

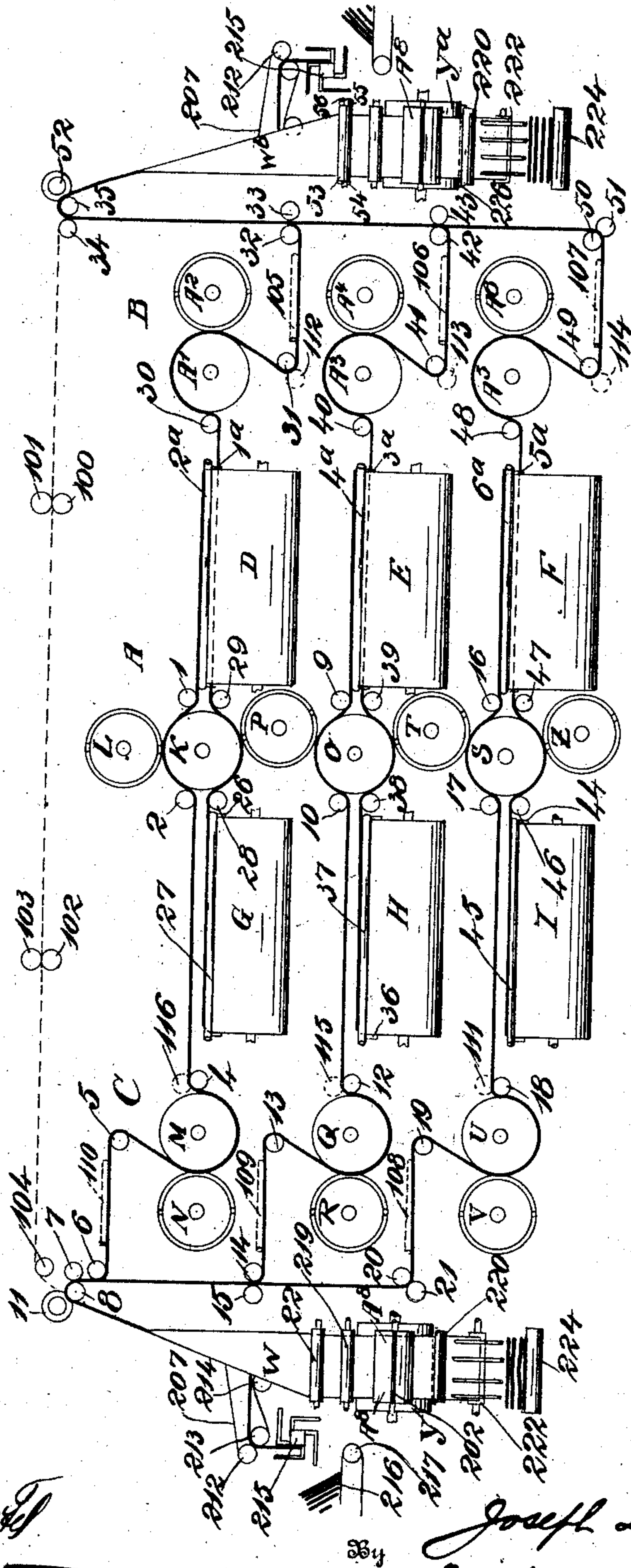
No. 883,706.

PATENTED APR. 7, 1908.

J. L. FIRM.
PRINTING MACHINE.
APPLICATION FILED OCT. 22, 1907.

2 SHEETS—SHEET 1.

Fig. 1.



