

No. 664,592.

Patented Dec. 25, 1900.

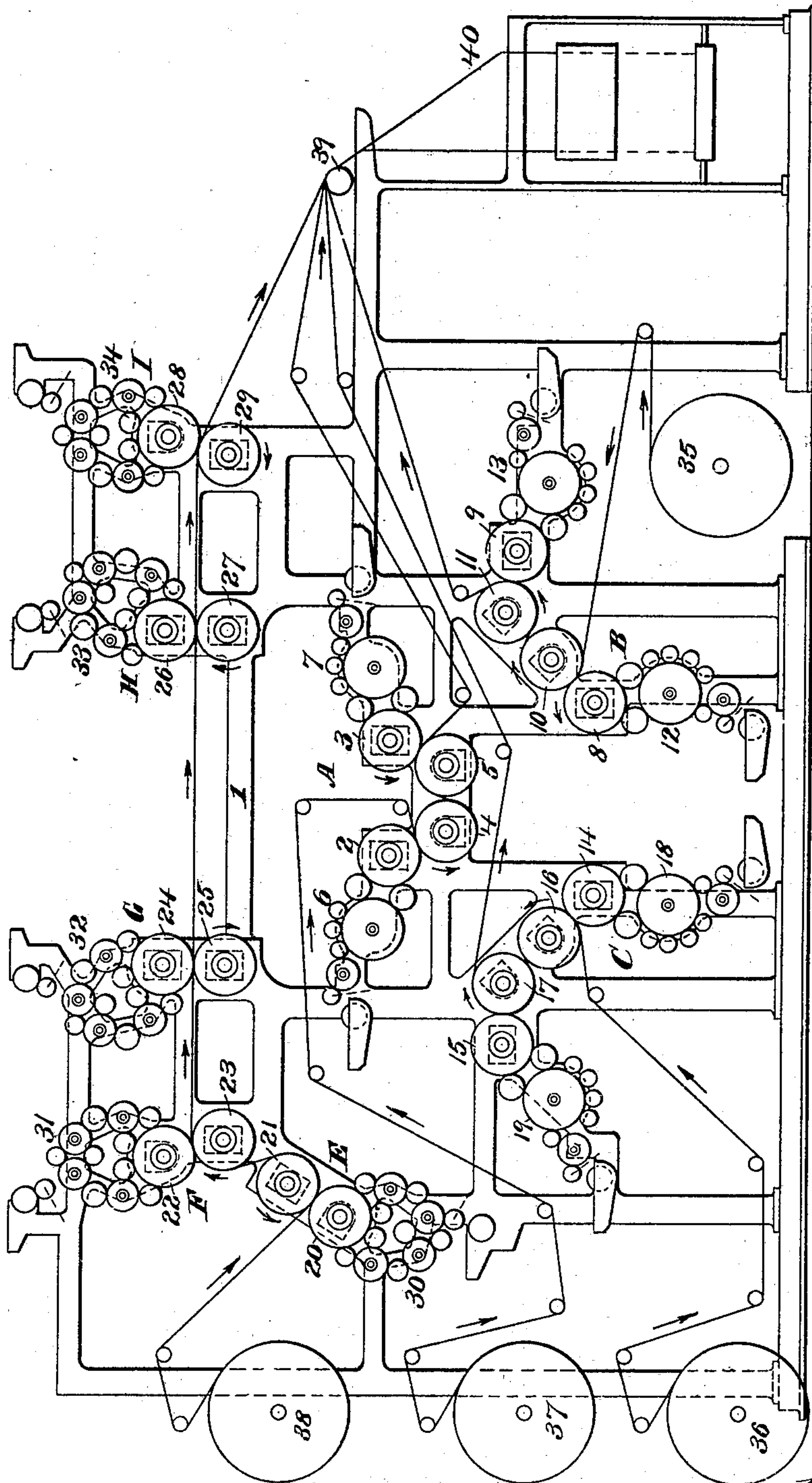
W. SPALCKHAVER.  
PRINTING MACHINE.

(Application filed June 2, 1900.)

