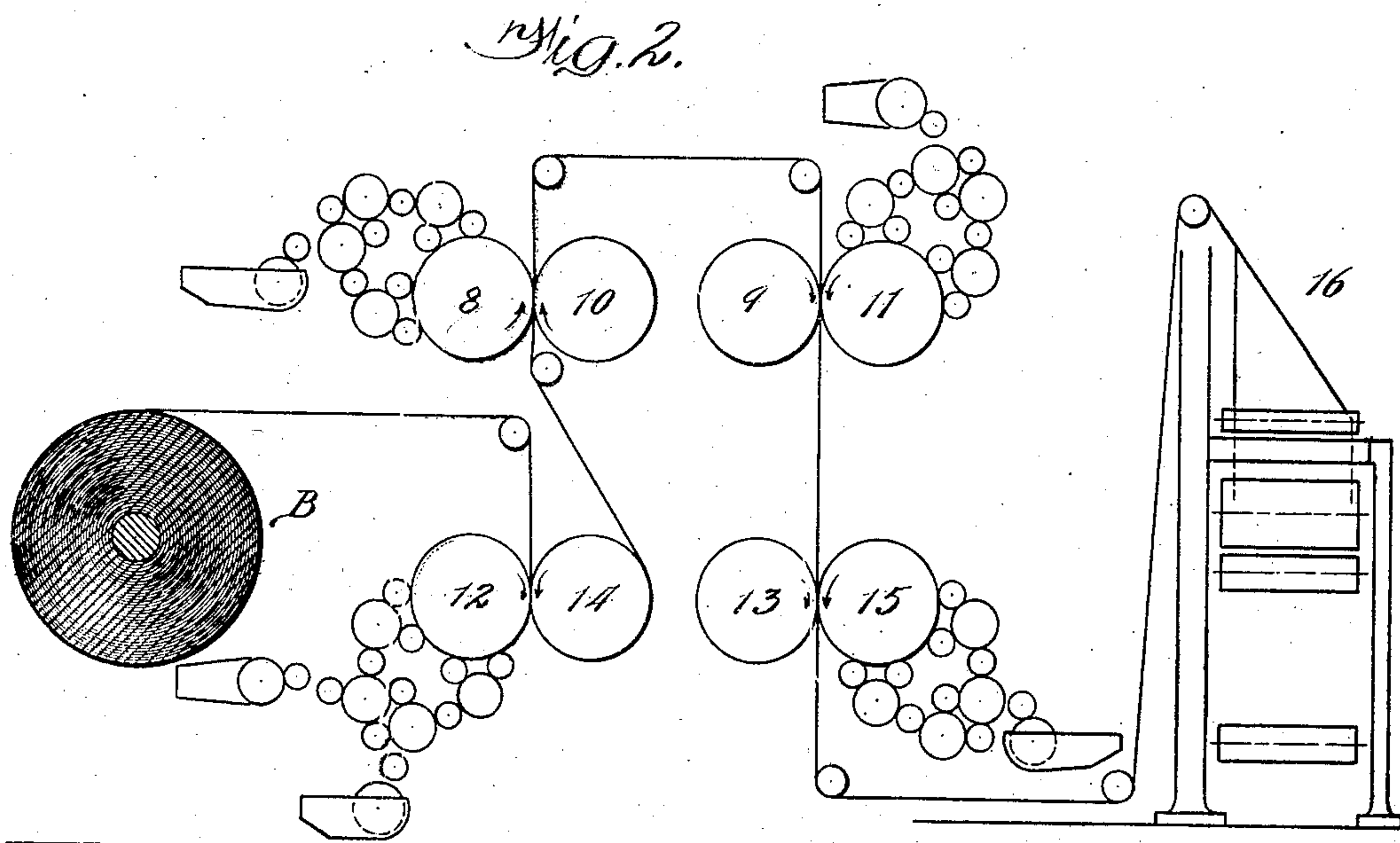