Inventor

Witnesses

W. H. Hunsford
Geo. E. Tew

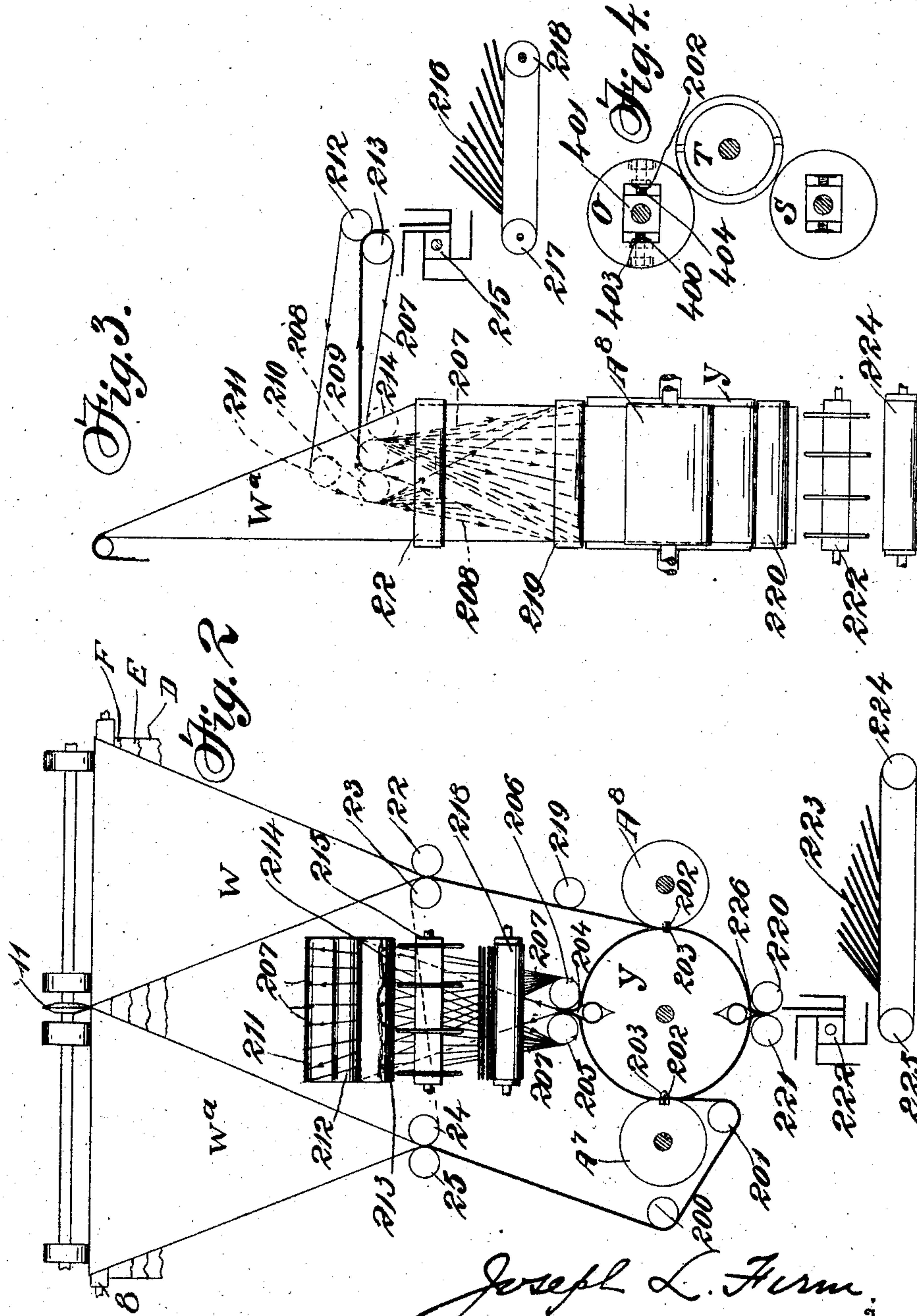
Joseph L. Firm.
Mrs. B. Hunsford
Attorneys

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2 SHEETS--SHEET 2.



Joseph L. Firm.
Inventor

Witnesses

A. A. Simons.
Geo. E. Tew

By

M. B. Turner.
Attorney

UNITED STATES PATENT OFFICE.

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

PRINTING-MACHINE.

No. 883,706.

Specification of Letters Patent.

Patented April 7, 1908.

Application filed October 22, 1907. Serial No. 398,625.

To all whom it may concern:

Be it known that I, JOSEPH L. FIRM, a citizen of the United States, residing at Berwyn, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification.

This invention relates to printing machines of the rotary perfecting type, and has for its object to provide a machine improved with respect to the means for printing, associating and delivering webs, to form a machine of large capacity and comparatively simple construction, and characterized also by rapidity in action and the use of a small number of form and impression cylinders in comparison to the large number of web rolls used.

One important feature of the machine is that it retains the straight line principle, and that it is convenient for handling the webs and the web rolls, all the webs being fed in on one side of the machine.