(No Model.)

4 Sheets—Sheet 1.

*Fig. 1.*



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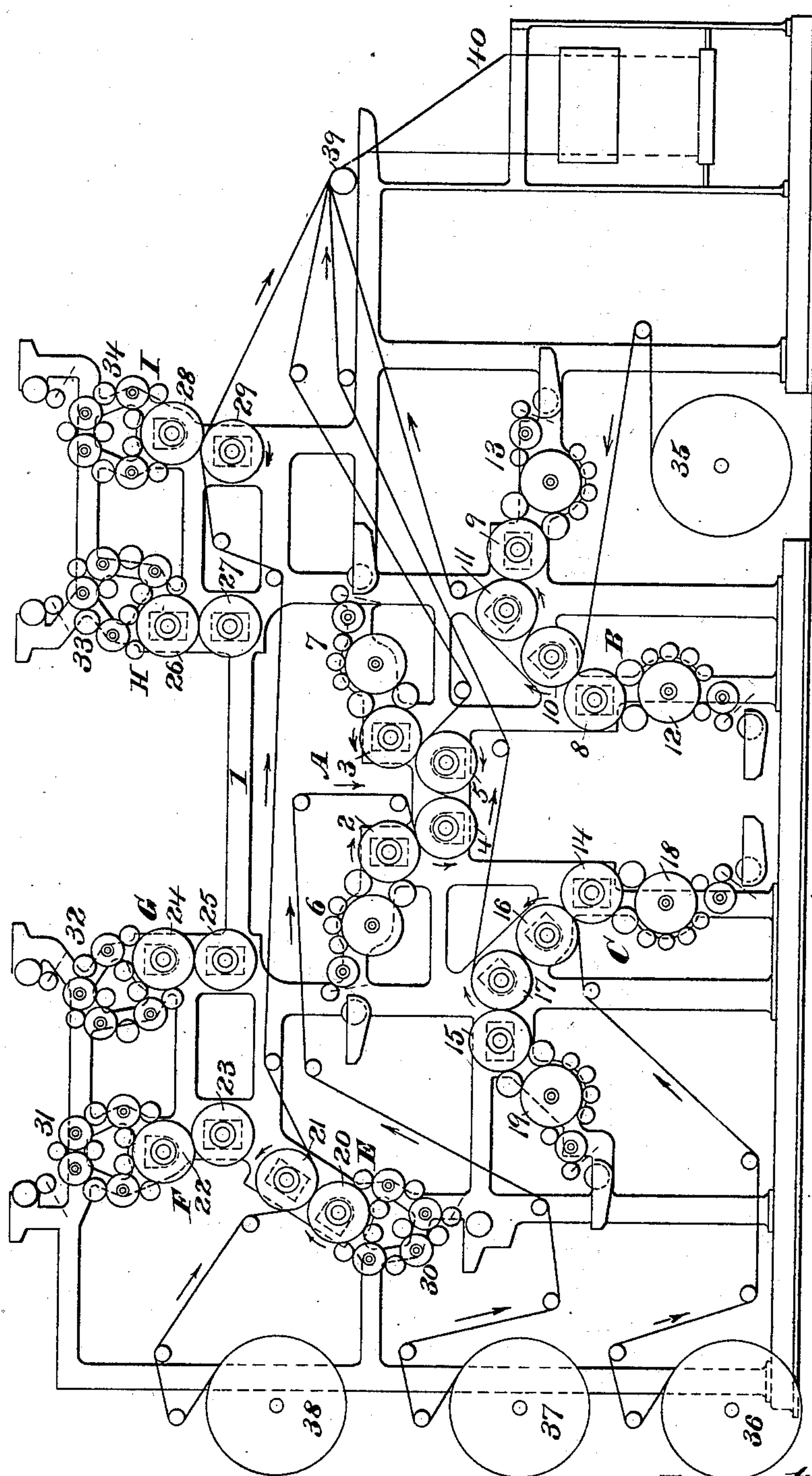
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4 Sheets—Sheet 2.

Fig. 2.