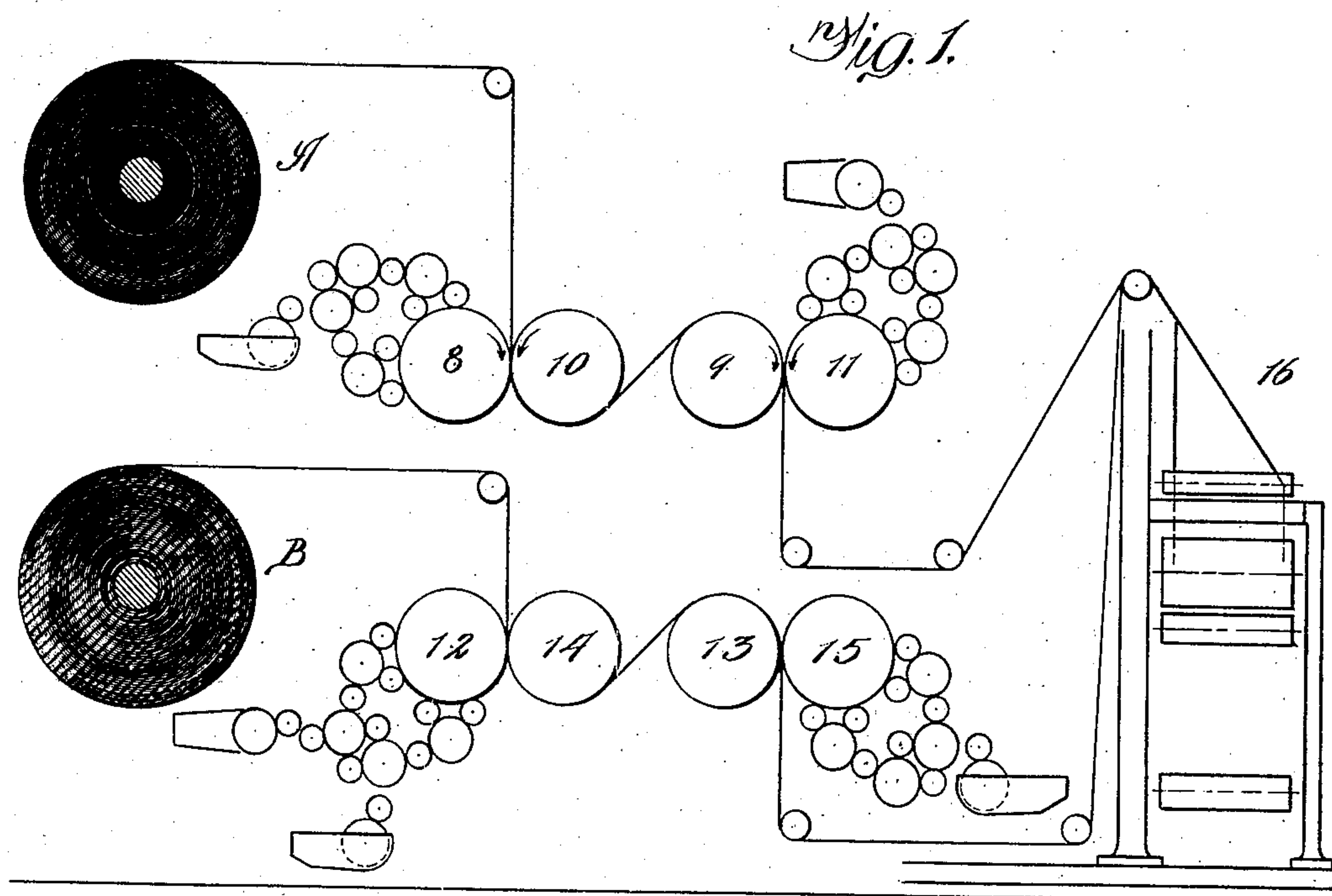


