

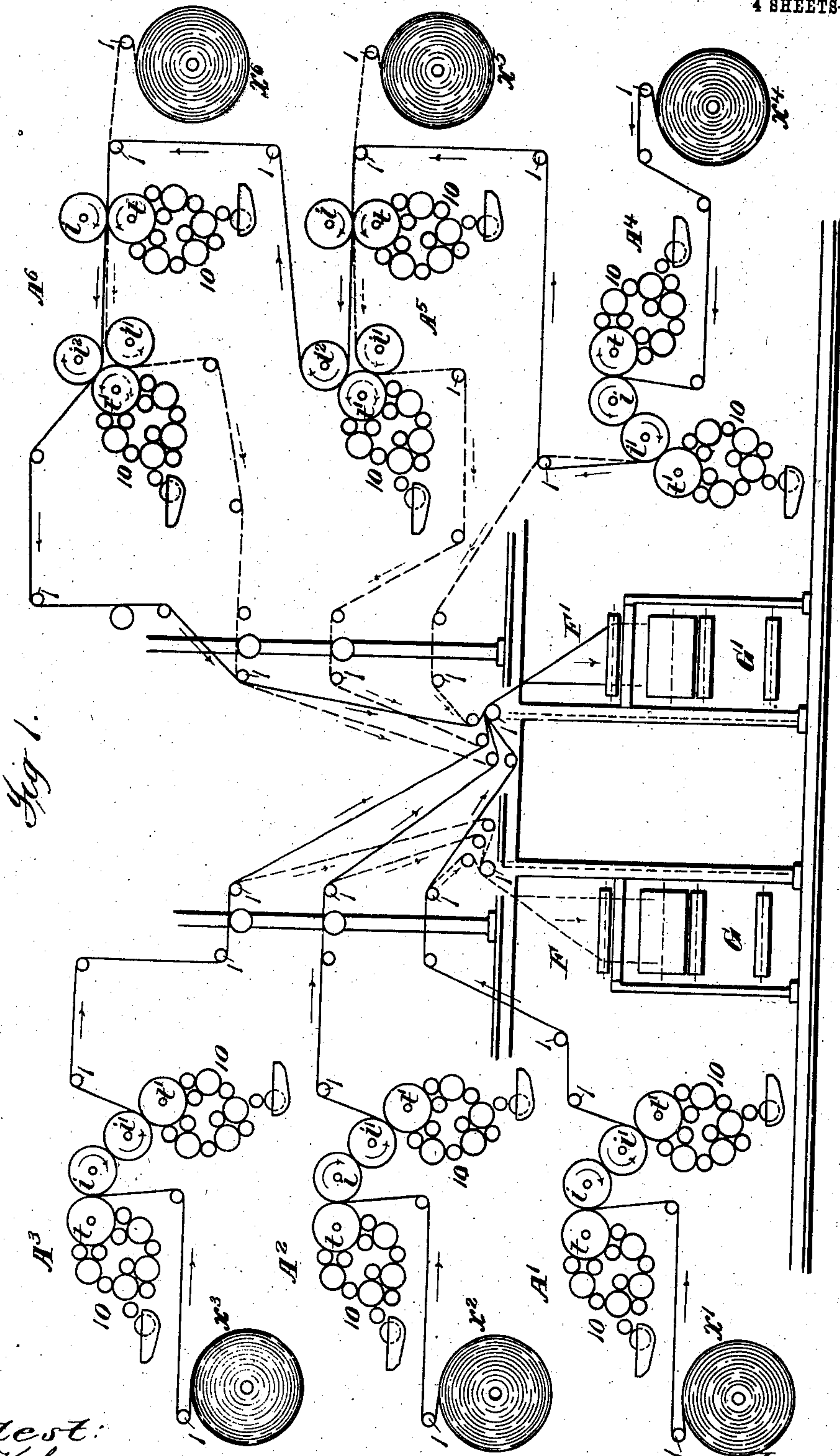
No. 742,248.

PATENTED OCT. 27, 1903.

W. SPALCKHAVER.
WEB PRINTING MACHINE.
APPLICATION FILED JULY 15, 1902.

NO MODEL.