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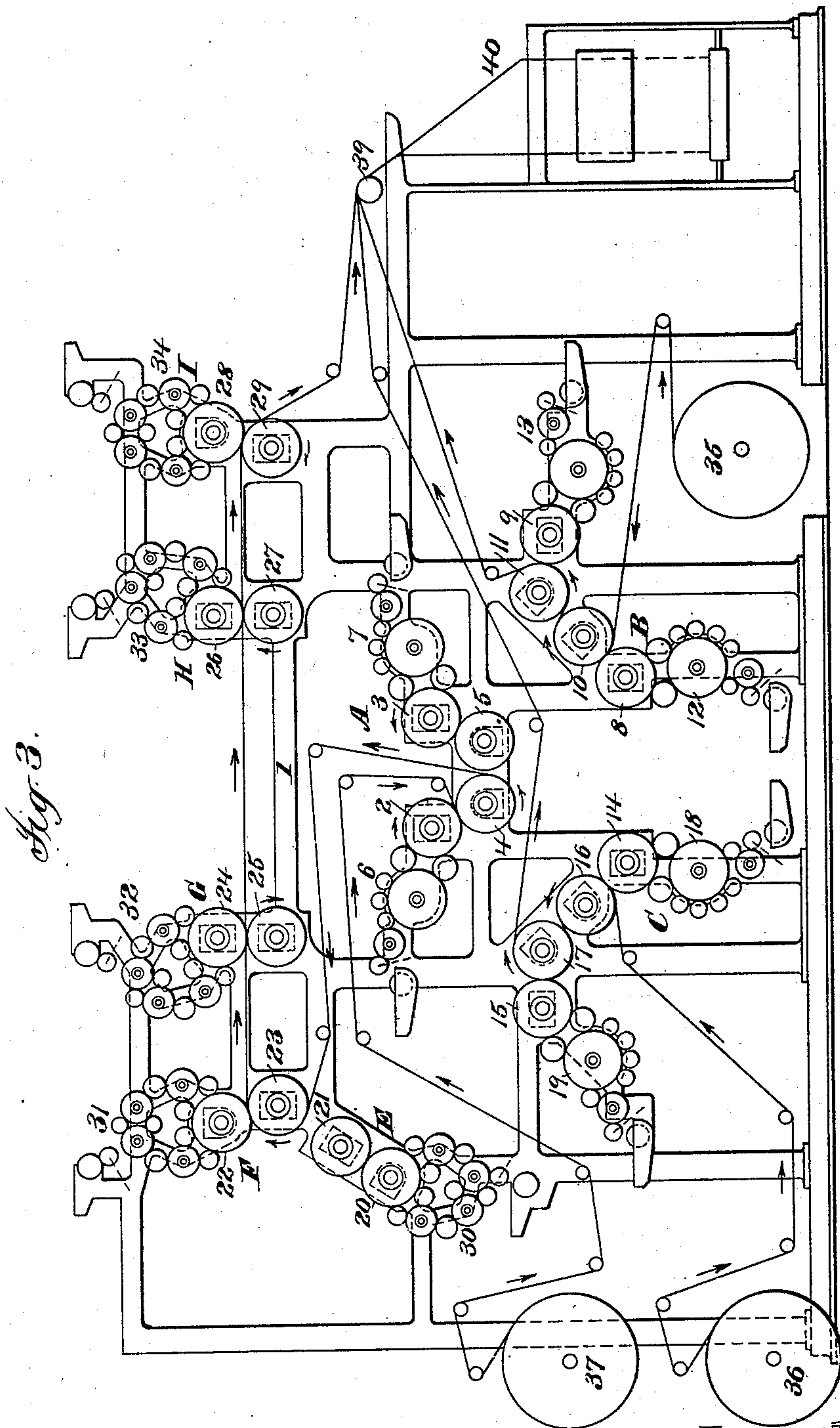
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4 Sheets—Sheet 3.



