

No. 627,447.

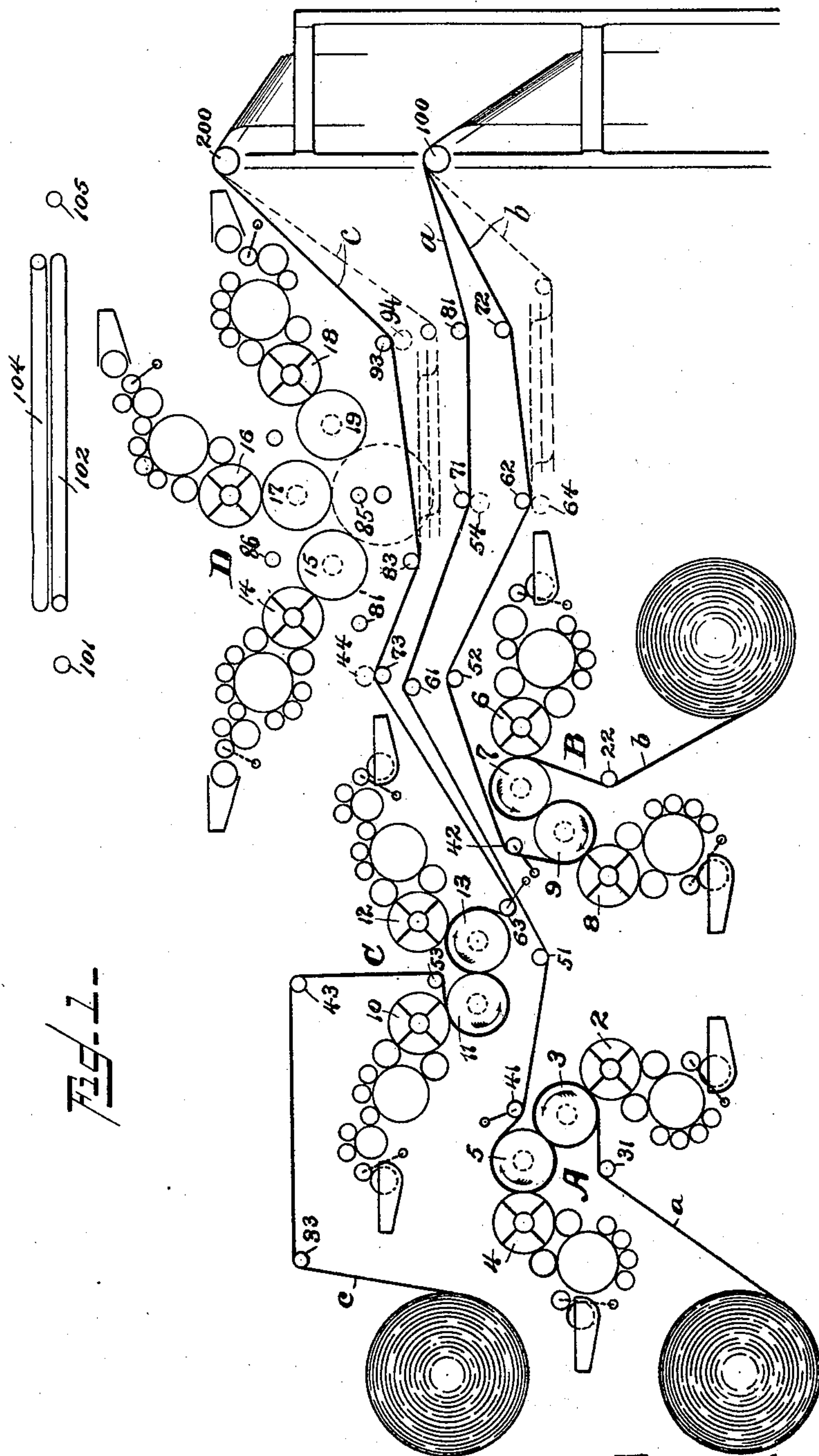
Patented June 20, 1899.

W. SPALCKHAVER.
PRINTING PRESS.

(Application filed Dec. 29, 1897.)

(No Model.)

6 Sheets—Sheet 1.



Attest
T. F. Schoe.
A. V. Bourke

Inventor:
William Spalckhaver
By Philip Phelps Sawyer
Atty

No. 627,447.

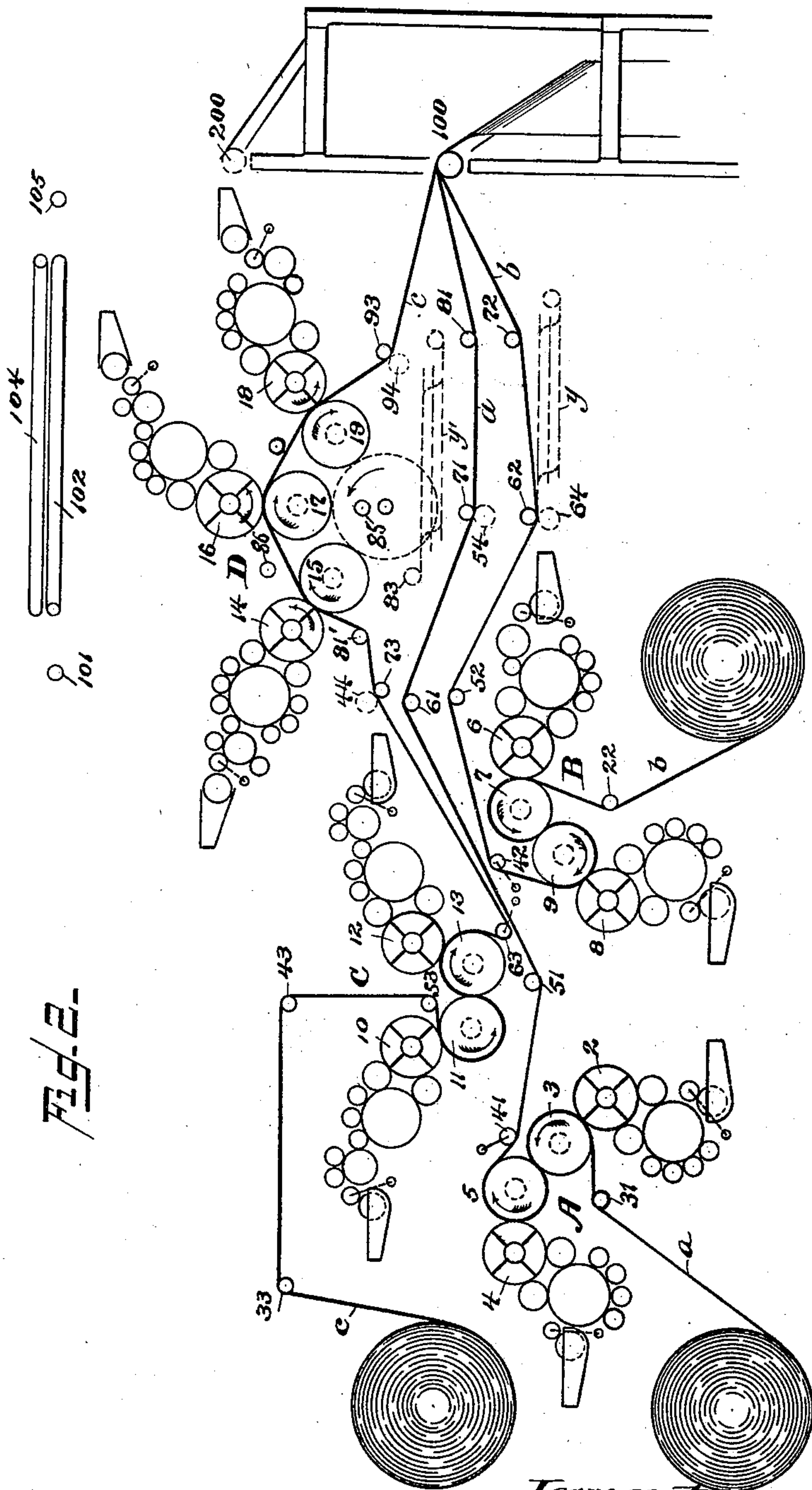
Patented June 20, 1899.

