

No. 724,458.

PATENTED APR. 7, 1903.

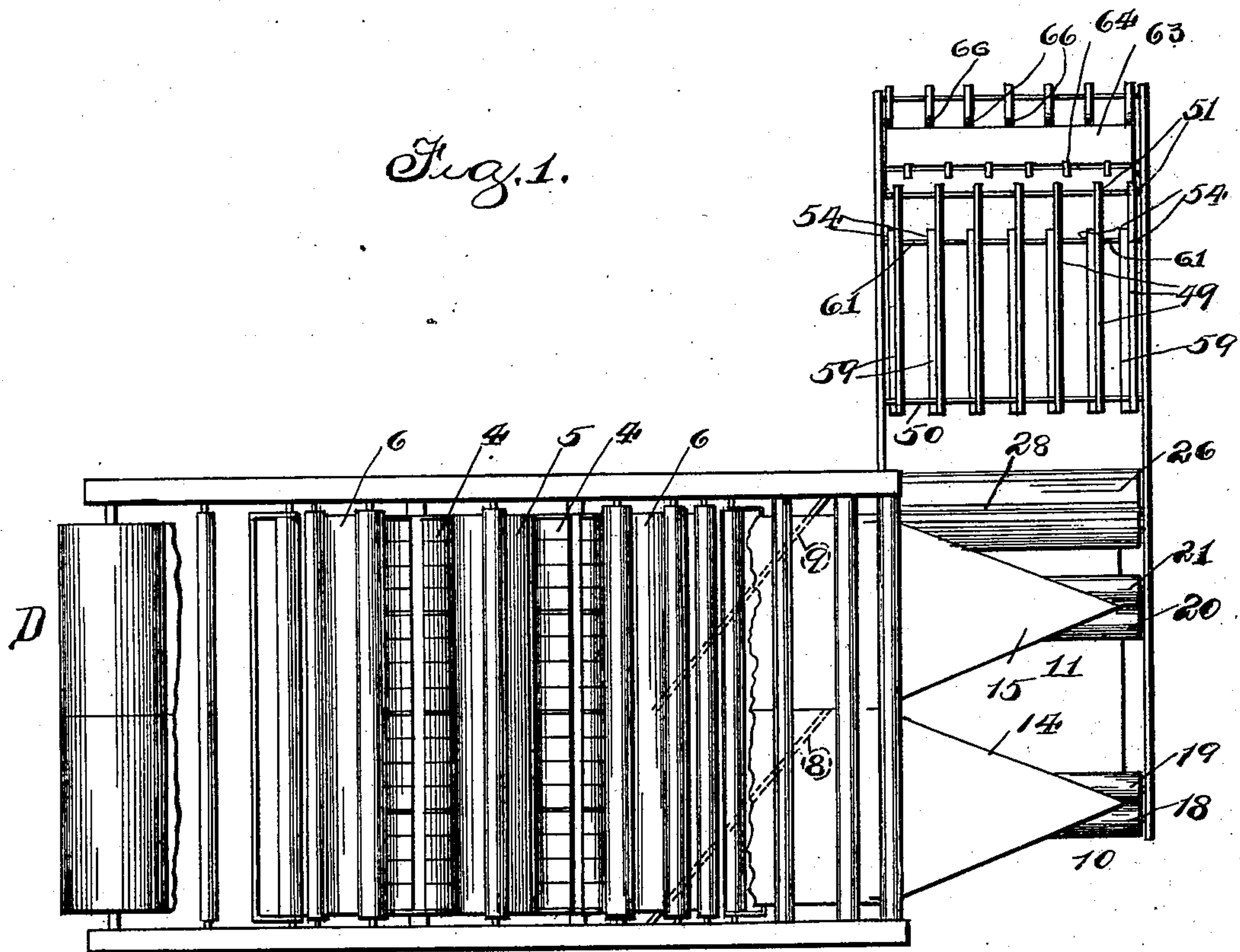
J. L. FIRM.

FOLDING AND DELIVERY DEVICE FOR PRINTING PRESSES.

