

April 19, 1927.

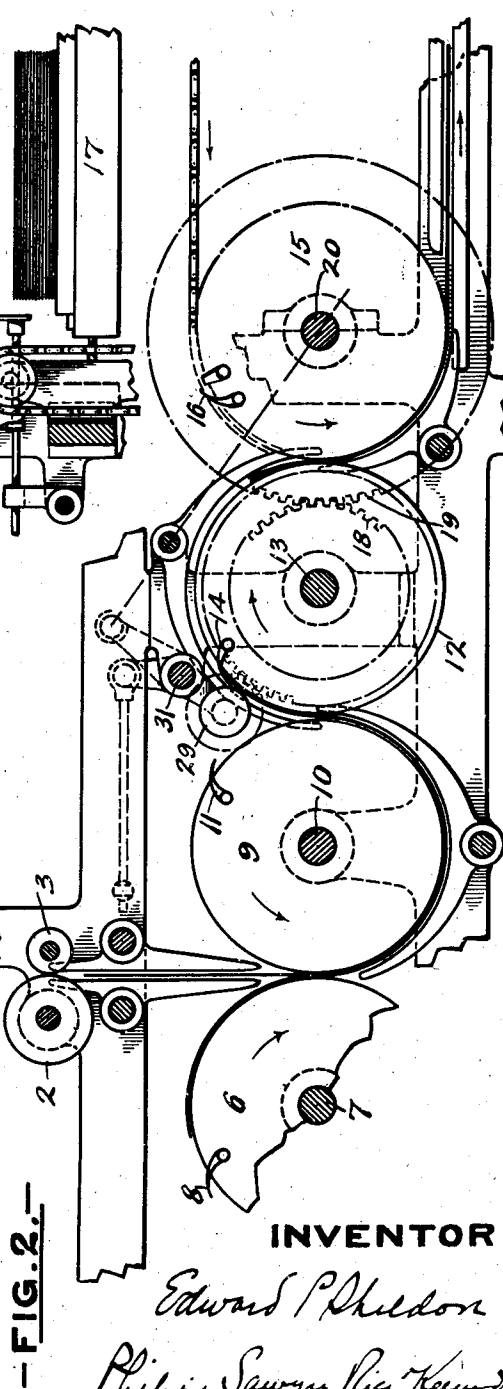
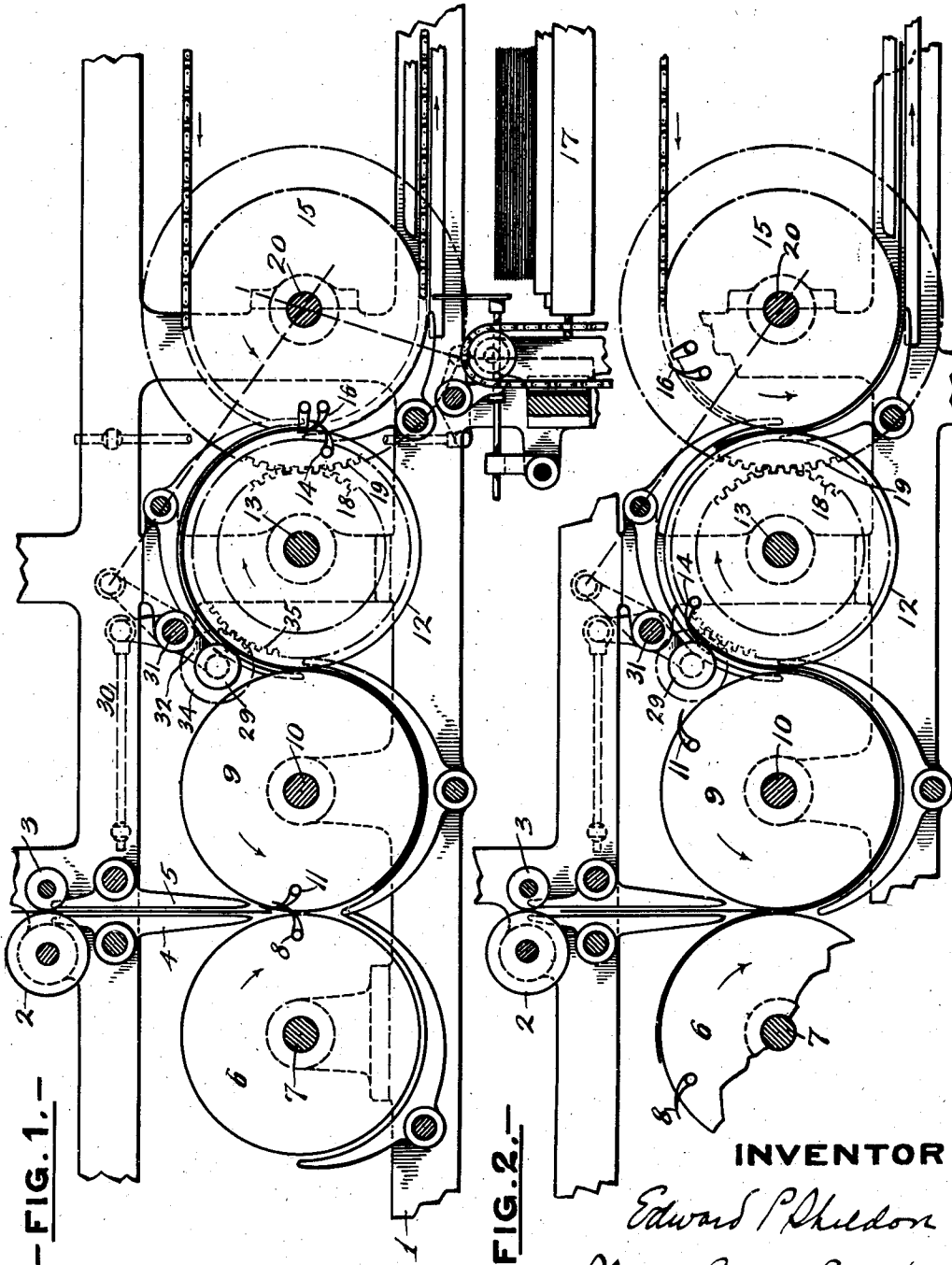
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SLOW DOWN MECHANISM FOR PRINTED PRODUCTS