W. SPALCKHAVER.
PRINTING PRESS.

(Application filed Dec. 29, 1897.)

(No Model.)

6 Sheets—Sheet 2



Attest
T. P. Lehoe.
N. W. Bourke.

Inventor
William Spalckhaver
By Philip Phelps Sawyer
Atty

No. 627,447.

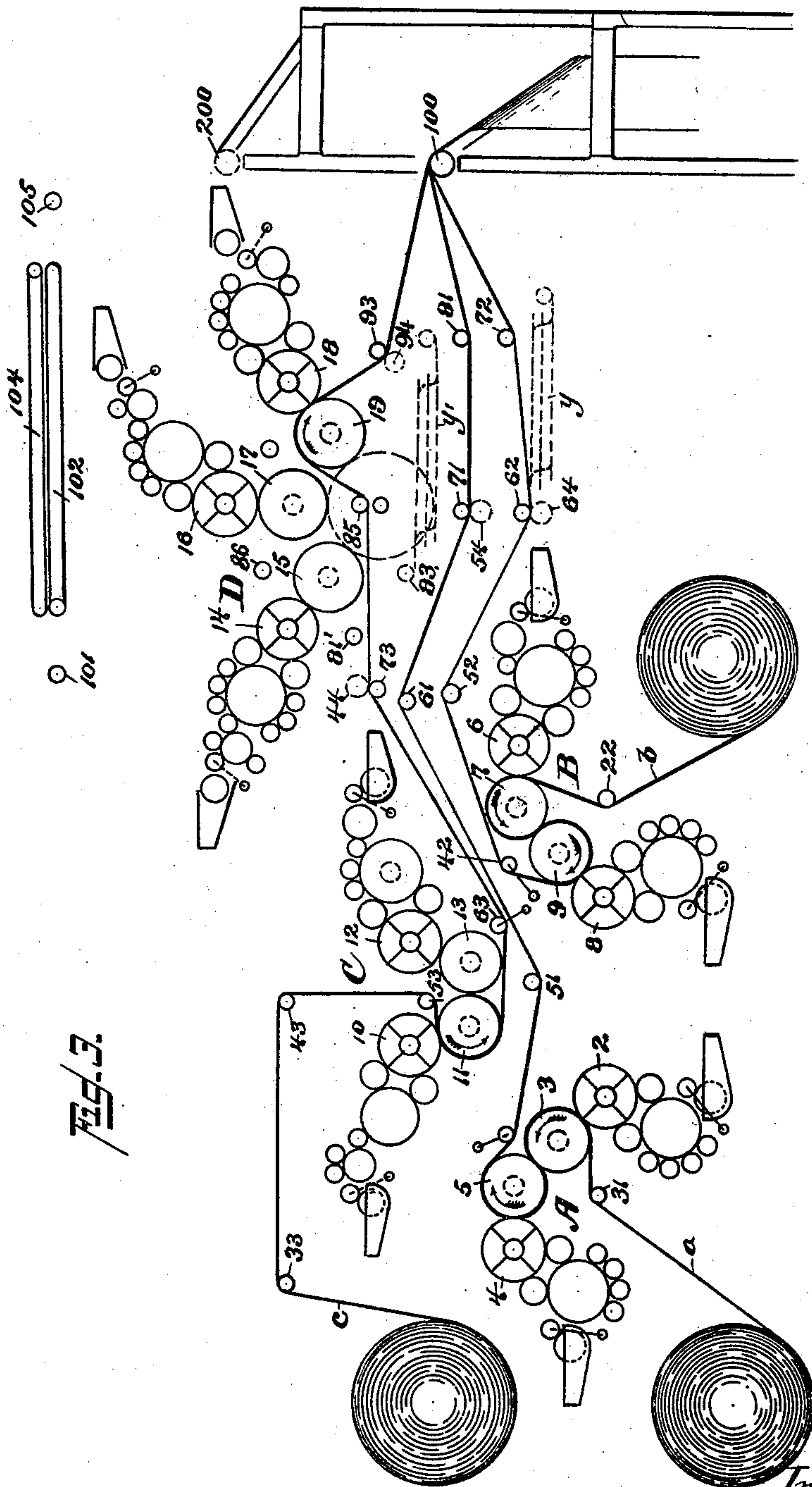
Patented June 20, 1899.

W. SPALCKHAVER.
PRINTING PRESS.

(Application filed Dec. 29, 1897.)

(No Model.)

6 Sheets—Sheet 3.



Attest:
T. F. Kahoe
A. M. Bourke

Inventor
William Spalckhaver
By Philipp Phelps & Sawyer
Attys

No. 627,447.

