

No. 697,558.

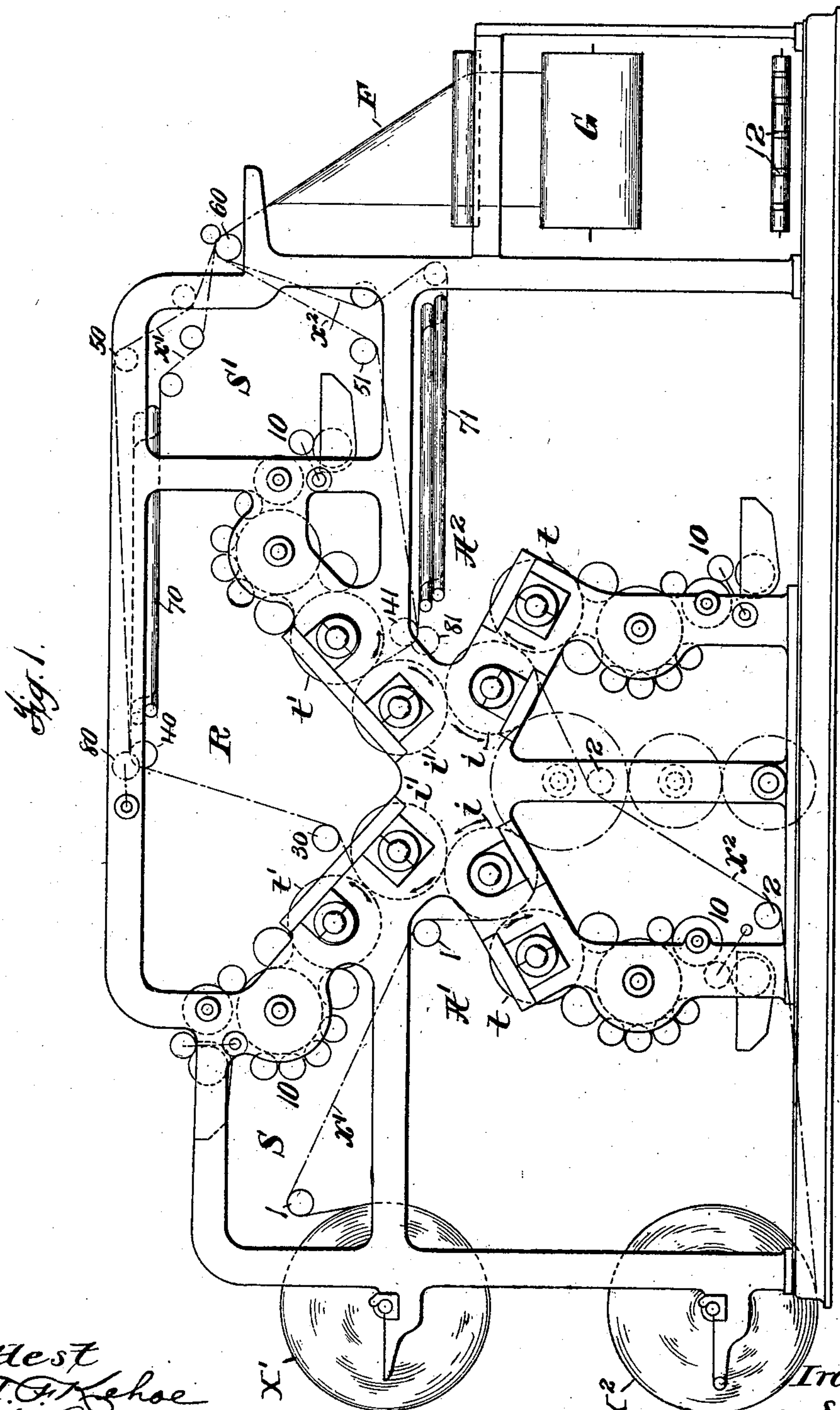
Patented Apr. 15, 1902.

W. SPALCKHAVER.  
PRINTING PRESS.

(Application filed Dec. 31, 1897.)

(No Model.)