No. 894,200.

PATENTED JULY 28, 1908.

S. G. GOSS.
PRINTING MACHINERY.
APPLICATION FILED SEPT. 18, 1907.

2 SHEETS—SHEET 1.



Witnesses:
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L. V. Donaruso Jr.

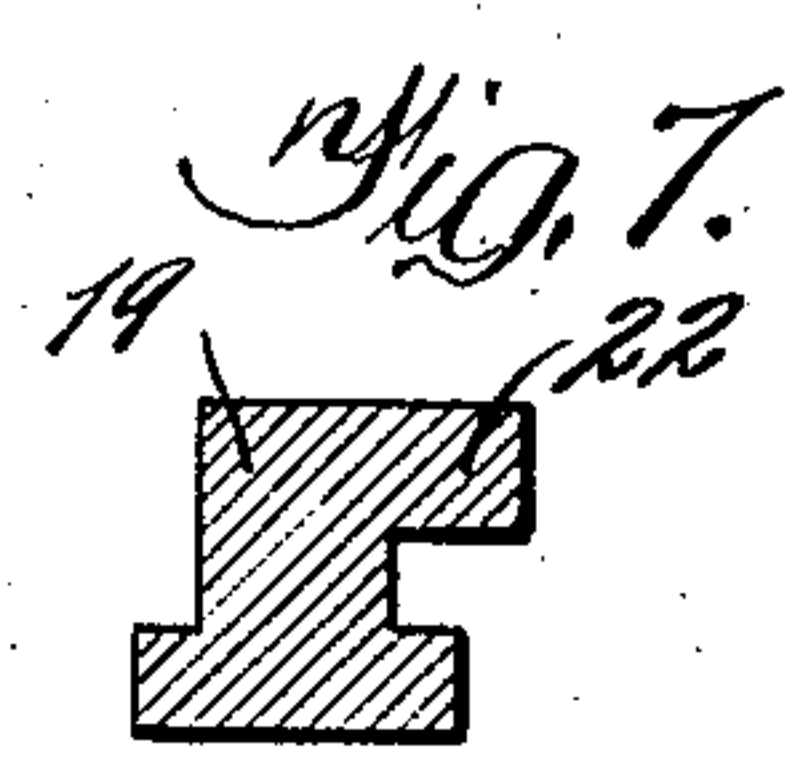
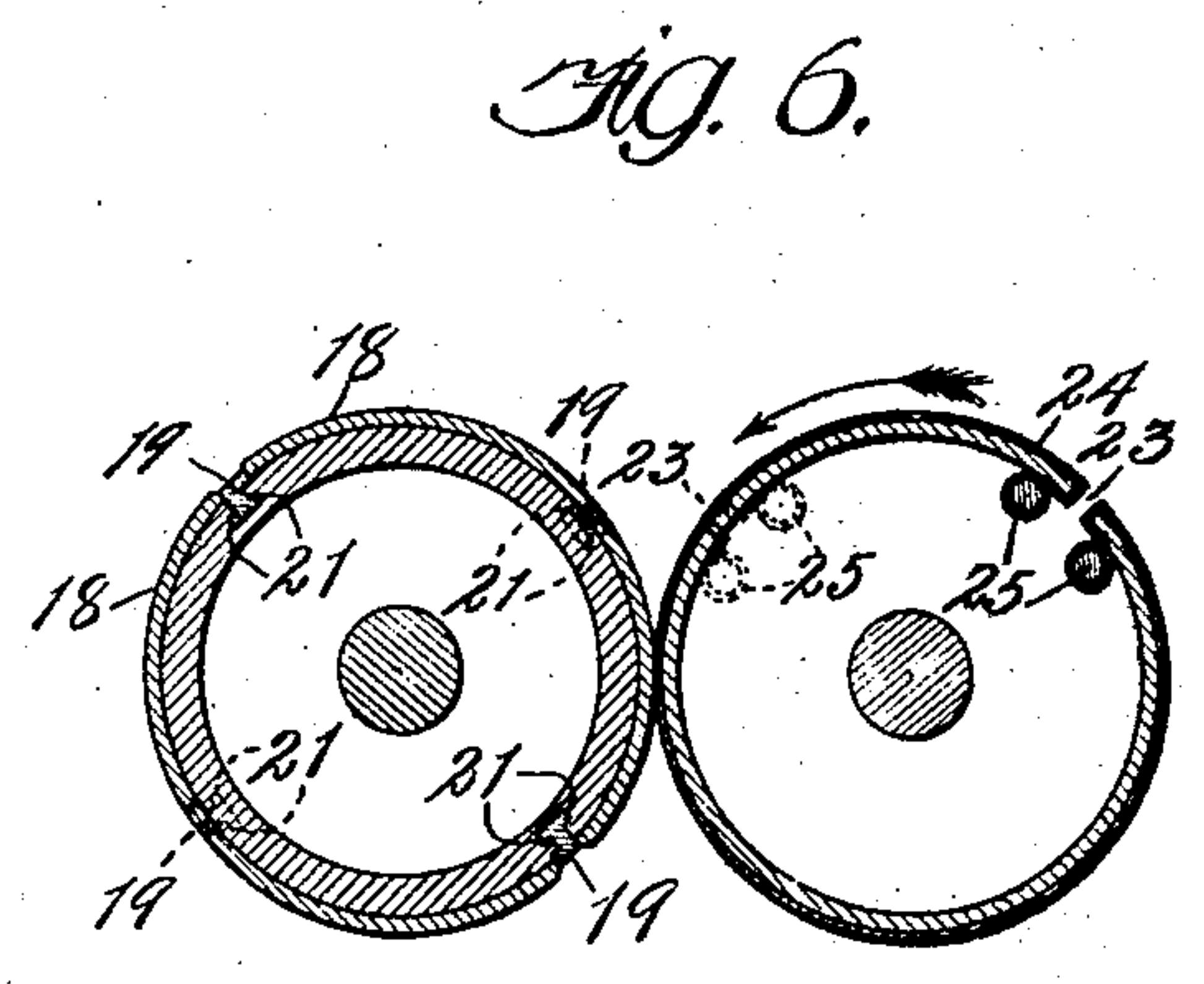
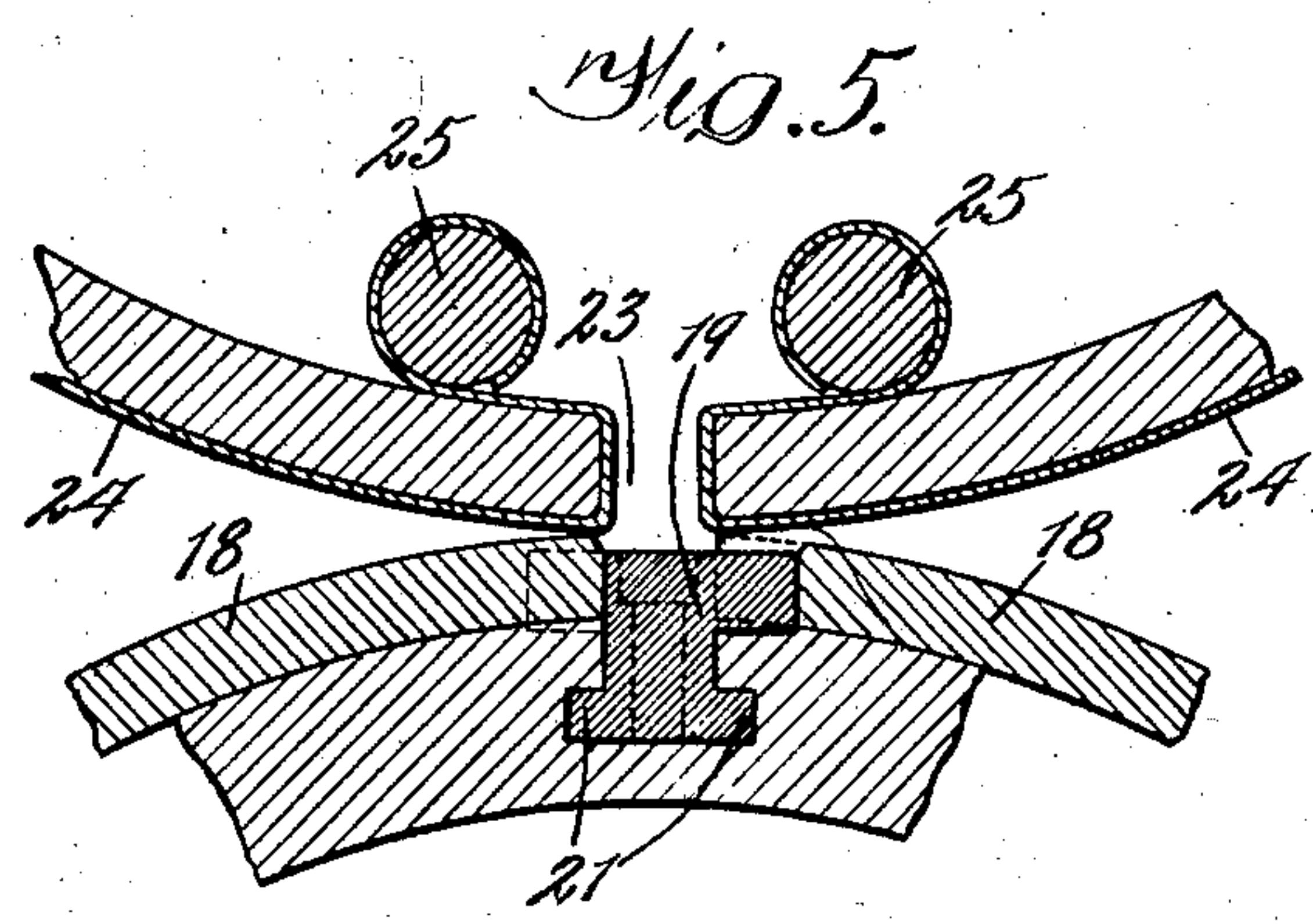
