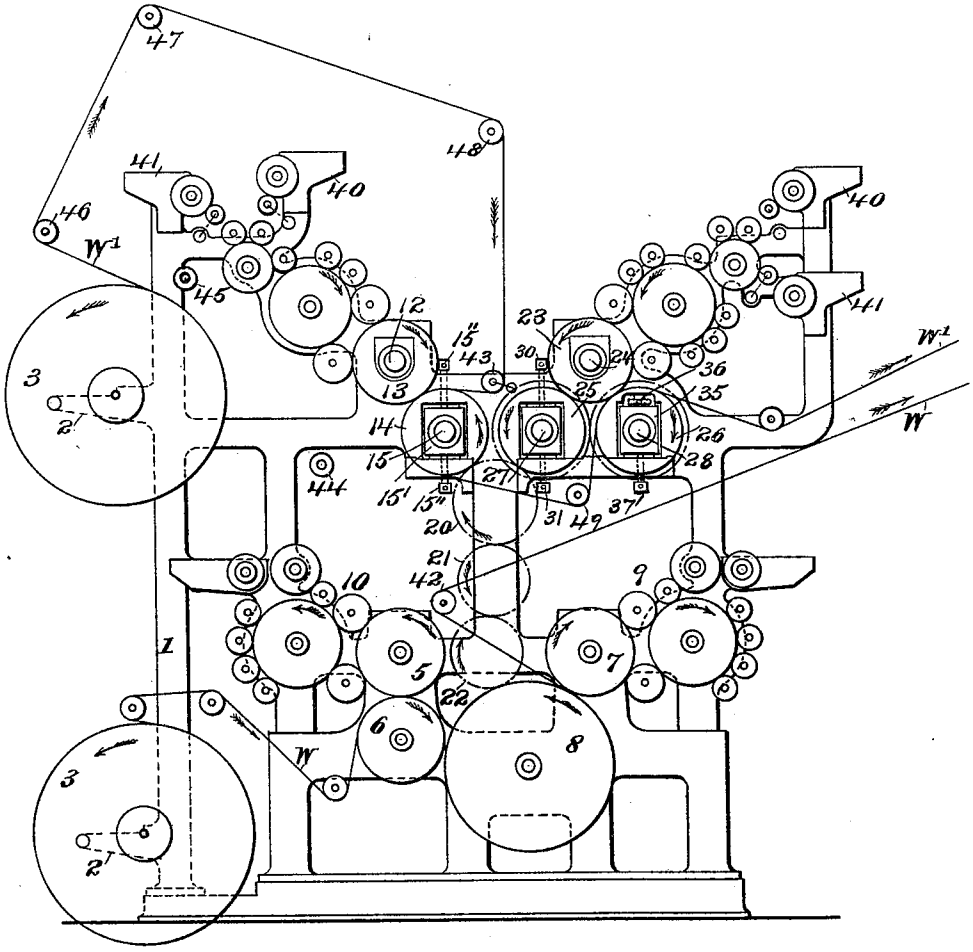
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Fig. 2.



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Fig. 3.