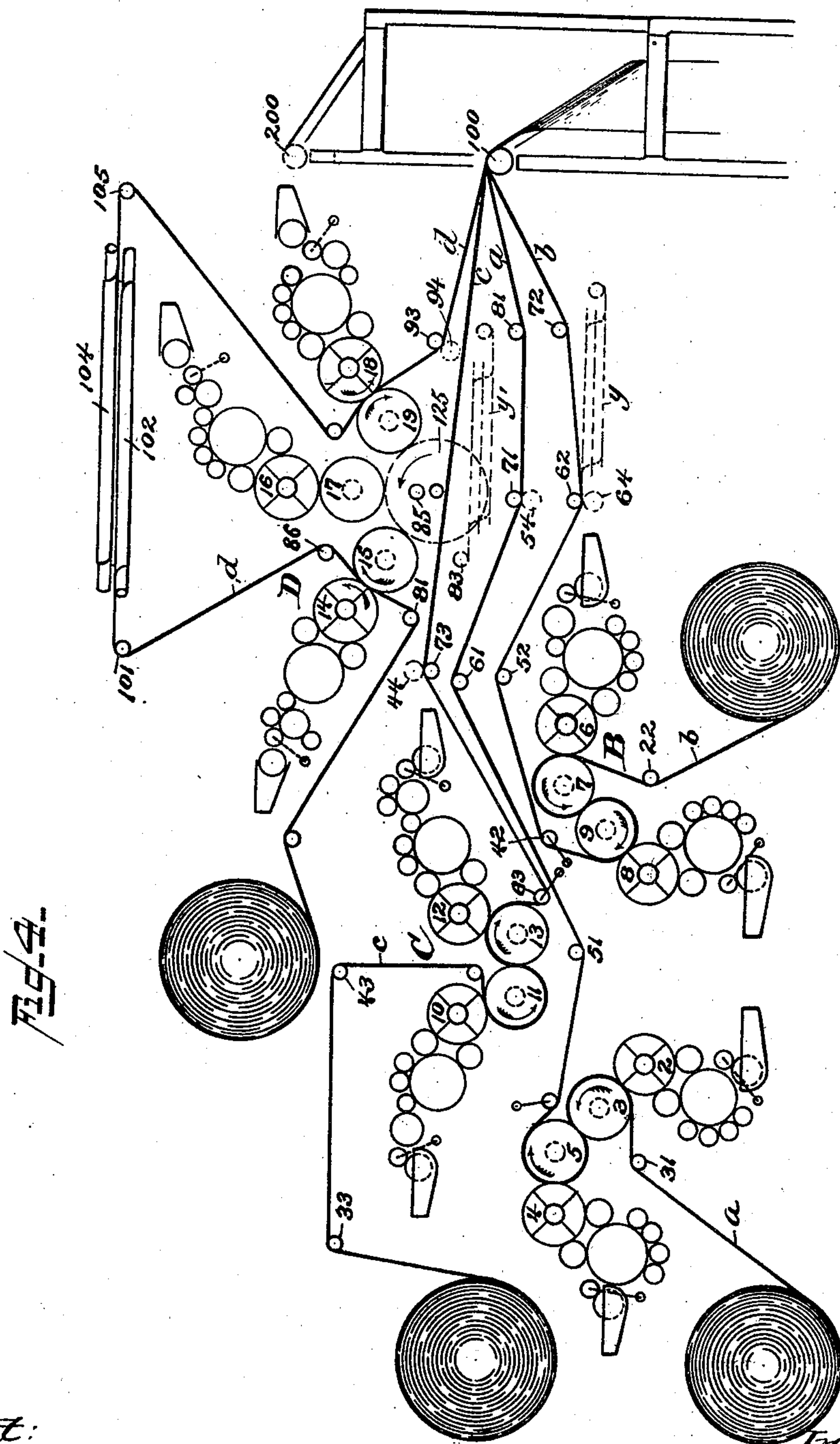
W. SPALCKHAVER.
PRINTING PRESS.

Patented June 20, 1899.

(No Model.)

(Application filed Dec. 29, 1897.)

6 Sheets—Sheet 4.



Attest:
D. A. Kehoe.
N. W. Bourke

Inventor
William Spalckhaver
By Philip Phelps Sawyer
Attys

No. 627,447.

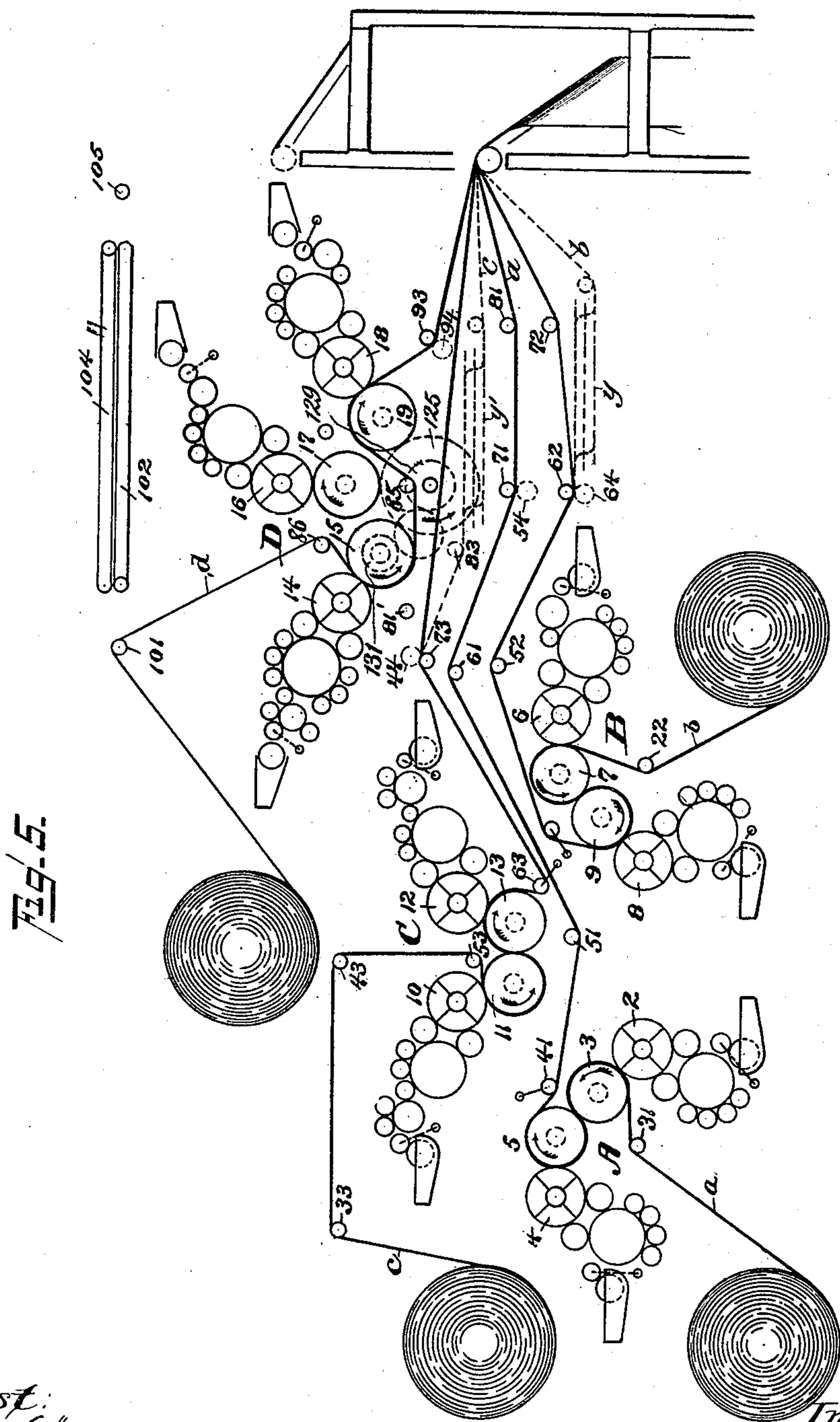
Patented June 20, 1899.

