

No. 627,592.

Patented June 27, 1899.

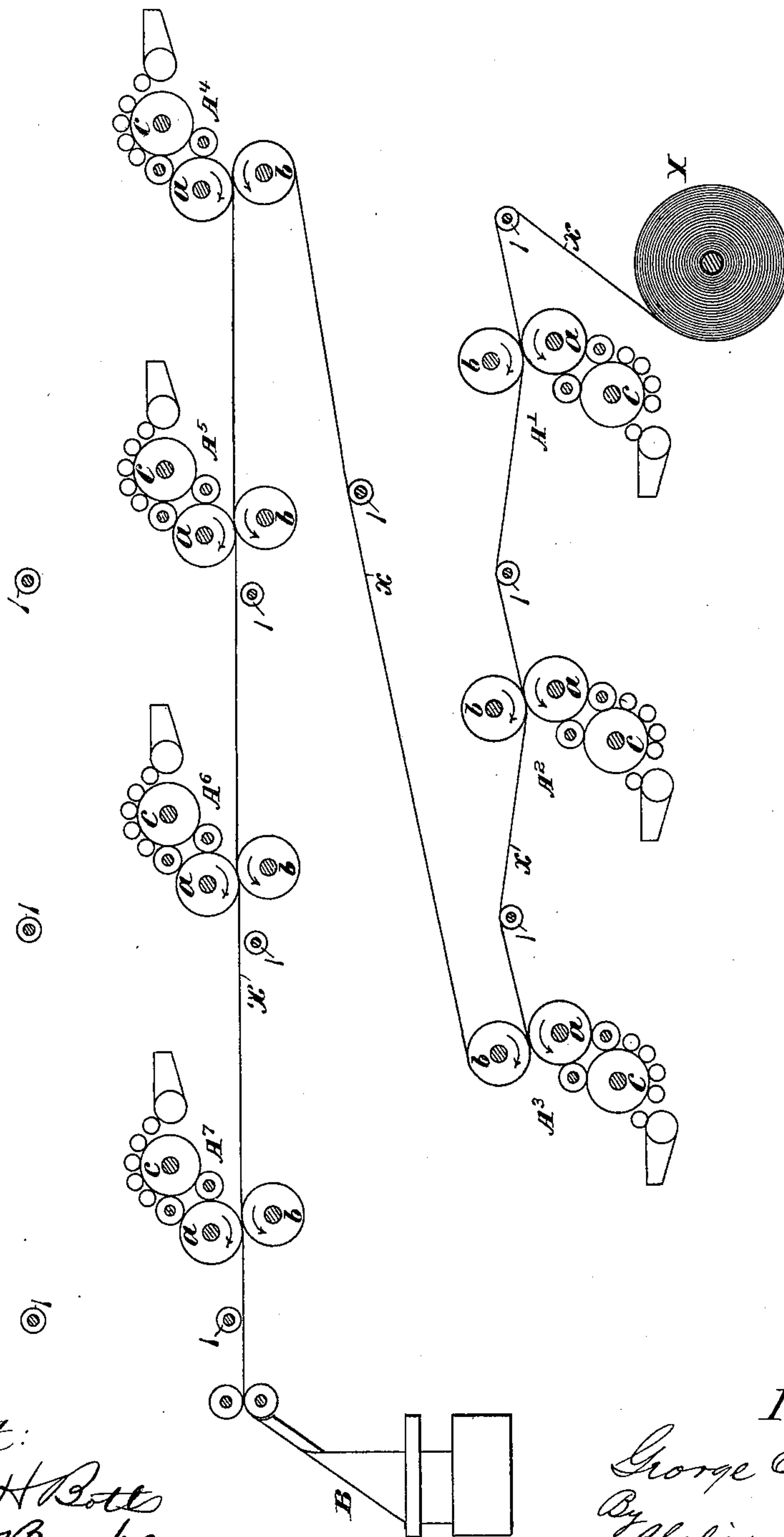
G. E. PANCOAST.  
PRINTING MACHINE.

(Application filed May 13, 1897.)

(No Model.)