Filed Oct. 18, 1922

3 Sheets-Sheet 1



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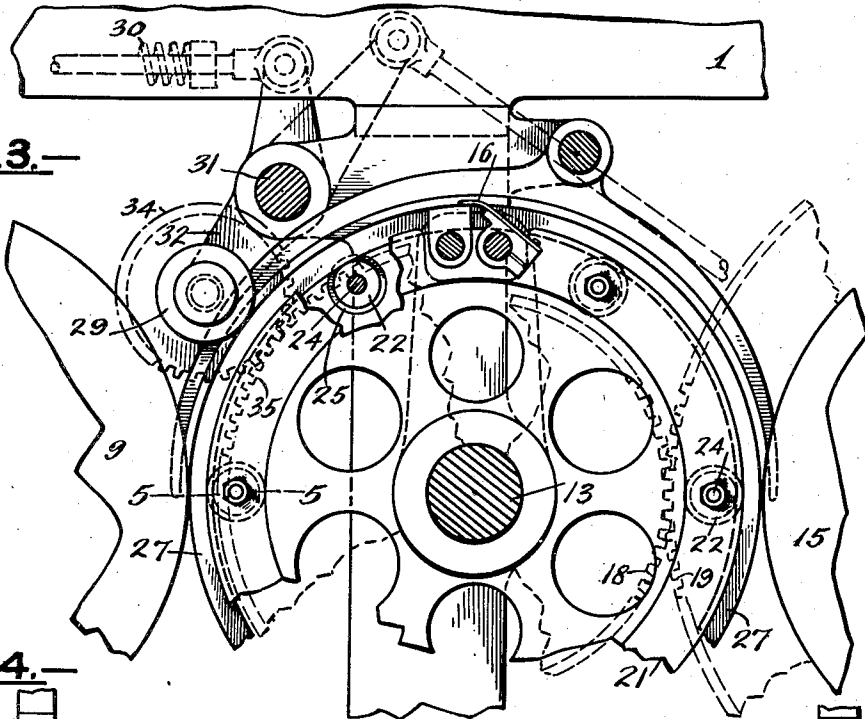
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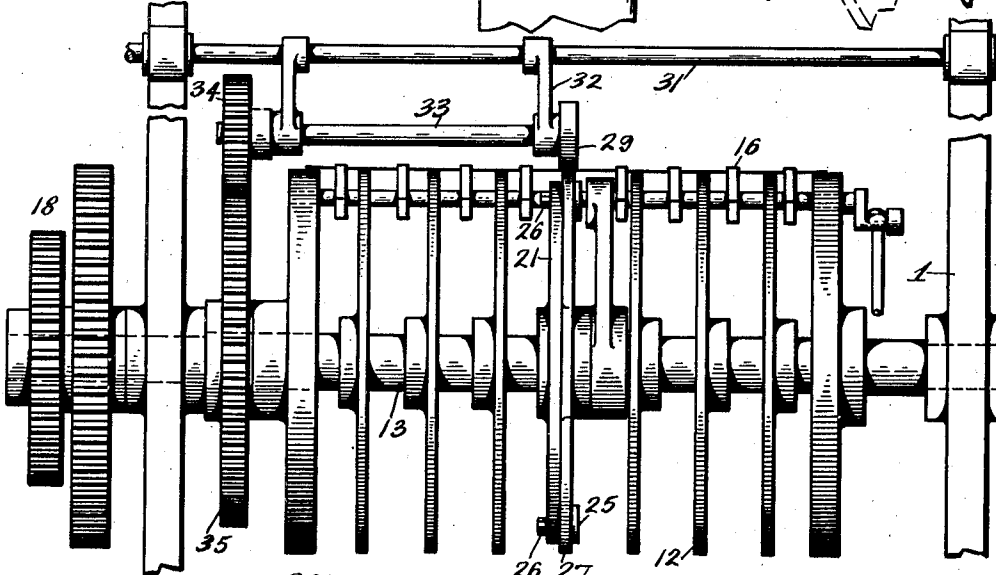
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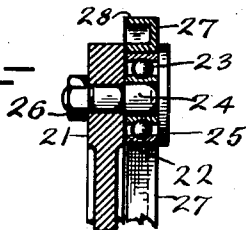
-FIG. 3.-