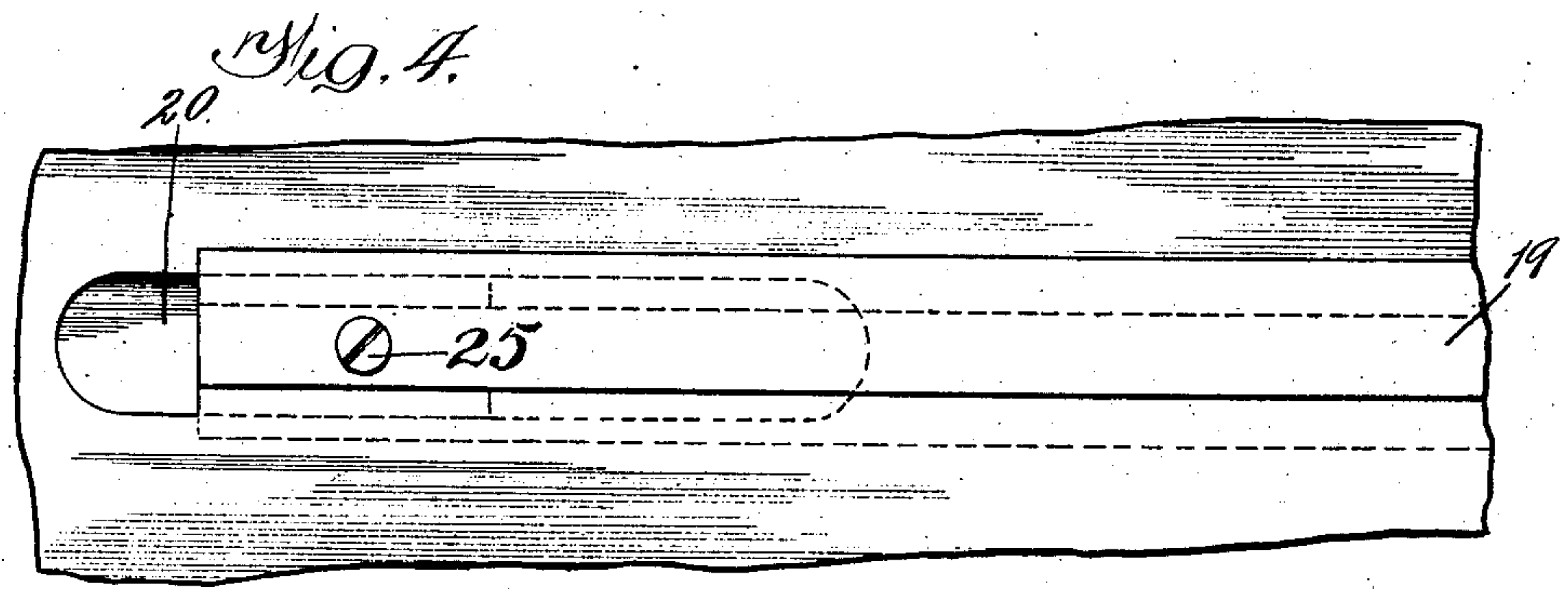
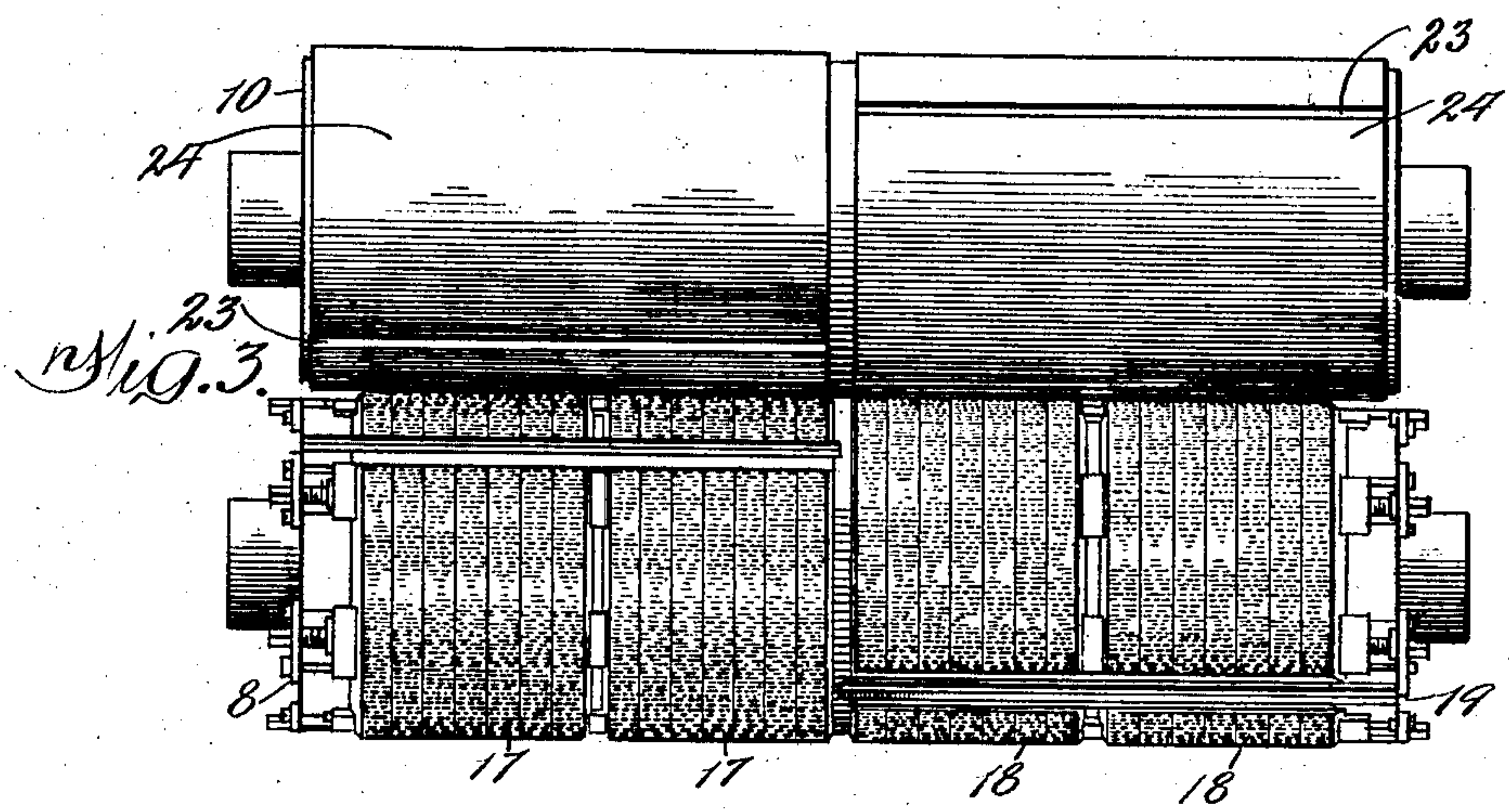
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