4 Sheets—Sheet 1.

*Fig. 1.*



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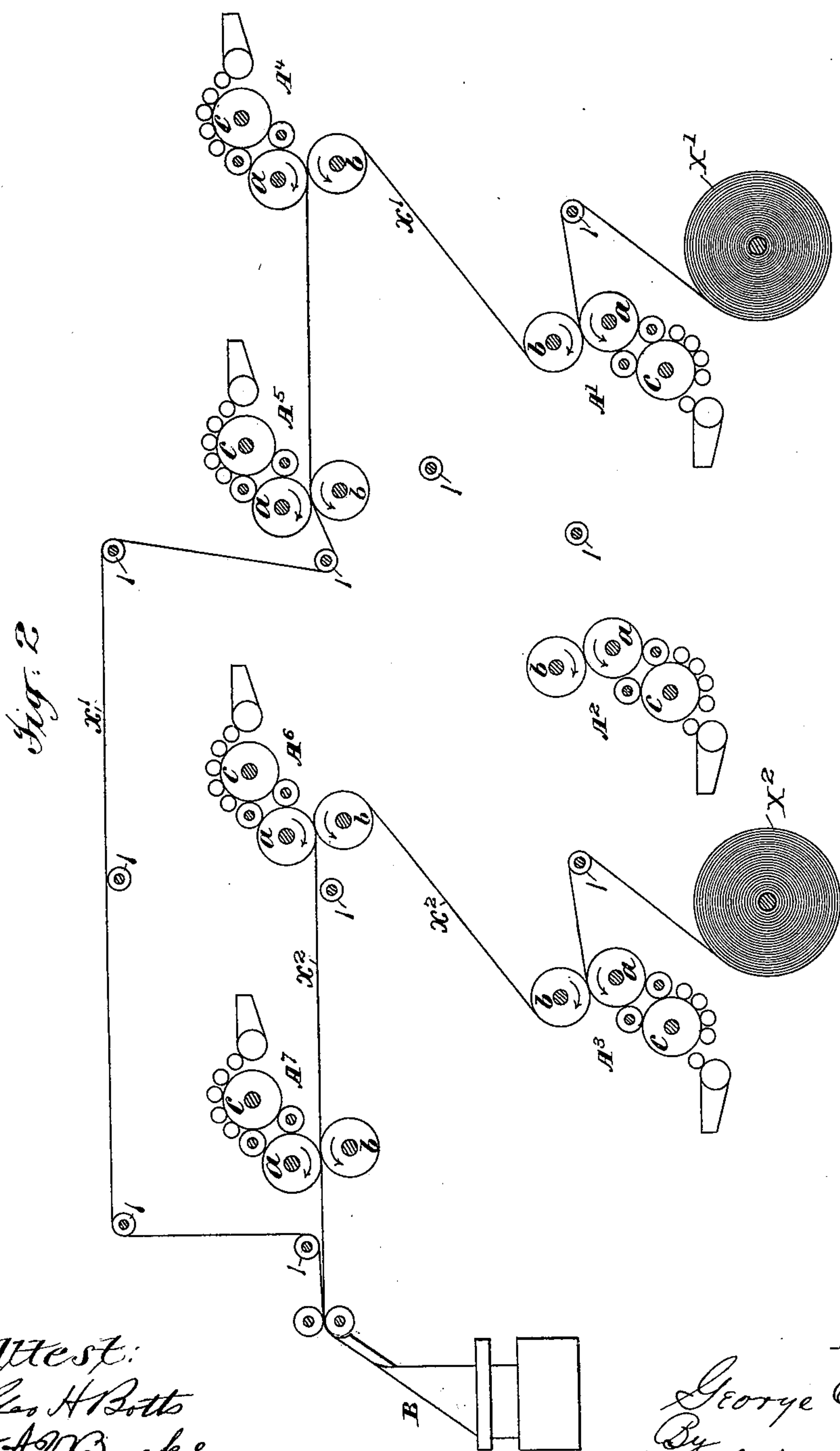