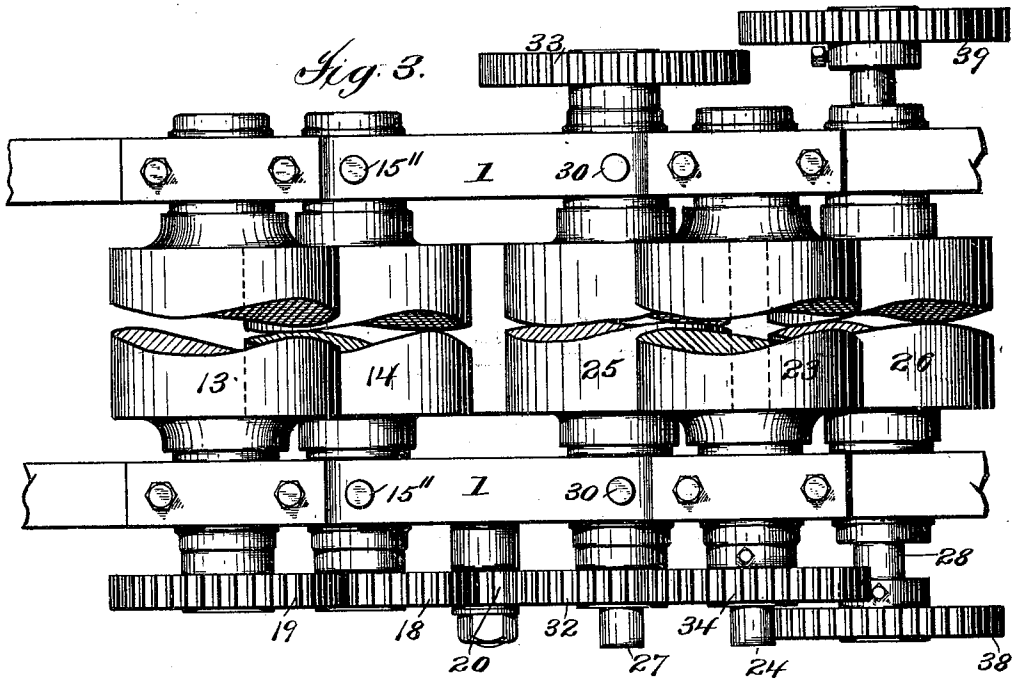
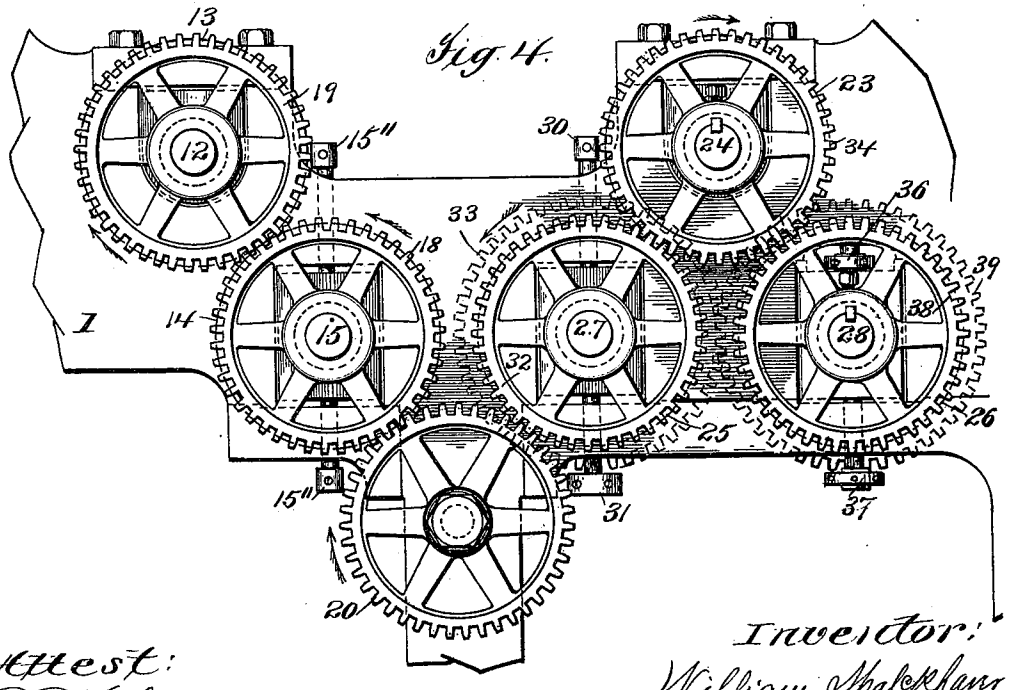


Fig. 4.