APPLICATION FILED MAY 28, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



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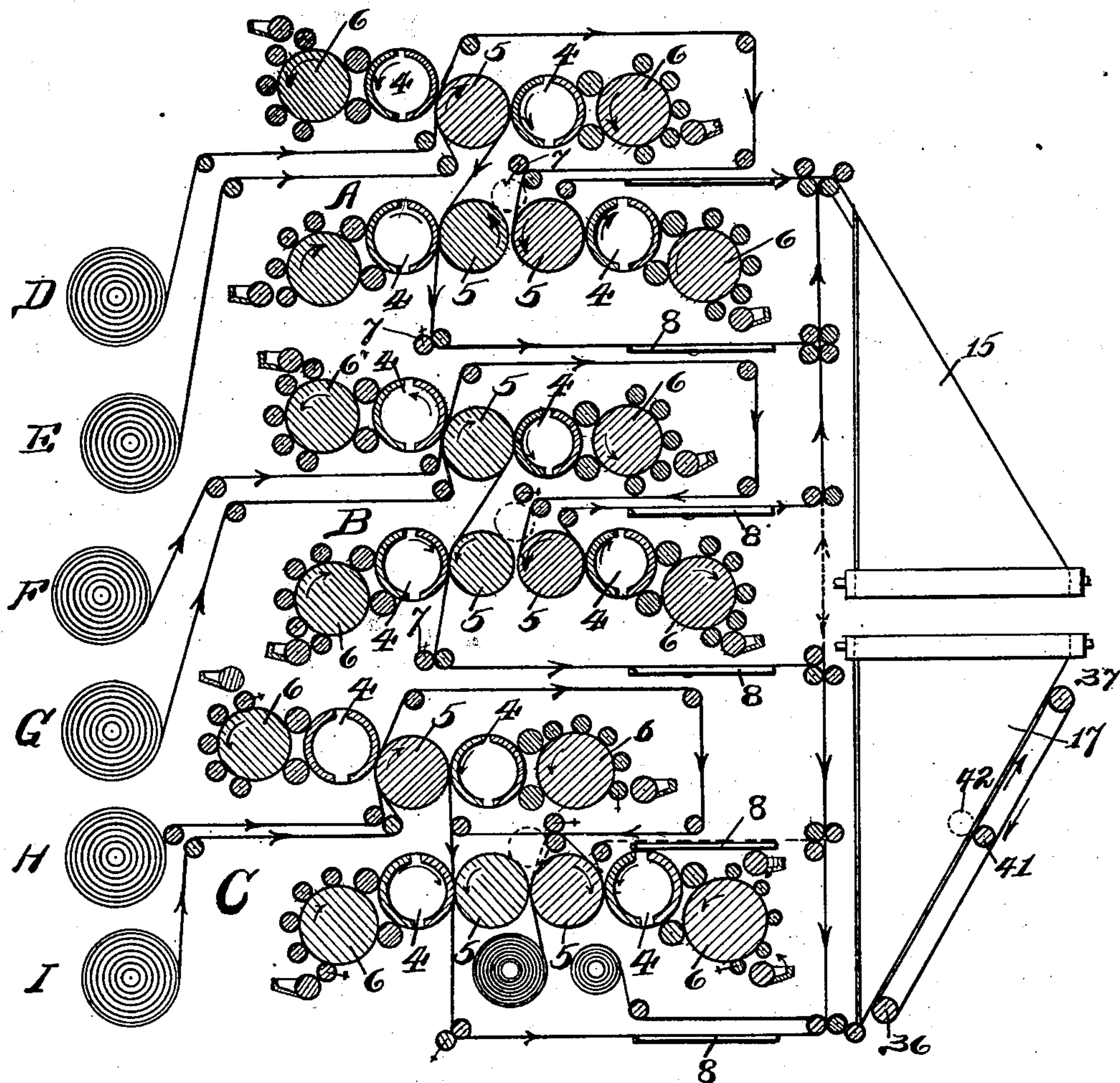
FOLDING AND DELIVERY DEVICE FOR PRINTING PRESSES.

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NO MODEL.

3 SHEETS—SHEET 2.

Fig. 2.



