No. 873,909. PATENTED DEC. 17, 1907.

W. SPALCKHAVER.

PRINTING MACHINE.

APPLICATION FILED FEB. 7, 1905.

4 SHEETS—SHEET 1.

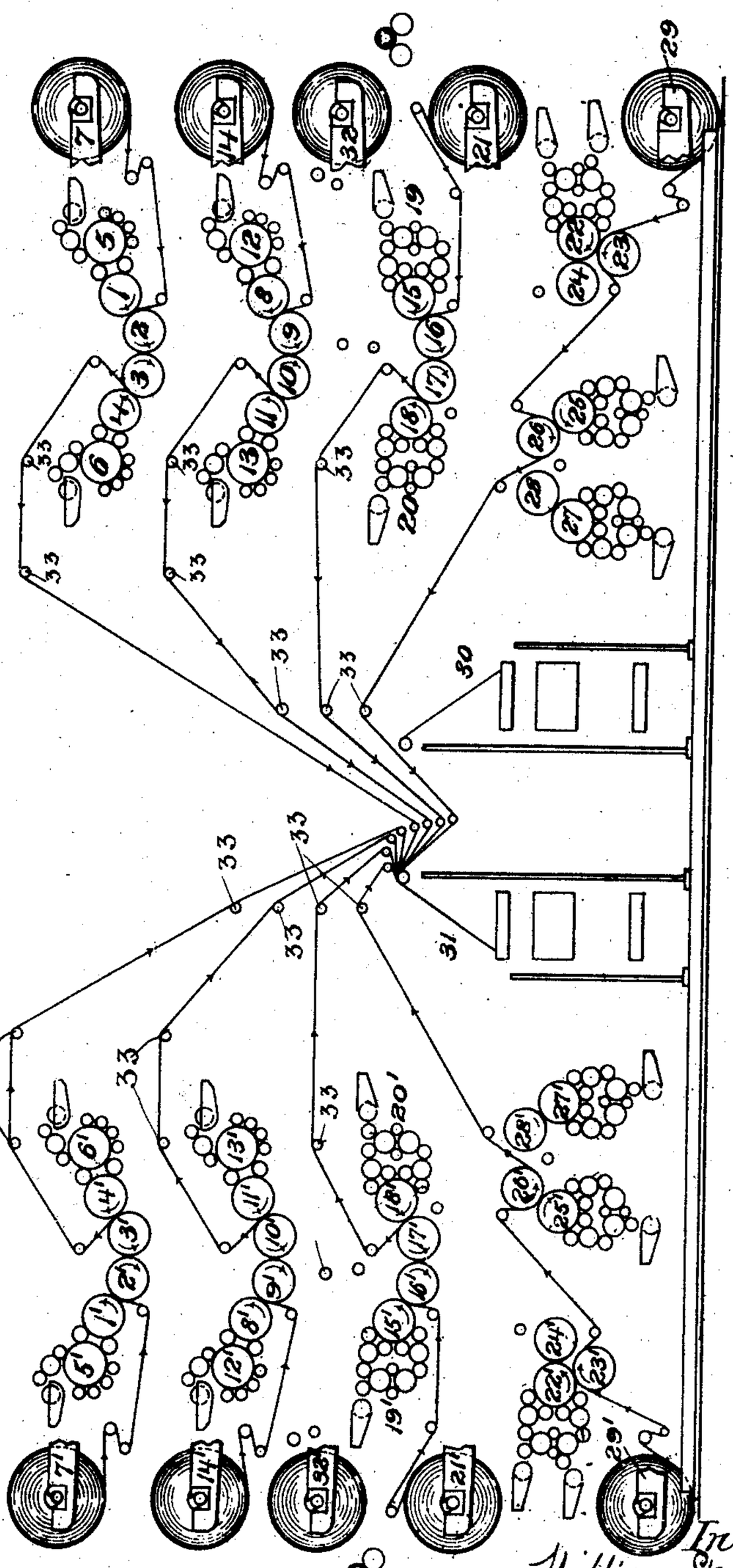

Fig. 1.