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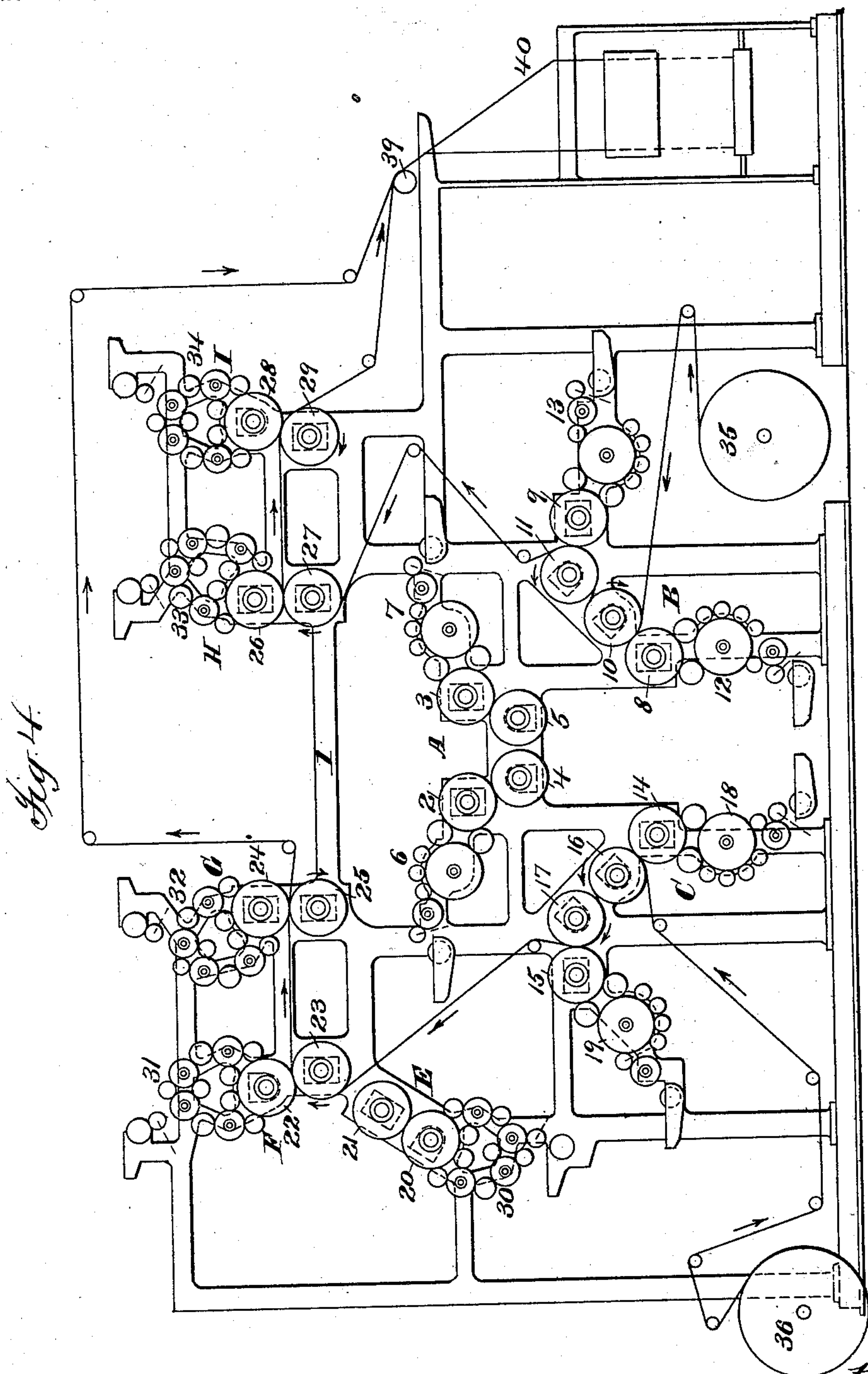
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4 Sheets—Sheet 4.



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# UNITED STATES PATENT OFFICE.

WILLIAM SPALCKHAVER, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE,  
OF SAME PLACE.

## PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 664,592, dated December 25, 1900.

Application filed June 2, 1900. Serial No. 18,793. (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, 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.