Speaking generally, the invention comprises three sets of printing mechanisms, arranged side by side with the axes of the printing cylinders in parallelism. The webs are first fed to the middle set, where they are printed on one side and pass therefrom to the end set, where they are printed on the other side, and they are folded, cut and delivered at both ends of the machine. Or, the product from one end may be associated with the other, and all folded and delivered at one end of the machine. By the use of double width webs, and a pair of longitudinal folders at each end, four papers or products are delivered at each operation of the machine.

The invention is shown as embodied in a triple or three deck mechanism, but the number of decks may be increased or diminished as desired.

In the accompanying drawings, Figure 1 is a diagrammatic front elevation of the machine, parts at the ends of the machine being broken away. Fig. 2 is a diagrammatic end elevation, showing the folders at one end of the machine. Fig. 3 is a rear elevation of the folding and delivering mechanism. Fig. 4 is a detail of means for silencing some of the couples.

In this specification the "front" of the press will be referred to as that side where the rolls are located, as shown in Fig. 1; and

the "ends" of the press will mean the side where the products are delivered.

The three sets of printing mechanisms are indicated as a whole at A, B and C. The intermediate set A consists of four form and three impression cylinders, each impression cylinder coöperating with two form cylinders to print upon the top and bottom of two independent webs at one operation, whereby six webs are printed on one side, the webs and web rolls being indicated at D, E, F, G, H and I. The set B consists of three couples or form and impression cylinders to print the opposite side of the webs D, E and F, and the set C consists of three form and three impression cylinders to print on the opposite side of the webs G, H and I.

The web D feeds in over the roller 1^a, and passes over the turning bar 2^a, thence under the guide roller 1, to impression cylinder K, and printed upon its first side by form cylinder L, thence under the roller 2 and over the roller 4, to impression cylinder M, and is printed upon its opposite side by form cylinder N, thence over the rollers 5, 6, 7 and 8, to the longitudinal folders W and W^a, after slitting by the slit 11.

The web E passes over the roller 3^a and the turning bar 4^a to the guide roller 9, thence over the impression cylinder O, and printed upon its first side by form cylinder P, thence under the roller 10 and over the roller 12, under impression cylinder Q, and is printed upon its opposite side by form cylinder R, thence over the roller 13, and between rollers 14 and 15, thence between rollers 7 and 8, where it meets and is associated with the web D.

The web F passes over the roller 5^a, thence over the turning bar 6^a, thence under the roller 16, to impression cylinder S, and is printed upon its first side by form cylinder T, thence passes under the roller 17 and over roller 18 to impression cylinder U, and is printed upon its opposite side by form cylinder V, thence over the roller 19, between rollers 20 and 21, and thence between rollers 14 and 15, where it meets the web E, passing onward between the rollers 7 and 8, where it meets the web D; thence all three webs pass down the longitudinal folders or formers W, and W^a, after having been slit by the slit 11, and thence pass between the rollers 22, 23, 24, and 25, and are transversely cut and folded on the carrier Y and delivered, making

ing four copies of twelve page papers at one end of the machine.

The web G passes over the roller 26, and turning bar 27, and over the roller 28, to impression cylinder K, and is printed upon by form cylinder P, thence over the roller 29, and under roller 30, to impression cylinder A¹, and has its opposite side printed by form cylinder A², thence around the roller 31, and between rollers 32 and 33, 34 and 35, to the longitudinal folders W^b and W^c, after slitting by slit 52.

The web H passes over the roller 36 and turning bar 37, thence over the roller 38 to impression cylinder O, and has its first side printed upon by form cylinder T, thence over the roller 39 and under roller 40 to impression cylinder A³, and is printed upon its opposite side by form cylinder A⁴, thence over and under the roller 41, between rollers 42—43, thence with web G between the rollers 32—33, and thence between the rollers 34 and 35, to the folders.

The web I passes over the roller 44 and turning bar 45, thence over the roller 46 to impression cylinder S, and is printed upon its first side by form cylinder Z, thence over the roller 47 and under the roller 48, to impression cylinder A⁵, and is printed upon its opposite side by form cylinder A⁶, thence over and under the roller 49, between rollers 50 and 51, after which it meets the webs G and H, passing onward therewith between the rollers 42 and 43, 32 and 33, 34 and 35, and thence over the longitudinal folders or formers W^b and W^c, all being slit by the slit 52, and thence between the rollers 53, 54, 55 and 56, to be cut and folded transversely on the carrier Y^a, corresponding in all respects to the carrier Y at the other end, making four more copies of twelve page papers, or a total of eight copies at one revolution of the machine.