SAMUEL G. GOSS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GOSS PRINTING PRESS COMPANY,
OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PRINTING MACHINERY.

No. 894,200.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed September 18, 1907. Serial No. 393,502.

To all whom it may concern:

Be it known that I, SAMUEL G. GOSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Printing Machinery, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in printing machinery, and particularly to a new and improved construction of printing couples in which the forms on the printing cylinder are staggered, and which are adapted to be run in either direction. As has long been known, in rotary printing machines, especially where the cylinders were adapted to carry four or more plates abreast, the length of the cylinders in the rapid running of the press has been such as to cause a vibration of the cylinders, causing imperfect printing when the forms are arranged with their lead ends in the same line across the cylinder, and it has been found advantageous in such cases to stagger the forms on the cylinder,—that is to say, to arranged the forms upon one longitudinal half of the cylinder in such a way that their ends are not on the same line as the ends of the forms upon the other half,—this construction preventing the jumping or knocking of the cylinders upon principles of operation that are well known and understood. In the development of printing machinery, as is also well known, it has become the custom to build machines so constructed that one or more of the printing couples can have the direction of their rotation reversed so that the material to be printed can pass through the cylinders in opposite directions when occasion requires. This condition arises in large presses containing a plurality of decks or groups of printing mechanism each adapted to print its own web. In such presses it is frequently desirable that one of the decks or groups of printing couples instead of printing its own web may print—usually in different colors—a web perfected or printed in the ordinary way on both sides by one of the other decks. In such cases it has been customary to so construct the machine that the web, after being printed upon one side by one deck, is led through one or both of the printing couples of the other deck for the purpose of printing upon it—usually in colors—and then leading it back to the

first deck to be printed upon the other side. In such cases it is necessary to reverse the direction of rotation of one of the printing couples upon the deck to which the web was led after being printed upon one side. When such a press carried printing cylinders upon which the forms were staggered, a difficulty, of course, at once arose, when the couple was reversed, because the impression from what might be termed the “leading” side of a staggered cylinder, when the cylinder was running in one direction, became the rear impression when the cylinder was running in the opposite direction by an amount equal to the amount of the stagger. In such cases, and in order to remedy this, special slitting mechanism has been introduced with compensating rollers to overcome this defect and to bring the impressions of the several couples into proper relation with each other. This is objectionable because it is desirable to keep the web together without slitting or cutting as long as possible. This feature of operation also led to the employing of two impression cylinders with differently-staggered blanket-openings,—one of the cylinders coöperating with the printing cylinder when that cylinder was running in one direction and the other coöperating with the cylinder when it was running in the other direction.

The form cylinders have also been arranged so that the stagger could be shifted—that is to say, so that the plates on either longitudinal half of the cylinder could be run in the lead according as the cylinder rotated in one direction or the other. The objection to this form of construction was that it introduced into the machine an additional cylinder and an additional mechanism for operating it, adding to the complication and expense of the machine. It has also been suggested that impression cylinders in such constructions be made of two parts, one part being rotatable axially with relation to the other so that the positions of the blanket-openings could be shifted when the cylinder was reversed. This construction, however, would obviously add practical complications and expense to the device. Printing presses have also been designed whose plates and blanket-openings were staggered by an amount equal to one-half of the circumferential length of a form surface, in order that when the rotation of one of the printing

couples was reversed the proper register might be preserved.

It is the object of my invention to provide new and improved mechanism by which the forms may be staggered upon the cylinder, and by which when the direction of the rotation of one of the printing couples is reversed a proper registry may be obtained. I accomplish this object by applying to the form cylinder form-holding devices which are so placed that the amount of the stagger of the plates upon one longitudinal half of the cylinder varies by a slight amount from a distance equal to one-half of the circumferential length of a form plate; by providing means by which the holding devices may be adjusted by an amount equal to twice the difference between the amount of the stagger and a stagger equal to one-half the circumferential length of a form cylinder; by staggering the blanket-openings upon the impression cylinder by a corresponding amount, and, in order to provide for the proper printing and the leaving of margins, by making those blanket-openings of a width slightly less than the width of the transverse margin minus the difference between the amount of stagger and one-half the circumferential length of a form plate.