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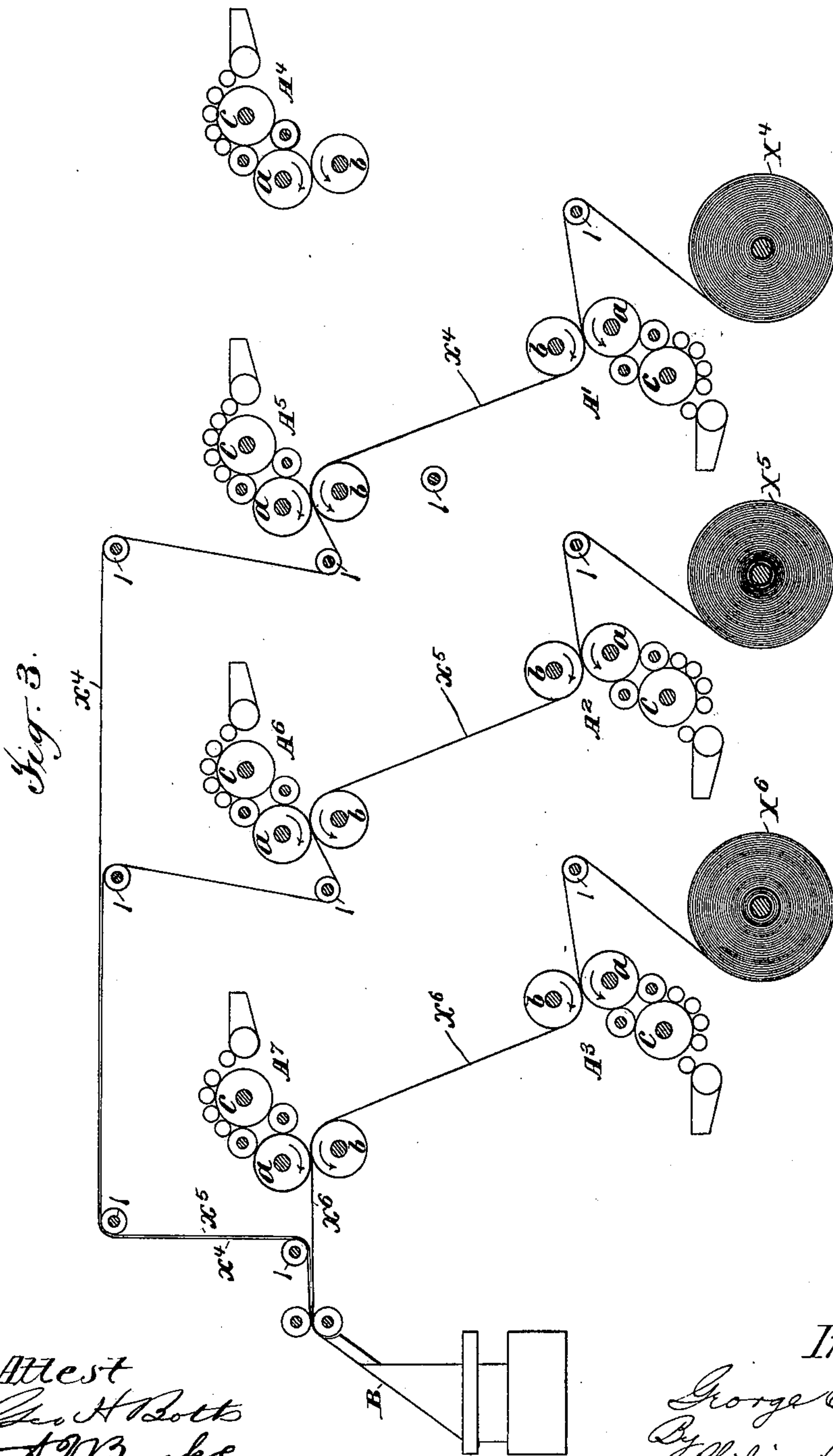
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4 Sheets—Sheet 3.



