No. 706,269. Patented Aug. 5, 1902.

# W. SPALCKHAVER.

## WEB PRINTING PRESS.

(Application filed Oct. 30, 1897.)

(No Model.) 2 Sheets—Sheet 1.

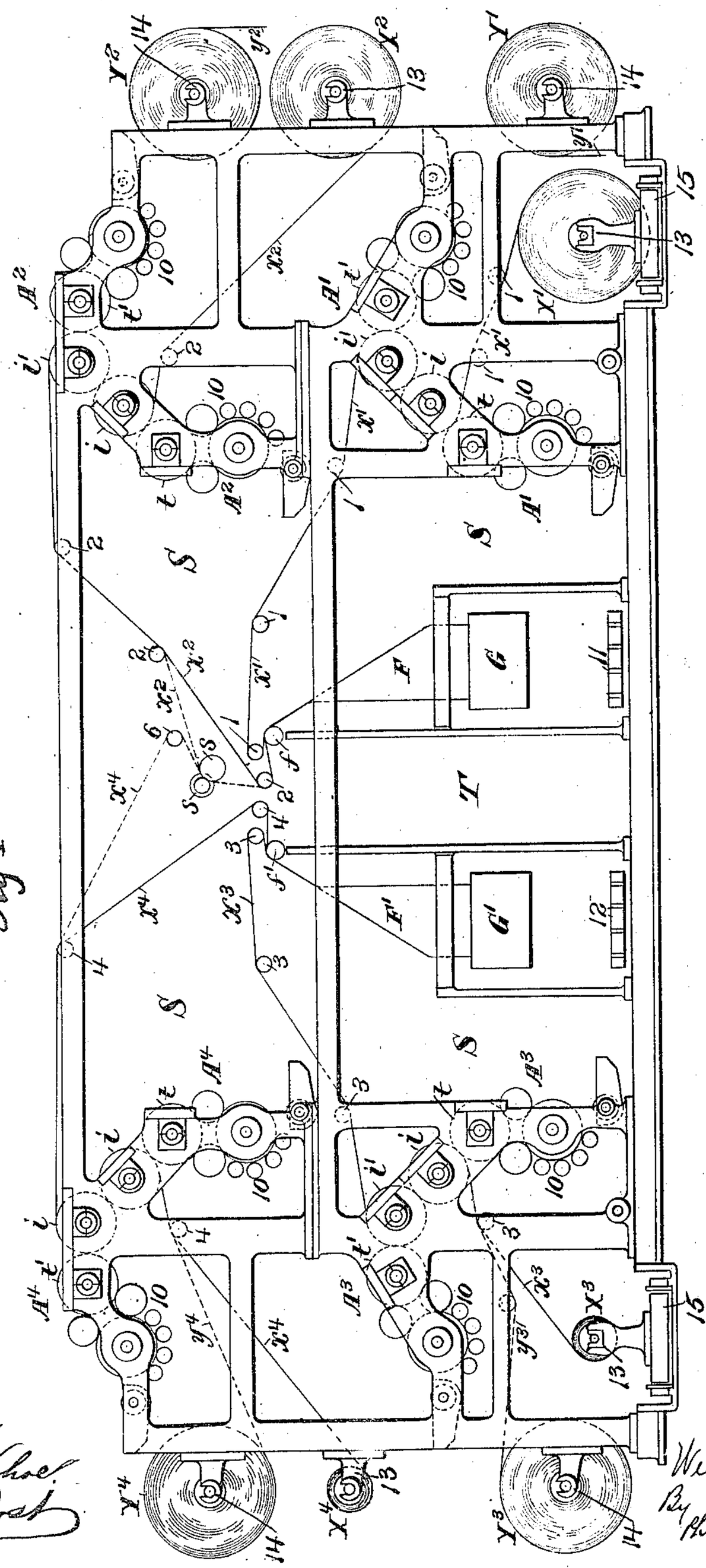

Fig. 1

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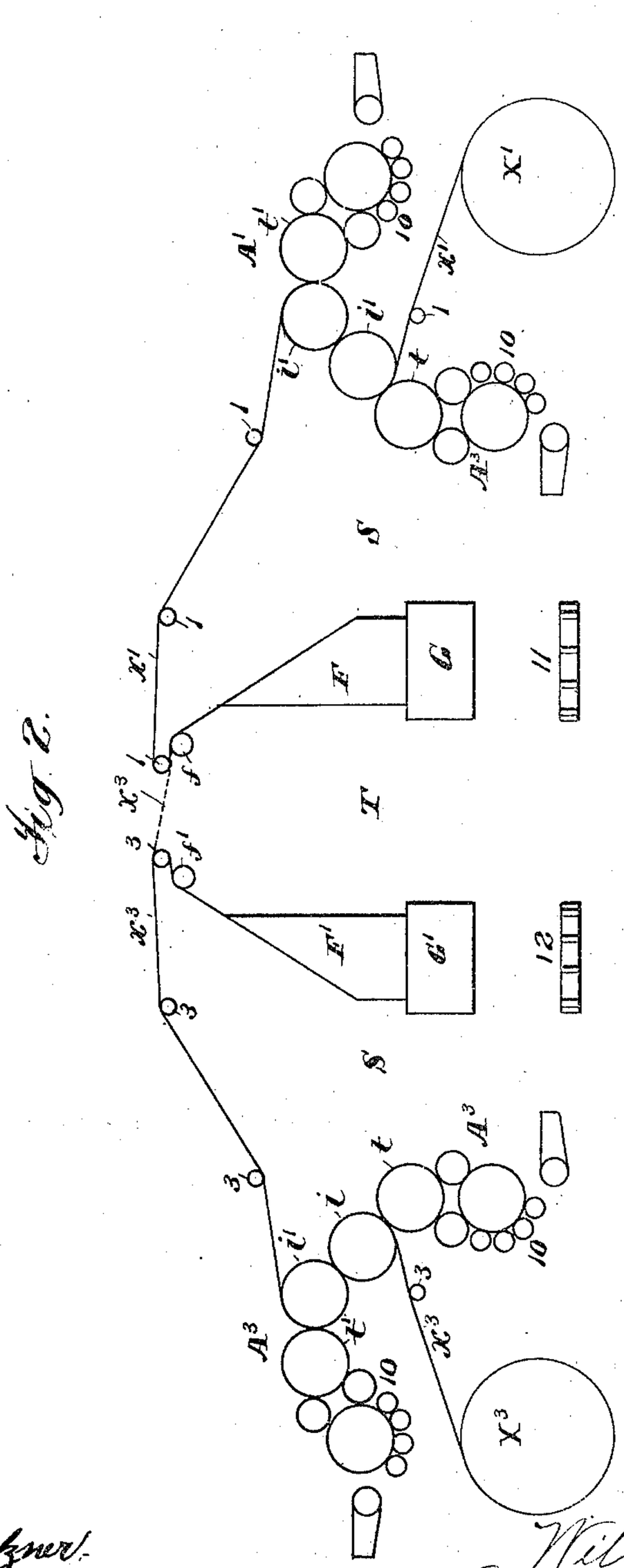
(Application filed Oct. 30, 1897.)

(No Model.) 2 Sheets—Sheet 2.

Fig 2.

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# UNITED STATES PATENT OFFICE.

WILLIAM SPALCKHAVER, OF BROOKLYN, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO ROBERT HOE AND CHARLES W. CARPENTER, OF NEW YORK, N. Y., UNDER THE FIRM-NAME OF R. HOE AND COMPANY.

## WEB-PRINTING PRESS.

SPECIFICATION forming part of Letters Patent No. 706,269, dated August 5, 1902.

