April 16, 1929. A. M. ZUCKERMAN 1,709,386

DELIVERY MECHANISM

Filed Sept. 9, 1926 4 Sheets-Sheet 1

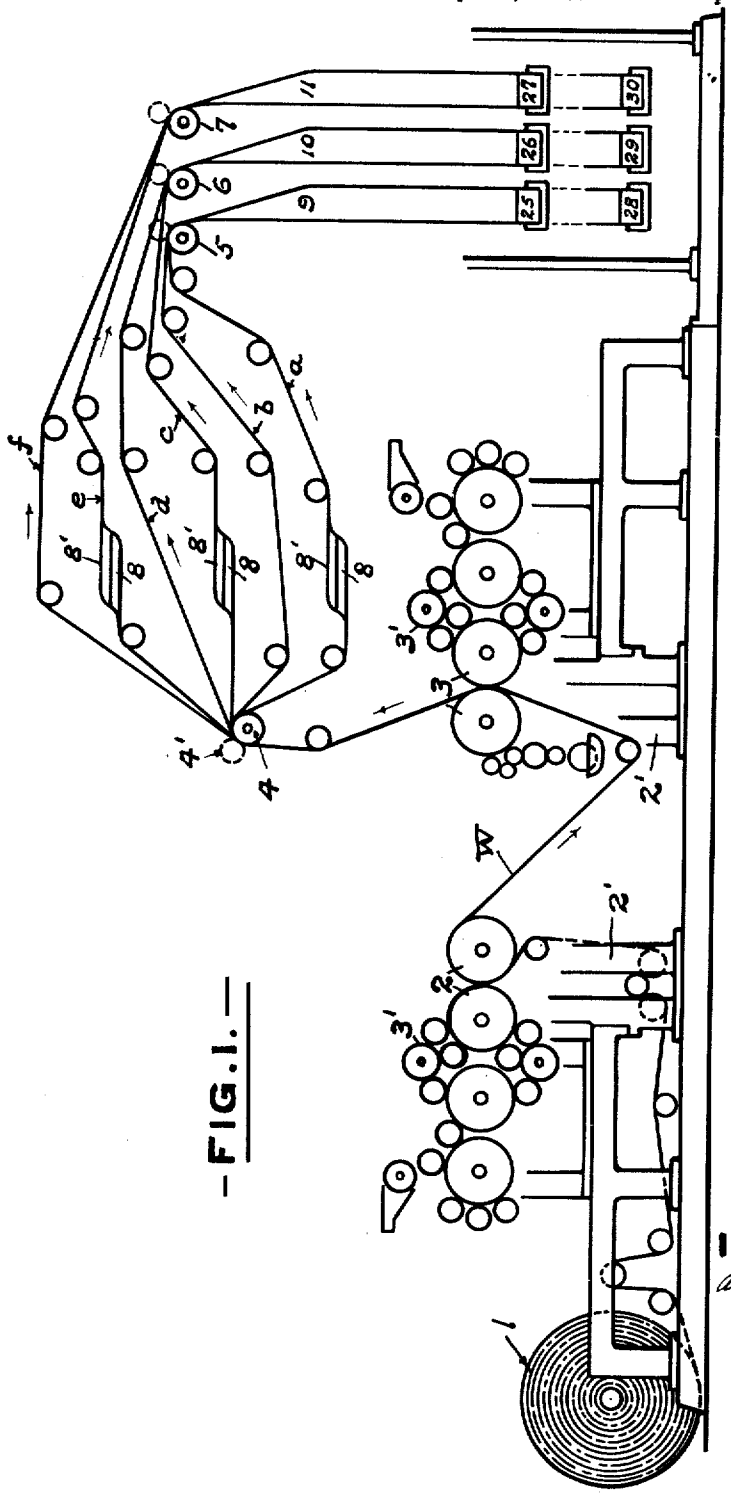


FIG. 1.