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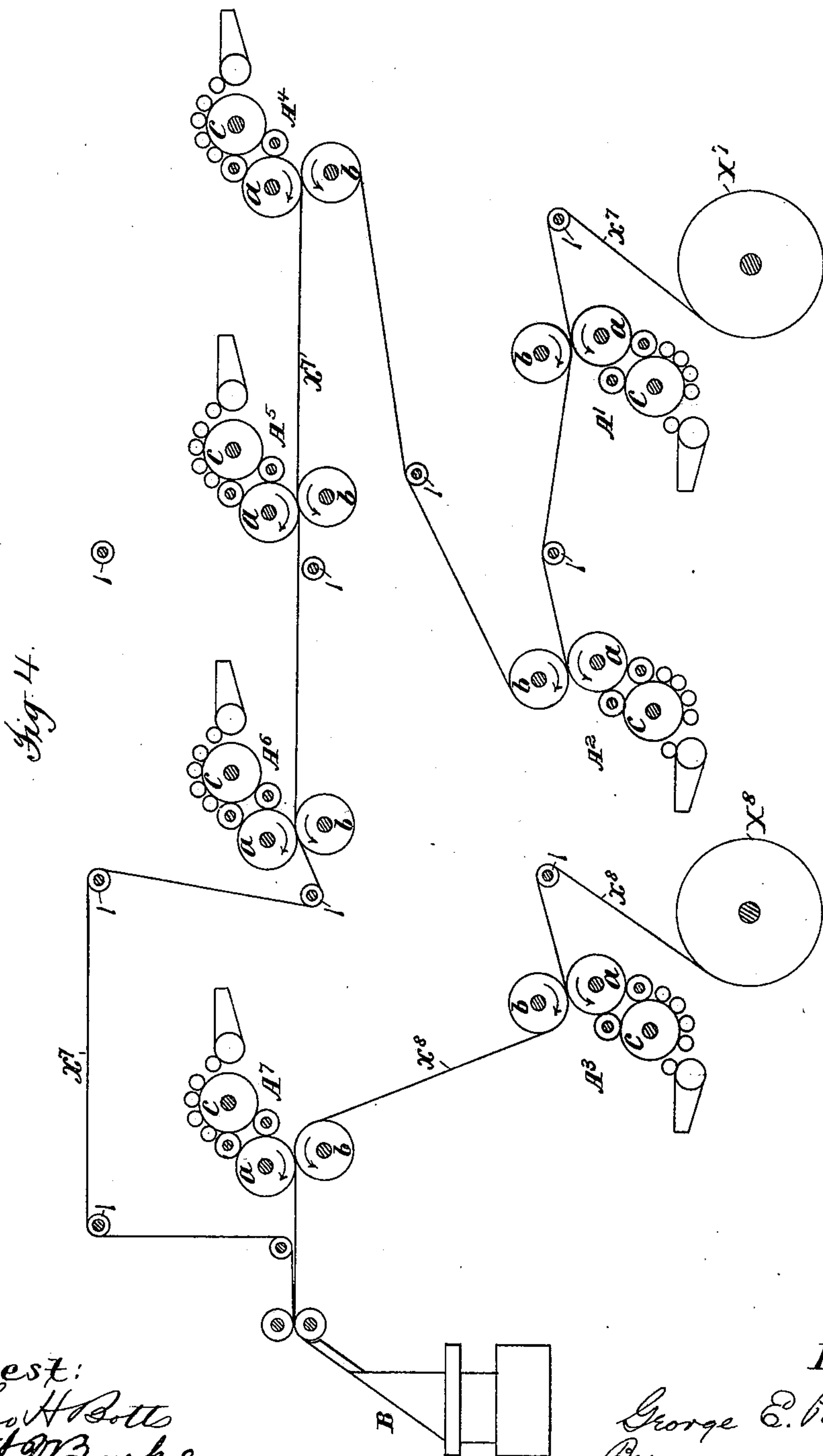
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4 Sheets—Sheet 4.