4 SHEETS--SHEET 1..



Attest:
R. K. Khol
S. V. Venkhal

Inventor:
William Spalckhar
by Philip Sawyer Rice & Kennedy, Attys

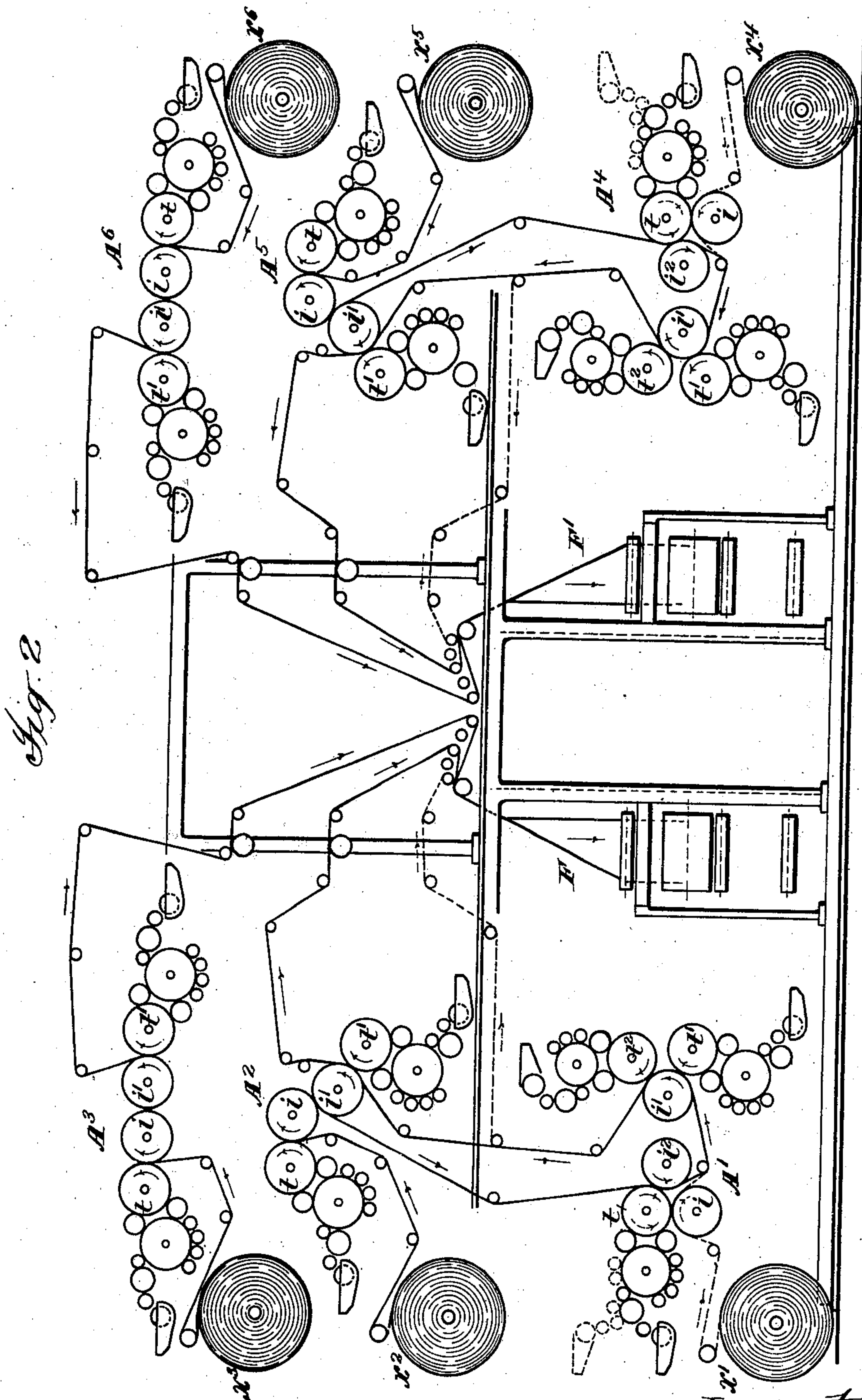
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