W. SPALCKHAVER.
PRINTING PRESS.

(Application filed Dec. 29, 1897.)

(No Model.)

6 Sheets—Sheet 5.



Attest:
J. F. Kehoe.
A. W. Bourke

Inventor
William Spalckhausen
By Philip Phelps & Sawyer
Attys.

No. 627,447.

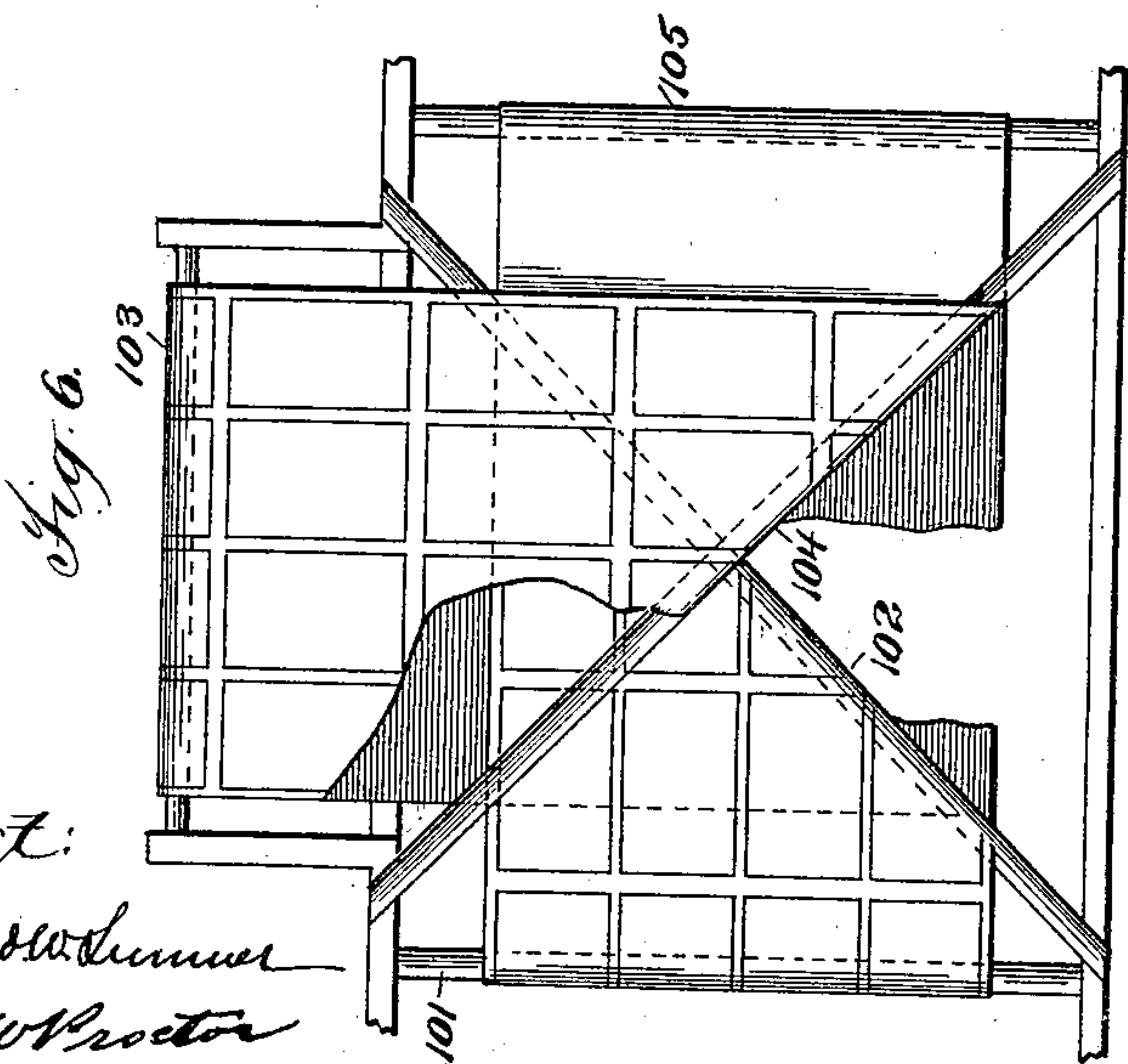
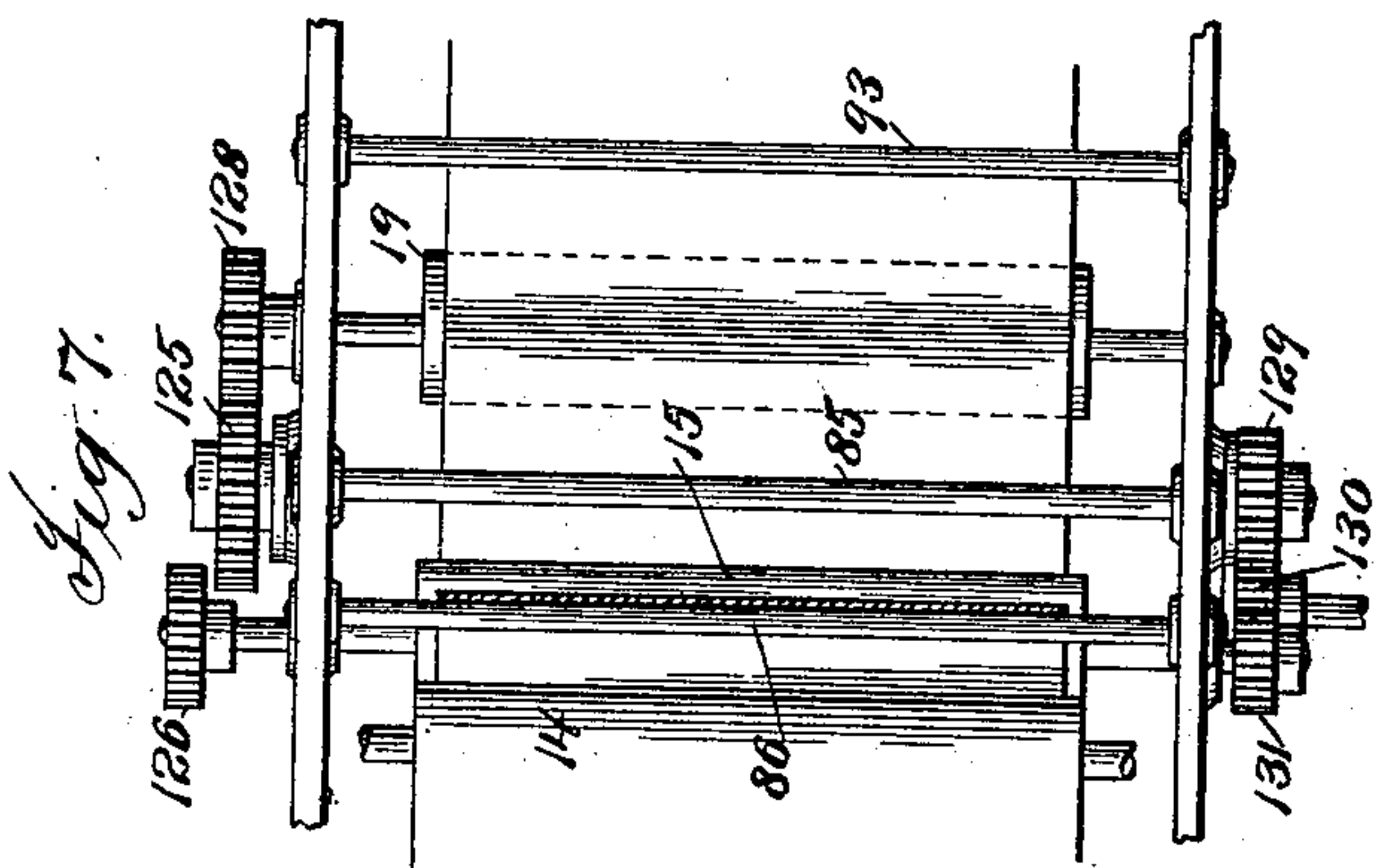
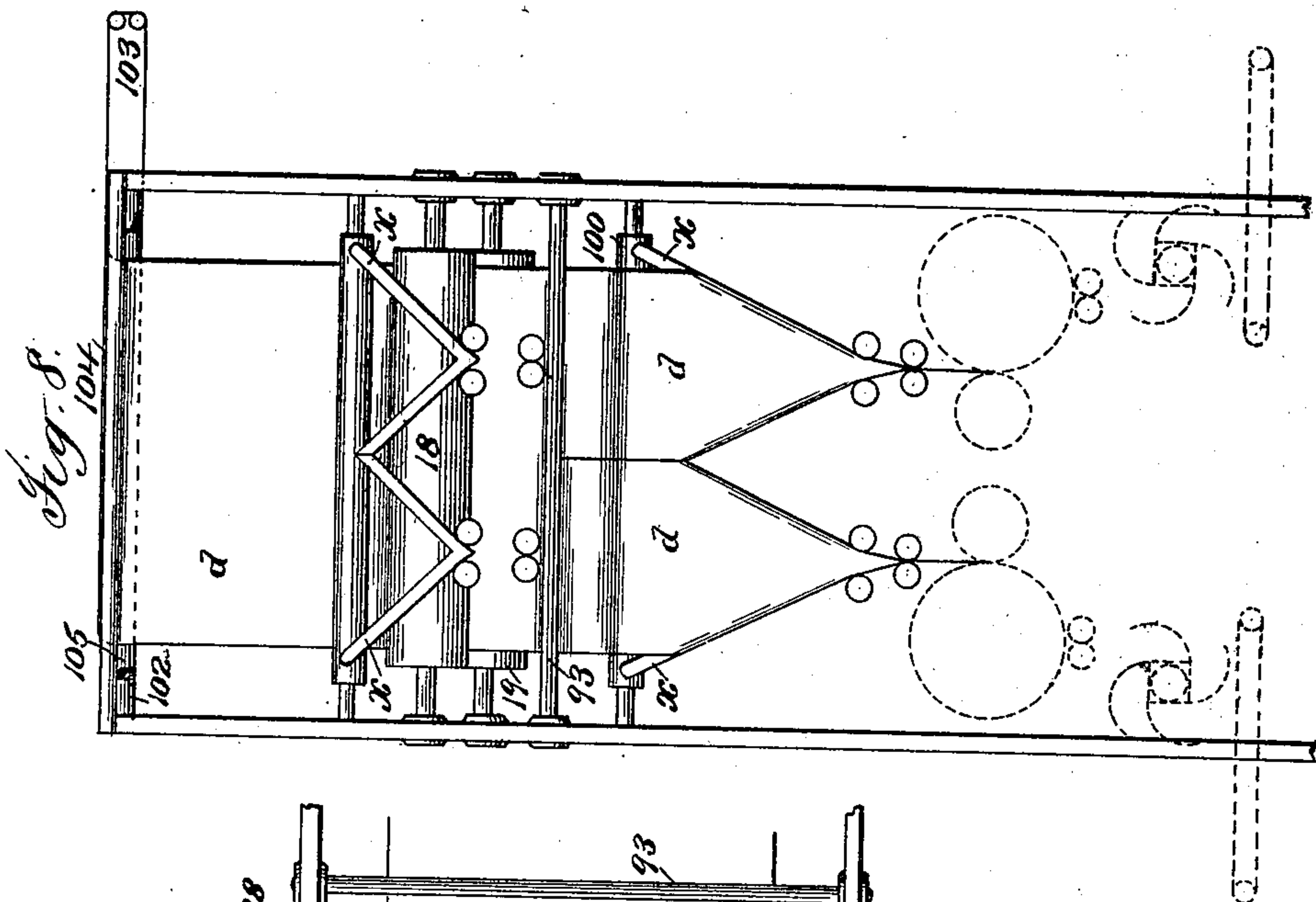
Patented June 20, 1899.

