

No. 724,456.

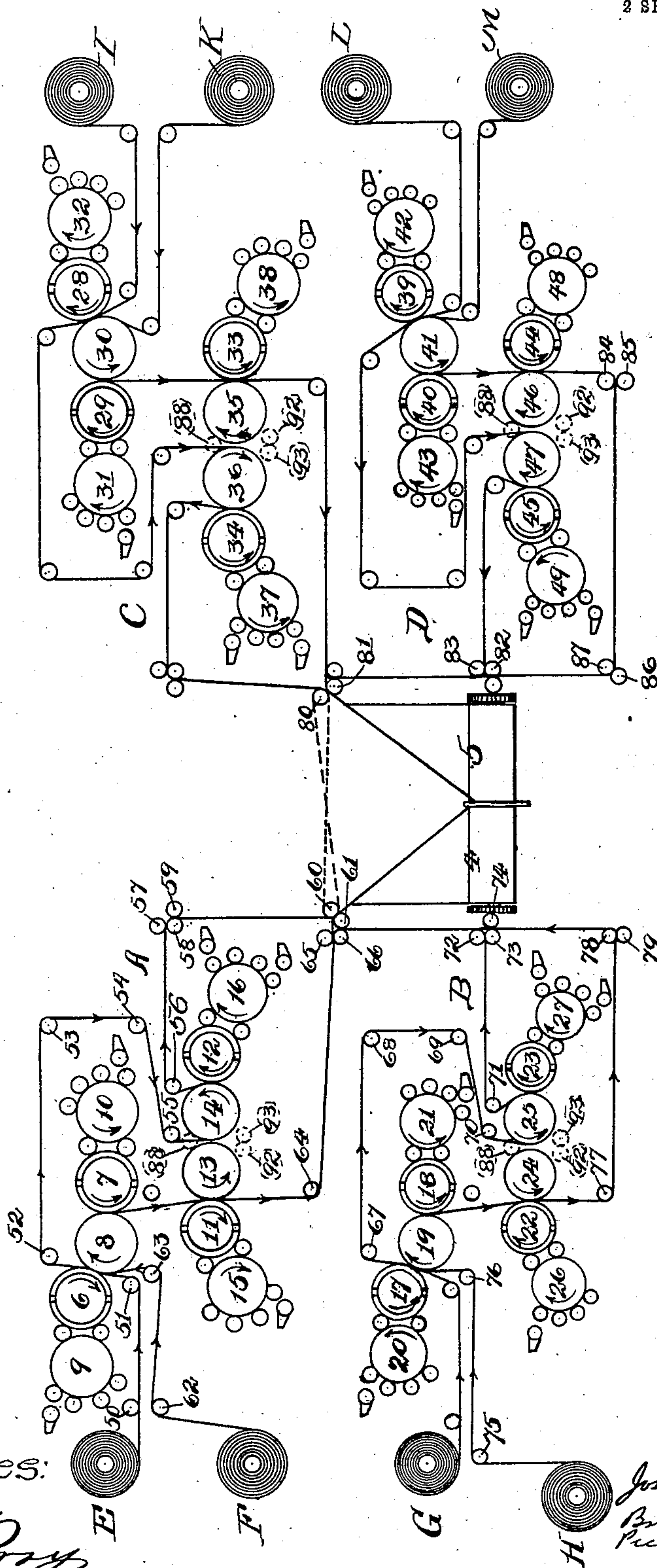
PATENTED APR. 7, 1903.