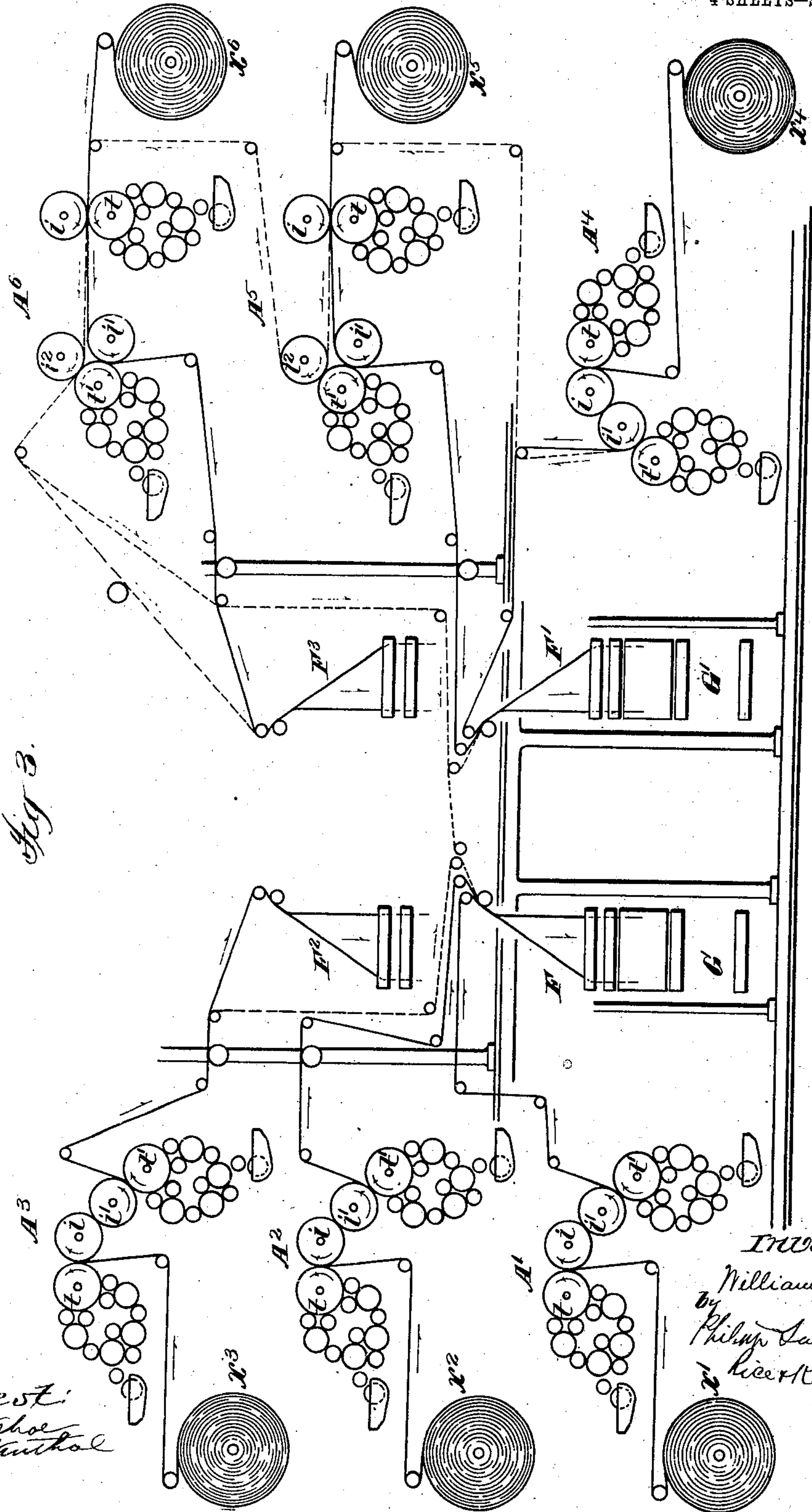


Fig. 3.