-FIG. 4.-



-FIG. 5.-



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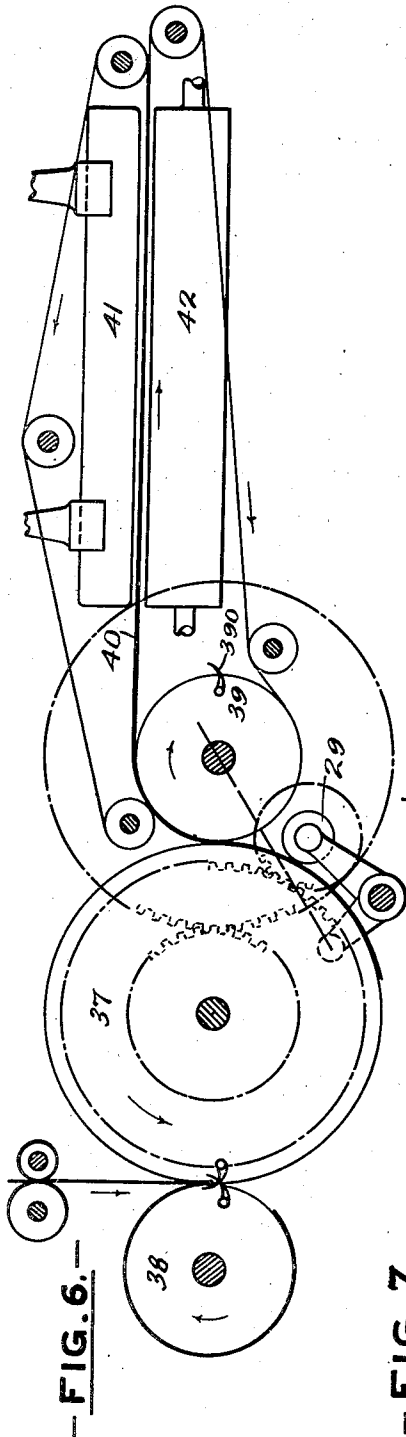
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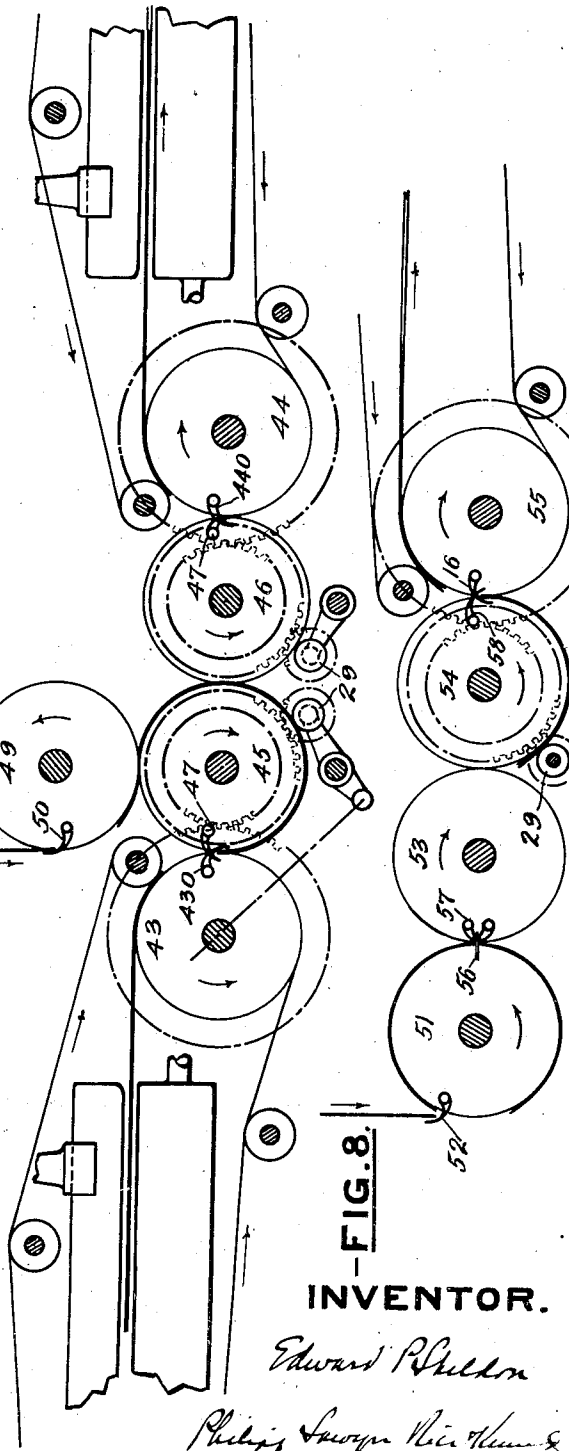
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-FIG. 6.-