In the drawings,—Figure 1 is a diagrammatic view of a two-deck press printing from two rolls of paper; Fig. 2 is a diagrammatic view of the same parts printing from one web of paper, the upper deck being used for additional printing and the direction of the first printing couple being reversed; Fig. 3 is an enlarged detail, being a top view of one printing couple; Fig. 4 is an enlarged detail, being a view of a part of the surface of one of the form cylinders, showing the adjusting bar in solid lines in one position and in dotted lines in the other; Fig. 5 is an enlarged detail, being a section through a portion of the form and coacting impression cylinders; Fig. 6 is a detail, being an end view of a printing couple, showing the position of the forms and blanket-openings at one end in solid and at the other in dotted lines; Fig. 7 is an enlarged detail, being a section through the adjuster bar.

Referring to the drawings,—8 9 indicate the form cylinders, and 10 and 11 the impression cylinders of the upper deck. 12 13 indicate the form cylinders and 14 15 the impression cylinders of the lower deck. The form cylinders are, of course, supplied with the usual inking mechanism, which it is not necessary to describe. The press is shown as printing from two webs A and B. Each deck prints its own web, which are thereupon led to the top of the usual folding and delivery mechanism 16 where, superposed in registry, they are folded and delivered. As this folding and delivery mechanism forms no part of my present invention and

may be of any well-known form and description, it is illustrated only diagrammatically in the drawings, and it is believed further description is unnecessary.

In Fig. 2 the web B only is used. It is first printed upon the under side between the printing couples 12 and 14 and thence led upward to the upper deck where it passes between printing couples 8—10. These printing couples are, therefore, reversed in the direction of their rotation. The reversal in direction of rotation is old and well known in the art and may be accomplished in any well-known way. It is believed that it is, therefore, unnecessary to show and describe this, especially as of itself it forms no part of my present invention. Printed in any desired manner upon the upper side by the printing couples 8 and 10, the web then passes between couples 9 and 11, where it receives the second imprint upon the same side, thence downward between printing couples 13 and 15, where the printing is completed.

Referring to Fig. 3, 17—17 and 18—18 indicate the forms upon the printing cylinder. As is shown therein, the forms upon one longitudinal half of the cylinder are staggered with reference to the forms upon the other side, and this amount of stagger—taking the distance between the lead end of the forms 17 and the lead end of forms 18—is a distance slightly less than one-half a page length. In other words, in the form shown where each printing cylinder contains upon one end one form on each semi-circumference and upon the other end one form upon each semi-circumference the distance between the lead ends of forms 17 and 18 is slightly less than ninety degrees. The form plates upon one end or longitudinal half of the cylinder are fixed in place by any suitable devices by means of which they may be locked upon the cylinder. Upon the other half of the form cylinder the forms are locked in place by means of bars 19. As is best shown in Figs. 4 and 5, these bars are adapted to be slid into the cylinder from one end fitting into a groove 20 in the cylinder for that purpose. The lower end of the bar 19 is provided with shoulders 21 symmetrical upon each side, as is best shown in Figs. 5 and 7, in order to hold the bar 19 firmly in place, which shoulders fit into corresponding rabbets in the groove 20 so as to slide therein. Upon its upper end the bar 19 is provided upon one side with a shoulder 22 which projects therefrom an amount equal to twice the difference between the stagger of the forms and one-half of a circumferential page form length. For instance, if the difference between the amount of the stagger and the half of a page form length is one-quarter of an inch, the projection 22 will project from the side of the bar one-

half an inch. The bars 19 are slid into the grooves 20 on the form cylinder in such a way as to abut closely upon the ends of the page forms, as is best shown in Fig. 5. The bottom surface of the shoulder 22 rests upon the upper surface of the form cylinder, which is squared to meet it upon each side of the groove 20. One position of this bar and of the forms is shown in solid lines in Fig. 5, which is the one used when the cylinder is revolving in one direction, say, in the direction of the solid arrows 18. When the direction of the rotation of the cylinders is reversed, the bar is withdrawn, turned the other end to, and inserted in the position shown in dotted lines in Fig. 5, with the shoulder 22, in other words, projecting in the direction and locking the forms in the position shown in dotted lines in Fig. 5. This adjustment being, as has been said, an amount equal to twice the difference between the amount of stagger given to the forms and one-half a page length will secure proper registration of the printing when the rotation of the cylinders is reversed.