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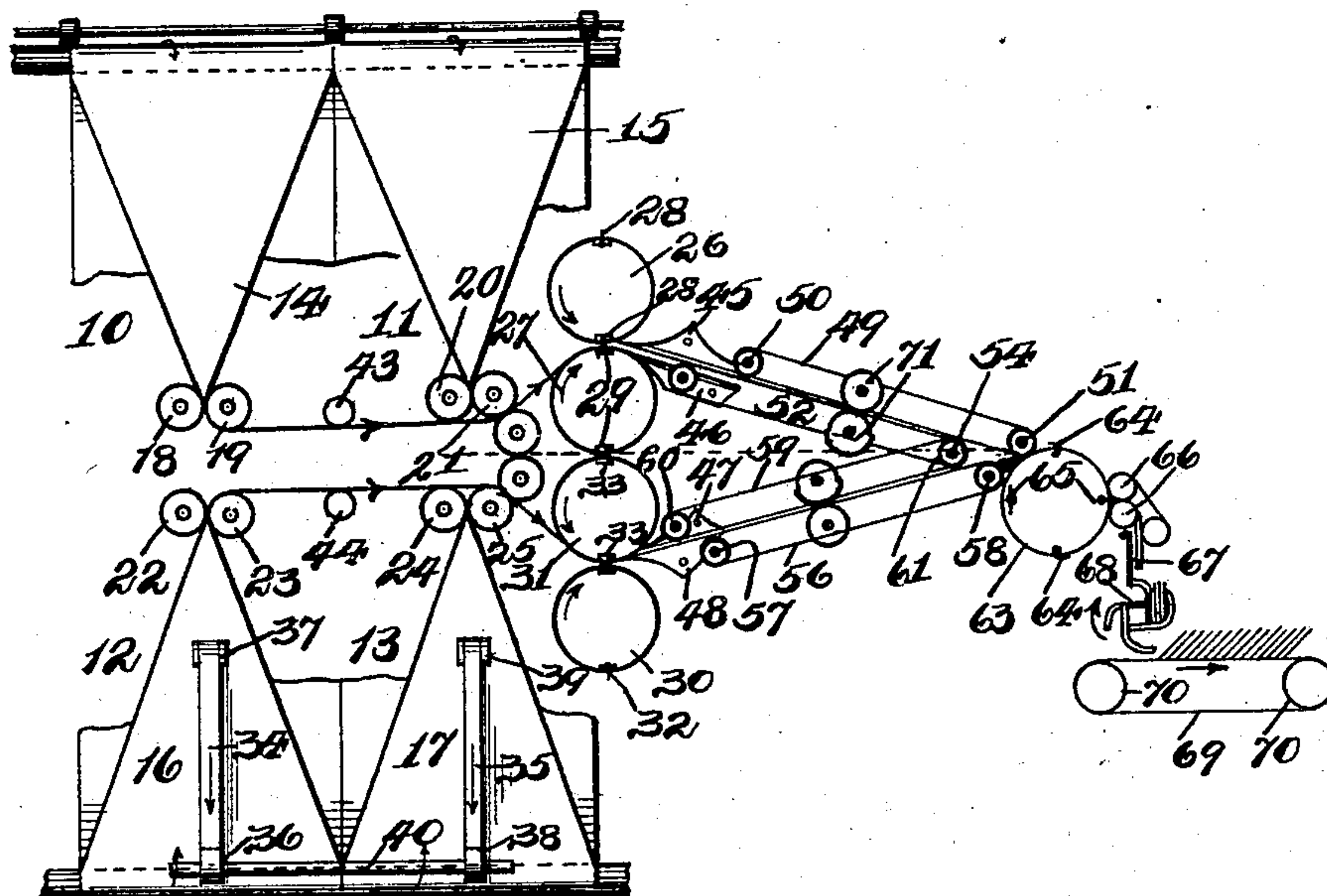
FOLDING AND DELIVERY DEVICE FOR PRINTING PRESSES.

APPLICATION FILED MAY 28, 1902.

NO MODEL.

3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH L. FIRM, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GOSS PRINTING PRESS COMPANY, OF CHICAGO, ILLINOIS.

FOLDING AND DELIVERY DEVICE FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 724,458, dated April 7, 1903.

Application filed May 28, 1902. Serial No. 109,275. (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 Folding and Delivery Devices for Printing-Presses, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to folding and delivery mechanism for rotary web-perfecting presses; and its object is to provide a new and improved mechanism by means of which a plurality of webs after being printed, brought together, and longitudinally folded may be brought from one longitudinal folder to another or cross-associated and delivered as one product.

Heretofore in superposing folded products by cross-associating from several folders it has been a common practice to associate the products before they are all severed transversely, and one difficulty arising from that lies in the fact that where the product to be cut consists of more than twenty-four pages the cutting is apt to shave strips from the edges, which are apt to fall back into and clog or interfere with the operation of the folder. It is one of the objects of my invention to obviate this difficulty.