-FIG. 7.-



-FIG. 8.-

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UNITED STATES PATENT OFFICE.

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SLOW-DOWN MECHANISM FOR PRINTED PRODUCTS.

Application filed October 18, 1922. Serial No. 595,232.

This invention relates to certain improvements in slow-down mechanisms for printed products.

In mechanisms in which cut sheets are handled, and particularly in web printing machines where the web is cut into sheets, difficulty is often experienced in accurately handling and positioning the sheets in the folder and in the delivery due to the very high speeds at which these sheets come to the folder and delivery, this being particularly the case where the cut sheets are forwarded against a front stop and folded and then delivered.

It is the especial object of the present invention to provide a slow-down mechanism whereby the cut sheets, as they come from the press and are moving at a very high speed, are acted on before being folded or delivered by a mechanism running at considerably lower speed, so that the speed of the sheets is slowed down and the difficulty in handling the sheets at the folder or delivery due to their high speed is obviated.

A further object of the invention is to provide a construction whereby overrunning or overlapping of the head of a following sheet on the tail of a leading sheet is prevented so that the slow-down mechanism may properly function, whereby the slow-down mechanism may be used with uncollected products, collected products, or uncollected folded products.

With these and other objects not specifically referred to in view, the invention consists in certain novel parts, arrangements and combinations which will be specifically described in connection with the accompanying drawings and the novel features thereafter pointed out in the claims hereunto appended.

Referring now to these drawings—

Figure 1 is an end view partly in section and partly broken away of the improved slow-down device as employed with a collected product;

Figure 2 is a view similar to Fig. 1, showing the parts in a different position;

Figure 3 is a view of one of the transfer cylinders shown in Fig. 1 on an enlarged scale, certain of the parts being broken away to more clearly show the construction;

Figure 4 is a side view partly broken away of the construction shown in Fig. 3;

Figure 5 is a detail sectional view, the section being taken on line 5—5 of Fig. 3;

Figure 6 is a diagrammatic end view partly in section of a modification of the slow-down device employing a single transfer cylinder, and employed in handling a collected product;

Figure 7 is a diagrammatic end view partly in section showing a slow-down mechanism which may be employed where a collected product or an uncollected unfolded product is being handled, and,

Figure 8 is a diagrammatic end view partly in section showing the slow-down arrangement when employed for handling collected or an uncollected folded product.