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(Application filed Oct. 14, 1898.)

(No Model.) 5 Sheets—Sheet 4.

Fig. 5.

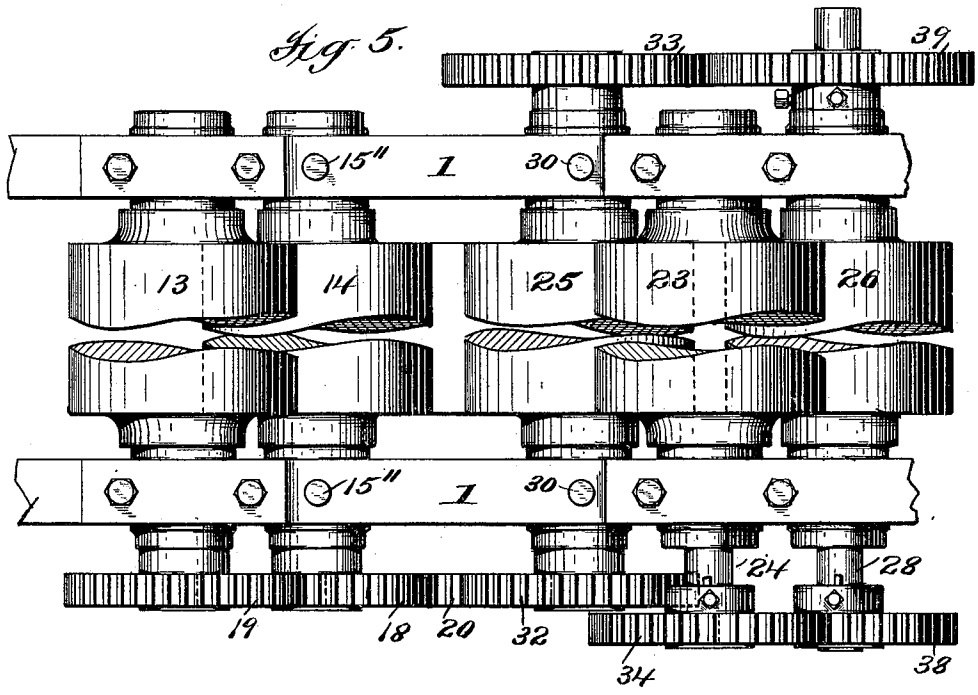
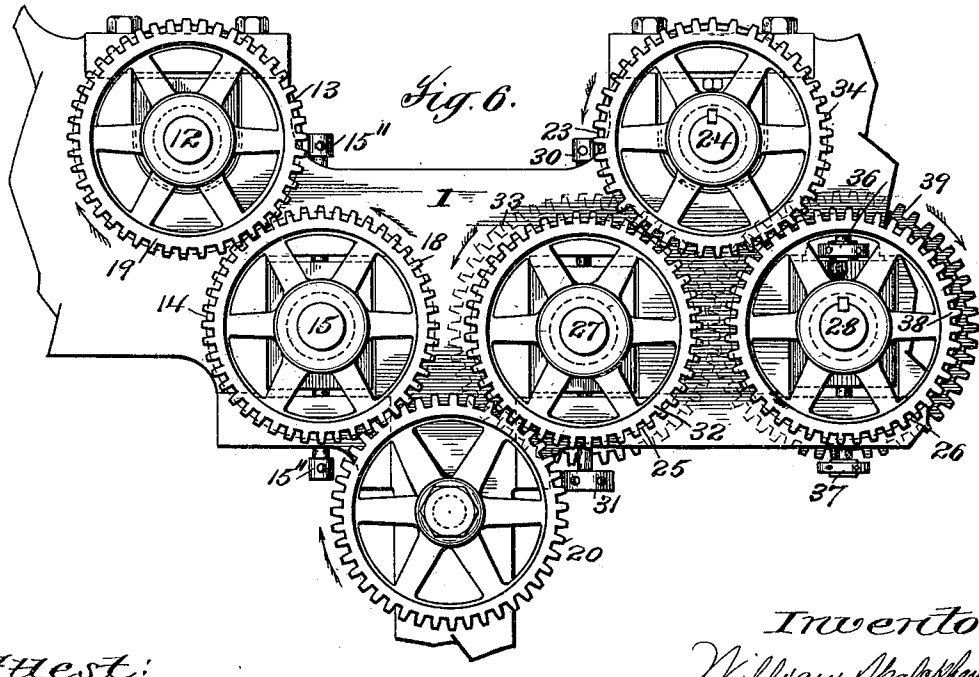