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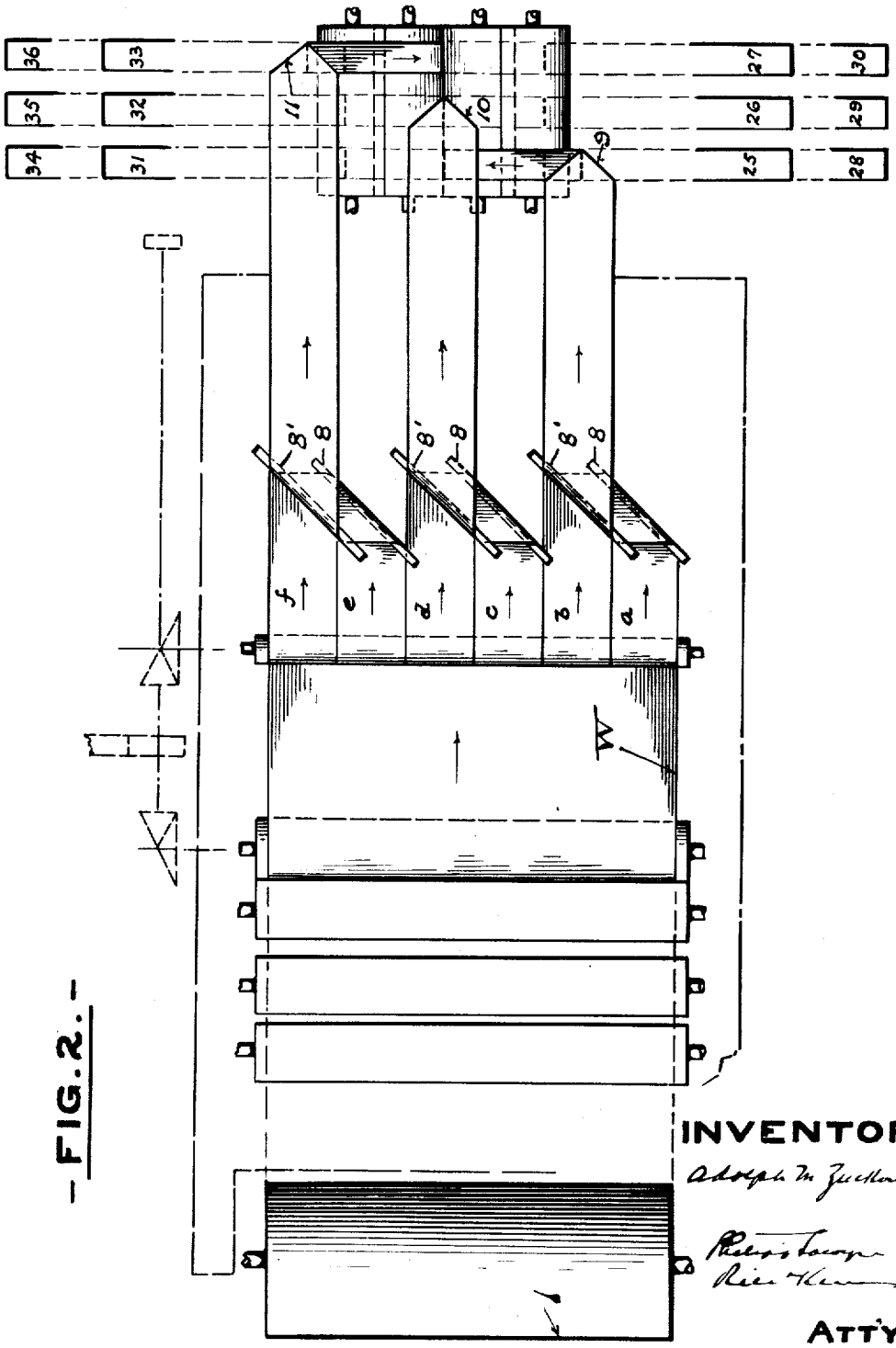


FIG. 2.