Referring now to these drawings—

The invention has been illustrated as employed with a high speed printing machine, the forwarding rollers only of which are illustrated, and the invention has been illustrated in arrangements for handling uncollected, collected products, or uncollected folded products, the mechanism including means whereby the necessary spacing or timing is provided for preventing the head of a following product from overrunning or overlapping on the tail of a leading product.

Referring first to Figures 1 to 5 inclusive, the mechanism is shown as arranged for handling collected unfolded products. In this arrangement, the time required for the collection of the sheets affords the necessary spacing for preventing the overrunning of the sheets as they pass from high speed to the low speed mechanisms. While the particular mechanism for effecting the slowing down of the sheets may be varied, in the construction illustrated in Figures 1 to 5 the parts of the mechanism are supported in side frames 1 of any usual or suitable configuration. The sheets are forwarded by the rolls indicated at 2, 3, and between guides 4, 5 to the sheet collecting mechanism. In the particular construction illustrated in Fig. 1, the sheets pass to a cylinder 6 mounted on a shaft 7 and provided with sheet-taking devices, as grippers 8, this cylinder acting as a collecting cylinder. Co-operating with this cylinder 6 is a cylinder

9 mounted on a shaft 10 and provided with sheet-taking devices, as grippers 11, this second cylinder 9 acting as a transfer cylinder by which the product is transferred to the slow-down mechanism hereinafter referred to. The cylinder 6 performs its collecting function in the usual way, that is, the grippers 8 take the head of a sheet which is carried around the cylinder until such time as the sheet meets the succeeding incoming sheet, at which time the grippers 8 deliver the collected product to the grippers 11 of the cylinder 9.

Co-operating with the cylinder 9 is a third cylinder 12 mounted on a shaft 13 and provided with sheet-taking devices, as grippers 14, these grippers 14 taking the collected product from the grippers 11 of the cylinder 9. The cylinder 12 also acts as a transfer cylinder and transfers the product to a delivery shown in the form of a cylinder 15 provided with sheet-taking devices, as grippers 16, this cylinder in the particular construction illustrated in Figs. 1 to 5, delivering the collected unfolded product to a pile delivery indicated at 17, of any usual or suitable type. It will, of course, be understood that any suitable final delivery mechanism may be employed, a pile delivery having been shown simply for illustrative purposes.

The cylinders 6, 9 and 12 are all driven at a similar speed, this speed being the high speed at which the sheets are forwarded from the high speed printing or other mechanism. In accordance with the invention means are provided for slowing down the sheets at the delivery so that they may be more readily handled at the delivery point or at the folding point where a folder is employed as hereinafter referred to. While the specific embodiment of this slow-down means may be varied within wide limits, in the particular construction illustrated this means includes devices whereby after the head of the product has been taken by the slow speed mechanism the remainder of the product may have a movement relative to the high speed mechanism by which it has been forwarded, so that the product as a whole may partake of the slower speed. In the particular construction illustrated for effecting this, provision is made whereby a slip action of the product takes place. As shown the shaft 13 of the transfer cylinder 12, which as before stated is running at the high speed, has fast thereon a gear 18 which is in mesh with and drives a gear 19 fast on the shaft 20 of the delivery cylinder 15 before referred to, the gear 19 being of greater diameter than the gear 18. The shaft 20 of the delivery cylinder and its associated mechanism run at a slower speed than the cylinder 12. The proportion of these gears may, of course, be varied to pro-

duce the desired slower speed for the delivery. In the particular construction illustrated the gear 19 is twice the diameter of the gear 18 so that the delivery is driven at half the speed of the mechanism by which the sheet is handled prior to its reaching the cylinder 15.

As the head of the product is taken by the slow speed grippers 16, or other sheet-taking devices on the delivery cylinder, the tail of the product still is passing round the high speed transfer cylinder 12. In accordance with the invention a means is provided for effecting a slip between the product and the high speed transfer cylinder so as to permit the product to partake of the lower speed of the delivery mechanism. In the particular construction illustrated for effecting this there is secured on the shaft 13 of the transfer cylinder 12 one or more members 21 in the form of spiders, one such member being illustrated in the drawings arranged substantially centrally of the transfer cylinder. Mounted at or near the periphery of the spider 21 are boxes 22 enclosing balls 23, this construction forming a ball-bearing, a suitable number of these ball-bearings being distributed around the spider 21. These ball-bearings are held in place on the spider by studs 24 having heads 25, the studs being secured in position by nuts 26.