W. SPALCKHAVER.
PRINTING PRESS.

(Application filed Dec. 29, 1897.)

(No Model.)

6 Sheets—Sheet 6.



Attest:

Edw. Sumner
Edw. Proctor

Inventor
William Spalckhaver
by Philipp, Phelps &
Sawyer

his Atty

UNITED STATES PATENT OFFICE.

WILLIAM SPALCKHAVER, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE,
THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF SAME PLACE.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 627,447, dated June 20, 1899.

Application filed December 29, 1897. Serial No. 664,209. (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, (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.

In the present state of the art of printing newspapers it is not only required that the press shall readily produce them in a great variety of sizes, but that one component web entering into the combination of webs composing the same may be printed in several colors, as well as in black; and the object of my present invention is to produce a press which shall be capable of giving such a product and which at the same time shall have an exceptionally large capacity for products printed wholly in black.

The invention consists in certain combinations, including one or more printing and perfecting mechanisms and a plurality of auxiliary printing mechanisms primarily adapted to print on the same side of a web, and with which is preferably combined means for reversing the web or the direction of rotation of cylinders, so that a web may be perfected by the auxiliary mechanisms, all as fully described and claimed hereinafter.

Most of the advantages of my present invention may be secured by combining the auxiliary mechanisms with a single printing and perfecting mechanism; but in practice it will usually be desirable to combine the auxiliary mechanisms with two or more printing and perfecting mechanisms. In the present application I have shown the combination as made with three printing and perfecting mechanisms.

In the accompanying drawings, illustrative of an embodiment of this invention, the framework and gearing are in part omitted to render the illustration perspicuous; but the direction of motion of the various parts indicated by the arrows will be sufficient to enable one skilled in the art to understand the structure and arrangement of the driving-gearing.

The complete machine herein embodied

consists of three printing mechanisms, each of which consists of two printing-couples adapted to print on opposite sides of a web to perfect the same, herein generally referred to as the "main machine," and of a fourth printing mechanism which consists of three printing-couples, each of which is adapted to print upon the same side, and herein generally referred to as the "auxiliary machine."

In the said drawings, Figure 1 is a side elevation of the complete machine, in which the three perfecting mechanisms of the main machine are shown as operating upon separate webs and perfecting the same in black. Fig. 2 is a side elevation of the same machine, in which two webs are being perfected in black by two of the printing-couples of the main machine, while the third web is not only perfected in black by one of the printing-couples of the main machine but has applied to it in addition thereto upon its upper side the three primary colors by the printing-couples of the auxiliary machine. Fig. 3 is a side elevation of the same machine, in which the three webs are perfected in black, the upper web receiving its "recto" impression from one printing-couple of the main machine and its "verso" impression from one printing-couple of the auxiliary machine. Fig. 4 is a side elevation of the same machine, but using the web-reverser, whereby four webs are printed in black, three of which webs are perfected by the primary couples of the main machine, and the fourth is perfected in black by two of the auxiliary printing-machines aided by the transferring mechanism. Fig. 5 is a side elevation of the complete machine, but provided with reversing-gearing whereby part of the mechanisms of the auxiliary machine are reversed, so as to accomplish the perfection of the fourth web. Fig. 6 is a plan view of the web-reverser shown in side elevation in Fig. 4. Fig. 7 is a plan view of so much of the auxiliary machine as is necessary to illustrate its change-gearing whereby the motion of one of its printing-couples is reversed, and Fig. 8 is a diagrammatic front elevation of the delivery end of the machine with the folding and delivery devices for the upper longitudinal folders omitted.

The three perfecting printing mechanisms

of the main machine are respectively designated A, B, and C, and the auxiliary printing-machine or group of three printing-couples is marked D, the whole being geared together so as to run in unison and the printing-machine D being provided, as will hereinafter appear, with reversing means, whereby it may be capacitated to perfect a web when desired, said means being a web-reverser for turning the web or change-gearing whereby one of its couples may run in either direction.

Each of the primary printing mechanisms A, B, and C consists of two printing-couples composed, respectively, of a form and impression cylinder, which are preferably of a length capacitating them to print a double-wide web upon its opposite sides, or, in other words, to perfect the same. The printing mechanism A thus has form-cylinders 2 4 and impression-cylinders 3 5. The printing mechanism B has form-cylinders 6 8 and impression-cylinders 7 9, and the printing mechanism C has form-cylinders 10 12 and impression-cylinders 11 13. The auxiliary printing-machine D consists of three printing-couples each composed of a form and impression cylinder, which are preferably of a length capacitating each of them to print a double-wide web. The three printing-couples of the auxiliary printing-machine are composed of form-cylinders 14 16 18 and coacting impression-cylinders 15 17 19. All of the form-cylinders are respectively provided with suitable ink-ing mechanisms, the fountains of which will be arranged to carry appropriate inks, and some of their fountains will be arranged for ready removal, so that the color of ink supplied to some of the form-cylinders may be readily changed without cleaning out the fountains.

This printing-press is shown as supplied with a delivery apparatus having longitudinal folders x of the usual form and arranged one above the other, so that the webs may be led together to the lower longitudinal folder or folders, or one or more of the webs may be led to the upper longitudinal folder or folders, according to the products desired. With double-wide printing mechanisms, as shown and preferably used, it will be understood that four longitudinal folders may be employed, as shown in Fig. 8, some of which may be out of operation at times, according to the product that is being delivered. If only single-wide webs are to be printed or double-wide webs are to be printed and half of each transferred and superposed upon the other half, it will be understood that each of the upper and lower delivery mechanisms will have but a single longitudinal folder. It will be understood also that while upper and lower delivery mechanisms are indicated this is only for a great variety of products, and the form of the delivery mechanism or mechanisms is not essential to the present invention. Slitters 44, 54, 64, and 94 are provided at suitable

points for dividing the double-wide webs, as usual in double-wide printing-presses, and two transferrers $y y'$ are shown in dotted lines, by which one-half of a web or webs may be transferred and superposed in producing certain products. All the printing mechanisms are shown as arranged in line, so that the general course of all of the webs passing through the printing mechanisms is in the same vertical planes, the delivery mechanism also being placed in line therewith, so as to secure the preferred straight run of the webs. As shown and described above, separate printing-couples—that is, type and impression cylinders—are used for each impression. While this is not absolutely essential, it is much preferable, especially for the different color impressions, as it is difficult otherwise to secure the special underlay and overlay required for each of such impressions.