10 This invention relates to certain improvements in printing-machines of the rotary type.

There is now a demand among newspaper publishers for fast rotary printing-machines which are so constructed as to produce a product part of which is printed in black and part in colors, the usual practice being to issue with the newspaper a supplement which is printed in colors. The colored supplement is usually produced by printing in the three primary colors, the additional colors, where necessary or desirable, being produced by blending, and then giving the picture a final printing in black from a key-plate in order to give it "expression." To successfully print pictures in 25 colors, therefore, a full "color-deck," as it is known in the art, is required, said deck consisting of at least four printing-couples, three of which are arranged to print the primary colors and the fourth couple delivers the final impression in black. With such a color-deck 30 by superposing the primary colors and blending them where necessary a range of pictures suitable for ordinary newspaper illustration can be produced. Color-decks such as have 35 been referred to may be either embodied in machines the remaining couples of which print in black or they may be made separate therefrom. When embodied in machines with other couples, it is desirable that the couples of the deck be arranged so that they 40 can be used either for black or color work. It is also desirable in such machines that the couples be so arranged that the cylinders thereof always rotate in the same direction and that the webs to be printed have short and direct runs through the machine, the runs being as far as possible in the same direction and without looping around or inclosing the printing-couples. The constructions so far 50 produced in the attempt to meet the demand of the publishers either do not fulfil the

requisites required or they have been more or less objectionable, because the additional color-decks have largely increased either the head-room or floor-space, or both, of the printing-machines. The machines are therefore 55 cumbersome and not adapted to be erected in press-rooms of ordinary size. Furthermore, the color-decks are not, as a rule, arranged so that they can be utilized in whole or in part 60 when the machines are not running on color-work.

It is the object of this invention to improve fast rotary printing-machines by adding thereto additional couples designed for color- 65 printing, but which may be used in whole or in part for black work when the machine is not running in colors, and to so arrange the construction that the machine shall be compact and the runs of the webs through the 70 machine shall be short and direct, avoiding the objectionable looping and inclosing of the couples, and the additional couples being so located that they may be thrown out, when the operations of making ready are to be performed upon them, without interfering with 75 the running of the remainder of the couples.

As a full understanding of the improvements constituting the present invention can best be given by an illustration and a detailed 80 description of an organization embodying the same, such a description will now be given in connection with the accompanying drawings, which illustrate one embodiment of the invention, and in which— 85

Figure 1 is a diagrammatic side elevation of an octuple printing-machine provided with a full color-deck, the machine being arranged to run at its full capacity—that is, print and perfect four webs, one of the webs receiving 90 a four-color printing. Fig. 2 is a view similar to Fig. 1, but showing the machine arranged to print and perfect four webs, a part of the color-deck being thrown out. Fig. 3 illustrates the same machine running as a sextuple 95 and employing the full color-deck. Fig. 4 illustrates the same machine arranged to print two webs, each web being printed in black on one side and in three colors on the other side. 100

Referring to the drawings, the machine which has been selected to illustrate the in-



vention is a machine arranged to print on four double-wide webs, this machine being ordinarily known in the art as an "octuple" machine. The frame of the machine (indicated at 1) may be of any suitable form. The machine is provided with three complete sets of printing-couples, each set being arranged to print and perfect a web. One of these sets of couples, which is marked A, is located substantially in the center of the frame, the two form-cylinders being marked 2 and 3 and the two impression-cylinders 4 and 5. An inking apparatus 6 is shown in connection with the form-cylinder 2, and a similar inking apparatus 7 is shown in connection with the form-cylinder 3, these inking apparatuses being of any usual or desired type. The couples are preferably arranged as shown—that is, the members of the couples are between the inking apparatuses.