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O. Dehne
S. Muthol

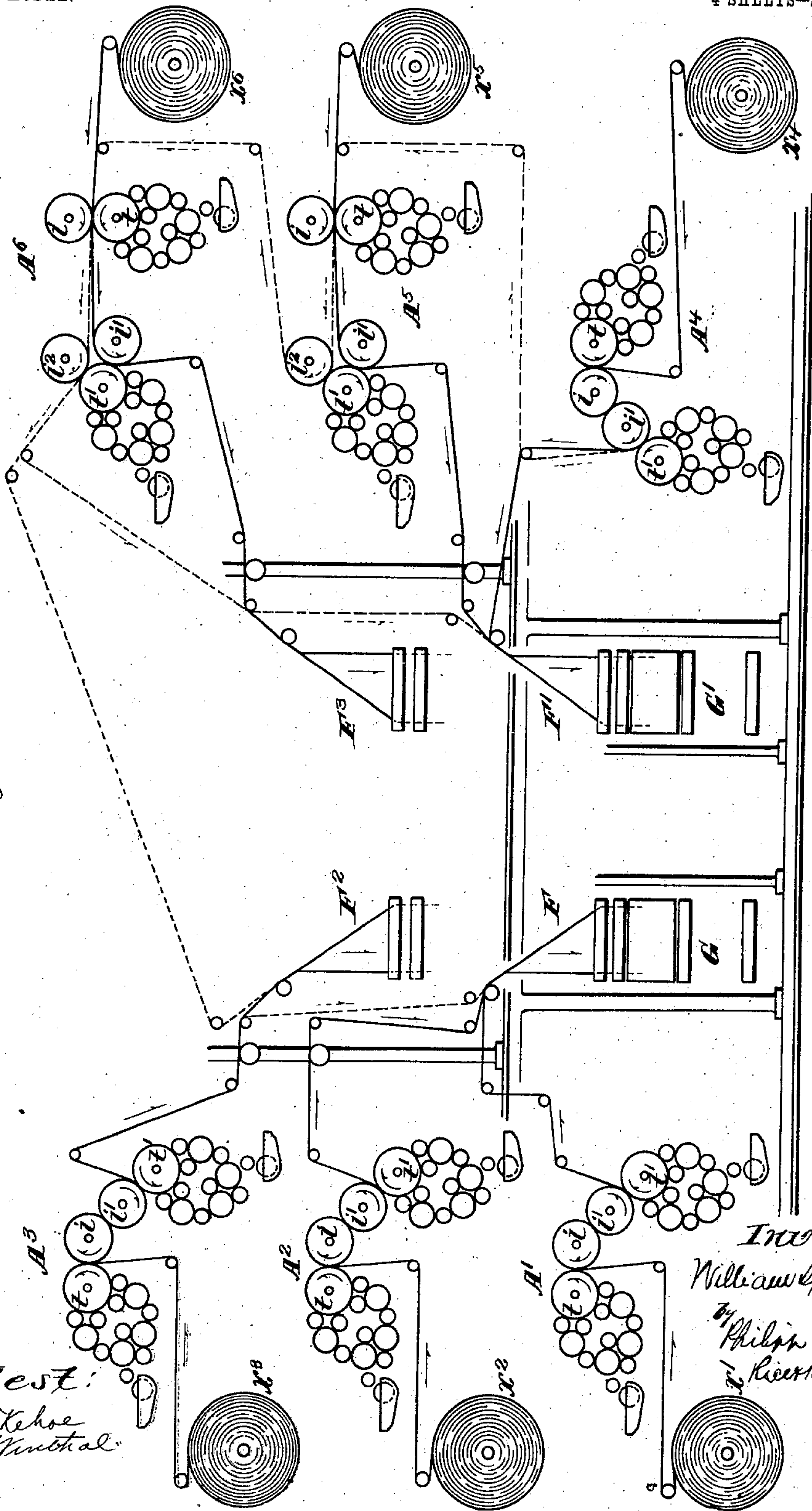
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4 SHEETS—SHEET 4.

Fig. 14.



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UNITED STATES PATENT OFFICE.

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

WEB-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 742,248, dated October 27, 1903.

Application filed July 15, 1902. Serial No. 115,626. (No model.)

To all whom it may concern:

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

This invention relates to an improved web-printing machine for printing a plurality of webs simultaneously, the especial object of the invention being to provide a compact high-speed machine with direct and short runs of the webs which shall be capable of producing a large variety of products consisting both of perfected webs and webs printed in colors and in which the full capacity of the type-cylinders may be used for perfecting webs when color-printing is not desired, while providing for the most convenient access of the attendants to all the printing, inking, and delivery mechanisms for the various purposes involved in web-printing and the delivery of the various products at convenient points.