Mounted on these ball-bearings, so as to have a movement independent of the spider 21 and consequently of the cylinder 12, is what may be called a slip member in the form of a ring 27 having a bearing face 28. This member is conveniently held in position between the edges of the spider and the heads 25 of the studs 24 before referred to, as clearly shown in Fig. 5.

Co-operating with the slip ring 27 is a holding roll 29 (see Fig. 4). This roll is spring-pressed toward the bearing face 28 of the slip ring by the usual spring rod construction 30 so as to normally exert the holding contact on a product passing between it and the ring. This holding roll is a driven roll and may be mounted and driven in any suitable manner. In the particular construction illustrated there is provided adjacent the cylinder 12, a rock shaft 31 suitably mounted in bearings in the side frames of the machine before referred to. Depending from this shaft is a pair of arms 32 in which is journaled a short shaft 33, this shaft 33 at one end carrying the roll 29. The other end of this shaft is provided with a gear 34 which meshes with and is driven by a gear 35 on the shaft 13 of the cylinder 12 before referred to, the parts being arranged so that when the roll 29 is in contact with the ring 27 the contact speed between the roll and the slip ring will be half that of the surface speed of the transfer cylinder

12. With this construction, when the head of the product has been transferred from the grippers 14 of cylinder 12 to the grippers 16 of delivery cylinder 15, although the cylinder 12 is running at full speed a slip of the product is provided by the free running slip ring 27 and the roller 29 so that the product is allowed to trail, so to speak, at the slow speed of the delivery cylinder.

10 In the particular construction in Figures 1 to 5, inclusive, the collected product is forwarded from the delivery to a pile. It will be understood, however, that from the delivery this product may, if desired, go to other forms of final delivery other than a pile, or, if desired, may go to a folder.

While only one slip ring and co-operating roll is shown and described, it will be understood that as many of these parts as are necessary or desirable may be provided to properly effect the transfer of the product from the high speed mechanism to the lower speed of the delivery, the illustration showing but one set of these members as being deemed sufficient to illustrate the invention.

Various modifications and arrangements of parts embodying the invention may, of course, be produced, and some such modifications have been illustrated in the accompanying drawings. Referring first to Fig. 6, an arrangement is illustrated in which but one transfer cylinder, indicated by the numeral 37, co-operates with a collecting cylinder 38 and a delivery cylinder 39 provided with sheet-taking devices or grippers 390. In the particular delivery illustrated in this figure, the delivery cylinder 39 delivers the product to tapes 40 which direct the product to a chopping blade folder, the blade of which is indicated by the numeral 41 and the folding-off rolls by the numeral 42. Where this arrangement is employed the roll 29 and its actuating mechanism will, as shown, be arranged below the cylinder 37 instead of above as shown in Figs. 1. to 5. In the construction illustrated in Fig. 6, furthermore, the arrangement is adapted to operate with collected products which are subsequently either folded as shown or which can be forwarded from the delivery cylinder 39 to any suitable final delivery point desired.

Referring now to Fig. 7, there is illustrated an arrangement embodying the invention which may be employed with either a collected product, or with an uncollected unfolded product. In the arrangement illustrated in this figure the spacing required for preventing the head of a following product from overlapping on the tail of a leading product, where an uncollected unfolded product is going through, is effected by providing two deliveries, the incoming product being alternately sent to one or the other of the deliveries, thus providing the necessary