In order to readily explain the present invention, the construction of the machine as exhibited by Fig. 1 in respect to the run of its webs will first be described. The web a is directed by guides or guide-roller 31 to and around the first impression-cylinder 3, thus receiving an impression upon one side from the form-cylinder 2, and thence passes around the second impression-cylinder 5, which presses it into contact with the second form-cylinder 4, by which it is printed on its second side, and thus perfected. This perfected web passes from the impression-cylinder 5 underneath a stretching-roller 41 and is directed by guides or guide-rollers 51, 61, 71, and 81 to a guide-roller 100, from which it is led to the delivery apparatus, having been slit by slitter 54. The web of paper b is guided by a roller 22 to and around the first impression-cylinder 7, thus receiving an impression upon one side from the form-cylinder 6, and thence passes around the second impression-cylinder 9, which thus presses it into contact with the second form-cylinder 8, by which it is printed upon its second side, thus being perfected. This perfected web passes over a stretching-roller 42 and guides or guide-rollers 52 62 72 to and over the said guiding-roller 100, by which it is carried to the delivery mechanism, having been slit by slitter 64. The web c is guided by means of guides or rollers 33 43 53 to and around the first impression-cylinder 11, thus receiving an impression upon one side from the form-cylinder 10, and thence passes around the second impression-cylinder 13, which presses it into contact with the second form-cylinder 12, by which it is printed upon its second side and thus perfected. This perfected web then passes outward under a stretching-roller 63 and thence is guided by guides or guiding-rollers 73 83 93 to a roller 200 and passes over this to the upper longitudinal folders, having been slit by slitter 44. As shown in full lines in this view, Fig. 1, and as above described, therefore, the two webs a and b pass over the two lower longitudinal folders x and are de-

livered in two streams at opposite sides of the press, while the third web *c* passes over the two upper longitudinal folders α and is delivered similarly or in any other suitable manner. As shown in dotted lines in this view, Fig. 1, the transferrers $y y'$ may be used and half of the webs *b* and *c* transferred and superposed, so as to be delivered by the folders on one side of the press, the web *a* being then not used, or the halves of this web *a* run in with the superposed halves of webs *b* and *c*, one half of web *a* on each of the opposite sides of the press, if desired, or any other suitable combination of the webs being made, according to the products desired. It will be understood that all three webs may be run together over the lower longitudinal folders or the upper longitudinal folders, if desired, and in Figs. 2 to 5 they are shown as all delivered by the lower longitudinal folders.

In Fig. 2 three double rolls are used, as before, the webs *a b* thereof being printed, slit, and delivered, as before, while the third web *c* runs from the guide 73 to a guide 81', from which it passes directly to the auxiliary machine D, entering between the impression-cylinder 15 and form-cylinder 14 of one printing-couple, thence between the impression-cylinder 17 and form-cylinder 16 of the second printing-couple, and therefrom between the impression-cylinder 19 and the type-cylinder 18 of the third printing-couple of the auxiliary printing-machine, and thence is led past the guide 93 to the roller 100 with the other webs, having been slit by slit 94. In this case if the ink-fountain of the type or form cylinder 12 of the printing mechanism C is provided with a suitable one of the primary colors and the inking mechanism of the type or form cylinder 14 with another, and the inking mechanism of the type or form cylinder 16 is provided with a third of the primary colors, and the inking mechanism of the type or form cylinder 18 is supplied with black ink, said web *c* will be printed by the form-cylinder 10 with black upon one side, by the form-cylinder 12 with one of the primary colors, by the form-cylinder 14 with another of the primary colors, by the form-cylinder 16 of the second printing-couple with the last of the primary colors, whereby the colored picture is produced, and such printed web will have added to the same surface by the form-cylinder 18 the key-plate impression in black. Two streams of products at opposite sides of the press are thus obtained, each product being formed of sheets from the two webs *a b*, printed in black, and an outer sheet from web *c*, printed in black on the inner side and in three colors and key-plate in black on the outer side.

In Fig. 3 the webs *a b* are printed, perfected, slit, and delivered as before, while the web *c* passes through the first printing-couple of the printing mechanism C, and is thereby printed upon one side in black, is thence led under the stretching-roller 63 and over

guide-roller 73, thence under a guide 85, thence over the impression-cylinder 19 and between it and its form-cylinder 18, whereby it receives an impression on its opposite side in black, and then is directed past the guide 93, where it is slit by slit 94, and to the roller 100, as before, whereby this web is perfected in black without any change in the ink-fountains from the arrangement for printing in color. If now the auxiliary machine D is supplied with reversing mechanism, whereby the same may be adapted to print and perfect, as well as to print on one side merely, not only may three webs be printed and perfected, as in the case of Fig. 1, but a fourth web may be perfected by a simple passage through said auxiliary machine and be delivered with the said three webs, so as to make a four-web product. Any suitable reversing mechanism for this purpose may be used, and I have shown herein two forms thereof—to wit, a web-reverser for turning the web and change-gearing for changing the direction of movement of one of the printing-couples.

The fourth web-roll is added in suitable bearings, as shown in Fig. 4, and when a web-reverser is used the fourth web *d* is passed over suitable guides to and between the printing-couple 14 15, thence around the turning-bars 101 102 103 104 105 of the web-reverser and, being reversed thereby, is passed through the printing-couple 18 19, and thence out past the slit 94, by which it is divided, to the delivery mechanism, with the other webs, as shown in Figs. 4, 6, and 8, thus forming two four-web products on opposite sides of the press. This fourth web *d* may be similarly printed by a reversing mechanism applied to the driving-gearing of the auxiliary printing mechanism D, as is shown in Figs. 5 and 7, and the reversing mechanism consisting of change-gearing will now be described. The driving-gearing for the auxiliary machine is primarily arranged to move the printing-couples of the auxiliary machine in a common onward direction, as is indicated in Figs. 2 and 4, where the wheel 125 is moved as is indicated by its arrow and meshes directly with the gears on one end of the shafts of the impression-cylinders 15 17 19, respectively.