Mounted below and at one side of the set of printing-couples A is another similar set of couples B, embodying two form cylinders 8 and 9 and two impression-cylinders 10 and 11 and two inking apparatuses 12 and 13. A third set of printing-couples (herein marked C) is shown as mounted in the frame below and at the other side of the set of couples A, this set comprising two form-cylinders 14 and 15, two impression-cylinders 16 and 17, and two inking apparatuses 18 and 19. The sets of couples B and C are preferably arranged as shown—that is to say, the sets of couples are spaced apart from each other, so that ready access may be had to the couples for changing the plates or other similar operations.

The machine is further provided with a color-deck which consists of a series of couples, herein marked E, F, G, H, and I, these couples being mounted above the sets of couples above described. The form and impression cylinders of the couple E are marked 20 and 21, respectively, those of the couple F 22 and 23, those of the couple G 24 and 25, those of the couple H 26 and 27, and those of the couple I 28 and 29. The inking apparatuses of the several couples of the color-deck are marked 30, 31, 32, 33, and 34, respectively, and may be of any usual or desired type. The couples of the color-deck are preferably arranged as shown—that is to say, the first couple of the deck is at one end thereof and below the remaining couples and the second and third couples of the deck are spaced from the fourth and fifth couples. With this arrangement it is possible to readily get at the form-cylinders to change the plates or make-ready.

The webs for the several sets of couples are derived from suitably-mounted web-rolls—that for the set B coming from the web-roll 35, that for the set C coming from the web-roll 36, that for the set A coming from the web-roll 37, and that for the color-deck coming from a web-roll 38. It will be noted in this connection that the impression-cylinder for the set of couples E of the color-deck is arranged to print on one side of the web, while

the remainder of the couples of the deck are arranged to print on the opposite side of the web. The webs are all given a straight run through the machine and are all led to a common delivery mechanism, the webs being associated as they pass over a common roll 39, from which they pass to a suitable delivery mechanism, (indicated at 40,) which may consist of a series of longitudinal folders. It is to be understood, of course, that a slitter or slitters (not shown) will be employed to cooperate with the roll 39, the slitters varying in number according to the number of delivery mechanisms employed.

Each of the couples as the machine is preferably constructed will be arranged to print on a double-wide web. It is to be understood, however, that the couples may, if desired, be arranged to print on a single-wide web. It will be understood, however, that all the couples in the machine are arranged to print on a web of uniform width whether this web be a single-wide or a double-wide web. The term "full width" as it is used in the specification and claims therefore indicates a web which is uniform in width with the other webs printed in the machine.

The machine shown in Fig. 1, assuming the couples to be double wide, is so arranged that the couples in the set B print and perfect the web coming from the roll 35, the set of couples in the set C print and perfect the web coming from the roll 36, and the couples in the set A print and perfect the web coming from the roll 37. The web from the roll 38 is led first between the form-cylinder 20 and the impression-cylinder 21 of the couple E of the color-deck, by which it is printed in black on one side. From this couple it is led between the members of the couples F, G, and H, being printed by them in colors, after which it is led between the members of the couple I, the form-cylinder 28 of which delivers the final impression in black on the web. With the couples arranged as described the machine is running at its full capacity and is producing, assuming the usual delivery to be employed, two sixteen-page papers, each including an outer sheet or supplement printed in three colors and having a final impression in black.

In Fig. 2 a different arrangement of the machine is shown. Here the webs are run as before; but the members of the couples F, G, and H are thrown out. With this arrangement the machine produces two sixteen-page papers the sheets of which are printed and perfected in black in the ordinary manner.

Fig. 3 shows the same machine running as a sextuple, one web being printed in colors. In this arrangement of the machine the form-cylinder 3 and the impression-cylinder 5 of the set of couples A is thrown out, and the first couple E of the color-deck is also thrown out. The web from the web-roll 37, after being led between the form and impression cylinders 2 and 4 of the set of couples A, is led



back, after which it passes in succession between the members of the couples F, G, H, and I, which print it in colors and give it the final impression in black.

5 Fig. 4 shows still another arrangement of the machine, which in this instance prints on two webs only, each web being printed in black on one side and in three colors on the opposite side. In this arrangement the set  
10 of couples A is thrown out and the first couple E of the color-deck is also thrown out. The web from the roll 35 after being printed by the set of couples B is led between the members of the couples H and I, while the  
15 web from the web-roll 36 after being printed by the couples in the set E is led between the members of the couples F and G of the color-deck. After leaving the couple G it is led over the couples H and I, and then downward  
20 to the roll 39.