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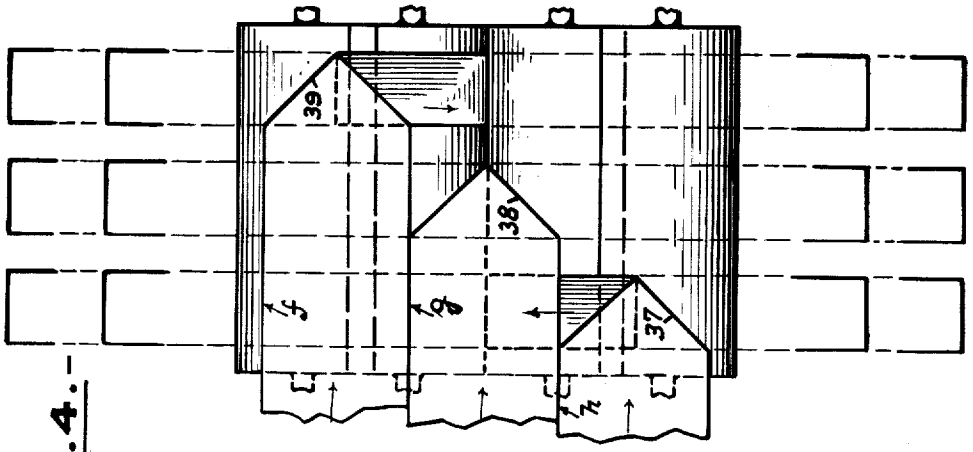


FIG. 4.

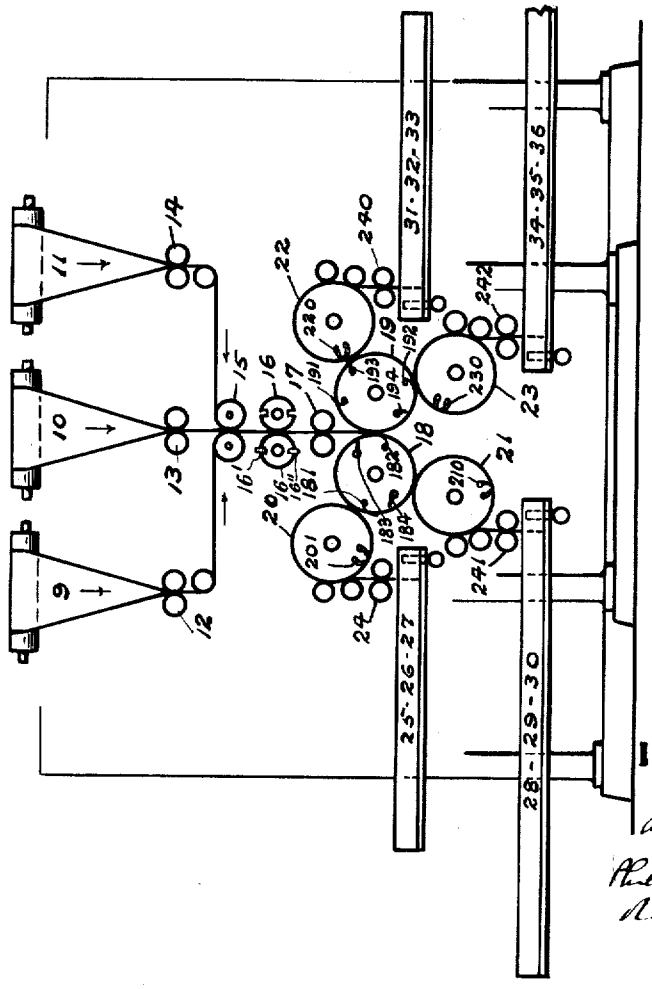


FIG. 3.