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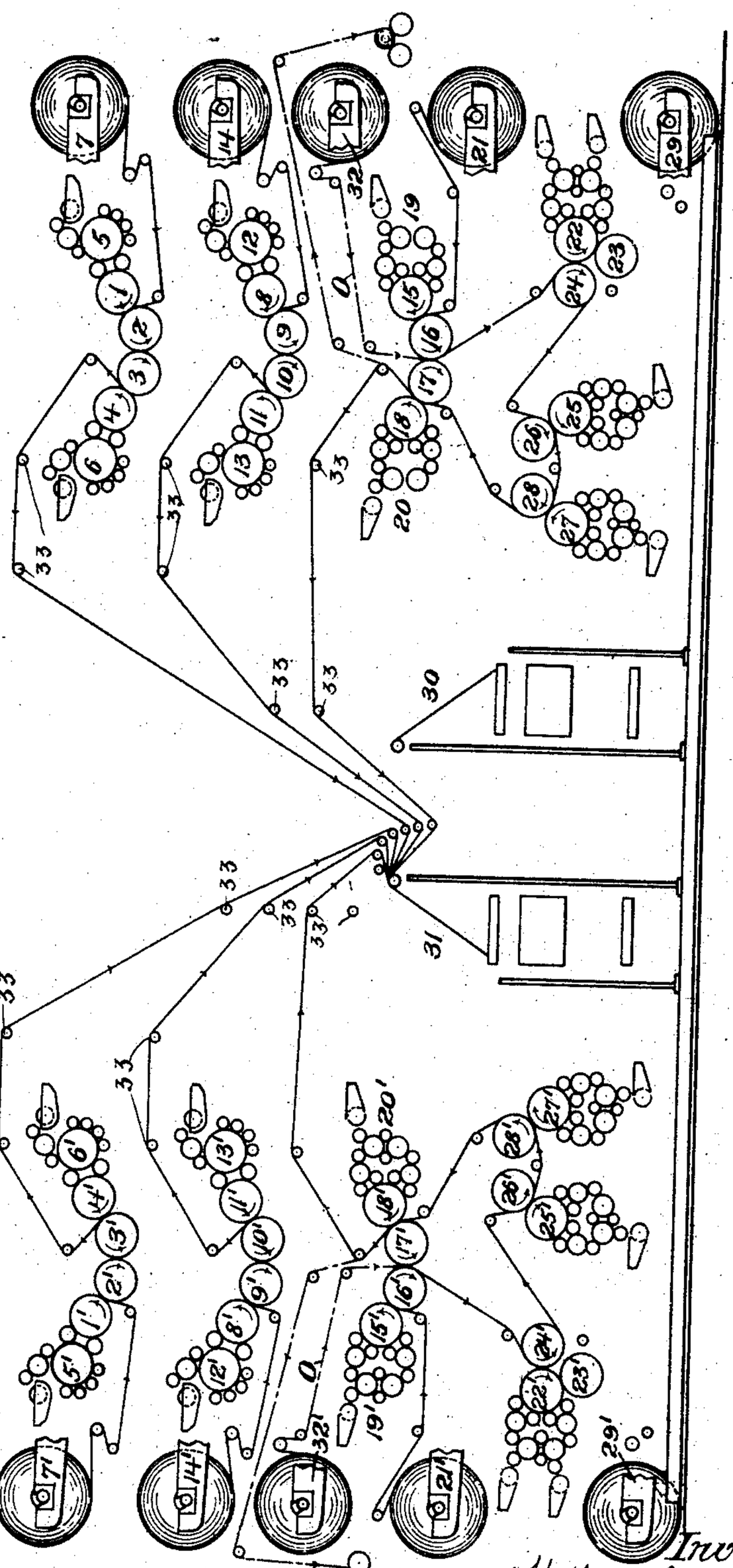
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