3 Sheets—Sheet 1.



Attest  
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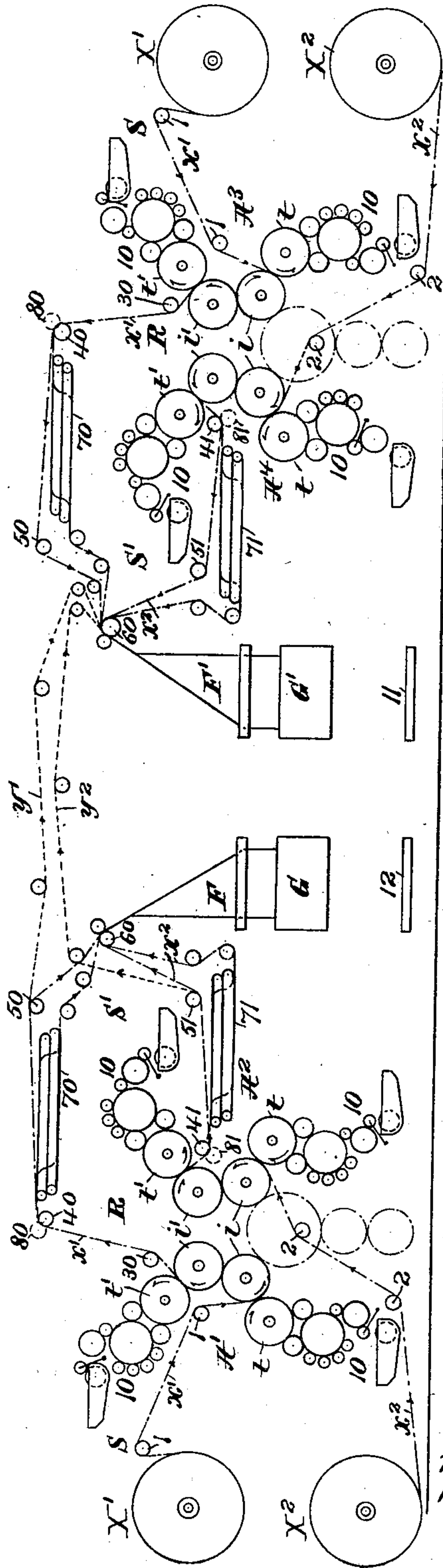
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(No Model.)

3 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, COPARTNERS AS R. HOE AND COMPANY, OF NEW YORK, N. Y.

## PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 697,558, dated April 15, 1902.

Application filed December 31, 1897. Serial No. 665,032. (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 Printing-Presses, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 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 a most convenient access of the attendants to all the  
15 printing, inking, and delivery mechanisms for the various purposes involved in web-printing in a press of compact form and occupying the minimum of space longitudinally and vertically, and wherein on account  
20 of the close proximity to each other of various parts change may readily be made from an arrangement for printing in black to an arrangement for printing in colors, and vice versa. To that end I propose to combine to-  
25 gether and arrange printing mechanisms in the manner hereinafter pointed out.

My invention further consists in the combination of the mechanisms above referred to with other features of construction.

30 As the invention can be best understood by a description of the same in connection with the drawings, no further brief preliminary description is considered necessary.

Referring to the drawings, Figure 1 is a  
35 side elevation of a press embodying my invention. Fig. 2 shows diagrammatically, in side elevation, a press in which my invention is embodied adapted to simultaneously print and perfect four webs of paper; and Fig. 3  
40 shows diagrammatically a press in side elevation provided with an additional printing mechanism for color-printing.

The press may be of either single or double width. The press shown in Fig. 1 prints  
45 from two webs, being a double press if of single width or a quadruple press if of double width, these printing mechanisms being arranged side by side, the two printing-couples of each printing and perfecting mechanism being arranged vertically one above the

other and being so arranged that the four printing-couples stand on lines radiating from a common center, the impression-cylinders being placed nearest that center and the plate-cylinders farthest therefrom. The  
55 printing mechanisms are all placed in line with their cylinders parallel, so that both the webs run in the same vertical planes and both the webs have a straight run.