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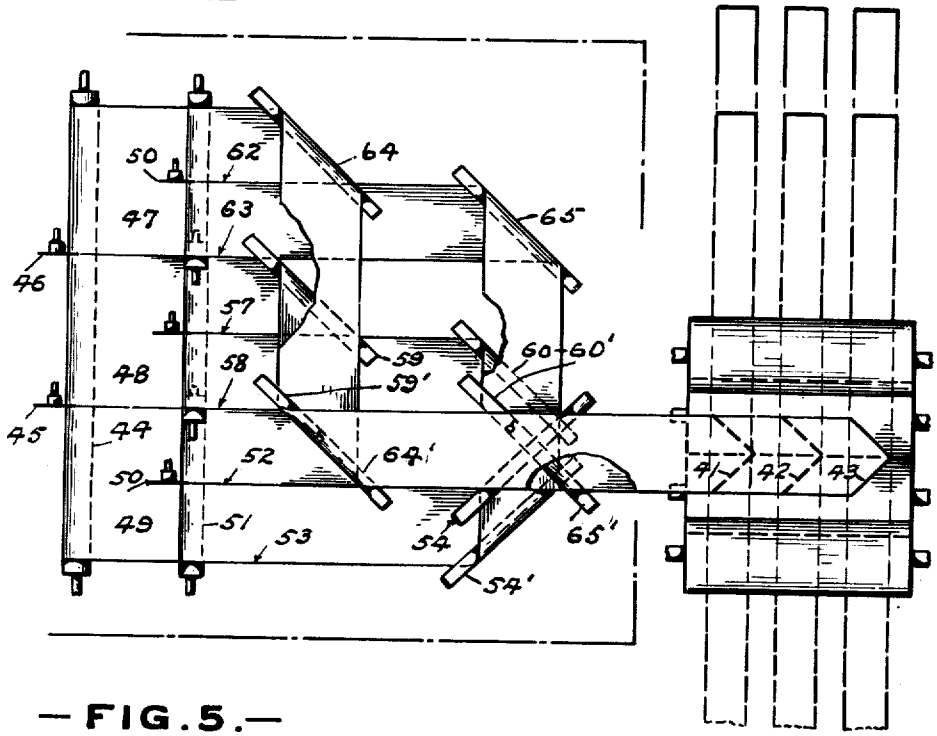
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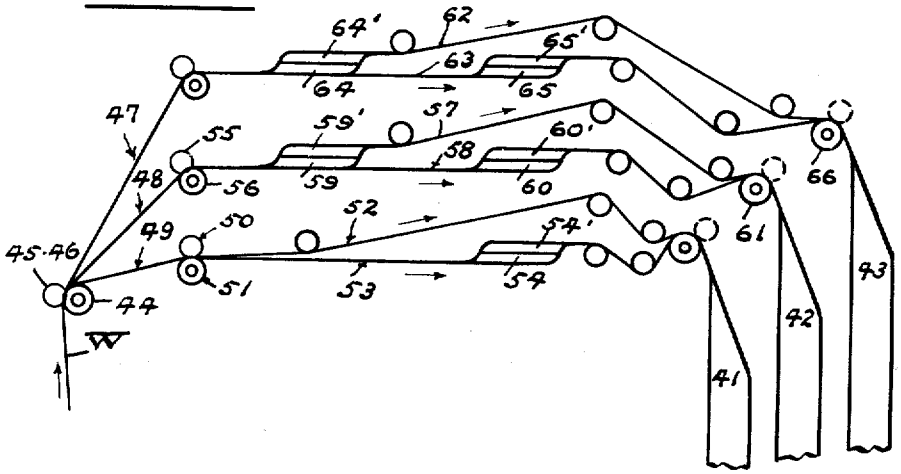
DELIVERY MECHANISM

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— FIG. 6. —



— FIG. 5. —



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UNITED STATES PATENT OFFICE.

ADOLPH M. ZUCKERMAN, OF NEW YORK, N. Y., ASSIGNOR TO R. HOE & CO., INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

DELIVERY MECHANISM.

Application filed September 9, 1926. Serial No. 134,339.

This invention relates to certain improvements in delivery mechanism.