Application filed October 30, 1897. Serial No. 656,906. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM SPALCKHAVER, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Web-Printing Presses, 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 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 with a press of compact form and occupying the minimum of space longitudinally and with one or more products of various forms delivered at a convenient point with direct and approximate equal runs of the different webs.

A further object of the invention is to provide means for the rapid and convenient substitution of new rolls of paper for the exhausted rolls, so as to reduce the time lost by this substitution, while securing the proper run of the webs.

The invention consists in various combinations of web-printing mechanisms and delivery apparatus and in a novel arrangement for the substitution of web-rolls in a web-printing machine, all of which will be fully described and specifically claimed hereinafter.

As the invention will be best understood by a description of a construction embodying the same, all further preliminary description will be omitted, and such a description will now be given in connection with the accompanying drawings, forming a part of this specification, and showing web-printing presses embodying all the features of the invention in their preferred form as applied in connection with four-press and two-press machines.

Referring to Figure 1 of the drawings, which is a diagrammatic side elevation of a press printing from four webs, which webs may be of double width forming an octuple press or of single width forming a quadruple press, the machine shown consists of four web-printing mechanisms arranged with two mechanisms at each end of the machine, one above the other, all these four mechanisms being arranged in line—that is, in the same vertical planes—with their cylinders parallel, so that the webs all run in the same vertical planes toward the longitudinal center of the machine and a straight run of all the webs is secured, and two or more of them may readily be associated for delivery together by apparatus located between the web-printing mechanisms. In the form shown each of the printing mechanisms, which are lettered, respectively, $A'$ $A^2$ $A^3$ $A^4$, has first and second pairs of type and impression cylinders, lettered, respectively, $t$ $t'$ and $i$ $i'$, and the type-cylinders of the printing mechanisms are provided with inking mechanisms 10, which may be of any suitable form, the printing mechanisms preferably having their type and impression cylinders and inking mechanism arranged with the row of cylinders reflexed outward toward the end of the press, so as to extend partly in a vertical and partly in a horizontal plane, as shown, instead of with the cylinders directly above each other or in the same horizontal planes, so as to avoid great length or height of the press and bring all the cylinders and inking mechanisms into position for the most convenient access and the best lead of the webs. The printing mechanisms at opposite ends of the press are arranged end to end in the construction shown, so that the webs run toward each other, and between the printing mechanisms $A'$ $A^2$ at one end of the press and the printing mechanisms $A^3$ $A^4$ at the opposite end of the press are arranged two longitudinal folders F F′, these longitudinal folders being arranged to face—that is, with their folding inclines pointing in opposite directions and toward the end of the press next which they are respectively placed. The longitudinal folders F F′ respectively deliver the folded web or webs passing over them to delivery mechanisms G G′, which may be of any suitable form and are shown as having the final delivery-tapes 11 12, delivering at the side of

the press, in line with the longitudinal folder F F′, so that the products from the two folders F F′ are delivered at the side of the press between the web-printing mechanisms.

As shown in full lines in the drawings, the webs $x'$ $x^2$ $x^3$ $x^4$, corresponding to the different printing mechanisms A′ $A^2$ $A^3$ $A^4$, are guided and delivered to the folders F F′ as follows: The web $x'$ passes from the web-roll X′ at the end of the press over guides 1, through the printing mechanism A′, and from the top of this mechanism passes approximately directly to the rear side of the longitudinal folder F, turning around the last guide 1 and then over the roll $f$ at the top of the longitudinal folder F to the latter. The web $x^2$ from web-roll $X^2$ at the end of the press passes over guide 2, through the printing mechanism $A^2$, then horizontally at the top of the press, and downward around guide 2 and over other guides 2 to a point at the rear of the folder F, turning around the last guide 2 to the roll $f$, where it is associated with the web $x'$ and passes with the latter to the longitudinal folder F. At the opposite end of the press the webs $x^3$ and $x^4$ pass from their respective web-rolls $X^3$ $X^4$ over their respective guides 3 4 through their respective mechanisms $A^3$ $A^4$ and over roll $f'$ to the folder F′ in the same manner as above described in connection with the webs $x'$ $x^2$, the arrangement of parts and run of the webs at the opposite ends of the press being shown as exactly the same. As shown in full lines in the drawings, therefore, two products are being delivered, each one made up of two webs printed at the ends of the machine corresponding to the respective longitudinal folders. The products delivered by this press may be varied widely, however, as it is possible to run all the webs or any number of the webs to either one of the folders, so that all the webs may be delivered by a single folder or two of the webs by each folder, as above described, or one web by one of the folders and three of the webs by the other folder. I have shown also a slitter $s$, which may be positioned as shown or at any other convenient point at or near the receiving ends of the folders or elsewhere for the convenient lead of some or all of the webs thereto without excessive difference in the length of run of the webs and by which slitter all the webs may be slit or some of the webs may be slit and others delivered without slitting and folded about the slit web or webs and various products be thus secured.