In the drawings, Figure 1 is a top or plan view. Fig. 2 is a diagrammatic view of the press and folders in side elevation, and Fig. 3 is an end view of the folding and delivery mechanism.

As shown in Fig. 1, the printing-press in the form in which I prefer to embody this part of the invention is composed of three printing mechanisms A, B, and C, each consisting of four form and three impression cylinders and adapted to perfect simultaneously six webs D, E, F, G, H, and I. These printing mechanisms are of the same form, construction, and mode of operation as are shown and described in my application for Letters Patent, Serial No. 105,987, filed May 5, 1902, except that, as is shown in Fig. 1, the press is of double width—that is to say, capable of printing webs four pages wide—and contains six sets of longitudinal slitting or cutting mechanism and six sets of angle-bars for the

purpose of slitting the web longitudinally, transferring one half and superposing it upon the other half in the ordinary well-known way.

4 indicates form-cylinders, and 5 impression-cylinders, provided with suitable inking mechanism 6.

7 indicates slitters of the well-known form and construction, which slit the web longitudinally in the well-known manner.

8 9 indicate angle-bars of the well-known form, construction, and method of operation, which are adapted to transfer one portion of a slit web its own width laterally and superpose it upon the other portion of the web.

The run of the several webs through the press is indicated by arrows in Fig. 2 of the drawings. Referring to that figure, web D, directed by suitable guide-rollers, passes upward between form-cylinder 4 and impression-cylinder 5 in the upper deck of press A. Thence, directed by suitable guide-rollers, it passes downward under and partly around the right-hand impression-cylinder 5 in the lower tier of press A and upward between it and coacting form-cylinder 4 upon the right-hand end of the lower tier of said press. Thence, directed by suitable guide-rollers, it passes to the longitudinal folder 15. Web E, directed by suitable guide-rollers, passes upward between web D and impression-cylinder 5 of the upper tier of press A, around impression-cylinder 5, and between it and the right-hand form-cylinder 4. It then passes downward between the left-hand pair of form and impression cylinders 4 and 5 of the lower tier of press A and thence, directed by suitable guide-rollers, to the longitudinal folder 15. Webs F and G, H and I pass through presses B and C, respectively, in the same way in which webs D and E pass through press A.

Inasmuch as my present application refers to the folding and delivery mechanism rather than to the printing mechanism, the precise mechanism of the printing-press forms no part of my present invention, and it is obvious that instead of the form and arrangement of printing mechanism shown in Fig. 1 any other well-known form consisting of a plurality of decks of printing mechanism

adapted to perfect a plurality of webs might be used. It is believed, therefore, that no further detailed description of the printing mechanism shown illustratively in Fig. 1 of my drawings is necessary.

10 11 12 13 indicate longitudinal folding mechanisms, consisting, respectively, of internal guides or V-shaped formers 14 15 16 17 with their respective external turners or folding-rolls 18 19 20 21 22 23 24 25, which are adapted to longitudinally fold the slit and superposed webs of paper after being printed by the several sets of printing mechanism above described. For instance, the webs D, E, and F will ordinarily be led to the folders 10 and 11 and the webs G, H, and I to the folders 12 and 13. This, however, may be varied and the products of more or less than three rolls sent to one or the other of the folding mechanisms, or, if desired, the product of all six rolls may be sent to one folding mechanism, as is indicated by dotted lines in Fig. 2. The longitudinal folders 10 and 11 have their V-shaped formers 14 and 15 pointing downward, and the folders 12 and 13 have their V-shaped formers 16 and 17 pointing upward, so that the apices of the two sets of formers point toward each other.

26 27 indicate cutting-cylinders of any well-known form and construction, provided with cutting-knives 28 28 and matrices 29, which are adapted to sever the longitudinally-folded webs transversely on every transverse margin.

30 31 indicate cutting-cylinders provided with knives 32 and matrices 33, which operate in any well-known manner and are adapted to sever folded webs transversely on every transverse margin.