Each of the printing and perfecting mechanisms, which are lettered, respectively, A' A<sup>2</sup>,  
60 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  
65 mechanisms 10, which may be of any suitable form, the printing mechanism having their type and impression cylinders and inking mechanisms arranged in diagonal lines instead of with the cylinders directly above  
70 each other or in the same horizontal planes, so as to reduce the length and height of the press and to bring all the cylinders and inking mechanisms into position for the most  
75 convenient access and for the best lead of the webs.

The longitudinal folder F is arranged at one end of the press and the stock-rollers X' X<sup>2</sup> at the other end. The longitudinal  
80 folder F delivers the folded web or webs passing over it to delivery mechanism G, which may be of any suitable form and is shown as having the final delivery-tapes 12.

There are shown by broken lines in the drawings the webs x' x<sup>2</sup>, corresponding to the  
85 two printing and perfecting mechanisms A' A<sup>2</sup>, guided and delivered to the folder F, as follows: The web x' passes from the web-roll X' over guide-rollers 1 through the printing mechanism A' and from the top of this  
90 mechanism passes over guide-rollers 30 40 50 60 to the folder. A slit 80 and associating-bars 70 are provided for associating the two webs, if desired. The web x<sup>2</sup> passes from the  
95 web-roll X<sup>2</sup> over guide-rollers 2 through the printing and perfecting mechanism A<sup>2</sup> and thence over guide-rollers 41 51 60 to the folder F. A slit 81 and associating-bars 71 are provided, as in connection with the other web.

It will be seen that this machine provides 100



very convenient access to the lower type-cylinder  $t$ , impression-cylinder  $i$ , and inking-rolls of printing and perfecting mechanism  $A'$  in the space between the latter mechanism and the roll  $X^2$ , that a suitable space for analogous purposes is provided between the printing and perfecting mechanisms  $A^2$  and the delivery, that convenient access to the upper elements of the printing and perfecting mechanisms is afforded in spaces  $R$ ,  $S$ , and  $S'$ . Convenient access and abundant space for the attendants are thus provided. The press is at the same time very compact, occupying a minimum of space both in height and length. It also has great simplicity, practically embodying, as it does, two printing-machines in a single frame, and it is therefore built with comparative ease and economy. A further advantage of this arrangement is that the proximity thus obtained of the impression-cylinders of the two printing and perfecting mechanisms is such that they may be readily used to cooperate in color-printing and the web passed to and fro from one printing and perfecting mechanism to the other, as shown in Fig. 3 and hereinafter described, the change from the arrangement for printing in black to that for printing in colors being made with great quickness and convenience.

In Fig. 2 I have shown my invention as applied to 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 consisting of two pairs of web printing and perfecting mechanisms, one pair arranged at each end of the machine, and the two printing and perfecting mechanisms of each pair being arranged as shown in Fig. 1, all these four printing and perfecting mechanisms being arranged in line with their cylinders parallel, so that the webs all run in the same vertical plane and from the ends toward the center of the machine, whereby 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 and perfecting mechanisms. As shown in the drawings, these four printing and perfecting mechanisms are arranged side by side—that is, one behind the other and in substantially the same horizontal planes—instead of one above the other.

The letters of reference applied to the several parts shown in Fig. 1 are applied to corresponding parts in Fig. 2, the parts shown on the right and left hand sides of Fig. 1 being alike, except that the printing and perfecting mechanisms on the right-hand side are for convenience of reference herein referred to as  $A^3$  and  $A^4$ . Between the printing mechanisms  $A'$  and  $A^2$  at one end of the press and the printing mechanisms  $A^3$  and  $A^4$  at the other are arranged two longitudinal folders  $F F'$ , these longitudinal folders being arranged to face each other—that is, with

their folding inclines pointing toward each other and toward the center of the press. The longitudinal folders  $F F'$  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 respectively with the longitudinal folders  $F F'$ , so that the products of the two folders  $F F'$  are delivered at the side of the press between the web printing and perfecting mechanisms.