J. L. FIRM.
WEB PERFECTING PRESS.
APPLICATION FILED MAY 5, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.



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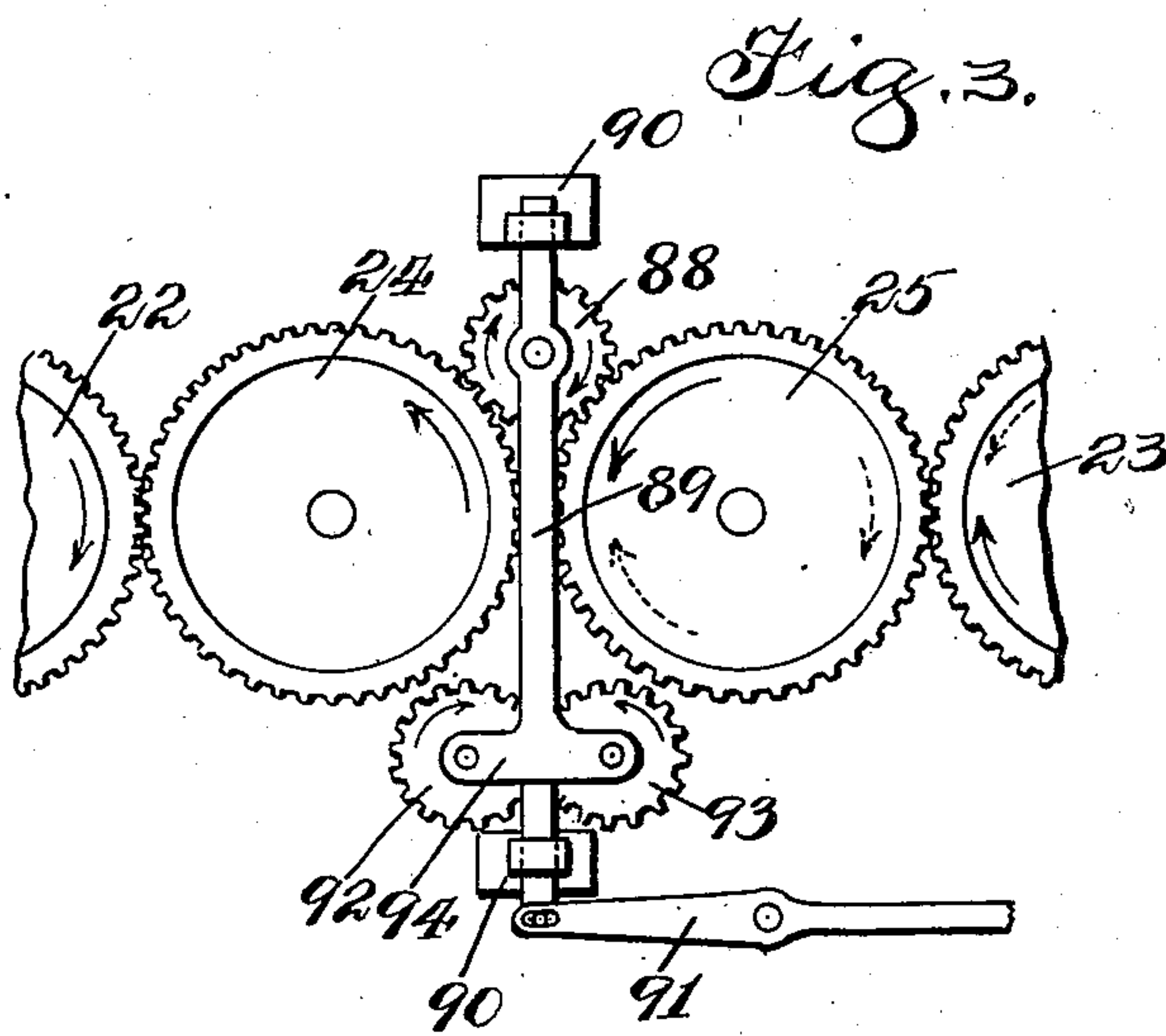
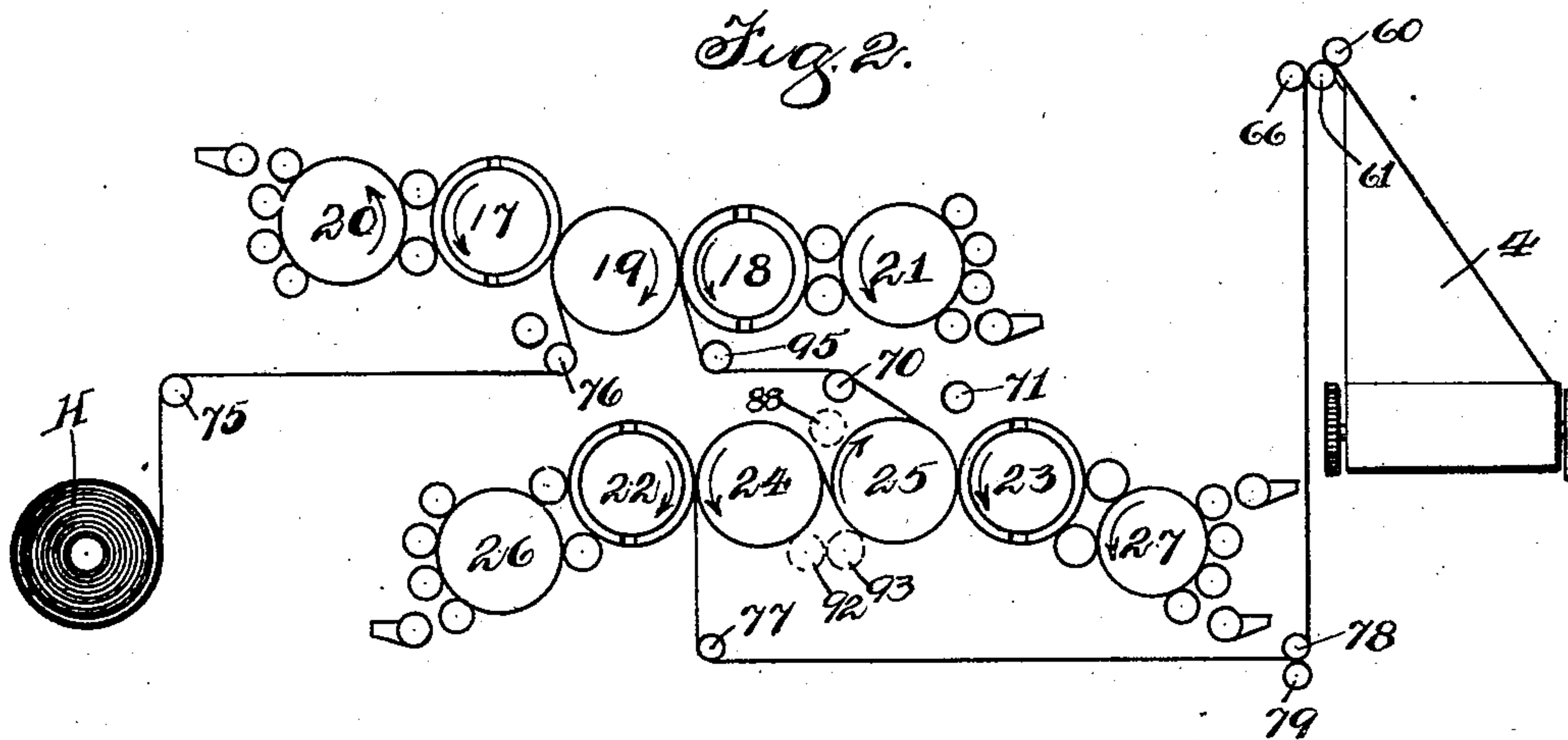
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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WEB-PERFECTING PRESS.