In order to reverse the run of the printing-couple 14 15, the shaft carrying the wheel 125 is provided at its opposite end with a gear-wheel 129, which gears through an intermediate 130 with a pinion 131 on the shaft of cylinder 15, which carries on its other end the gear 126, which is in position to engage gear 125 when impression-cylinder 15 is driven directly from the gear 125, as shown in Fig. 4. The gear 129 and the gear 130, and also the gears 126 and 125, are arranged to be connected or disconnected by adjusting the gears 126 and 130 longitudinally of their shafts, so as to drive the cylinder 15 in the desired direction, the position of the gearing

in Fig. 7 being such as to reverse the movement of the printing-couple 14 15 from that which it has in Fig. 4 to that given to it in Fig. 5. By this latter arrangement the web from the fourth roll is first led by the guide 86 through the first printing-couple 14 15 of the auxiliary machine D and printed upon one side, thence around guide 85 to the third printing-couple of said machine to be printed upon its second side or perfected, whence it passes outward past the slit 94 and to roller 100 for delivery in common with the other perfected webs over the lower longitudinal folders.

It is obvious that the auxiliary printing mechanisms may be placed in the press elsewhere than where they are shown in the drawings and that various arrangements of such auxiliary printing mechanisms with one or more web printing and perfecting mechanisms may be made so as to embody the present invention. It is usually desired, however, especially in newspaper work, that products formed of two or more sheets, including a color-sheet, should have the color-sheet upon the outside of the product, so that I have shown the auxiliary printing mechanisms as located in such a position that the color-web runs above the other webs and the latter are thus folded within the color-web as they pass over the longitudinal folder; but it will be understood that this is not essential.

What I claim is—

1. The combination with a web printing and perfecting mechanism, of a plurality of web-printing mechanisms adapted primarily to make multiple impressions on one side of a web and arranged to coact with said web printing and perfecting mechanism in color-printing on a single web, and reversing mechanism combined with said printing mechanisms to secure the printing and perfecting of a plurality of webs, substantially as set forth.

2. The combination with a web printing and perfecting mechanism, of three web-printing mechanisms adapted primarily to make multiple impressions on one side of a web and arranged to coact with said web printing and perfecting mechanism in color-printing on a single web, and reversing mechanism combined with said three printing mechanisms to secure the printing and perfecting of a web by said mechanisms, substantially as set forth.

3. The combination with a web printing and perfecting mechanism, of a plurality of web-printing mechanisms adapted primarily to make multiple impressions on one side of the web and arranged to coact with said web printing and perfecting mechanism in printing a web in colors with one of the color impressions printed by the web printing and perfecting mechanism and the other color impressions including the key-plate impression

in black printed by said printing mechanisms, or to print and perfect a web by the other printing-surface of the web printing and perfecting mechanism and the key-plate printing mechanism, substantially as described.

4. The combination with a web printing and perfecting mechanism, of three web-printing mechanisms adapted primarily to make multiple impressions on one side of a web and arranged to coact with said web printing and perfecting mechanism in printing a web in colors with one of the color impressions printed by the web printing and perfecting mechanism and two color impressions and the key-plate impression in black printed by said three printing mechanisms, or to print and perfect a web by the other printing-surface of the web printing and perfecting mechanism and the key-plate printing mechanism, substantially as set forth.

5. The combination with a web printing and perfecting mechanism consisting of two printing-couples, of a plurality of web-printing mechanisms consisting of separate printing-couples and adapted primarily to make multiple impressions on one side of a web and arranged to coact with said web printing and perfecting mechanism in printing a web in colors with one of the color impressions printed by one of the couples of the web printing and perfecting mechanism and the other color impressions and key-plate impression in black printed by said printing mechanisms or to print and perfect a web by the other printing-couple of the web printing and perfecting mechanism and the key-plate printing-couple, substantially as set forth.

6. The combination with a web printing and perfecting mechanism, of a plurality of web-printing mechanisms adapted primarily to make multiple impressions on one side of the web and arranged to coact with said web printing and perfecting mechanism in printing a web in colors with one of the color impressions printed by the web printing and perfecting mechanism and the other color impressions including the key-plate impression in black printed by said printing mechanisms, or to print and perfect a web by the other printing-surface of the web printing and perfecting mechanism and the key-plate printing mechanism, and reversing mechanism combined with said printing mechanisms to secure the printing and perfecting of a web by said printing mechanisms, substantially as set forth.

7. The combination with a plurality of web printing and perfecting mechanisms of a plurality of web-printing mechanisms adapted primarily to make multiple impressions on one side of a web and arranged to coact with one of said web printing and perfecting mechanisms in color-printing on a single web, and reversing mechanism combined with said printing mechanisms to secure the printing

and perfecting of a web by said printing mechanisms, substantially as set forth.

8. The combination with three web printing and perfecting mechanisms, of a plurality of web-printing mechanisms adapted primarily to make multiple impressions on one side of a web and arranged to coact with one of said web printing and perfecting mechanisms in color-printing on a single web, and reversing mechanism combined with said mechanisms to secure the printing and perfecting of four webs simultaneously thereby, substantially as set forth.

9. The combination with a web printing and perfecting mechanism, of a plurality of web-printing mechanisms adapted primarily to make multiple impressions on one side of a web and arranged to coact with said web printing and perfecting mechanism in color-printing on a single web, and reversing mechanism combined with said mechanisms to secure the printing and perfecting of a plurality of webs thereby, said printing mechanisms and said printing and perfecting mechanism being so arranged that the general course of the webs

passing through them is in the same vertical planes, substantially as set forth.

10. The combination with three web printing and perfecting mechanisms, of a plurality of web-printing mechanisms adapted primarily to make multiple impressions on one side of a web and arranged to coact with one of said web printing and perfecting mechanisms in color-printing on a single web, and reversing mechanism combined with said mechanisms to secure the printing and perfecting of four webs simultaneously thereby, said printing mechanisms and said printing and perfecting mechanisms being so arranged that the general course of the webs passing through them is in the same vertical planes, substantially as described.

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

WILLIAM SPALCKHAVER.

Witnesses:

T. F. KEHOE,

A. V. BOURKE.