In printing products from web printing machines, the character of the product frequently requires the simultaneous printing and delivery of a large number of different folded signatures, and in some instances products in which the signature is delivered with a head fold, that is, a fold at the top of the page, this head fold being produced by running the web over a former, the product being delivered with a head fold uncut, this folding of the product having certain advantages. A certain number of this class of products can be handled with two formers placed side by side, the folder and cutting mechanism being one product wide, two deliveries being placed on each side of the folder. With this arrangement four different signatures could be simultaneously delivered. Any further increase, however, in the number of signatures delivered requires the addition of a large number of parts, and can be accomplished only with difficulty, and with the sacrifice of accessibility and convenience of arrangement in the machine.

The present invention has for its object the provision of a delivery employing a plurality of formers, and a folder and cutting mechanism so arranged that there may be used a large number of deliveries for simultaneously delivering a large number of different products, the mechanism being compact and accessible, and capacitated to deliver this number of different folded products without unduly complicating the machine or requiring many parts.

Generally speaking this object of the invention is effected by providing 2, 3, or more formers, as desired, which are arranged out of line with each other widthwise of the press so that each web has a longer distance to travel than the other web and by making the folder and the cutting mechanism 2, 3, or more products wide. The products are then delivered to deliveries on each side of the folder and cutting mechanism, these deliveries being superposed and each delivery being capacitated to receive 2, 3, or more products delivered abreast. Thus with this arrangement the number of signatures which can be handled may be greatly increased without the addition of a large number of parts, and by so arranging the formers the width of the folder can be increased to the width of the number of products it is required to handle without losing compactness and accessibility.

With the above mentioned object, and others not specifically referred to in view, the invention consists in certain novel parts, arrangements and combinations which will be described in connection with the accompanying drawings and the novel features pointed out in the claims hereunto annexed.

In the drawings—

Figure 1 is a diagrammatic side elevation of a press and delivery embodying the novel features of the invention.

Figure 2 is a plan view of the arrangement shown in Fig. 1.

Figure 3 is an end view of the folder used with the arrangement of Fig. 1.

Figure 4 is a partial plan view of a modified folder arrangement.

Figure 5 is a diagrammatic side elevation of a modified arrangement of the formers, and

Figure 6 is a plan view of the arrangement shown in Fig. 5.

Referring now to these drawings, the machine which has been chosen to illustrate the invention is a perfecting web press which is fed from a web roll marked 1, the web being indicated by the letter W, the printing and perfecting couples of this press being marked 2, 3 and supported in suitable framing 2′ and inked from suitable inking mechanism 3′.

In the particular arrangement shown in Figure 1–3, the machine is capacitated to print on a web twelve pages wide, though, of course, the width of the web and the number of pages may be varied within any desired limits. In the arrangement shown in these figures, the plate cylinder is capacitated to carry eight plates around with the columns running lengthwise or longitudinally of the cylinders.

After the web has been printed, referring first to the construction of Figs. 1 to 3, the web is led over a drag roller 4 where it is slit into six webs, *a*, *b*, *c*, *d*, *e*, *f*, by a slitter, indicated by the numeral 4′. After the web has been slit, three of the webs, as the webs

b, *d* and *f* are led directly to and over three drag rolls 5, 6 and 7; the other three webs *a*, *c* and *e*, each go over a pair of turning bars 8 and 8′ and then are associated with the other webs and pass with them over the drag rolls 5, 6 and 7.

In the embodiment of the invention illustrated, these webs are given a head fold by means of formers, one former being supplied for each web or each set of associated webs. While these formers may be varied in number, in the particular machine illustrated, there are three such formers, and these formers are arranged out of line widthwise of the members, that is, widthwise of the web so that each web or set of associated webs have web paths of different lengths, the difference being slightly more than the width of a product. While this out of line position of the formers may assume various arrangements, in the construction shown in Figs. 1 to 4, the formers are arranged in staggered offset relation to each other, that is, they are arranged diagonally of the run of the web through the machine, these formers being marked (in Fig. 2) 9, 10 and 11, the formers being of the ordinary V-type. As the columns run longitudinally of the cylinder, the width of each web section is twice the height of a page plus margins. This first fold therefore comes at the head of a page, and is, as it is called, a head fold.