The gearing by which the cylinders are run may be of any ordinary description. This gearing has no particular relation to the invention, and it is entirely within the power  
25 of any person skilled in the art of printing machinery to supply the same, and an illustration thereof has been omitted as unnecessary.

In all the arrangements of the machine it  
30 will be seen that the webs are given a direct run through the machine and that the members of the couples always run in the same direction. The machine is, furthermore, capable of a great variety of products, and, if desired, may be run either as a sextuple printing  
35 three webs in black or as an octuple printing four webs in black. When run as a sextuple printing three webs in black, the operators are free to make ready on all the couples of the color-deck without in any way interfering with the running of the machine. When run as an octuple printing all the webs in black, the form-cylinders in the couples F, G, and H may be made ready for color-work  
45 and the shifting from the octuple printing in black to an octuple printing one web in colors requires only a change of black plates on the cylinders 20 and 28, which takes but a very short time. Furthermore, owing to the arrangement of couples in the frame all the form-cylinders can be readily reached, so that a change of plates throughout the machine or any part of it can be readily effected. While also the number of couples in the  
50 color-deck will preferably be that shown, it will be understood, of course, that more couples may be used in it, if desired. Furthermore, while a full color-deck will preferably be used, the invention in all its features is  
55 not limited to the use of such a deck.

What is claimed is—

65 1. In a printing-machine, the combination with a frame, of a printing mechanism mounted substantially centrally in the frame, two sets of printing-couples, each set being mounted below and at one side of the said printing mechanism, and a series of couples mounted

in the frame and arranged over said centrally-mounted mechanism, substantially as described.

2. In a printing-machine, the combination  
70 with a frame, of a printing mechanism mounted substantially centrally in the frame, two sets of printing-couples, each set being mounted below and at one side of the said printing  
75 mechanism, a series of couples mounted in the frame and arranged over said centrally-mounted mechanism, and a common delivery mechanism to which all the webs are led, substantially as described.

3. In a printing-machine, the combination  
80 with a frame, of a printing mechanism mounted substantially centrally in the frame and capacitated to print a full-width web, two sets of printing-couples, each set being mounted  
85 below and at one side of the said printing mechanism and capacitated to print a full-width web, and a series of couples mounted in the frame and arranged over said centrally-mounted mechanism and capacitated  
90 to print a full-width web, substantially as described.

4. In a printing-machine, the combination  
95 with a frame, of a printing mechanism mounted substantially centrally in the frame and capacitated to print a full-width web, two sets of printing-couples, each set being mounted below and at one side of the said printing  
100 mechanism and capacitated to print a full-width web, a series of couples mounted in the frame and arranged over said centrally-mounted mechanism and capacitated to print a full-width web, and a common delivery mechanism to which all the webs are led, substantially as described.

5. In a printing-machine, the combination  
105 with a suitable frame, of a set of printing-couples mounted substantially centrally in the frame, two sets of printing-couples, one set being mounted below and at one side of  
110 the centrally-mounted set and the other set being mounted below and at the other side of the centrally-mounted set, and a color-deck, the couples of which are mounted above the  
115 said sets of couples, the first couple of the deck being arranged to print on one side of a web in black and the last couple of the deck being arranged to print on the other side  
120 of the web in black, the intermediate couples being arranged to print on one side of the web in colors, the arrangement being such that the web may be led through all the couples of the deck, or through the first and last couples of the deck, substantially as described.

6. In a printing-machine, the combination  
125 with a suitable frame, of a set of printing-couples mounted substantially centrally in the frame, two sets of printing-couples, one set being mounted below and at one side of  
130 the centrally-mounted set and the other set being mounted below and at the other side of the centrally-mounted set, a color-deck, the couples of which are mounted above the said sets of couples, the first couple of the deck



being arranged to print on one side of a web in black, the last couple of the deck being arranged to print on the other side of the web in black, and the intermediate couples being arranged to print on one side of the web in colors; the arrangement being such that the web may be led through all the couples of the deck or through the first and last couples of the deck, and a common delivery mechanism to which all the webs are led, substantially as described.