For a full understanding of the invention a detailed description of constructions embodying the same in some of the preferred forms will now be given in connection with the accompanying drawings, forming a part of this specification, and the features forming the invention will then be specifically pointed out in the claims.

In the drawings, Figure 1 is a diagrammatic side elevation of a press arranged for perfecting six webs and delivering the same to folders arranged back to back between the presses or for producing products including a single-color printed web. Fig. 2 is a similar view of a press arranged for perfecting six webs or producing one or more products combined of perfected and color-printed webs. Fig. 3 is a similar view of a press with the printing mechanisms arranged as in Fig. 1, but with upper and lower pairs of folders arranged back to back. Fig. 4 shows a press similar to Fig. 3, but with the folders arranged to face each other.

Referring now especially to Fig. 1, six

mechanisms each adapted to print and perfect a web are shown, these printing mechanisms A^1, A^2, A^3, A^4, A^5 , and A^6 being arranged in sets of three printing mechanisms at each end of the press, preferably one above the other, as shown, each of these printing mechanisms having the first and second pairs of type and impression cylinders lettered, respectively, $t\ t'$ and $i\ i'$, and the type-cylinders of the printing mechanism are provided with inking mechanisms 10, which may be of any suitable form. The printing mechanisms at both ends of the press are arranged with their cylinders parallel and in line—that is, in the same vertical planes longitudinally of the press—and between the printing mechanisms in the same vertical planes with the cylinders are arranged two longitudinal folders $F\ F'$, which are placed back to back—that is, with their folding inclines pointing in opposite directions and toward the end of the press next which they are respectively placed—these longitudinal folders delivering to folding and delivery mechanisms $G\ G'$, which may be of any suitable form. The printing-cylinders and folding and delivery mechanisms of the press, therefore, are all arranged in line, so that the webs x^1, x^2, x^3, x^4, x^5 , and x^6 from the respective web-rolls have direct and short runs through the printing mechanisms to the longitudinal folders at the center of the press. With the first and second pairs of type and impression cylinders $t\ t'$ and $i\ i'$, as above described, and with the webs run as shown in dotted lines, and the second type-cylinders of mechanisms $A^5\ A^6$ rotating, as shown by the dotted arrows thereon, the machine is adapted for perfecting webs. The second type-cylinders t' of the printing mechanisms $A^5\ A^6$ are made reversible by any suitable change-gear mechanism, such as is well known in the art, these cylinders being reversed for the purpose of printing in colors from the same type-cylinders when a color product is to be produced, so as to rotate as shown by the full-line arrows thereon, and color-impression cylinders i^2 are added to the machine, which impression-cylinders rotate in the opposite direction to the second-impression cylinders i' of printing mechanisms $A^5\ A^6$ and coact with the type-cylinders t' in color-printing, so as