After the webs have received their head fold they pass through nipping rolls 12, 13 and 14, arranged below the formers and to and between a centrally arranged pair of nipping rollers 15. From the rollers 15 the webs are directed to and through a pair of cutting cylinders 16 which make two cuts for each revolution, being provided with cutting knives indicated at 16′, 16″. These cutting cylinders are of the width of the number of products corresponding to the number of formers, that is, in the present instance, these cutting cylinders are three products wide, so that all the webs or associated webs may go to the cutting mechanism side by side. After the products have been separated from the webs by the cutting cylinders they are drawn through a pair of nipping rollers 17 and pass to a pair of folding cylinders 18, 19.

In the machine embodying the invention in its best form, the products are delivered on each side of the folding mechanism. In accordance with the invention, therefore, these folding cylinders 18, 19 are arranged to alternately take the products, that is, where three products wide are coming down, the folding cylinder 18 takes the three products and the succeeding three products are taken by the cylinder 19, the cylinders 18, 19 being provided with suitable sheet taking devices for taking the sheets, such as grippers. For the purpose hereinafter referred to, each of the cylinders are provided with two sets of grippers, the cylinder 18 being provided with grippers 181 and 182 and tucking blades 183 and 184, and the cylinder 19 being provided with grippers 191 and 192, and tucking blades 193 and 194. From the cylinders 18, 19 the products pass to cooperating folding cylinders which are shown as jaw cylinders 20, 21, 22 and 23, these cylinders being provided with jaws 201, 210, 220 and 230.

In accordance with the invention in order to provide for the delivery of a large number of different signatures, two deliveries are provided on each side of the folding mechanism arranged in superposed relation and these deliveries are each, as shown in Fig. 1, a plurality of products wide. Thus from the cylinder 18 three products are delivered to the jaw cylinder 20 from which the products are delivered through pressure rolls 24 to three deliveries arranged abreast and marked 25, 26 and 27. The second set of products is delivered from the cylinder 19 to the jaw cylinder 22 and from it are passed through similar pressure rolls 240, to a plurality of deliveries arranged abreast and marked 31, 32 and 33. The third set of products is then taken by the cylinder 18 and is delivered to the jaw cylinder 21, and passes through pressure rolls 241 to deliveries 28, 29 and 30 arranged below the deliveries 25, 26 and 27, before referred to, and as shown in Fig. 1. The fourth set of products is delivered from the cylinder 19 to the jaw cylinder 23 and from this cylinder passes through pressure rolls 242 to a plurality of side by side deliveries 34, 35 and 36, these deliveries being located below the deliveries 31, 32 and 33, before referred to.

It will thus be seen that, with the construction so far described, without adding a large number of new parts or complicating the machine, a large number of products with a head fold can be simultaneously delivered, and with the arrangement shown, twelve different signatures may be produced. It will be obvious, of course, that various associations of the sections of the web can be made by varying the arrangement of the turner bars 8 and thus produce signatures having various number of pages.

Referring to Fig. 4, a slightly different arrangement is shown. In this the wide web W is slit into only three webs *f*, *g*, *h* which go directly to the three formers 37, 38 and 39 which, as in Fig. 2, are arranged diagonally of the press, the rest of the arrangement so far as the delivery is concerned being the same as that already described. In the arrangement shown in this figure the cylinder is six pages or plates wide and eight plates around, with the col-

umns running longitudinally or widthwise of the cylinder. With the construction shown in this figure twelve different signatures of eight pages each and having a closed top head will be produced.