SPECIFICATION forming part of Letters Patent No. 724,456, dated April 7, 1903.

Application filed May 5, 1902. Serial No. 105,987. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH L. FIRM, 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 Web-Perfecting Presses, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to web-perfecting printing-presses adapted to print from a plurality of rolls; and one of its objects is to provide a new and useful arrangement of the printing mechanisms of each series of form and impression cylinders whereby each printing mechanism will consist of an upper deck, composed of two form cylinders and one impression-cylinder, with their inking-rolls, and a lower deck, composed of two form and two impression cylinders, with their inking-rolls, thereby employing a less number of impression-cylinders than is ordinarily used and providing a new and improved arrangement of printing-cylinders whereby each set of printing mechanism may be used to perfect two webs in the ordinary way or may be used to print one web in colors upon one side and in black or another color upon the other.

Another object of my invention is the improvement of multiroll web-perfecting presses in sundry details hereinafter pointed out.

That which I regard as new will be set forth in the claims.

Referring to the drawings, Figure 1 is a diagrammatic elevation of a press. Fig. 2 is a detail showing one of the printing mechanisms as used in the printing of a web in colors; and Fig. 3 is an enlarged detail, being a view of part of the gearing of one of the printing mechanisms and showing the shiftable gear connections.

In the drawings my printing-press as I prefer to embody it consists of four printing mechanisms A, B, C, and D, capable of printing, respectively, rolls E and F, G and H, I and K, and L and M. These four sets of printing mechanism, as is shown in Fig. 1, are arranged facing each other with the rolls of paper upon the outside at each end and each provided with a folding mechanism 45, which

face each other between the two groups of presses. Each printing mechanism, as is shown, consists of two decks, an upper deck, consisting of two form-cylinders and one impression-cylinder, and a lower deck, consisting of two form and two impression cylinders, with their appropriate inking apparatus.