40 In order to assist the upward movement of the paper over the formers 16 17, I provide each of the folders 12 and 13 with belts 34 35, passing over pulleys 36 37 38 39, which are mounted upon a shaft 40, driven in any appropriate manner at the surface speed of the paper and moving in the direction shown by arrows on Figs. 2 and 3. This upward movement of the paper may also be further facilitated by rollers 41 42, located in the central line of the V-shaped formers 16 17 and placed, respectively, one outside and the other inside the V-shaped former, the roller 42 working through a suitable opening in the surface of the former for that purpose. The paper passing upward from the formers 16 17 will be engaged between their surfaces and the belts 34 35 and between the rollers 41 42, all of which being driven at the surface speed of the paper will assist the upward movement of the paper over said formers. The rollers 41 42 of course will be driven by any suitable mechanism, which being of any well-known form and construction and forming no part of my present invention it is deemed not necessary to further describe.

43 44 indicate rolls of any well-known form, construction, and operation.

45 46 47 48 indicate guides or strippers which are adapted to strip the sheets from the cutting-cylinders 26 27 30 31.

49 indicates tapes which pass over rollers 50 51 and are driven in the usual manner.

52 indicates tapes adapted to cooperate with tapes 49, which pass over and are carried by rollers 53 54, forming a tape-path between which the sheets of paper after being severed by the cutting-cylinders 26 27 pass to the delivery mechanism, hereinafter described. The rollers 53 are driven in any well-known manner, and the rollers 54 are idler-rollers mounted upon a shaft 55.

56 indicates tapes passing over and carried by rollers 57 58.

59 indicates tapes which pass over and are carried by rollers 60 61 and cooperate with the tapes 56 to carry the sheets of paper after being severed by the cutting-cylinders 30 31 to the delivery mechanism hereinafter described in registry with the sheets carried by the upper tape-paths 49 52, above described. The rollers 60 are driven in any well-known way, and the rollers 61 are idlers upon the same shaft 55 upon which the rollers 54 are mounted.

62 indicates a guide of any well-known form and description, which is adapted to guide the severed sheets of paper from the tape-paths 56 59 and deliver them upon the delivery mechanism, hereinafter described.

63 indicates a rotary carrier provided with two sets of grippers 64 and two sets of folding-blades 65. The grippers 64 and folding-blades 65 are of any well-known form and construction and are operated in the well-known way, and it is not, therefore, necessary to describe them more fully here.

66 indicates folding-rollers, between which the sheets of paper seized by the carrier, as hereinafter described, are forced by the folding or tucking blades 65 to give the sheets of paper a cross-fold.

67 indicates a guide guiding the transversely-folded sheets to an S-fly 68, which rotating in the direction indicated by the arrow in Fig. 3 delivers the transversely-folded sheets to the slow-moving tapes 69, mounted upon rollers 70 and operating in the well-known way. The S-fly 68 operates in the well-known way, and forming by itself no part of my present invention needs, it is believed, no further description. In place of the S-fly 68 and the slow-moving tapes 69 some other well-known form of mechanism for receiving the sheets from the carrier and delivering the same in an orderly manner may be employed.

71 72 indicate cam-rollers which operate in the well-known manner to control and insure the proper registry of the two sets of severed sheets when they come together after being cut by the cutting-cylinders 26 27 30 31.

The operation of the above-described mechanism is as follows: The webs being perfected are delivered, as above described, to

the several longitudinal folding mechanisms 10 11 12 13. The portion of the longitudinally-slit webs passing over the former 14 and between the folding-rolls 18 19 passes under 5 the registering-roll 43 and is associated in registry with the other portion of the longitudinally-slit webs passing over former 15 and between folding-rolls 20 21. The two sets of superposed webs thus associated pass upward in the direction indicated by arrows in 10 Fig. 3 between the cutting-cylinders 26 27, where they are transversely severed. The associated webs thus consisting of two products each of such number of pages as may result from the number of webs employed superposed upon one another in registry are 15 stripped from the cutting-cylinders 26 27 by the strippers or guides 45 46 and pass thus superposed between the tapes 49 52. In the 20 meanwhile the other perfected and longitudinally-slit webs which passed downward and thence to the folders 12 13 pass upward over the former 16 17. That portion of the longitudinally-slit web which passes upward over 25 former 16 and is longitudinally folded passes between the folding-rolls 22 23 over the registry-roller 44 to be associated in registry with the other portion of the longitudinally-severed webs, which passing upward over the 30 former 17 and between the rollers 24 25 is folded longitudinally. The two portions of the longitudinally-slit webs thus superposed in registry pass downward between the cutting-cylinders 30 31, where they are severed 35 transversely upon every transverse margin. They are then stripped from the cutting-cylinders 30 31 by the strippers 47 48 and guided thereby to the tape-paths 56 59, between which they pass upward and directed by the 40 guide 62 meet in registry therewith the products which have passed over the formers 14 15 and into the tape-paths 49 52. The several tape-paths are so adjusted that the forward edges of the two superposed products 45 coming from the upper set of longitudinal folding mechanism will lie in registry with the forward edges of the two sets of folded products coming from the lower longitudinal folding mechanism, and the four products 50 thus superposed will be delivered to the rotary carrier 63 in such position that the forward edges of the superposed products will be seized by the grippers, so that the severed sheets will be carried half-way around by the 55 cylinder. The folding-blades then coming into operation will force the web between the folding-rollers 66, which will fold the superposed and associated sheets transversely, from whence they will pass to the S-fly 68 and 60 to the slow-moving tapes 69.