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# UNITED STATES PATENT OFFICE.

GEORGE E. PANCOAST, OF NEW YORK, N. Y.

## PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 627,592, dated June 27, 1899.

Application filed May 13, 1897. Serial No. 636,334. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE E. PANCOAST, 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-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 The object of the present invention is to provide an improved web-printing machine adapted to print a single web on each side with the number of colors required in web color-printing, or to print a plurality of webs with one impression on one side and in colors on the opposite side, or to perfect and associate a plurality of webs, one or more of which may have an additional color, and especially to provide a compact, efficient, and convenient machine for accomplishing these results with a direct lead and convenient delivery-point of the web or webs under all conditions and with the web or webs running throughout in the same vertical planes longitudinally of the web or webs, so as to avoid the use of turning-bars or similar devices and to secure to the greatest extent possible the full capacity of the machine in all the different operations.

To this end the invention consists in certain arrangements and combinations of printing-couples in a web-printing machine, as fully described hereinafter in this specification and specifically pointed out in the claims.

For a full understanding of the invention a detailed description of a printing-machine embodying all the features of the same as applied in their preferred form will now be given in connection with the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a diagrammatic side elevation of the printing-machine, showing the operation of printing a single web in colors with three impressions on one side and four on the other. Fig. 2 is a similar view showing the operation of printing two webs with one impression on one side and two on the other for single impression on one side and color-printing on the other. Fig. 3 is a similar view showing the operation of printing three webs with one impression on each side. Fig. 4 is

a similar view showing the operation of perfecting one web and printing another web with two colors on one side and three on the other.

The direction of movement of the parts of the machine will be readily understood from the indicating-arrows on the cylinders, so that the gearing is omitted for clearness, it being understood that any suitable gearing may be used having removable intermediates or otherwise arranged so that the printing-couples are independent of each other and any one or more of the printing-couples may be thrown out of operation, as desired.

In the preferred form of machine shown there are seven printing mechanisms or couples, (lettered, respectively,  $A'$   $A^2$   $A^3$   $A^4$   $A^5$   $A^6$   $A^7$ ), each printing-couple consisting of a form or type-cylinder  $a$ , impression-cylinder  $b$ , and inking mechanism  $c$ , all of which may be of any common or suitable construction, suitable leading or guiding rolls  $l$  being provided for the different leads of the web or webs, and delivery mechanism  $B$  for the web or webs is indicated, which may be of any suitable form for handling the various products.

The printing-couples  $A'$   $A^2$   $A^3$  are arranged in line horizontally with the type-cylinders below the web and rotating in the same direction, so that these three couples are adapted to print three impressions on the under side of a single web led through them. The printing-couples  $A^4$   $A^5$   $A^6$   $A^7$  are arranged above the cylinders  $A'$   $A^2$   $A^3$ , and in the preferred construction illustrated their cylinders rotate in the same direction as the cylinders of the couples  $A'$   $A^2$   $A^3$ , so that a web moves in the same direction in passing through the seven printing-couples. The printing-couples  $A^4$   $A^5$   $A^6$   $A^7$  are arranged with the type-cylinders on the opposite side of the web from the type-cylinders of the printing-couples  $A'$   $A^2$   $A^3$ —that is, above the web—so that a web passing through the seven printing-couples receives three impressions on the under side from the lower series of printing-couples  $A'$   $A^2$   $A^3$  and four on the upper side from the upper series of printing-couples  $A^4$   $A^5$   $A^6$   $A^7$ .

The cylinders of all the printing-couples are parallel and lie within the same vertical planes extending longitudinally of the web, so as to



secure what is known in the printing art as a "straight-line" run of the web or webs, avoiding the use of turning-bars or similar devices.

For securing a more direct lead of the webs when a plurality of webs are to be printed and for compactness and convenience of access to the cylinders and inking mechanisms, especially when a plurality of webs are being printed, the printing-couples of the two series are preferably arranged as shown, the successive couples of the two rows being staggered, so that the printing-couple  $A^1$  lies in vertical planes transverse to the web between the printing-couples  $A^4 A^5$ , the printing-couple  $A^2$  between printing-couples  $A^5$  and  $A^6$ , and printing-couple  $A^3$  between printing-couples  $A^6 A^7$ . As shown in the drawings, the two series of printing-couples are separated considerably for clearness of illustration; but it will be understood that in practice the two series of printing-couples may be placed quite close together, permitting the lead of a web between them.