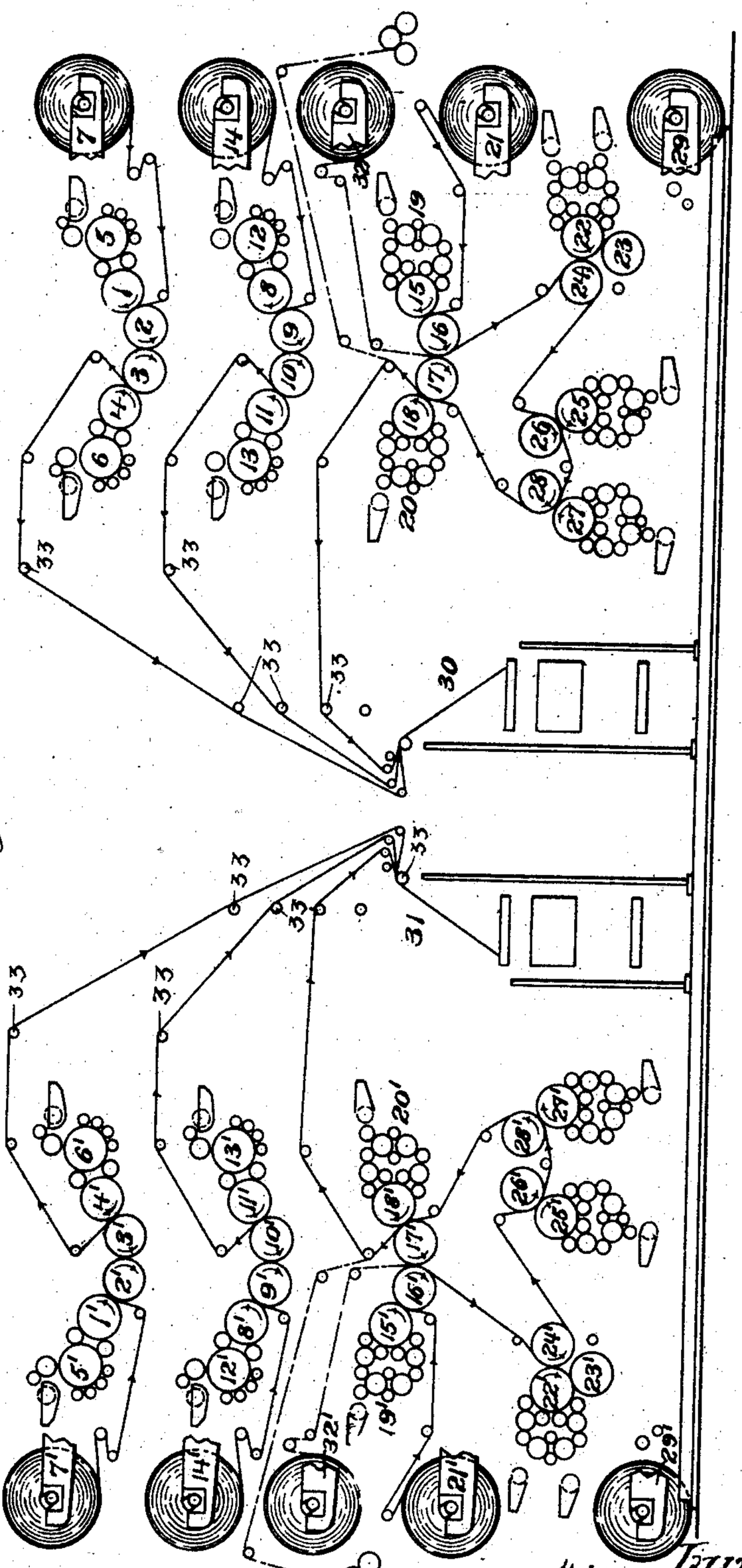

Fig. 3.