time for the transfer of the products from the high incoming speed to the lower delivery speed. In this construction there is provided a pair of delivery cylinders 43, 44, provided with sheet-taking devices as grippers 430, 440, these delivery cylinders in the particular construction illustrated in this figure delivering to chopping blade folders similar to those heretofore referred to with respect to Fig. 6. Co-operating with the delivery cylinders 43, 44, is a pair of transfer cylinders 45, 46, these cylinders being provided with sheet-taking devices in the form of grippers 47. One of these transfer cylinders as cylinder 45, takes a product from the cylinder 49, which, for purposes hereinafter referred to, may be a collecting cylinder, this cylinder being provided with sheet-taking devices, as grippers 50, to which the product is forwarded at the high speed. Where an uncollected unfolded product is being handled the cylinder 45 acts to alternately deliver a product to the delivery cylinder 43, and to the transfer cylinder 46, which in turn delivers the product to the other delivery cylinder 44, suitable cams and connections for operating the grippers to effect this being provided (not shown). Each of the transfer cylinders 45, 46, has co-operating therewith a roll 29 and a slip ring as before described. With this construction an uncollected unfolded product may accordingly be handled, or a collected product, the cylinder 49 being, as before stated, arranged to act as a collecting cylinder. Where this is done the collection of the product, as in the arrangement previously described, affords a space for preventing the overrunning of successive products. Where a collected product is being handled the cylinder 45 delivers to the delivery cylinder 43, the other transfer cylinder 46 and delivery cylinder 44 not being used.

Referring to Fig. 8, there is shown an arrangement embodying the invention in which a collected product or an uncollected folded product may be handled. In the construction here illustrated there are provided a cylinder 51 provided with sheet-taking devices as grippers 52, to which a product is forwarded at high speed, a transfer cylinder 53, a second transfer cylinder 54 and a delivery cylinder 55. In the construction illustrated in this arrangement the cylinder 51 may act as a collecting cylinder or as a folding cylinder being provided with a folding blade 56 with which co-operates a pair of folding jaws 57 on the transfer cylinder 53. Or the cylinder 51 may act simply as a collecting cylinder, the product collected thereon being transferred to the cylinder 53 and from it to the cylinder 54, the latter of which is provided with sheet-taking devices, as grippers 58, the

product being delivered from the grippers 58 to the grippers 16 on the delivery cylinder 55. In this arrangement roll 29 co-operating with a slip ring on the transfer cylinder 54 is provided as before described.

With the construction shown and described it will be apparent that a very simple and effective slow-down device is provided for slowing down the speed of rapidly incoming sheets so that they may be accurately and easily handled at the delivery. While the invention has been shown and described in what is believed to be its best forms, it will be understood that various changes and variations may be made in the specific constructions shown and described without departing from the invention.

What I claim is:

1. The combination of means for forwarding a product at high speed, a delivery operating at a lower speed, an intermediate transfer mechanism operating at the high speed of the forwarding means by which the product is transferred to the delivery, and means for effecting a relative movement between the product and the transfer mechanism whereby the product may be moved at the low speed of the delivery while being transferred thereto.

2. The combination of means for forwarding a product at high speed, a delivery operating at a lower speed, an intermediate transfer mechanism operating at the high speed of the forwarding means by which the product is transferred to the delivery, and means for effecting a slip of the product relatively to the transfer mechanism whereby the product may be moved at the low speed of the delivery while being transferred thereto.

3. The combination of means for forwarding a product at high speed, a transfer mechanism running at the speed of the product, a delivery mechanism running at a lower speed than the transfer mechanism, and means whereby the transfer mechanism may be run at a higher speed than the product while it is delivering the product to the delivery mechanism.

4. The combination of means for forwarding a product at high speed, a delivery operating at a lower speed, an intermediate transfer mechanism operating at the high speed of the forwarding means by which the product is transferred to the delivery, means for effecting a relative movement between the product and the transfer mechanism whereby the product may be moved at the low speed of the delivery while being transferred thereto, and means for preventing the head of a following product from overlapping the tail of a leading product as the speed of the leading product is changed.

5. The combination of means for forwarding a product at high speed, a deliv-

ery operating at a lower speed, an intermediate transfer mechanism operating at the high speed of the forwarding means by which the product is transferred to the delivery, means for effecting a slip of the product relatively to the transfer mechanism whereby the product may be moved at the low speed of the delivery while being transferred thereto, and means for preventing the head of a following product from overlapping the tail of a leading product as the speed of the leading product is changed.

6. The combination of means for forwarding a product at high speed, a transfer mechanism running at the speed of the product, a delivery mechanism running at a lower speed than the transfer mechanism, means whereby the transfer mechanism may be run at a higher speed than the product while it is delivering the product to the delivery mechanism, and means for preventing the head of a following product from overlapping the tail of a leading product as the speed of the leading product is changed.