The formation of the different products will be readily understood from the drawings and above description by those skilled in the art without further explanation; but for the purpose of illustration I have shown in dotted lines in the drawings the delivery of the webs $x^2$ $x^4$ by the folder F and delivery mechanism G, with the webs $x^2$ $x^4$ slit and the web $x'$ folded about the slit webs $x^2$ $x^4$, so that the sheets from webs $x^2$ $x^4$ are inset within the longitudinally-folded sheets from web $x'$. With this arrangement the webs $x'$ $x^3$ are delivered as before; but the webs $x^2$ $x^4$ instead of passing directly to the folder pass thereto over the slitter $s$, the web $x^4$ passing to the slitter from the guide 4 at the top of the press around another guide 6 above the slitter $s$, and thus over the slitter, and thence to the folder F with the web $x^2$. The web $x^3$ is thus delivered by the folder F′ to form a product separate from the other three webs; but it is obvious that this web also may be delivered by the folder F inset with webs $x^2$ $x^4$ within web $x'$ by leading the web $x^3$ to the slitter $s$, and thence to the folder F, or the web $x^3$ may be led directly to the folder F without slitting and the slit webs $x^2$ $x^4$ inclosed within the unslit webs $x'$ $x^3$ by leading the web $x'$ around roll 1 and over roll $f$ to the folder F, the webs $x^2$ $x^4$ past the slitter $s$, around roll 2 and over roll $f$ to folder F under the web $x'$, as shown in dotted lines in the drawings, and the web $x^3$ over the roll 3 and then under the rolls 4 2 and over roll $f$ to the folder F under the webs $x'$ $x^2$ $x^4$.

With the arrangement of web-printing and delivery mechanisms shown and above described any suitable arrangement for mounting the web-rolls may be used; but I prefer to combine therewith means for mounting a plurality of web-rolls for each of the printing mechanisms in such a manner that when one web-roll is exhausted or about to be exhausted the web from another web-roll may be led to the printing mechanism without shifting the roll, and then a new roll may be substituted for the exhausted roll without interfering with the run of the new web and so that the web may be led from the substituted roll to the printing mechanism without shifting the roll. The specific arrangement for this substitution of web-rolls may be varied; but, as shown, the press is provided with two web-supports 13 14 for each printing mechanism, these supports 13 14 for each printing mechanism being arranged in such position relatively to each other and to the printing mechanism that a web from a roll in either of these supports may be led to the printing mechanism without interfering with the other roll and a new roll substituted for an exhausted roll in either of the supports without interfering with the run of the web from a roll in the other support. As shown in connection with printing mechanisms A′ $A^2$, the rolls X′ $X^2$ in supports 13, from which the webs are passing to the respective printing mechanisms, are approximately full and new full web-rolls Y′ $Y^2$ have been substituted in supports 14 for previously-exhausted rolls in the same supports and are in position for the ends of the webs $y'$ $y^2$ to be led to the respective printing mechanisms A′ $A^2$ when web-rolls X′ $X^2$ are exhausted, and new rolls can then be substituted in supports 13 for rolls X′ $X^2$ without interfering with the run of webs $y'$ $y^2$, and thus be ready for use when web-rolls Y′ $Y^2$ are exhausted. In connection with printing