Fig. 6.



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(Application filed Oct. 14, 1898.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 7.

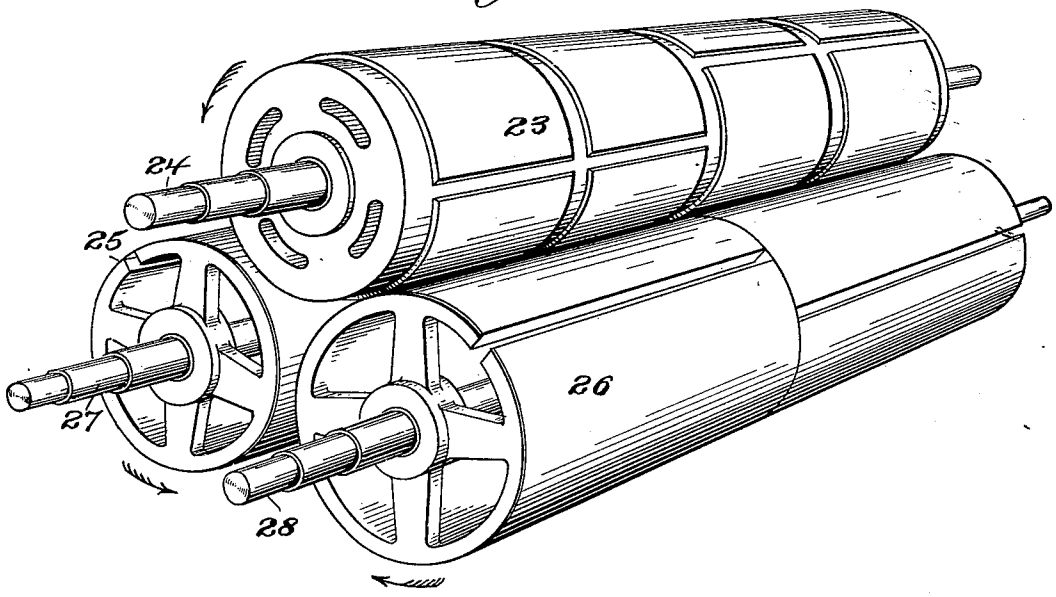
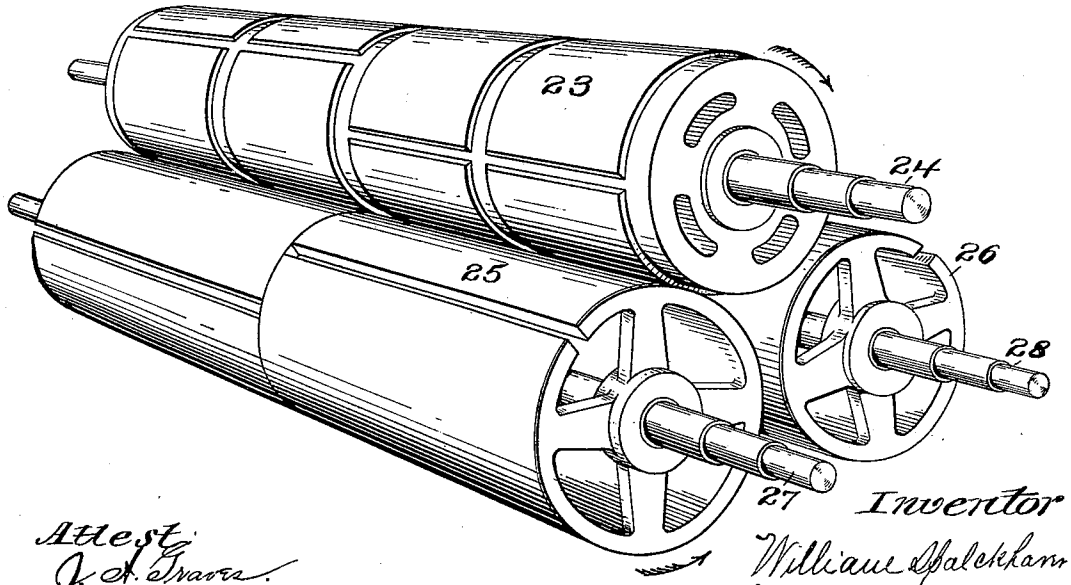