The operation shown in Fig. 1 is that of printing a single web in colors, the single web  $x$ , led from the web-roll  $X$ , passing successively through the printing-couples  $A^1 A^2 A^3$ , thus receiving three impressions or colors on its under side, then returning from printing-couple  $A^3$ , so as to have a long run before printing the other side, and then passing through printing-couples  $A^4 A^5 A^6 A^7$ , thus receiving four impressions or colors on its upper side, and thence passing to the delivery mechanism  $B$ .

In Fig. 2 the operation of printing two webs with one impression on one side and two on the other is shown, the webs then being associated and passing together to the delivery mechanism  $B$ . In this operation different printing-couples may be used, the web  $x''$ , led from the web-roll  $X'$ , being shown as passing through the printing-couple  $A^1$ , receiving one impression on its under side, then through the printing-couples  $A^4$  and  $A^5$ , receiving two impressions on its upper side, thence passing above printing-couples  $A^6 A^7$ , and downward to the delivery mechanism  $B$ , with the web  $x^2$  from web-roll  $X^2$ , which has likewise received one impression on its under side and two impressions on its upper side from the printing-couples  $A^3 A^6 A^7$ . If desired, one of the webs may receive an additional impression on its under side from the printing-couple  $A^2$ , but the operation shown is that which is more frequently desired.

In Fig. 3 the machine is shown as printing three webs with a single impression on each side, such operation being required in perfecting or printing a single impression on each side. As shown in this view, the printing-couple  $A^4$  is not used, and the webs  $x^4 x^5 x^6$  from the respective web-rolls  $x^4 x^5 x^6$  are printed on opposite sides by the printing-couples  $A^1 A^5$  and  $A^2 A^6$  and  $A^3 A^7$ , respectively, the webs then being associated and passing together to the delivery mechanism  $B$ . The

printing-couples used in this operation may be varied, and, if desired, another color on the upper side of web  $x^4$  may be printed, leading the web through couple  $A^4$ , if desired.

In Fig. 4 the machine is shown as printing one web with one impression on each side and a second web with two colors on one side and three on the other. As shown, web  $x^7$  from web-roll  $X^7$  receives two impressions on the under side from couples  $A^1 A^2$  and three on the upper side from couples  $A^4 A^5 A^6$ , while web  $x^8$  from web-roll  $X^8$  is perfected by couples  $A^3 A^7$ . This operation is frequently desirable, as it secures the desirable product of a cover-sheet in colors and perfected inside sheet.

It will be seen that by using independent printing-couples arranged in accordance with my invention I obtain a very convenient and efficient printing-machine for the various products desired in newspaper-printing, and in printing in single impression or less than the permissible number of colors only those parts of the machine required for the product desired are included in the run of the web or webs and a number of webs may be printed with the direct lead and convenient delivery-point desired. In the preferred construction shown, also, it will be seen that all the cylinders are in convenient position, and all the inking mechanisms are readily accessible and large space in a compact machine provided for that purpose in producing each of the various products.

It will be understood that various other runs of one or more webs may be made with the printing-couples shown, those illustrated being the more important and more frequently-desired runs. It will be understood also that the invention is not to be limited to the exact arrangement or to the number of printing-couples shown, but that these may be varied somewhat according to the results desired. With seven printing-couples combined as shown, however, substantially all the products desired in a newspaper-printing office may be obtained, as more than four impressions on either side are not required. If desired, another printing-couple may be added in the lower series, so as to print four impressions on each side of a single web and perfect simultaneously four webs instead of three as in the construction shown.

What is claimed is—

1. The combination of two series of printing-couples arranged one above the other with their cylinders parallel and lying in the same vertical planes transverse to the cylinders, the printing-couples of one series being arranged to print on one side and the printing-couples of the other series on the opposite side of a web, a delivery mechanism located at one end of the two series, and suitable guides whereby a single web may be led through all the couples of both series to the delivery mechanism, or a plurality of webs may be led through a part of the couples of each series,



associated and led to the delivery mechanism, substantially as described.

2. The combination of two series of printing-couples arranged one above the other with their cylinders parallel and lying in the same vertical planes transverse to the cylinders and rotating in the same direction, the printing-couples of one series being arranged to print on one side and the printing-couples of the other series on the opposite side of a web and suitable guides whereby a single web may be led through all the couples of both series or a plurality of webs may be led through a part of the couples of each series, substantially as described.