mechanisms $A^3$ $A^4$ the showing is the same, except that web-rolls $X^3$ $X^4$ in supports 13 are shown as just about to be exhausted and the path of the webs $y^3$ $y^4$ from full web-rolls $Y^3$ $Y^4$, mounted in supports 14 to the respective printing mechanisms $A^3$ $A^4$, is shown in dotted lines, so that it is seen that the run of neither web is interfered with by the substitution of a new roll of the other web.

The supports 13 for the lower web-rolls $X'$ $X^3$ are shown as mounted on carriages 15, so as to be run endwise into the press below the webs $y'$ $y^3$ and inside the web-rolls $Y'$ $Y^3$. This is a convenient and compact construction; but it will be understood that the arrangement of these roll-supports may be varied, all the rolls being mounted vertically in line at the end of the press or otherwise in any suitable manner to secure the result desired. The webs from the new rolls may be threaded into the machine independently of the webs from the rolls exhausted or about to be exhausted or the ends of the new webs to be introduced may be attached to the webs for which they are to be substituted, and thus led to the printing mechanism, my invention being applicable in connection with either method of threading the new webs.

It will be seen that this machine, with the web-printing mechanisms arranged in the same vertical planes at opposite ends of the press and with the folding and delivery mechanisms facing in opposite directions and away from each other toward the opposite ends of the press, provides for most convenient access to the lower printing and inking mechanisms and to the front of the folders and delivery mechanism with ample space for convenient work, while at the same time the total length of the press is small. Considering the lower printing mechanisms $A'$ $A^3$ in connection with the folders F F' and delivery mechanisms G G', it will be seen that the lower type-cylinders $t$ of mechanisms $A'$ $A^3$ and their inking mechanisms are readily and conveniently accessible from the spaces S between these printing mechanisms and the delivery mechanisms G G', and that the front of these folders and of the delivery mechanisms are readily accessible from the same spaces, and that large and convenient space for the attendant is provided by this arrangement with a short press, as all the space left between the delivery mechanisms and the printing mechanisms is available for the attendant and without interference, since the gearing of the two delivery mechanisms, which is on their rear sides, is brought into the space T between the folders and out of the way of the attendant. The upper type-cylinders $t'$ and their inking mechanisms in these presses are readily accessible from the rear or above in the spaces between the printing mechanisms and the webs $x^2$ $x^4$, which space is also utilized in threading the webs. Thus convenient access and abundant space for the attendant is provided in connection with these lower printing mechanisms and the delivery mechanisms. In connection with the upper printing mechanisms $A^2$ $A^4$ also abundant space and convenient access to the lower type-cylinders $t$ and their inking mechanisms are secured within the spaces S between the webs $x'$ $x^2$ and the webs $x^3$ $x^4$, the webs $x^2$ $x^4$ preferably being led for this purpose as shown—that is, horizontally from the top of the press for a sufficient distance to secure the desired space and then downward to the folders. The upper type-cylinders $t'$ and their respective inking mechanisms are readily accessible from the top of the press, as usual in such constructions. By the arrangement of the folding and delivery mechanisms, as shown, also the webs may be led to the respective folders in opposite directions from the center toward the ends of the press, and all or some of the webs may be led to either of the mechanisms without substantial difference in the length of the run of the webs from the different printing mechanisms, this construction also permitting the lead of the webs to the different delivery mechanisms for the various products with the least interference with each other, so that a very large variety of products may be secured.