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM SPALCKHAVER, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF SAME PLACE.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 636,862, dated November 14, 1899.

Application filed October 14, 1898. Serial No. 693,488. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SPALCKHAVER, a citizen of the United States, residing at New York city, county of Kings, and State of New York, have invented certain new and useful Improvements in Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in printing-machines.

There is great demand at the present time, particularly among the publishers of newspapers, for machines which will not only print and perfect in the usual manner, but also which will print in colors, such machines being used more particularly for the production of colored illustrated supplements, and an attempt has been made to supply this demand by providing the ordinary newspaper-printing machine with attachments for printing in colors. These attachments as practically used at the present time are generally constructed by adding to an ordinary newspaper-printing machine of the perfecting type a set or sets of additional printing-couples, one for each color to be printed. These couples are, however, all designed and arranged to print on the same side of the web, and consequently have their printing or plate cylinders arranged on one side of the lead of the web and their impression-cylinders arranged on the other side of the lead of the web. Attachments so constructed when added to the large presses in common use take up considerable space in the press-room, are expensive to build, and since they are adapted by reason of their arrangement to print only in colors must stand idle when the machine is not running on color-work. Constructions have also been suggested in which the printing is to be provided with a number of sets of couples—say four or more—so disposed with relation to each other that the web or webs may be led to them in various ways. In such constructions by varying the web-leads and the sequence in which the web passes between the several couples a machine is produced which is capable of printing in colors with one or some leads of the web and printing in black or perfecting with other leads of the web. In all such machines, however, it is necessary in changing from color to black, and vice versa, if all the couples are to be used, to change the direction of rotation of some or all of the printing-couples through or between which the web passes—that is to say, when the machine is arranged to print in black or to perfect the web runs in one direction through the supplemental couples and when the machine is arranged to print in colors the web runs in the opposite direction through the supplemental couples. Since, however, the impression-cylinder of each couple is provided with a wrapping or blanket, which is wound thereon in the direction in which the cylinder is intended to rotate, the reversal of the direction of rotation of the impression-cylinder causes or tends to cause the blanket to unwind or work loose under the heavy pressure it receives from the printing or plate cylinder. The impression-cylinder therefore must either be reblanketed for each style of printing or else its effectiveness will be seriously impaired or altogether destroyed and exceedingly poor work will result. Furthermore, in machines employing a double-wide cylinder it is very desirable, for reasons well understood in the art, to have the printing-plates staggered on the plate-cylinder, so that some portion of the plate-cylinder will always be running in contact with the impression-cylinder, and this construction has been adopted on the best machines of this character. In double-wide machines employing staggered plates and printing on a double-wide web if the direction of rotation of the printing-couple be reversed the impressions cannot be made to fall properly on the opposite sides of the web unless a slitting mechanism be employed to slit the web and in addition a compensating mechanism be introduced to retard or increase the length of travel of one or both portions of the web. Such constructions, however, produce a machine of considerable complexity of mechanism and are objectionable for that and other reasons.