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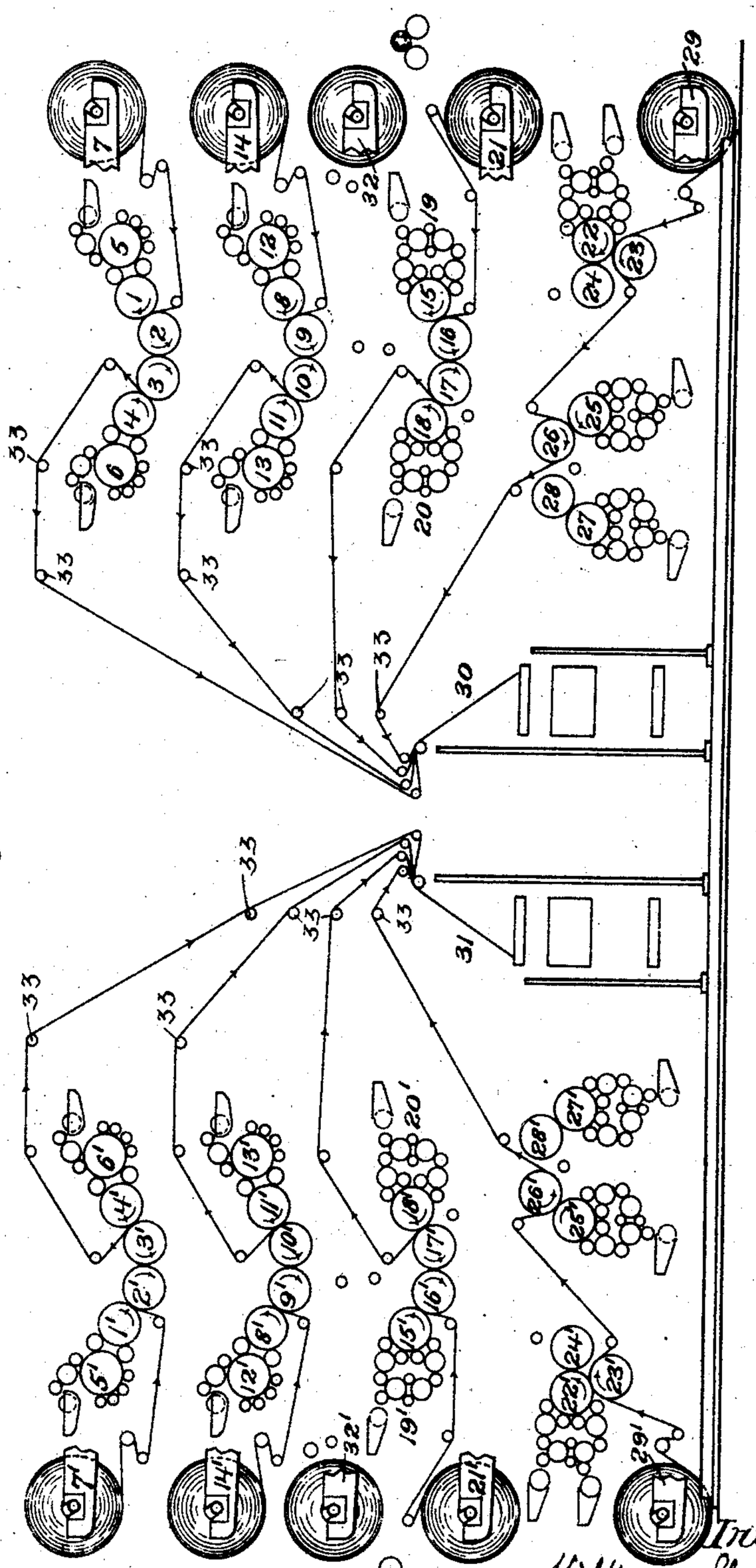
4 SHEETS—SHEET 4.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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PRINTING-MACHINE.

No. 873,909. Specification of Letters Patent. Patented Dec. 17, 1907.

Application filed February 7, 1905. Serial No. 244,579.

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.

This invention relates to certain improvements in web printing machines.

There is, at present, a demand in the trade for printing machines which are capacitated to produce products which vary in the number of sheets which go to make up the products, and also vary in the character of the printing, that is to say, as to whether the products shall be printed entirely in black or a part of the sheets which go to make up the products shall be printed in one or more colors. Thus, in some cases, a publisher may desire to produce a product having a great number of sheets and in which the outside and inside sheets may be printed in a number of colors, the other sheets being printed in black, and at the same time may desire to use the same machine for printing products having lesser numbers of sheets printed either all in black or with part of the sheets printed in various combinations of colors, or products in which all the sheets are printed in black.