to print on the same side of the web as the first type and impression cylinders of the same printing mechanism. With one of the type-cylinders of two of the printing mechanisms reversible, as shown, one more color than the three colors and key-plate impression of a full-color deck may be obtained. If only one cylinder be made reversible for use in color-printing, a full-color deck only is provided. All the printing mechanisms are preferably of double width and double-wide webs used, these webs being slit and the products from opposite ends of the type-cylinders passing to folding and delivery mechanisms arranged side by side or being otherwise combined; but it will be understood that the invention is applicable also to single-wide presses. As shown in full lines in Fig. 1, printing mechanisms $A^1 A^2 A^3$ are each perfecting a web, and these three webs are led from the printing mechanisms over suitable guide-rolls 1 to the longitudinal folder F' , so as to be delivered by the delivery mechanism G' . At the other end of the press a single web x^1 is being printed in black on one side and colors on the opposite side, this web receiving an impression in black from the first couple of printing mechanism A^4 , four-color impressions from the second couple of the same printing mechanism A^4 , the two printing-couples of printing mechanism A^5 and the first couple of printing mechanism A^6 , and receiving its final or key impression from the second couple of printing mechanisms A^6 , the second type-cylinders t' of printing mechanisms A^5 and A^6 coacting with impression-cylinders i^2 . This color-printed web x^4 passes from printing mechanism A^6 over suitable guide-rolls l downward to the longitudinal folder F' and is combined thereon with the perfected webs $x^1 x^2 x^3$, so as to be folded with its color side outward, thus producing a sixteen-page product with an outside color-sheet, or, if the press is double width, two such products, or a thirty-two page product, if the webs from opposite ends of the cylinders are combined. It is also possible to produce with this press a considerable variety of products either with or without a color-sheet, these products, with the color-sheet, being produced by the use of one or more of the webs $A^1 A^2 A^3$ and combining the color-sheet with the perfected webs in the manner desired. When the press is to be used for perfecting only, any number of the printing mechanisms may be used, each printing mechanism perfecting a single web, which webs may be combined and led to a single folder F or F' or divided between the two folders, as desired. As shown in dotted lines in Fig. 1, the second type-cylinders t of printing mechanisms $A^5 A^6$ have been reversed in direction from their run in color-printing and now coact with the second impression-cylinders i' of these printing mechanisms, and each of the six printing mechanisms is shown as perfecting a web, the webs $x^1 x^2 x^3$ being

led to longitudinal folder F and webs $x^4 x^5 x^6$ to longitudinal folder F' , thus producing two twelve-page products printed in black, if the press be of single width, or four twelve-page papers printed in black, if the press be of double width. By running the webs to a single folder F or F' a twenty-four page paper, printed in black, will be produced on a press of single width or two twenty-four page papers in a press of double width, or by associating the webs from opposite ends of the cylinders of a double-wide press a forty-eight page paper may be produced.

In the construction shown in Fig. 2 a greater variety of products may be secured, including products at each end of the press formed from a perfected web and a color-web. In this construction the two printing mechanisms A^1 and A^4 at opposite ends of the press are provided with the additional impression-cylinders i^2 to coact with the reversible type-cylinder t of the first couple of these printing mechanisms, and the second couples of these mechanisms are provided with an additional color-type cylinder t^2 , so that a web may be printed in colors—that is, with three color impressions and the key-plate impression at each end of the press by the two lower printing mechanisms $A^1 A^2$ and $A^4 A^5$, leaving the top printing mechanisms $A^3 A^6$ to perfect a web at each end of the press. As shown in solid lines in this figure, webs $x^2 x^5$ are being printed in black on one side and colors on the opposite side by, respectively, the printing mechanisms $A^2 A^1$ and $A^5 A^4$, and the webs $x^3 x^6$ are being perfected by the printing mechanisms $A^3 A^6$ and the two webs at each end of the press combined on the folders $F F'$ with the color-pages on the outside, thus producing two papers of eight pages each with the outside pages printed in colors. A single sixteen-page product with four pages printed in color may obviously be secured by combining the four webs on either one of the folders, and if the press be of double width two eights or two sixteens may thus be obtained or the products of the opposite ends of the cylinders combined for products of double the number of pages. As indicated in dotted lines in Fig. 2, each of the printing mechanisms may be used for perfecting a web, the first type-cylinders of the printing mechanisms $A^1 A^4$ then being reversed and coacting with the first-impression cylinders i' and various products printed in black be thus produced, as described above in connection with Fig. 1.

A greater variety of products may be secured without increasing the length of the press by using an additional longitudinal folder or more than one folder placed above the folders $F F'$. In the construction shown in Fig. 3 two longitudinal folders $F^2 F^3$ are used above the longitudinal folders $F F'$ and arranged in the same manner. The products of the printing mechanisms may thus be divided between the four folders or between