7. In a printing-machine, the combination with a suitable frame, of a set of printing-couples mounted substantially centrally in the frame and capacitated to print and perfect a full-width web, two sets of printing-couples one set being mounted below and at one side of the centrally-mounted set and the other set being mounted below and at the other side of the centrally-mounted set, and each of these sets being capacitated to print and perfect a full-width web, and a color-deck, the couples of which are mounted above the said sets of couples and capacitated to print and perfect a full-width web, the first couple of the deck being arranged to print on one side of the web in black, the last couple of the deck being arranged to print on the other side of the web in black, and the intermediate couples being arranged to print on one side of the web in colors, the arrangement being such that the web may be led through all the couples of the deck or through the first and last couples of the deck, substantially as described.

8. In a printing-machine, the combination with a suitable frame, of a set of printing-couples mounted substantially centrally in the frame and capacitated to print and perfect a full-width web, two sets of printing-couples one set being mounted below and at one side of the centrally-mounted set and the other set being mounted below and at the other side of the centrally-mounted set, and each of these sets being capacitated to print and perfect a full-width web, a color-deck, the couples of which are mounted above the said sets of couples and capacitated to print and perfect a full-width web, the first couple of the deck being arranged to print on one side of the web in black, the last couple of the deck being arranged to print on the other side of the web in black, and the intermediate couples being arranged to print on one side of the web in colors, the arrangement being such that the web may be led through all the couples of the deck or through the first and last couples of the deck, and a common delivery mechanism to which all the webs are led, substantially as described.

9. In a printing-machine, the combination with a frame, of a set of printing-couples and suitable inking apparatuses therefor, the couples and inking apparatuses being arranged substantially centrally of the frame, and the members of the couples being arranged between the inking apparatuses, two sets of

printing-couples and suitable inking apparatuses therefor, one set of couples and its inking apparatuses being arranged at one side and below the centrally-mounted set of couples and the other set of couples and its inking apparatuses being arranged below and at the other side of said centrally-mounted set of couples, the sets of couples being spaced apart from each other so as to allow ready access to the form-cylinders, and a color-deck arranged above the sets of couples, each couple of the deck being provided with a suitable inking apparatus, and the first couple of the deck being arranged at one end of the deck and below the other couples and printing on one side of a web and the last couple of the deck being arranged at the other end and printing on the other side of said web, and the intermediate couples being arranged to print on one side of the web, and the second and third couples and their inking apparatuses being spaced from the fourth and fifth couples and their inking apparatuses, whereby ready access is had to all the form-cylinders, substantially as described.

10. In a printing-machine, the combination with a frame, of a set of printing-couples and suitable inking apparatuses therefor, the couples and inking apparatuses being arranged substantially centrally of the frame, and the members of the couples being arranged between the inking apparatuses, two sets of printing-couples and suitable inking apparatuses therefor, one set of couples and its inking apparatuses being arranged at one side and below the centrally-mounted set of couples and the other set of couples and its inking apparatuses being arranged below and at the other side of said centrally-mounted set of couples, the sets of couples being spaced apart from each other so as to allow ready access to the form-cylinders, a color-deck arranged above the sets of couples, each couple of the deck being provided with a suitable inking apparatus, and the first couple of the deck being arranged at one end of the deck and below the other couples and printing on one side of the web and the last couple of the deck being arranged at the other end and printing on the other side of said web, and the intermediate couples being arranged to print on one side of the web, and the second and third couples and their inking apparatuses being spaced from the fourth and fifth couples and their inking apparatuses, whereby ready access is had to all the form-cylinders, and a common delivery mechanism to which all the webs are led, substantially as described.

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

WILLIAM SPALCKHAVER.

Witnesses:

F. W. H. CRANE,  
L. ROEHM.