The object of this invention is to produce an improved printing machine capacitated to produce products varying widely as to the number of sheets and as to the kind or style of printing.

With this and other objects not specifically referred to in view, the invention consists in certain constructions, and in certain parts, improvements and combinations as will be hereinafter fully described and pointed out.

Referring to the drawings—Figure 1 represents diagrammatically a printing machine forming one embodiment of the invention, the machine being arranged to produce a product printed entirely in black. Fig. 2 represents the same machine arranged to produce products printed partly in black and partly in colors, and Fig. 3 represents the machine running as two independent machines producing products printed partly in colors and partly in black, and Fig. 4 represents the same machine running as two independent machines and producing products printed entirely in black.

The machine which has been selected to illustrate the invention is a machine which may be termed a double octuple machine when its greatest capacity is considered, that is to say, the couples are so arranged that the machine will print from eight double wide rolls. While the number of couples and decks may be varied, in the particular construction shown the machine is provided with eight decks of couples, four decks being superposed and arranged on one side of the machine and the other four decks are superposed and arranged on the other side of the machine.

In the drawings, and referring to the decks on the right hand side of the machine, the upper deck comprises a pair of printing couples, the printing cylinder of one of the couples being marked 1 and the impression cylinder 2, the impression cylinder of the other couple being marked 3 and its printing cylinder 4. Inking mechanisms 5 and 6 of any usual or desired type will be used in connection with the couples of this deck, and a web roll mounted in supports 7 is illustrated for supplying the web to these couples. This deck, as shown, operates in the usual manner to print and perfect a web. The deck below the deck just described is a duplicate of it, said deck consisting of a printing couple, the impression cylinder of which is marked 8 and the printing cylinder 9, and a perfecting couple, the impression cylinder of which is marked 10 and the printing cylinder 11. This deck has inking mechanisms 12 and 13 of any usual type for coöperating therewith and supplied by web roll mounted in supports 14. The printing cylinders of the couples of the next deck, in the particular machine illustrated, are marked 15 and 18, the impression cylinders 16 and 17, and the inking mechanisms 19 and 20. The web roll for supplying this deck is mounted in supports 21.

The lowest deck may be varied considerably as to the character and composition of the couples, but, in the particular machine illustrated, includes a couple having a reversible printing cylinder. This cylinder is marked 22, and in the particular construction shown, there are provided two impression cylinders 23, 24, one of said cylinders cooperating with the printing cylinder when

the cylinder is running in one direction and the other impression cylinder coöperating with it when the cylinder is running in the opposite direction. In the particular construction shown, two couples, the printing cylinders of which are marked 25 and 27, and the impression cylinders 26 and 28, make up the remainder of this deck of couples, although one of these couples might be omitted, if desired. The web roll supplying web to this deck of couples is mounted in supports 29.

The decks so far described make up what may be termed a set of decks and the machine has a similar set of decks arranged on the other side. Inasmuch as the construction and arrangement of the first set of decks is duplicated at the other end of the machine, a specific description of these couples will not be given, the corresponding parts of corresponding couples being marked, however, with the same reference characters primed.

In the space between the two sets of decks, two sets of folding mechanisms 30 and 31 are arranged, these consisting of the ordinary longitudinal folders, the folder of one set of decks being arranged, however, back to back, with respect to the folder of the other set of decks, as shown. Where double wide rolls are used, each folder will consist of two folding mechanisms.

In accordance with the invention a part of the decks on each side of the machine will be used for printing in black and the remainder of the decks on each side of the machine will be used for printing either in black or in colors, as the occasion may require. In the particular machine illustrated, the two upper decks on each side of the machine are intended to be used for printing in black alone while the two remaining decks on each side of the machine may be used either to print in black or in colors. In the particular machine illustrated, offset devices are provided, these offset devices consisting of offset web rolls mounted in supports 32 and 32′ which, in the particular construction shown, are mounted in line with the other web roll supports, and the usual devices for unwinding and re-winding the offset web. The usual web guides 33, which it is not necessary to describe in detail, will be employed to control the webs and give them their direction through the machine and into the folder or folders. The particular machine illustrated may be used in various ways, according to the particular products it is desired to produce, and the drawings illustrate some of the principal methods of operating the machine.