As shown in broken lines in the drawings, the webs corresponding to the different printing and perfecting mechanisms  $A' A^2 A^3 A^4$  are guided and delivered to the folders  $F F'$  in a manner which has been described with reference to the printing mechanisms  $A' A^2$  and folder  $F$  in the explanation of Fig. 1. By reason, however, of the number of webs and the position of the folders  $F F'$  the products of this press may be conveniently and widely varied, as it is possible to run all the webs over either folder, as is suggested by the broken lines  $y' y^2$  in Fig. 2, or two of the webs may go to each folder, or one of the webs to one of the folders and three of the webs to the other folder. If desired, also, the slitters 80 81 and associating-bars 70 71 may be brought into operation to vary the character of the products. Thus 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, as will be understood by one skilled in the art. A great variety of combinations may thus be secured, and this, moreover, may be done without requiring any excessive difference in the length of the run of the webs.

It will be seen that in this machine, with the web-printing mechanisms arranged in line at opposite ends of the press and side by side and with the folding and delivery mechanisms placed between the printing mechanisms, provision is made for very convenient access to all the elements of the printing and perfecting mechanisms and to the front of the folders and delivery mechanisms, with ample space for convenient work, while at the same time a minimum height and length are secured. Further, by the arrangement of the folding and delivery mechanisms shown the webs may be led to the respective folders in opposite directions from the ends toward the center of the press, and some or all 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 feature of the invention above described, consisting in the combination of web-printing mechanisms



and delivery mechanisms arranged as described, is 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 in itself forms a part of the invention; but the invention also includes certain combinations including but a single web-printing mechanism at each end of the press.

10 In Fig. 3 there is shown, in combination with the two printing and perfecting mechanisms, a color attachment consisting of a plate-cylinder Z and inking mechanism 13, which plate-cylinder coacts with the impression-cylinder  $i'$  of the printing and perfecting mechanisms A<sup>2</sup>. With this addition the mechanism may be used in color-printing for giving a single web two impressions on one side and three on the other instead of printing and perfecting two webs in black. When so used, the course of the web  $x'$  is from roll X' over guide-rollers 1 to the left-hand impression-cylinder  $i$ , where it receives an impression in a color or in black, thence over right-hand impression-cylinder  $i$ , where it receives a second impression in color or in black upon the same side, thence to the left-hand impression-cylinder  $i'$ , where it receives an impression on the opposite side in a color or in black, thence under guide-roller 90 to right-hand impression-cylinder  $i'$ , on which impression-cylinder two imprints are received—to wit, from the plate-cylinder Z and the plate-cylinder  $t'$ —thence over guide-rollers 41 51 60 to the folder. While the plate-cylinder Z is shown as coacting with the impression-cylinder  $i'$ , this is not requisite, as it may be provided with a special impression-cylinder. The color attachment is preferably placed in the V-shaped space R above the center of the machine, which, it will be observed, is the only place within the frame of the press where it can be conveniently placed, as it is desirable to leave the press free at other points for convenience of access.

Of course the mechanism may be used without the attachment for giving two imprints to both sides of the web.

What I claim is—

50 1. In a printing-press, the combination of two printing and perfecting mechanisms, each of said mechanisms comprising a pair of printing-couples, the two couples of each printing and perfecting mechanism being arranged one above the other and the four printing-couples being arranged in radii from a common center, the impression-cylinders of each couple being placed nearest the center and the inking mechanism for each couple being placed farthest from the center in the case of each printing mechanism, all of the printing mechanisms being arranged in line and with their cylinders parallel, and means whereby a single web may be led through both said mechanisms for color-printing, or separate webs may be led through said mechanisms

for printing and perfecting a plurality of webs, substantially as described.

2. In a printing-press, the combination of two printing and perfecting mechanisms, each of said mechanisms comprising a pair of printing-couples, the four printing-couples being arranged in radii from a common center, the impression-cylinders of each couple being placed nearest the center and the inking mechanism for each couple being farthest from the center in the case of each printing mechanism, all of said mechanisms being arranged in line with their cylinders parallel, means whereby a single web may be led through both said mechanisms for color-printing, or separate webs may be led through said mechanisms for printing and perfecting a plurality of webs, and a fifth printing mechanism arranged to coact with said two web printing and perfecting mechanisms in color-printing, substantially as described.