As before stated, other arrangements of the formers and deliveries may be provided whereby a large number of products may be simultaneously produced, and one such arrangement is shown in Figs. 5 and 6. In this construction the formers are arranged out of line widthwise of the press, but instead of being arranged diagonally, as heretofore described, they are arranged one behind the other, these formers being marked 41, 42 and 43. Fig. 6 shows diagrammatically the arrangement of turner bars for guiding the webs to these folders, the printed web being divided into six webs for delivery. In the particular construction shown here, the main web W goes over a drag roll 44 and is slit by slitters 45 and 46 into three webs 47, 48 and 49. The web 49 is again slit by a slitter 50 cooperating with a drag roll 51 into two webs 52 and 53. The web 52 runs directly to the former 41 and the web 53 is given a turn and associated with web 52 by bars 54 and 54'. The web 48 is slit by a slitter 55 cooperating with a drag roll 56 into two webs 57 and 58. The web 57 goes over bars 59 and 59', and the web 58 goes over bars 60 and 60', these webs being associated over a drag roll 61 and going to the former 42. The web 47 is divided into two webs 62 and 63. The web 62 goes over bars 64 and 64', and the web 63 over bars 65 and 65', these webs being associated with a drag roll 66 and going to the former 43.

It will be seen that with any of the arrangements described, each of the webs has a different length path, the difference in the length of the web path being slightly more than the width of a product. By arranging the former out of line widthwise of the machine, therefore, the webs may be run side by side from either side of the former to the side by side deliveries so that a large number of different products may be accommodated without unduly complicating the mechanism.

While the invention has been shown and described in its preferred form, it will be understood that various arrangements of the formers and deliveries can be made within the scope of the invention, and that the invention is not, therefore, to be restricted to the particular arrangement shown and described.

What I claim is:

1. The combination of means for forwarding a plurality of webs, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, means for severing products from the webs, and a plurality of deliveries each two or more products wide to which the products are delivered.

2. The combination of means for forwarding a plurality of webs, a plurality of formers for giving the webs a head fold and from which the webs are forwarded in side by side relation after folding, means for severing products from the webs, and a plurality of deliveries each two or more products wide to which the products are delivered.

3. The combination of means for printing a wide web, means for dividing the web into a plurality of narrower webs, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, means for severing products from the webs, and a plurality of deliveries each two or more products wide to which the products are delivered.

4. The combination of means for printing a wide web, means for dividing the web into a plurality of narrower webs, a plurality of formers for giving the webs a head fold and from which the webs are forwarded in side by side relation after folding, means for severing products from the folded webs, and a plurality of deliveries each two or more products wide to which the products are delivered.

5. The combination of means for forwarding a plurality of webs, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, means for severing products from the webs, means for giving the products a cross fold, and a plurality of deliveries, each two or more products wide to which the products are delivered.

6. The combination of means for forwarding a plurality of webs, a plurality of formers for giving the webs a head fold from which the webs are forwarded in side by side relation after folding, means for severing the products from the webs, means for giving the products a cross fold, and a plurality of deliveries each two or more products wide to which the products are delivered.

7. The combination of means for forwarding a plurality of webs, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, means for severing products from the webs, and a plurality of deliveries on each side of the formers to which the products are alternately delivered, each of the deliveries being two or more products wide.

8. The combination of means for forwarding a plurality of webs, a plurality of formers for giving the webs a head fold and from which the webs are forwarded in side by side relation after folding, means for severing products from the webs, and a plu-

rality of deliveries on each side of the formers to which the products are delivered, each of the deliveries being two or more products wide.

9. The combination of means for forwarding a plurality of webs, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, means for severing products from the webs, and a plurality of superposed deliveries, each two or more products wide to which the products are delivered.

10. The combination of means for forwarded a plurality of webs, a plurality of formers for giving the webs a head fold and from which the webs are forwarded in side by side relation after folding, means for severing products from the webs, and a plurality of superposed deliveries, each two or more products wide to which the products are delivered.

11. The combination of means for forwarded a plurality of webs, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, means for severing products from the webs, and a plurality of superposed deliveries on each side of the formers to which the products are delivered, each of the deliveries being two or more products wide.