It is the object of this invention to produce a perfecting-machine in which some of the

sets of couples may be used, with slight adjustments, either for printing in colors on one side of a web or to perfect or print in black on both sides of a web and to do this without reversing the direction of rotation of the impression member of said couples, a machine being thus produced in which the full number of couples may be employed at all times, whether the machine be running in colors or in black, which is particularly adapted for use with staggered plates, and in which it is not necessary to reblanket the impression-cylinder when the direction of rotation of the plate-cylinder is reversed.

With this object in view the invention consists in certain constructions and in certain parts, improvements, and combinations thereof, as will hereinafter be fully described, and pointed out in the claims hereunto appended.

In the accompanying drawings, which constitute a part of this specification and to which reference is to be had for a fuller understanding of the invention, Figure 1 is a side view of a part of a quadruple press embodying the invention and with the web-leads arranged so that the machine will print in colors. Fig. 2 is a side view of the machine shown in Fig. 1, but with the web-leads and adjustments so arranged that the machine will perfect two webs in black. Fig. 3 is a plan view, and Fig. 4 is a side view, of the gears employed for rotating the members of the printing-couples, the gearing being illustrated as it is arranged when the machine is to be used for printing in colors. Figs. 5 and 6 illustrate, respectively, plan and side views of the arrangement of the gearing used when the machine is to be used for perfecting two webs. Figs. 7 and 8 are perspective views illustrating the staggered form-cylinder and the two impression-cylinders which coöperate therewith, one of the impression-cylinders being shown operating in connection with the form-cylinder in one view and the other impression-cylinder being shown operating in connection with the form-cylinder in the other view.

In the embodiment of the invention chosen for illustration, which is in its main features a machine of the ordinary quadruple type, 1 indicates the frame of the machine, having the usual roll-supports 2 for carrying the web-rolls 3, which supply the paper to the machine. Considering the couples at the lower part of the machine, 5 indicates the printing or plate cylinder, and 6 the impression-cylinder, of the first pair of couples, which act to print in black on one side of the web, and 7 and 8 indicate the plate and impression cylinders which print upon the other side of the web. The printing-cylinders 5 and 7 are supplied with inking mechanisms 9 and 10, which may be of any usual type. Considering the couples at the upper part of the machine, 12 indicates a shaft upon which a plate-cylinder 13 is mounted. The impression member of the couple of which the cylinder 13 forms a part consists of an impression-cylinder 14, mounted upon the shaft 15, the shaft being mounted in the usual adjustable boxes 15′, the adjustment being controlled by the screws 15″. These two cylinders are geared together by means of the gears 18 and 19, which are mounted upon the shafts 12 and 15, respectively, and are operated from a train of gears 20 21 22, which train meshes with the gear on the impression-cylinder of the second couple or derives its movement from any other suitable rotating part of the machine.

The machine is provided with a fourth printing-couple, the printing member or plate-cylinder 23 of which is mounted on a shaft 24, which is located in suitable bearings in the machine. The impression member of this couple consists of two impression-cylinders 25 26, which are mounted, respectively, on shafts 27 and 28. The shaft 27 is mounted in adjustable boxes 29, the adjustment of these boxes being effected by the adjustment of set-screws 30 31, this construction being of an ordinary and well-known character. The shaft 27 is provided on that end which is nearest the observer in Fig. 1 with a gear 32 and on its opposite end with a gear 33. The shaft 24, which carries the printing or plate cylinder, is provided with a gear 34, which gear is located on that end of the shaft which is nearest the observer in Fig. 1. This gear is secured to the shaft in any suitable manner, as by a spline and set-screw, and is made adjustable lengthwise on the shaft. The shaft 28 is mounted in adjustable boxes 35, the adjustment of these boxes being effected by set-screws 36 and 37, and has upon that end which is nearest the observer in Fig. 1 a gear 38. This gear is also secured to the shaft by means of a spline and set-screw. This shaft 28 is provided on its opposite end with a gear 39, which is or may be secured to the shaft in the same manner and which is made adjustable lengthwise on the shaft. The gear 32 is in mesh with the gear 20 of the train before referred to and derives its movement therefrom.