3. The combination of two printing and perfecting mechanisms consisting of a pair of printing-couples arranged in radii from a common center, the impression-cylinders of each couple being placed nearest the center and the inking mechanism for each couple being placed farthest from the center in the case of each printing mechanism, all of said printing mechanisms being arranged in line with their cylinders parallel, means whereby a single web may be led through both said mechanisms for color-printing, or separate webs may be led through said mechanisms for printing and perfecting a plurality of webs, and a third printing mechanism placed in the V-shaped space above the center of the press and arranged to coact with said two web printing and perfecting mechanisms in color-printing, substantially as described.

4. The combination with a plurality of web-printing mechanisms arranged in line with their cylinders parallel, of two folding and delivery mechanisms having longitudinal folders arranged in line with and between said printing mechanisms, with the folders facing in opposite directions and toward each other, and means for guiding the web from the respective mechanisms to either of the folders, substantially as described.

5. The combination with a plurality of web-printing mechanisms at each end of the press, arranged in line with their cylinders parallel and with the printing and perfecting mechanisms at the same end of the press arranged side by side with their printing-couples radiating from a common center, of two folding and delivery mechanisms arranged in line with and between the printing mechanisms at the opposite ends of the press, substantially as described.

6. In a printing-press, the combination with a plurality of web printing and perfecting mechanisms at each end of the press arranged in line with their cylinders parallel and with the printing and perfecting mechanisms at



the same end of the press arranged side by side, of folding and delivery mechanisms arranged in line with and between the printing mechanisms at the opposite ends of the press, substantially as described.

7. In a printing-press, the combination with a plurality of web printing and perfecting mechanisms at each end of the press arranged in line with their cylinders parallel and with the printing and perfecting mechanisms at the same end of the press arranged side by side, of two folding and delivery mechanisms arranged in line with and between the printing mechanisms at the opposite ends of the press, substantially as described.

8. In a printing-press, the combination with a plurality of web printing and perfecting mechanisms at each end of the press arranged in line with their cylinders parallel and with the printing and perfecting mechanisms at the same end of the press arranged side by side, of two folding and delivery mechanisms arranged in line with and between the printing mechanisms at the opposite ends of the press and having longitudinal folders facing in opposite directions and toward each other, substantially as described.

9. In a printing-press, the combination with a plurality of web printing and perfecting mechanisms at each end of the press arranged in line with their cylinders parallel and with the printing and perfecting mechanisms at the same end of the press arranged side by side with their printing-couples radiating from a common center, of two folding and delivery mechanisms arranged in line with and between the printing mechanisms at the opposite sides of the press, and having longitudinal folders facing in opposite directions and toward each other, substantially as described.

10. In a printing-press, the combination with a plurality of web printing and perfecting mechanisms at each end of the press arranged in line with their cylinders parallel and with the printing and perfecting mechanisms at the same end of the press arranged side by side of two folding and delivery mechanisms arranged between the printing and perfecting mechanisms at the opposite ends of the press, and means for guiding the webs

from the respective mechanisms to either of the folders, substantially as described.

11. In a printing-press, the combination with a plurality of web printing and perfecting mechanisms at each end of the press arranged in line with their cylinders parallel and with the printing and perfecting mechanisms at the same end of the press arranged side by side, of two folding and delivery mechanisms arranged between the printing mechanisms at the opposite ends of the press, and having longitudinal folders facing in opposite directions and toward each other, and means for guiding the webs from the respective mechanisms to either of the folders, substantially as described.

12. In a printing-press, the combination with a plurality of web printing and perfecting mechanisms at each end of the press arranged in line with their cylinders parallel and with the printing and perfecting mechanisms at the same end of the press arranged side by side, of two folding and delivery mechanisms arranged in line with and between the printing and perfecting mechanisms at the opposite ends of the press, and means for guiding the webs from the upper type-cylinders of the respective printing and perfecting mechanisms to the folders, with space between the upper and lower webs for access to the upper type-cylinders and inking mechanisms of the two inside printing and perfecting mechanisms, substantially as described.

13. The combination with a plurality of web printing and perfecting mechanisms at each end of the press arranged in line with their cylinders parallel, of two folding and delivery mechanisms each arranged in line with and between said web printing and perfecting mechanisms with the front side of the folding and delivery mechanisms facing in opposite directions and toward each other, 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,  
E. L. SPEIR.