a less number of folders or may be combined and delivered by any suitable mechanisms. The folded webs from folders $F^2 F^3$ may conveniently be led downward and delivered by the delivery mechanisms $G G'$ below folders F' with the webs from the folders $F F'$, or separate delivery mechanisms for the folders $F^2 F^3$ may be used. The arrangement of the additional color-impression cylinders i^2 in this press is the same as in the press shown in Fig. 1, these additional impression-cylinders being used in connection with printing mechanisms $A^5 A^6$. In the construction shown in solid lines in Fig. 3 each of the printing mechanisms is perfecting a single web, the upper webs $x^3 x^6$ being led to the upper folders $F^2 F^3$, and the two lower webs $x' x^2 x^4 x^5$ at opposite ends of the press being combined on the folders $F F'$, thus producing two eight-page products below and two four-page products above, or the four pages from each of the folders $F^2 F^3$ may be led downward and combined in the delivery mechanisms $G G'$ with the products from folders $F F'$, thus producing two twelve-page products from a single-wide press or products of double the number of pages from a double-wide press. Instead of leading the upper webs $x^3 x^6$ to the upper folders $F^2 F^3$ they may be led downward and combined with the other webs on the longitudinal folders, as shown in dotted lines in Fig. 3. There is shown in dotted lines in Fig. 3 also the printing of a web in colors at the right-hand end of the press, the web x^4 being then led through printing mechanism A^8 , where it is printed in black on one side and with one color on the opposite side, then upward through printing mechanisms $A^5 A^6$, where it receives the additional color impressions and key impression, the second type-cylinders i' being reversed from the run indicated in solid lines and coacting with the impression-cylinders i^2 , and this color-web may either be led, as indicated in dotted lines, to the longitudinal folder F^3 or downward directly to the longitudinal folder F' , or, as also indicated in dotted lines, it may be led to the longitudinal folder F and folded inside the webs at the opposite end of the press, or the webs on the left-hand end of the press may be led across to the folder F' , as shown in Fig. 1, and combined with the color-web at the right-hand end with the color side of the latter outward.

It is not essential to the invention that the folders should be arranged back to back; but they may be arranged otherwise, so far as the present invention is concerned. In Fig. 4 there is shown a construction similar to Fig. 3, except that the upper and lower folders are arranged facing each other instead of back to back. This construction permits the color-web from the right-hand side of the press to be led over to the left-hand side of the press and folded with the web or webs on the left-hand side of the press on one or the other of

the two folders $F^2 F$, with the color-pages on the outside. This run of the color-web x^4 is indicated in dotted lines in this figure, and it is obvious that the color-web may thus be combined with the single web x^3 on the upper folder F^2 or may be led downward with that web and combined with the webs $x' x^2 x^3$ on folder F , while webs $x^4 x^5$ pass to folder F' , thus producing in a single-width press three eight-page products, one of which has a color-sheet on the outside, or a sixteen-page product with a color-sheet on the outside and an eight-page product.

It will be understood that the invention is not limited to any of the specific constructions shown nor to the number of printing mechanisms at each end of the press, but that more or less than three printing mechanisms at each end of the press may be used as long as the printing mechanisms at one or both ends of the press are arranged to form a full color-deck, so that a web may be printed in colors at one or both ends of the press. With only three printing mechanisms at one or both ends of the press, as shown, some means are preferably provided so that one of the type-cylinders may print on either side of a web, so as to get four colors and a key impression when required, this result being preferably secured, as shown, by reversing one of the type-cylinders and providing an additional impression-cylinder to coact therewith in color-printing. It will be understood, however, that other means may be used for enabling one of the type-cylinders to print on either side of a web for perfecting or color printing and that if more than three perfecting printing mechanisms are used at one or both ends of the press it will not be necessary to have one of the type-cylinders print on either side of the web or to use additional color-cylinders; but with four perfecting mechanisms four impressions on one side may be secured by using only one couple of three of the perfecting mechanisms, and in the same manner five impressions—the greatest number required—can be obtained with five perfecting mechanisms by employing only one couple of each of the four mechanisms.

What I claim is—

1. The combination with a plurality or set of web-perfecting mechanisms at each end of a press arranged with their cylinders parallel and in line and with the printing mechanisms at the same end of the press arranged one above the other, the couples of one of said sets being arranged to provide a full color-deck and to coact in printing a web in colors, of a folding and delivery mechanism for each set of perfecting mechanisms, said folding and delivery mechanisms having longitudinal folders arranged in line with and between the perfecting mechanisms at the opposite ends of the press, and means for guiding the webs from each set of perfecting mechanisms to its own folder or folders or a part or all of the

product of one set of perfecting mechanisms to the folder or folders of the other set of perfecting mechanisms.