3. The combination of two series of printing-couples arranged one above the other with their cylinders parallel and lying in the same vertical planes transverse to the cylinders and rotating in the same direction, the printing-couples of one series being arranged to print on one side and the printing-couples of the other series on the opposite side of a web, a delivery mechanism located at one end of the two series, and suitable guides whereby a single web may be led through all the couples of both series to the delivery mechanism, or a plurality of webs may be led through a part of the couples of each series, associated and led to the delivery mechanism, substantially as described.

4. The combination of two series of printing-couples arranged one above the other with their cylinders parallel and lying in the same vertical planes transverse to the cylinders and rotating in the same direction, the printing-couples of one series being arranged to print on one side and the printing-couples of the other series on the opposite side of a web the couples of one series being staggered with relation to the couples of the other series, and suitable guides whereby a single web may be led through all the couples of both series or a plurality of webs may be led through a part of the couples of each series, substantially as described.

5. The combination of two series of printing-couples arranged one above the other with their cylinders parallel and lying in the same vertical planes transverse to the cylinders and rotating in the same direction, the printing-couples of one series being arranged to print on one side and the printing-couples of the other series on the opposite side of a web, the couples of one series being staggered with relation to the couples of the other series, a delivery mechanism located at one end of the two series, and suitable guides whereby a single web may be led through all the couples of both series to the delivery mechanism, or a plurality of webs may be led through a part of the couples of each series, associated and led to the delivery mechanism, substantially as described.

6. The combination with a plurality of printing-couples with their cylinders rotating

in the same direction and adapted to print on the under side of a web, of a plurality of printing-couples arranged in the same horizontal planes above said first-mentioned couples with their cylinders rotating in the same direction and adapted to print on the upper side of a web led through all the couples, the cylinders of all the couples being parallel and lying in the same vertical planes transverse to the cylinders, suitable guides whereby a single web may be led through all the couples of both series, or a plurality of webs may be led through a part of the couples of each series and in either case without reversing the direction of rotation of any of the couples, substantially as described.

7. The combination with a plurality of printing-couples with their cylinders rotating in the same direction and adapted to print on the underside of a web, of a plurality of printing-couples arranged in the same horizontal planes above said first-mentioned couples with their cylinders rotating in the same direction and adapted to print on the upper side of a web led through all the couples, the cylinders of all the couples being parallel and lying in the same vertical planes transverse to the cylinders, a delivery mechanism located at one end of the two series, and suitable guides whereby a single web may be led through all the couples of both series to the delivery mechanism, or a plurality of webs may be led through a part of the couples of each series, associated and led to the delivery mechanism, substantially as described.

8. The combination with a plurality of printing-couples with their cylinders rotating in the same direction and adapted to print on the under side of a web, of a plurality of printing-couples arranged in the same horizontal planes above said first-mentioned couples with their cylinders rotating in the same direction and adapted to print on the upper side of a web led through all the couples, the cylinders of all the couples being parallel and lying in the same vertical planes transverse to the cylinders, and the printing-couples of each series being staggered with relation to the printing-couples of the other series, and suitable guides whereby a single web may be led through all the couples of both series or a plurality of webs may be led through a part of the couples of each series, and in either case without reversing the direction of rotation of any of the couples.

9. The combination with a plurality of printing-couples with their cylinders rotating in the same direction and adapted to print on the underside of a web, of a plurality of printing-couples arranged in the same horizontal planes above said first-mentioned couples with their cylinders rotating in the same direction and adapted to print on the upper side of a web led through all the couples, the cylinders of all the couples being parallel and lying in the same vertical planes transverse



to the cylinders, and the printing-couples of each series being staggered with relation to the printing-couples of the other series, a delivery mechanism located at one end of the  
5 two series, and suitable guides whereby a single web may be led through all the couples of both series to the delivery mechanism, or a plurality of webs may be led through a part of the couples of each series, associated and

led to the delivery mechanism, substantially as described.

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

GEORGE E. PANCOAST.

Witnesses:

C. J. SAWYER,  
A. L. KENT.