In Fig. 1, the machine is shown as arranged to print a product from all the webs and entirely in black. In this arrangement, the web from all the web rolls is led straight through the couples and to one of the folders, as, for instance, the folder 31. With this arrangement, the couples 27, 28, and 27′, 28′ on each side of the machine will be cut out and the printing cylinders 22, 22′ of the lower decks will coöperate with the impression cylinders 23, 23′ respectively. With this arrangement, the offset web is without function and will, therefore, not be used. The arrangement shown in Fig. 1 will produce thirty-two page products without the use of collecting cylinders.

Fig. 4 shows the machine arranged to run as two independent machines, the webs on the right hand end of the machine being directed to the folder 30 on that side and the webs on the left hand side of the machine being directed to the folder 30 on that side. Arranged as shown in this figure, each side of the machine will produce sixteen page products printed wholly in black without the use of collecting cylinders.

Fig. 2 shows the machine running as a color machine. In this arrangement, the webs from the two upper decks on each side of the machine are led straight through the machine and to one of the folders, as for instance the folder 31. The lower web roll on each side of the machine is cut out. The web from the web roll 21 is led through the couples 15, 16, 22, 24, then through the couples 25, 26, 27, 28, through the couple 17, 18 and to the folder 31. The web from the roll 21′ is given a similar lead. With this arrangement, the offset web, marked O, when such a web is employed, is given the lead indicated through the various couples, so that it is running with the web as the colors are being printed upon it. With this arrangement, twenty-four page products will be produced, the outer pages being perfected in black and three colors, and the inner pages being printed in black and perfected in black and three colors. In this arrangement, it will be seen that the direction of the reversible printing cylinders 22, 22′ has been changed and that they coöperate with the impression cylinders 24, 24′, the impression cylinders 23, 23′ being cut out.

Fig. 3 shows the machine running as two independent machines, each side producing a colored product. The lead of the webs on each side of the machine is the same as in the arrangement illustrated in Fig. 2, but the webs from the decks on both sides, instead of being led to a single folder, are led to the folder belonging to that deck. With this arrangement, the decks on each side of the machine will produce twelve page products, the outside sheets being in colors. Other combinations are, of course, possible, and it will be readily understood by those skilled in the art how they can be made.

Changes and variations may be made in the construction by which the invention is carried into effect. The invention is not, therefore, to be limited to the particular

construction and arrangements of printing machines hereinbefore described.

What is claimed is:—

In a printing machine, the combination of a deck of couples arranged on one side of the machine, said deck including a couple having a reversible printing cylinder and two impression cylinders, one of said impression cylinders coöperating with the printing cylinder when the cylinder is running in one direction, and the other of said impression cylinders coöperating with it when the cylinder is running in the opposite direction, a plurality of independent couples in said deck one of which may coöperate with said reversible printing cylinder couple to perfect a web and all of which may coöperate therewith to print in colors, a web roll support for said deck, three decks each comprising printing and perfecting couples and web roll supports for said couples said decks being superposed, and all the decks forming a set, an offset web roll support, a similar set of decks and an offset web roll support on the opposite side of the machine, folders arranged back to back between the sets of decks, guides whereby the reversible couple deck of each set and the deck next it may be caused to act either as a combined color deck or as perfecting decks, guides whereby when all the decks of each set are acting as perfecting decks or partly as perfecting and partly as color decks the webs from both sets of decks may be led to one folder or the webs from each set may be led to the folder of that set, and guides for leading the offset webs through the reversible color deck and their coöperating decks when said decks are operating as color decks.

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

WILLIAM SPALCKHAVER.

Witnesses:

F. W. H. Crane,

Louis Roehm.