2. The combination with a plurality or set of web-perfecting mechanisms at each end of a press arranged with their cylinders parallel and in line, the couples of one of said sets being arranged to provide a full color-deck and to coact in printing a single web in colors, of means for enabling one or more of the perfecting mechanisms to print two impressions on the same side of a web, and folding and delivery mechanism for each set of perfecting mechanisms, said folding and delivery mechanisms being arranged in line with and between the perfecting mechanisms at the opposite ends of the press.

3. The combination with a plurality or set of web-perfecting mechanisms at each end of a press arranged with their cylinders parallel and in line, the couples of one of said sets being arranged to provide a full color-deck and to coact in printing a single web in colors, one or more of said perfecting mechanisms being provided with an additional type-cylinder for color-printing, of means for enabling one or more of the perfecting mechanisms to print two impressions on the same side of a web, and folding and delivery mechanism for each set of perfecting mechanisms, said folding and delivery mechanisms being arranged in line with and between the perfecting mechanisms at the opposite ends of the press.

4. The combination with a plurality or set of web-perfecting mechanisms at each end of a press arranged with their cylinders parallel and in line, the couples of one of said sets being arranged to provide a full color-deck and to coact in printing a single web in colors, of means for enabling one or more of the perfecting mechanisms to print two impressions on the same side of a web, folding and delivery mechanism for each set of perfecting mechanisms, said folding and delivery mechanisms being arranged in line with and between the perfecting mechanisms at the opposite ends of the press, and means for guiding the product of each set of perfecting mechanisms to its own delivery mechanism or a part or all of the product of one set of perfecting mechanisms to the delivery mechanism of the other set.

5. The combination with a plurality or set of web-perfecting mechanisms at each end of a press arranged with their cylinders parallel and in line, the couples of one of said sets being arranged to provide a full color-deck and to coact in printing a web in colors, of means for reversing the direction of rotation of one of the type-cylinders of one or more of said perfecting mechanisms and an additional impression-cylinder to coact with the reversed type-cylinder in color-printing, and folding and delivery mechanism for each set of perfecting mechanisms, said folding and delivery mechanisms being arranged in line with

and between the perfecting mechanisms at the opposite ends of the press.

6. The combination with a plurality or set of web-perfecting mechanisms at each end of a press arranged with their cylinders parallel and in line, the couples of one of said sets being arranged to provide a full color-deck and to coact in printing a web in colors, of means for reversing the direction of rotation of one of the type-cylinders of one or more of said perfecting mechanisms and an additional impression-cylinder to coact with the reversed type-cylinder in color-printing, one or more of said perfecting mechanisms being provided with an additional type-cylinder for color-printing, and folding and delivery mechanism for each set of perfecting mechanisms, said folding and delivery mechanisms being arranged in line with and between the perfecting mechanisms at the opposite ends of the press.

7. The combination with a set of three perfecting mechanisms at each end of a press arranged one above the other with their cylinders parallel and in line, the couples of one or both sets being arranged to coact in printing a web in colors, of means for enabling one or more of said perfecting mechanisms to print two impressions on the same side of a web, one or more longitudinal folders and delivery mechanism for each set of perfecting mechanisms, arranged in line with and between the sets of perfecting mechanisms, and means for guiding the webs from each set of perfecting mechanisms to its own folder or folders or a part of all of the product of one set of perfecting mechanisms to the folder or folders of the other set of perfecting mechanisms.

8. The combination with a set of two perfecting mechanisms at each end of a press arranged one above the other with their cylinders parallel and in line, the couples of one or both sets being arranged to coact in printing a web in colors, of means for enabling one of the perfecting mechanisms of one or each set to print two impressions on the same side of a web by the perfecting-couples and an additional impression on the same side by an additional type-cylinder, one or more longitudinal folders and delivery mechanism for each set of perfecting mechanisms, arranged in line with and between the sets of perfecting mechanisms, and means for guiding the webs from each set of perfecting mechanisms to its own folder or folders or a part or all of the product of one set of perfecting mechanisms to the folder or folders of the other set of perfecting mechanisms.

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

WILLIAM SPALCKHAVER.

Witnesses:

T. F. KEHOE,
C. J. SAWYER.