12. The combination of means for forwarding a plurality of webs, a plurality of formers for giving the webs a head fold and from which the webs are forwarded in side by side relation after folding, means for severing products from the webs, and a plurality of superposed deliveries on each side of the formers, each of the deliveries being two or more products wide.

13. The combination of means for forwarding a plurality of webs, a plurality of formers over which the webs are led, arranged out of line with each other widthwise of the machine, a cutting mechanism to which the webs are led in side by side relation for severing products from the webs, a plurality of folders for giving the products a cross fold, and a plurality of deliveries each two or more products wide to which the products are delivered.

14. The combination of means for forwarding a plurality of webs, a plurality of formers for giving the webs a head fold and from which the webs are forwarded in side by side relation after folding, a cutting mechanism capacitated to receive the webs in side by side relation for severing the products from the webs, a plurality of folders by which the products are alternately taken and given a cross fold, and a plurality of deliveries, each two or more products wide to which the products are delivered from the folders.

15. The combination of means for forwarding a plurality of webs, means for associating certain of the webs, a plurality of formers over which the webs are led, arranged out of line with each other widthwise of the machine, means for severing products from the webs, and a plurality of deliveries each two or more products wide to which the products are delivered.

16. The combination of means for forwarding a plurality of webs, means for associating certain of the webs, a plurality of formers for giving the webs a head fold from which the webs are forwarded in side by side relation after folding, means for severing products from the webs, and a plurality of deliveries, each two or more products wide to which the products are delivered.

17. The combination of means for printing a wide web, means for dividing the web into a plurality of narrower webs, a plurality of formers over which the webs are led, arranged out of line with each other widthwise of the machine, means for severing products from the webs, and a plurality of superposed deliveries to which the products are delivered, each of the deliveries being two or more products wide.

18. The combination of means for printing a wide web, means for dividing the web into a plurality of narrower webs, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, means for severing products from the webs, a plurality of folding mechanisms for giving the webs a cross fold to which the products are alternately forwarded, and a plurality of superposed deliveries to which the products are delivered, each delivery being two or more products wide.

19. The combination of means for forwarding a plurality of webs, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, means for severing products from the webs, a plurality of folding mechanisms, each including two folding cylinders to which products are alternately forwarded, and a plurality of deliveries, each two or more products wide to which the products are delivered from the folding cylinders.

20. The combination of means for printing a wide web, means for dividing the web into a plurality of narrower webs, means for associating certain of the webs, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, means for severing products from the webs, and a plurality of deliveries, each two or more products wide to which the products are delivered.

21. The combination of means for for-

warding a plurality of webs side by side, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, a cutting mechanism capacitated to receive the webs side by side for severing products from the webs, and a plurality of deliveries, each two or more products wide to which the products are delivered.

22. The combination of means for forwarding a plurality of webs side by side, a plurality of formers over which the webs are led arranged out of line with each other widthwise of the machine, a cutting mechanism capacitated to receive all the webs side by side for severing the products from the webs, a plurality of folding mechanisms to which the severed products are alternately forwarded, and a plurality of deliveries on each side of the folding mechanism to which the products are delivered, each delivery being two or more products wide.

23. The combination of means for forwarding a plurality of webs, a plurality of formers arranged so that each web has a different length path to which the webs are led, means for severing products from the webs to which the webs are led in side by side relation, and a plurality of deliveries each two or more products wide to which the products are delivered.

24. The combination of means for forwarding a plurality of webs, a plurality of formers arranged so that each web has a different length path to which the webs are led, means for severing products from the webs to which the webs are led in side by side relation, and a plurality of superposed deliveries each two or more products wide to which the products are delivered.

25. The combination of means for forwarding a plurality of webs, a plurality of formers arranged so that each web has a different length path to which the webs are led, a cutting mechanism to which the webs are led in side by side relation for severing products from the web, folding mechanism for giving the products a cross fold, and deliveries on each side of the folding mechanism to which the products are delivered, each delivery being a plurality of products wide.

In testimony whereof, I have hereunto set my hand.

ADOLPH M. ZUCKERMAN.