Referring to printing mechanism A, 6 7 indicate form-cylinders. 8 indicates an impression-cylinder located between and cooperating with the two form-cylinders 6 and 7. 9 10 indicate inking apparatus, which may be of any approved and well-known form and construction and needs no further description here. In the lower deck of printing mechanism A, 11 12 indicate form-cylinders. 13 indicates an impression-cylinder cooperating with form-cylinder 11. 14 indicates an impression-cylinder cooperating with form-cylinder 12. 15 16 indicate inking mechanisms of any well-known and approved form and construction.

In the press B the upper deck consists of form-cylinders 17 18, an impression-cylinder 19, cooperating with both form-cylinders 17 18, and inking mechanism 20 21. The lower deck consists of form-cylinders 22 23, impression-cylinders 24 25, and inking mechanisms 26 27.

In printing mechanism C the upper deck consists of form-cylinders 28 29, cooperating impression-cylinder 30, and inking mechanisms 31 32. The lower deck consists of form-cylinders 33 34, impression-cylinders 35 36, and inking mechanisms 37 38.

In press D the upper deck consists of form-cylinders 39 40, impression-cylinder 41, and inking mechanisms 42 43. The lower deck consists of form-cylinders 44 45, impression-cylinders 46 47, and inking mechanisms 48 49.

It will be seen that the four printing mechanisms A, B, C, and D are all exactly alike in their construction and operation, arranged as shown in Fig. 1, with two superposed mechanisms upon one side facing two superposed mechanisms upon the other.

When the presses are used to perfect webs of paper in the ordinary way—that is to say, without the use of colors—the webs run as shown in Fig. 1.

In printing mechanism A web E passes un-

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der roller 50, under and partly around roller 51, between form-cylinder 6 and impression-cylinder 8, where it is printed upon one side by form-cylinder 6. It then passes over roller 52, over roller 53, under and partly around roller 54, over and partially around roller 55, downward between impression-cylinders 13 and 14, which are slightly separated, as shown in the drawings, under and partially around impression-cylinder 14, and between said impression-cylinder 14 and form-cylinder 12, where it is printed upon the other side. It then passes over roller 56, between rollers 57, 58, and 59, and downward between rollers 60 and 61 to the longitudinal folder 4, where it is folded and afterward disposed of in the usual well-known way.

Web F passes over roller 62, under roller 63, between form-cylinder 6 and impression-cylinder 8, underneath web E, which prevents it from being printed by form-cylinder 6. It then passes over impression-cylinder 8 and between it and form-cylinder 7, where it is printed upon one side by form-cylinder 7. It thence passes downward between form-cylinder 11 and impression-cylinder 13, where it is printed upon the other side, under roller 64, between rollers 65 and 66, where it meets web E, between rollers 60 and 61 in registry with said web E, and downward over the longitudinal folding mechanism 4, to be disposed of in the usual manner.

Webs G and H, I and K, and L and M pass, respectively, through the printing mechanisms B, C, and D in the same manner and are dealt with and perfected in the same way as webs E and F are printed by printing mechanism A.

Web G is printed upon one side by form-cylinder 17 and after passing over and under several rollers 67, 68, 69, and 70 is printed upon the other side by form-cylinder 23, co-acting with impression-cylinder 25, passes over roller 71, between rollers 72, 73, and 74, whence it passes upward between rollers 61 and 66 to meet the product of press A.

Web H, passing over rollers 75 and 76, passes between web G and impression-cylinder 19, is printed upon one side by form-cylinder 18, upon the other side by form-cylinder 22, and thence, passing under roller 77 and between rollers 78 and 79, passes upward between rollers 73 and 74 and 61 and 66 to meet in registry the other webs.

Web I is printed upon one side by form-cylinder 28, upon the other side by form-cylinder 34, and passing over sundry rollers, which it is not necessary to further describe or refer to, as they are in all respects duplicates of the rollers described in the presses upon the other side, goes to longitudinal folding mechanism 5, where it is disposed of in the usual way.