It is obvious from the above description that when the above-described press and folding mechanism is run at its full capacity it will produce, fold, and deliver as one product a 65 newspaper of forty-eight pages, consisting of four sections of twelve pages each, each of said twelve-page sections being folded longi-

tudinally and said four superposed sections folded transversely and delivered as one product. It will also be apparent that by 70 means of the sets of turning-bars 8 9 the slit webs may be shifted their own width laterally and superposed upon one another before being delivered to the longitudinal folding mechanisms, in which case only one folder of 75 each pair of folding mechanisms will be used, and when the above-described press is run at its full capacity a forty-eight-page paper, consisting of two sections of twenty-four-page sections superposed in registry and trans- 80 versely folded and delivered, will be produced. It will be obvious that such being the maximum capacity of the press its capacity to print papers of a lesser number of pages will be easily understood without further descrip- 85 tion.

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

1. The combination with a printing-press adapted to perfect a plurality of webs, and 90 a pair of longitudinal folding mechanisms pointing respectively upward and downward, of transverse cutting mechanism for each of said longitudinal folding mechanisms, a single delivery mechanism, and means for lead- 95 ing the severed sheets from each of said cutting mechanisms, superposing them upon each other in registry, and delivering them, thus associated, simultaneously to the delivery mechanism, substantially as described. 100

2. The combination with a printing-press adapted to perfect a plurality of webs, longitudinal folding mechanism pointing downward, transverse cutting mechanism adapted to sever transversely the webs folded by said 105 longitudinal folding mechanism, a second longitudinal folding mechanism pointing upward toward said first longitudinal folding mechanism, and a second transverse cutting mechanism adapted to transversely sever the webs 110 longitudinally folded by said second longitudinal folding mechanism, of a single delivery mechanism, and means for leading the sheets from said two transverse cutting mechanisms toward one another, superposing the 115 severed sheets upon one another in registry, and delivering them, thus superposed, simultaneously to said delivery mechanism, substantially as described.

3. The combination with a printing-press 120 adapted to perfect a plurality of webs, of a pair of longitudinal folding mechanisms pointing downward, a pair of cutting-cylinders adapted to sever transversely the longitudinally-folded and associated webs folded by 125 said pair of longitudinal folding mechanisms, a second pair of longitudinal folding mechanisms pointing upward toward said first pair of longitudinal folding mechanisms, a pair of cutting-cylinders adapted to transversely 130 sever the folded and associated webs from said second pair of longitudinal folding mechanisms, a rotary folding-carrier, and a pair of converging tape-paths adapted to lead to-

gether and superpose in registry and deliver simultaneously to said rotary folding-carrier the severed cuts from each of said pairs of transverse cutting-cylinders, substantially as described.

4. The combination with a printing-press adapted to perfect a plurality of webs, of a pair of longitudinal folding mechanisms pointing downward, a pair of cutting-cylinders adapted to sever transversely the longitudinally-folded and associated webs folded by said pair of longitudinal folding mechanisms, a second pair of longitudinal folding mechanisms pointing upward toward said first pair of longitudinal folding mechanisms, a pair of

cutting-cylinders adapted to transversely sever the folded and associated webs from said second pair of longitudinal folding mechanisms, a rotary folding-carrier, and a pair of converging tape-paths adapted to receive the severed cuts from said first and said second pairs of cutting-cylinders, respectively, and lead them together with their leading edges in registry, and to deliver said cuts simultaneously to said rotary folding-carrier, substantially as described.

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