When it is required to enlarge the products by any number of pages above twelve, the webs G, H, and I are passed between the rollers 34, and 35, and thence, as shown in dotted line, between rollers 100 and 101, 102 and 103, and over rollers 104 and to the longitudinal folders or formers W^a and carrier Y, the carrier Y^a being silenced and not used, and said webs being associated and delivered with the webs D, E, and F. By this operation copies of fourteen, sixteen, eighteen, twenty, twenty-two and twenty-four page products may be printed and associated from the printing mechanism in a straight pathway and without turning or reversing.

It is to be understood that the products of a machine of this kind may be varied, and turning bars can be used if desired, such as are shown in dotted lines at 105, 106, 107, 108, 109 and 110, and slitters shown in dotted lines at 115, 111, 112, 113 and 114 can be used if required to slit the different webs,

which may then be turned and superposed if desired. It is also to be understood that the longitudinally folded webs may be passed from one former to the other, and thence to the carrier, and superposed and all delivered as one product.

A description of one longitudinal folder and carrier will suffice for all, as the mechanism is the same at both ends of the machine. The webs D, E, and F, having been printed on both sides and slit by the slit 11, pass down the longitudinal folders W and W^a, as shown in Fig. 2, and thence from each folder between the rollers 22 and 23 and 24 and 25 respectively. The webs coming from the folder W^a pass thence, under the rollers 200 and 201, and thence between the cutting cylinder A⁷ and carrier Y, and are cut by the knife 202, in the matrix 203, and thence folded off of the carrier by the folding blade 204, between the rollers 205 and 206, thence through a series of converging and quarter turned tapes 207 and 208, which pass over rollers 209, 210, 211, 212, 213 and 214, to the rotary fly 215, and are delivered to the apron 216, which passes over rollers 217 and 218. The webs that pass over the longitudinal former W, pass between the rollers 22 and 23 and over the roller 219, thence between the cutting cylinder A⁸ and the carrier Y, where they are cut transversely by the knife 202, and are thence folded between the rollers 220 and 221 by the folding blade 226, and thence to the rotary fly 222, which delivers them to apron 223 which passes over rollers 224 and 225.

The transverse folding and delivery mechanisms are the same as shown in my application, Serial No. 354,101, with this exception, the papers are all delivered in front of or on one side of the carrier. By this means I can place the carrier and cutting cylinders in a horizontal plane and have one of the deliveries between the longitudinal folders, as shown in Fig. 2, thereby making less space and travel for the webs from the longitudinal folders to the carrier Y.

If the longitudinally folded webs should be required to be superposed, one on top of the other, the longitudinally folded web from the former W^a may be passed from the roller 24 to the roller 23, as shown in dotted lines, and thence between the cutting cylinder A⁸ and carrier Y, both of the sections being cut by the knife 202 on the cutting cylinder A⁸ and thence transversely folded off between the rollers 220 and 221, and delivered by the fly 222 to the apron 223. In this event I would silence the upper delivery and cutting cylinder A⁷, only one delivery—the lower one—being used.

I prefer to feed all the webs from one side of the press, as this will give the tension hand a supervision of all the rolls and have them handy to thread the machine by any

breakage of the webs, but part may be fed from the front and part from the back, if desired.

As shown in Fig. 4, one or more of the impression cylinders may be silenced. Thus—
 5 the impression cylinders O and S may be moved to one side if at any time it should be desired to use less rolls, by removing the gear from the impression cylinder O, and
 10 drawing it to one side by loosening the set bolt 400, in the box 401, and tightening the bolt 402, and then fastening the set nuts 403 and 404, and likewise with respect to impression cylinder S.

15 The inking devices may be old and are omitted, but are preferably those shown in my U. S. Patent 648,938 which may be moved back from the form cylinder to facilitate putting the plates thereon.

20 I claim:

1. In a printing machine, the combination of three sets of printing couples arranged in a row with their cylinders in parallelism, means to feed a plurality of webs to the intermediate set, there to be printed on one side,
 25 means to pass part of said webs to each of the end sets, there to be printed on the other side, and means to cross over the webs from the set at one end and associate the same with the webs of the set at the other end.