Web K, passing over sundry rollers in its course, passes between web I and impression-cylinder 30, is printed upon one side by form-cylinder 29, on the other side by form-cyl-

der 33, and meeting the web I between rollers 80 and 81 in registry passes with it to the folder 5.

Web L is printed upon one side by form-cylinder 39, upon the other side by form-cylinder 45, and, passing between rollers 82 and 83, passes upward and meets the other web between rollers 80 and 81.

Web M, passing underneath web L and between it and the impression-cylinder 41, is printed upon one side by form-cylinder 40, upon the other side by form-cylinder 44, and, passing between rollers 84 and 85, 86 and 87, meets the other web between rollers 80 and 81 in registry therewith.

The course of the webs and the direction of rotation of the several form and impression cylinders are shown in Fig. 1 by arrows.

As is shown in the drawings, impression-cylinders 13 and 14, 24 and 25, 35 and 36, and 46 and 47 are separated from one another and are not geared together. The gearing arrangement of each of these several sets of impression-cylinders is best shown in Fig. 3, which for illustration may be taken to be the gearing upon press B, (shown at Fig. 2,) being duplicated upon each of the other presses A, C, and D. The impression-cylinder 24 gears with form-cylinder 22 and the impression-cylinder 25 with form-cylinder 23. The impression-cylinders 24 and 25 do not gear together.

88 indicates a gear which is mounted upon a longitudinally-movable rod 89 in bearings 90. The rod 89 is moved longitudinally of itself by means of a hand-lever 91, which is suitably connected with one end of the rod 89. The gear 88 meshes with the gears upon the ends of form-cylinders 24 and 25, whereby when the parts are in the position shown in Fig. 3 the impression-cylinders 24 and 25 will be rotated in the direction shown by solid arrows thereon, which is the direction of rotation of said impression-cylinders shown in Fig. 1, the webs being run as hereinabove described.

92 93 indicate two intermeshing gears of equal size, which are rotatably mounted upon a cross-bar 94 on the rod 89 and which by the upward motion of said rod 89 are capable of being moved into mesh with the gears on the impression-cylinders 24 and 25. This upward movement of the rod 89 will cause gear 92 to mesh with the gear on impression-cylinder 24 and the gear 93 to mesh with the gear on impression-cylinder 25, lifting the gear 88 out of mesh with said impression-cylinder gears. The result of this will be that, impression-cylinder 24 continuing to rotate in the same direction as heretofore, the direction of rotation of impression-cylinder 25 and form-cylinder 23 will be reversed, causing said impression and form cylinders to rotate in the direction shown in dotted arrows on Fig. 3 and in the direction shown in solid arrows in Fig. 2. This prepares press B, which is used for the sake of illustration, for print-

ing web H in colors. In this case web H, passing over roller 75 and under roller 76, passes upward between form-cylinder 17 and impression-cylinder 19, where, the web G being removed, it is printed upon one side by form-cylinder 17 in one color, then passing over impression-cylinder 19, between it and form-cylinder 18, it is printed by form-cylinder 18 with a second color upon the same side as the first color impression by form-cylinder 17. It then passes under roller 95, over roller 70, around impression-cylinder 25, between said impression-cylinder and form-cylinder 23, which, rotating in the direction shown by arrows in Fig. 2 and by dotted arrows in Fig. 3, prints a third color from form-cylinder 23 upon the same side as the two previous color impressions. Passing thence downward under impression-cylinder 25, the web passes across it and over impression-cylinder 24, between it and form-cylinder 22, where it is printed upon the reverse side, either in black or with a single color, as the case may be. The web thus perfected upon one side in colors and upon the other side in black or in one color passes under roller 77, between rollers 78 and 79, upward between rollers 61 and 66, where it meets the product of press A in registry therewith and passes downward over the longitudinal folding and delivery mechanism 4. I have described this arrangement of the press for printing in colors and the run of the web therethrough only in connection with printing mechanism B and for purposes of illustration. It will be perfectly obvious, however, that printing mechanism A, printing mechanism C, or printing mechanism D, being precisely like printing mechanism B, may be used in the same manner as above described for printing mechanism B. Any one of the four printing mechanisms A, B, C, or D may be used in this way, or two, three, or all may be used in the same way. In case only one is used it will be obvious that the printing mechanism shown in Fig. 1 will print six webs in the ordinary manner and one color-web in the manner last described. The one web thus printed in colors may, as said above, come from any one of the four printing mechanisms. In case two of the printing mechanisms are used for printing colors the press shown in Fig. 1 is capable of printing four webs in the ordinary way and two webs in colors, and so on. Moreover, the product of either one of the two sets of presses upon each side of the folding mechanism may be led over to the folding mechanism upon the other press, and thus the product of all four printing mechanisms and of the entire number of webs used, whether eight, seven, six, &c., may be brought in registry with one another and folded simultaneously over either one of the folding mechanisms. For instance, the product of presses C and D, or either of them, instead of passing down over folding and delivery mechanism 5 may be led across the press over