The plate-cylinders 23 and 13 of the upper couples may be supplied with ink in any usual way. The machine is preferably, however, provided with two sets of fountains for each of these cylinders, one for containing black ink and the other for containing colored ink. The fountains for containing black ink for each of these couples are marked 40 and the fountains for containing colored ink are marked 41. Any usual distributing mechanism may be employed to convey ink from these fountains to the plate-cylinders.

Supposing that it be desired to arrange the machine to print in colors, as shown in Fig. 1, the shaft 28 is by means of its adjustable boxes lowered, so that the impression-cylinder carried thereby will be out of contact with the plate-cylinder 23, and the gear 39 is adjusted outward on the shaft 28, so that it will be out of mesh with the gear 33. The

gear 34 is so adjusted on its shaft that it will be in mesh with the gear 32 on the shaft 27, which shaft, as before stated, carries the impression-cylinder 25, and out of mesh with the gear 38 on the shaft 28. With this arrangement of the gearing it will be seen that the cylinders 25 and 23 will rotate in the direction indicated by the arrows in Fig. 1. The web W, passing from the impression-cylinder 8 and over the web-guide 42, may therefore be led directly between the plate-cylinder 23 and the impression-cylinder 25 and receive a second impression on the same side as that imparted to it by the cylinder 7. Passing from the cylinders 23 25 over the web-guide 43, the web may be led between the cylinders 13 and 14 and receive a third impression on the same side, after which it passes over the guides 44 45 46 47 and is led to the folder or some point where it may be associated with another web or webs coming from other printing-couples. If, however, it is desired to use the machine to perfect two webs instead of printing in colors on a single web, the shaft 27 is lowered by means of its adjustable boxes, so that its impression-cylinder will be out of contact with the plate-cylinder 23, and the gear 34 is so adjusted on its shaft as to be out of mesh with the gear 32 and in mesh with the gear 38. The shaft 28 is raised by means of its adjustable boxes until its impression-cylinder is in contact with the plate-cylinder 23. The gear 39 is so adjusted on its shaft as to be in mesh with the gear 33. With this arrangement of the machine motion is imparted by the gear 20 to the gear 32 and the shaft 27, which in turn by means of its gear 33 rotates the gear 39 and the shaft 28. The gear 38 on the shaft 28 rotates the gear 34 and the shaft 24, which carries the plate-cylinder.

A second web-roll is mounted on the upper pair of supports 2 and the web W′ led from the guides 46, 47, 48, and 43 between the parts of the couple 13 and 14, receiving an impression on one side, and from the guide 49 between the cylinders 23 and 26, by which it is given an impression on the opposite side. From this couple it is led out of the machine into the folder, where it is or may be associated with the web which is being printed by the first set of couples 5, 6, 7, and 8.

It will be seen that a machine thus constructed can be almost instantly changed from a color run on one web to a run on two webs in black, and when in either adjustment reversal of the direction of rotation of the operative impression member is not necessary, thereby avoiding the ill effects due to loosening the blanket or the necessity of reblanketing.

In case the plate-cylinder 23 carries staggered plates a slight adjustment of these plates will be necessary; but this can be easily accomplished by well-known agencies which it is not necessary to illustrate or describe.

The invention may be carried into effect in various ways. A convenient way of carrying it into effect is as in the form shown by substituting for the final printing-couple of a quadruple press a couple consisting of a single plate and two impression-cylinders. It is not, however, limited to use in such a press; but such couples may be substituted in any form of perfecting-press, or by adding a pair of couples, one of which consists of a single plate and two impression-cylinders, to the ordinary quadruple press the same may be converted into a sextuple press having capacity for color-printing.