It will be understood that the features of the invention, consisting in the combination of web-printing mechanisms and delivery mechanisms arranged as described, are not limited to a construction in which a plurality of printing mechanisms are arranged at each end of the press, although such a construction is preferred and is included within the broad invention covered by this application; but the invention includes also certain combinations which may comprise but a single web-printing mechanism at each end of the press. Such a two-web-press machine is shown in diagrammatic side elevation in Fig. 2, this press being shown as the same in general construction and arrangement of printing mechanisms and folding and delivery mechanism as in the case of the two lower printing mechanisms of the press shown in Fig. 1 and above described, so that the same letters of reference may be applied as to corresponding parts in Fig. 1, and the construction of Fig. 2 will be fully understood from the previous description of the four-press machine of Fig. 1, so that no further description of this two-press construction is required.

In another application, Serial No. 47,429, filed February 15, 1901, now Letters Patent No. 671,061, dated April 2, 1901, and forming a division of the present application, I have claimed specifically the construction shown in Fig. 1 of this application, together with certain combinations limited to a plurality of web-printing mechanisms arranged one above the other at each end of a press, with folding and delivery mechanisms in the space between them.

What I claim is—

1. The combination with a plurality of web-printing mechanisms arranged in the same

vertical planes with their cylinders parallel, of two folding and delivery mechanisms having longitudinal folders arranged in line with and between said web-printing mechanisms with the folders facing in opposite directions and away from each other toward the opposite ends of the press, substantially as described.

2. The combination with a plurality of web-printing mechanisms arranged in the same vertical planes with their cylinders parallel, of two folding and delivery mechanisms arranged in line with and between said web-printing mechanisms with the front side of the folding and delivery mechanisms facing in opposite directions and away from each other toward the respective ends of the press, substantially as described.

3. The combination with a plurality of web-printing mechanisms arranged in the same vertical planes with their cylinders parallel, of folding and delivery mechanism arranged in line with and between said web-printing mechanisms, and pairs of web-roll supports, as 13, 14, for each printing mechanism arranged at the opposite ends of the press and positioned for the lead to the respective printing mechanisms of a web from a roll mounted in either of the corresponding pair of supports and to permit the substitution of a full web-roll for an exhausted roll in either support of a pair while the printing mechanism is running on a web from a web-roll mounted in the other support of said pair, substantially as described.

4. The combination with a plurality of web-printing mechanisms arranged in the same vertical planes with their cylinders parallel, of two longitudinal folders arranged in line with said web-printing mechanisms with the folders facing in opposite directions and away from each other toward the opposite ends of the press, substantially as described.

5. The combination with a plurality of web-printing mechanisms arranged in the same vertical planes with their cylinders parallel, of two longitudinal folders arranged in line with said web-printing mechanisms with the folders facing in opposite directions and away from each other toward the opposite ends of the press, and means for directing the webs from the printing mechanisms to either of the longitudinal folders or partly to one longitudinal folder and partly to the other, substantially as described.

6. The combination with a plurality of web-printing mechanisms arranged in line with each other, with their cylinders parallel, of two folding and delivery mechanisms having longitudinal folders arranged in line with and between said web-printing mechanisms, with the folders arranged back to back and facing toward the opposite ends of the press.

7. The combination with a plurality of web-printing mechanisms arranged in line with each other, with their cylinders parallel, of two folding and delivery mechanisms arranged in line with and between said web-printing mechanisms, with the front side of the folding and delivery mechanisms facing in opposite directions and away from each other toward the respective ends of the press.

8. The combination with a plurality of web-printing mechanisms arranged in line with each other with their cylinders parallel, of two longitudinal folders arranged in line with said printing mechanisms, with the folders arranged back to back and facing toward the opposite ends of the press.

9. The combination with a plurality of web-printing mechanisms arranged in line with each other, with their cylinders parallel, of two longitudinal folders arranged in line with said web-printing mechanisms, with the folders arranged back to back and facing toward the opposite ends of the press, and means for directing the webs from the printing mechanisms to either of the longitudinal folders or partly to one longitudinal folder and partly to the other.

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

WILLIAM SPALCKHAVER.

Witnesses:
F. W. H. CRANE,
E. L. SPEIR.