30 2. In a printing machine, the combination of three sets of printing mechanisms arranged side by side, with cylinders parallel, the intermediate set having a plurality of form and impression cylinders arranged one above the other with each impression cylinder coöperating with two form cylinders, to print one side of a plurality of webs, and each end set having means to print the other side of part
 40 of said webs, means to feed a plurality of webs to the intermediate set, and means to pass part thereof to each of the end sets.

3. In a printing machine, the combination of three sets of printing mechanisms arranged in a row with cylinders parallel, the intermediate set having an impression cylinder coöperating with two form cylinders to print one side of two webs, and the end sets each having a couple to print the other
 50 side of one web, means to feed webs into the intermediate set from the side, and means to turn said webs and to pass the same severally in a straight line through the intermediate and each of the end sets and deliver part of
 55 the webs at each end of the machine.

4. In a printing machine, the combination of an intermediate and two end sets of printing mechanisms arranged in a straight line with cylinders parallel, the intermediate set
 60 having a plurality of double couples arranged one above the other and comprising alternate form and impression cylinders, each impression cylinder coöperating with the two adjacent form cylinders to print one side of two
 65 webs, and the end sets being constructed to

each print the other side of part of the webs, means to feed a plurality of webs to the intermediate set and to pass part of said webs to one end set and part to the other.

5. In a printing machine, the combination
 70 of an intermediate and two end sets of printing couples arranged in a straight line with cylinders parallel, the intermediate set comprising a plurality of double couples arranged one above the other and adapted to each
 75 print one side of two webs, and the end sets each comprising a plurality of single couples arranged one above the other and adapted to each print the other side of one web, means to feed two sets of webs to the couples of the
 80 intermediate set from the side, one set of webs being fed to said couples in one direction and the other set in the opposite direction, and means to pass said sets of webs to the end couples respectively and to deliver
 85 the same respectively at opposite ends of the machine.

6. In a printing machine, the combination with a pair of longitudinal folders, of a rotary transverse folder and cutter, means to pass
 90 webs from the longitudinal folders to opposite sides of the transverse folder, and means to deliver the product from the top and bottom of said transverse folder.

7. In a printing machine, the combination
 95 with a pair of longitudinal folders, of a rotary transverse folder and cutter, means to pass webs from the longitudinal folders to opposite sides of the transverse folder, and means to deliver the product from the top and bot-
 100 tom of said transverse folder, the top delivery devices being located between the longitudinal folders.

8. In a printing machine, the combination of an intermediate and two end sets of
 105 printing couples, the intermediate set comprising a plurality of couples arranged one above the other with cylinders in substantially the same vertical plane, and the end sets each comprising a plurality of single
 110 couples arranged one above the other with the cylinders of each couple in substantially the same horizontal plane, means to feed a plurality of webs to the intermediate set, and means to pass part of said webs therefrom to
 115 each of the end sets.

9. In a printing machine, the combination of an intermediate set having one impression and two form cylinders, to print different webs, end sets on opposite sides of said set
 120 and spaced therefrom, each of the end sets having one impression and one form cylinder, means to feed different webs in opposite directions to said intermediate set, including turning bars located in the said
 125 spaces on opposite sides of the intermediate set, and means to pass part of said webs to each of the end sets.

10. In a printing machine, in combination, a perfecting cylinder mechanism having
 130

means to print a plurality of webs, including sets of couples spaced apart horizontally, means to feed webs into said mechanism at the side thereof, that is, at the ends of the 5 cylinders, and between said sets, means to associate webs at each end of said mechanism, and means to optionally deliver the webs so associated, at either or both ends of said mechanism.

10 11. In a printing machine, the combination of an intermediate set comprising two form and three impression cylinders arranged in alternation one above the other, with impression cylinders at the top and bot- 15 tom and each form cylinder cooperating with two impression cylinders, and sets each consisting of two couples of single form and im-

pression cylinders on opposite sides of said intermediate set and spaced therefrom, to which the webs are respectively passed, to 20 perfect the same, and means to feed webs between the form and impression cylinders of the intermediate set in opposite directions alternately, including web rolls at the side of the machine and turning bars located in the 25 said spaces on opposite sides of the intermediate set.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH L. FIRM.

Witnesses:

FLORENCE HENDERSON,
H. G. BATCHELOR.