It is to be understood that the invention is not concerned with the particular mechanical details by which it has been described as carried into effect, but is generic in its nature. Many changes may be made in the means employed, and such changes will readily suggest themselves to skilled mechanics and press-builders. The invention is to be understood, therefore, as including all such mechanical changes as fall within its spirit and scope.

What is claimed is—

1. In a printing-machine, the combination with a set of rotary perfecting-couples consisting of a printing member and an impression member, of a second set of rotary perfecting-couples one of which consists of a printing member and an impression member, and the other of which consists of a printing member and two impression members, means whereby either of the impression members of this couple may be caused to coact with the printing member, and means whereby said couples may be caused to perfect two webs or to perfect and print in colors on a single web, substantially as described.

2. In a printing-machine, the combination with a set of rotary perfecting-couples consisting of a printing member and an impression member, of a second set of rotary perfecting-couples one of which consists of a printing member and an impression member, and the other of which consists of a printing member and two movable impression members, means whereby either of the impression members of this couple may be moved so as to coact with the printing member, and means whereby said couples may be caused to perfect two webs or to perfect and print in colors on a single web, substantially as described.

3. In a printing-machine, the combination with a double-wide cylinder constructed to carry staggered plates, of two movable impression-cylinders, means whereby either of the cylinders may be moved into and out of contact with the plate-cylinder, and means for rotating the impression-cylinders in opposite directions, substantially as described.

4. In an organized printing-machine, the combination with a frame, of two lower couples mounted in the frame, said couples consisting of a printing member and an impression member, two upper couples mounted in the frame, one of the couples consisting of a

printing member and an impression member, and the other couple consisting of a printing member and two impression members, means whereby either impression member of this couple may be caused to coact with the printing member, means whereby the set of upper couples and the set of lower couples may be each caused to perfect a web or the four couples may be caused to perfect and print in colors on a single web, substantially as described.

5. In a printing-machine, the combination with a set of rotary perfecting-couples, each consisting of a printing member and a perfecting member, of a second set of rotary perfecting-couples, one of which consists of a printing member and an impression member, and the other of which consists of a printing member and two movable impression members, the printing members of all of the couples being double wide and constructed to carry staggered plates, means whereby either impression member of the last-named couple may be moved so as to coact with the printing member, and means whereby the several couples may be caused to perfect a plurality of webs or to perfect and print in colors on a single web, substantially as described.

6. The combination with a pair of shafts carrying the printing and impression members of a printing-couple and having intermeshing gears, of a gear by which these gears are operated, three shafts carrying respectively the printing and two impression members of a second printing-couple and having gears thereon, means whereby the operating-gear may be caused to rotate the shaft of the printing-cylinder of the last-named couple in opposite directions and means whereby either impression-cylinder of this couple may be caused to coact with the printing-cylinder, substantially as described.

7. The combination with the shafts 12 and 15 carrying printing and impression cylinders and having gears 18, 19 thereon, of an operating-gear 20 in mesh with the gear 18, the shaft 27 having gears 32, 33, the gear 32 being constantly in mesh with the operating-gear 20, shaft 24 carrying an adjustable gear 34 and cylinder 23, means for moving the shaft 27 so that the cylinder carried thereby will be either in or out of contact with the cylinder 23, a shaft 28 having an adjustable gear 39 and a gear 38, said shaft carrying an impression-cylinder 26, means for moving the shaft 28 so that the impression-cylinder 26 will be either in or out of contact with the cylinder 23, means for moving the gear 39 into and out of mesh with the gear 33, and means for moving the gear 34 so that it will be in mesh either with the gear 32 or the gear 38, substantially as described.

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

WILLIAM SPALCKHAVER.

Witnesses:
T. F. KEHOE,
GEO. H. BOTTS.