In order to secure proper printing it is necessary that the impression cylinders are so arranged that the longitudinal opening in the surface of the impression cylinders into which the ends of the blanket are inserted for placing the blanket upon the cylinder should never come opposite a printing portion of the form. In order to secure this result and to secure the proper coaction of the impression cylinder with the form cylinder I stagger the blanket-openings upon each longitudinal half of the impression cylinder to correspond with the staggering of the forms upon the form cylinder and make these openings of such a width that in whichever of the two positions the forms are placed by means of the adjusting bar 19 the opening will always come between the ends of the forms—that is to say, upon a transverse margin of the paper. To do this it is necessary that the opening should be somewhat less than the width of the transverse margin less the difference between the amount of stagger and one-half of a longitudinal page length. Referring particularly to Figs. 3 and 5, in which this construction is shown, 23 indicates the opening in the cylinders by means of which the blankets are secured to the cylinder. 24 indicates the blanket, the ends of which passing into the interior of the impression cylinder through the opening 23 are wound upon suitable rollers 25, by means of which the blanket may be stretched upon the impression cylinder. These rollers are conventionally illustrated in Fig. 7 and may be of any well-known and approved form and construction and forming no part by themselves of my present invention it is believed it is unnecessary to further illustrate or describe them. The effect of making the open-

ing 23 of the width above described with relation to the stagger is clearly shown in Fig. 5, in which it will clearly appear that in whichever of the two positions the forms may be locked by the adjusting bar 19 the opening 23 will lie between the adjacent ends of the forms—that is to say, upon the unprinted transverse margin. To illustrate, I will suppose that the difference between the amount of stagger and one-half a circumferential page length is one-quarter of an inch. The variation in the position of the forms to secure proper registration when the direction of rotation is reversed will, therefore, be twice that amount, or one-half an inch, and the shoulder 22 will project one-half an inch from the side of the adjusting bar. If, therefore, the width of the transverse margin is two inches, the width of the opening 23 between the blankets will be somewhat less than two inches minus one-half an inch—namely, somewhat less than one and one-half inches. It is necessary to make this opening somewhat less in order to insure that the open space between the blankets shall always register with some part of the transverse margin in whichever of the two positions the plates are locked. The difference in the case above supposed, therefore, would be such as to make the width of the opening about one and one-quarter inches. The bar 19 when in position is locked in by screws 25 which are, of course, removed when it is desired to remove the bar for purposes of adjustment.

It will be obvious from the above description that by giving the forms a stagger differing but slightly from one-half of a circumferential page length I am enabled to provide a reversible form cylinder the forms of which may be readily adjusted to secure proper registration of the printing in whichever direction the cylinder is run and at the same time to provide a co-acting reversible impression cylinder having blanket openings correspondingly staggered and of such width that the blanket openings will always register with the space between the adjacent ends of the forms in whichever direction the form and co-acting impression cylinders are rotated, and without any shifting or adjustment of the blanket cylinder.

I have shown and described the machine as provided with form cylinders adapted to contain two sets of plates abreast and one plate on each semi-circumference of each longitudinal half of said cylinder. It is obvious, however, that the number of plates may be varied both as to the number of sets of plates abreast and as to the circumferential length of the plate with reference to the circumference of the form cylinder.

That which I claim as my invention, and desire to secure by Letters Patent, is,—

1. The combination with a printing cou-

ple, of a second printing couple the cylinders whereof may be run in either direction, the printing cylinder of said second couple being provided with devices for retaining forms thereon side by side and so arranged that adjacent form surfaces on said cylinder may be staggered by an amount slightly differing from one-half the circumferential length of a form surface and having means for adjusting said form surfaces on said cylinder to secure registry in printing when said direction of rotation is reversed and the impression cylinder of said couple having its blanket openings correspondingly staggered and of a width less than the width of the transverse margin minus the amount of adjustability of said forms on said printing cylinder.

2. The combination with a printing couple, of a second printing cylinder adapted to be run in either direction devices on said second printing cylinder for retaining forms thereon side by side and so arranged that adjacent form surfaces on said cylinder may be staggered by an amount slightly differing from one-half the circumferential length of a form surface, means for adjusting said form surfaces on said cylinder by an amount equal to twice the difference between said stagger and one-half a circumferential form length, and a coacting impression cylinder adapted to be run in either direction and having its blanket openings correspondingly staggered and of a width less than the width of the transverse margins between the forms minus the difference between the stagger and one-half of a circumferential form length.

3. The combination with a printing cylin-

der adapted to be run in either direction and to carry staggered forms arranged side by side, of means for adjusting forms around said cylinder to secure registry of printing when said cylinder is reversed, and an impression cylinder adapted to be run in either direction and provided with blanket openings correspondingly staggered and of such width as to cause said blanket openings to always come between the adjacent ends of the forms when operating in either direction.

4. The combination with a printing couple, of a second printing cylinder adapted to be run in either direction, devices on said second printing cylinder for retaining forms thereon side by side, so arranged that the form surfaces upon one longitudinal half of the cylinder are staggered with reference to the forms upon the other half by an amount slightly differing from one-half of the circumferential length of a form surface, means for adjusting the forms upon one longitudinal half of said cylinder by an amount equal to twice the difference between said stagger and one-half a circumferential form length, and a co-acting impression cylinder adapted to be run in either direction, and having its blanket openings correspondingly staggered and of such width as to cause said blanket openings to always come between the adjacent ends of said forms when operating in either direction.

SAMUEL G. GOSS.

Witnesses:

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R. J. PICKARD.