roller 60 and between rollers 60 and 61 in registry with the webs perfected by printing mechanisms A and B, or the webs perfected by either or both of the presses A and B instead of passing downward over folding and delivery mechanism 4 may be led across the press, over roller 80, between it and roller 81, where it will meet the product of the other presses in registry and be folded with said product and delivered by folding mechanism 5.

It will be seen from the above description that each one of the several printing mechanisms A, B, C, and D is capable of printing upon its two decks, consisting one of one impression and two form cylinders and the other of two form and two impression cylinders, either two webs in the ordinary way or one web with three colors upon one side and black or one color upon the other.

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

1. In a web-perfecting press, the combination with a set of printing-couples consisting of two form-cylinders and one coacting impression-cylinder, and a second set of printing-couples consisting of two form-cylinders and two coacting impression-cylinders, of mechanism adapted to lead two superposed webs between one of the form-cylinders and the coacting impression-cylinder of said first-named set of printing-couples, whereby one web will be printed upon one side, mechanism for leading the other web between the said impression-cylinder and the other form-cylinder of said first set of printing-couples, whereby said web will be printed upon one side, and mechanism adapted to lead each web between a form-cylinder and coacting impression-cylinder of said second set, whereby both webs will be printed upon the other side, substantially as described.

2. In a web-perfecting press, the combination with a set of printing-couples consisting of two form-cylinders and one coacting impression-cylinder, and a second set of printing-couples consisting of two form-cylinders and two coacting impression-cylinders, of mechanism adapted to lead two superposed webs between one of the form-cylinders and the coacting impression-cylinder of said first-named set of printing-couples, whereby one web will be printed upon one side, mechanism for leading the other web between the said impression-cylinder and the other form-cylinder of said first set of printing-couples, whereby said web will be printed upon one side, mechanism adapted to lead each web between a form-cylinder and coacting impression-cylinder of said second set, whereby both webs will be printed upon the other side, mechanism for reversing the direction of rotation of one form-cylinder and one coacting impression-cylinder of said second set of printing-couples, and mechanism adapted to lead a single web between the printing-couples of both sets of printing mechanism suc-

cessively, whereby one web may be printed upon one side in black and upon the other side in a plurality of colors, substantially as described.

5 3. In a web-perfecting press, two sets of printing mechanisms arranged in the same vertical plane with their delivery ends facing each other, and provided each with a folding and delivery mechanism, each of said sets of
10 printing mechanism consisting of a deck of printing-cylinders comprising two form-cylinders and one coacting impression-cylinder, a second deck of printing-cylinders comprising two form-cylinders and two coacting im-
15 pression-cylinders, and means for reversing the direction of rotation of one form-cylinder and one coacting impression-cylinder in said second deck, whereby said printing mechanism may perfect two webs simultaneously, or
20 may print one side of a single web with a plurality of colors and the other side in black or a single color, substantially as described.

25 4. In a web-perfecting printing-press, the combination with a series of superposed sets of printing mechanisms, of a second series of

superposed sets of printing mechanisms, said two series of superposed sets of printing mechanisms lying in the same vertical plane and with their delivery ends facing each other, each series of sets of superposed printing mechanisms being provided with its own
30 folding and delivery mechanism, each set of said superposed printing mechanism consisting of a deck of printing-cylinders comprising two form-cylinders and one coacting im-
35 pression-cylinder, a second deck of printing-cylinders comprising two form-cylinders and two coacting impression-cylinders, and means for reversing the direction of rotation of one form-cylinder and one coacting impression-
40 cylinder in said second deck, whereby said printing mechanism may perfect two webs simultaneously, or may print one side of a single web with a plurality of colors and the other side in black or a single color, substan-
45 tially as described.

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