7. The combination of means for forwarding a product at high speed, a cylinder provided with sheet taking devices to which the product is forwarded operating at the speed of the product, a delivery operating at a lower speed, a transfer cylinder provided with sheet taking devices operating at the speed of the product by which the product is transferred to the delivery, and means for effecting a relative movement between the product and the transfer cylinder whereby the product may be moved at the low speed of the delivery while being transferred thereto.

8. The combination of means for forwarding a product at high speed, a cylinder provided with sheet taking devices to which the product is forwarded operating at the speed of the product, a delivery operating at a lower speed, a transfer cylinder provided with sheet taking devices operating at the speed of the product by which the product is transferred to the delivery, and means for effecting a slip of the product relatively to the transfer cylinder whereby the product may be moved at the low speed of the delivery while being transferred thereto.

9. The combination of means for forwarding a product at high speed, a cylinder provided with sheet taking devices to which the product is forwarded operating at the speed of the product, a delivery operating at a lower speed, a transfer cylinder provided with sheet taking devices operating at the speed of the product by which the product is transferred to the delivery, and means whereby the transfer cylinder may be run at a higher speed than the product while it is delivering the product to the delivery mechanism.

10. The combination of means for forwarding a product at high speed, a collecting cylinder provided with sheet taking devices, a transfer cylinder provided with sheet taking devices, such collecting and transfer cylinders operating at the speed of the product, a delivery cylinder provided with sheet taking devices and operating at a lower speed, and a surface on the transfer cylinder arranged to have a movement relative thereto over which the product passes as it is delivered by the transfer cylinder to the delivery cylinder.

11. The combination with means for forwarding a product at high speed, of a delivery cylinder provided with sheet taking devices and running at a lower speed, and an intermediate transfer cylinder carrying a surface having a movement relative thereto over which the product passes as the product is delivered by the transfer cylinder to the delivery cylinder.

12. The combination with means for forwarding a product at high speed, of a collecting cylinder having sheet taking devices, a transfer cylinder having sheet taking devices, such cylinders running at the speed of the product, a delivery cylinder running at a lower speed, and a slip ring on the transfer cylinder and having a movement relative thereto over which the product passes as it is delivered by the transfer cylinder to the delivery cylinder.

13. The combination with means for forwarding a product at high speed, of a cylinder provided with sheet taking devices running at the speed of the product, a delivery cylinder running at a lower speed to which a product is forwarded by the first cylinder, and a slip ring on the first cylinder having a movement relative thereto over which the product passes as it is forwarded to the delivery cylinder.

14. The combination of means for forwarding a product at high speed, delivery mechanism operating at a lower speed, an intermediate transfer mechanism operating at the high speed of the forwarding means by which the product is transferred to the delivery, a roll cooperating with the transfer mechanism for controlling the product while being transferred, and means whereby the head of a following product is prevented from overlapping the tail of a leading product while the transfer of the products is being effected.

15. The combination of means for forwarding a product at high speed, delivery mechanism operating at a lower speed, a transfer cylinder operating at the speed of the product by which the product is transferred to the delivery, a roll cooperating with the transfer cylinder for controlling the product while being transferred, and means whereby the head of a following

product is prevented from overlapping the tail of a leading product while the transfer of the product is being effected.

16. The combination of means for forwarding a product at high speed, delivery mechanism operating at a lower speed, a folding cylinder operating at product speed, and a transfer cylinder provided with sheet taking devices operating at product speed and transferring the folded product to the delivery, and a roll cooperating with the transfer cylinder for controlling the product while being transferred.

17. The combination of means for forwarding a product, delivery mechanism operating at a speed lower than the product, a transfer cylinder for transferring the product to the delivery, and a member carried by the transfer cylinder and rotatable independently thereof and contacting with the product.

18. The combination of means for forwarding a product, delivery mechanism operating at a speed lower than the product, a transfer cylinder for transferring the product to the delivery, a member carried by the transfer cylinder and rotatable independently thereof and contacting with the product, and a co-operating abutment.

19. The combination of means for forwarding a product, delivery mechanism operating at a speed lower than the product, transfer cylinder for transferring the product to the delivery, a shaft therefor, and a member freely rotatable relatively to the shaft and contacting with the product.

20. The combination of means for forwarding a product, delivery mechanism operating at a speed lower than the product, a transfer cylinder for transferring the product to the delivery, a shaft therefor, a member freely rotatable relatively to the shaft and contacting with the product, and a co-operating abutment.

21. The combination of means for forwarding a product, delivery mechanism operating at a speed lower than the product, a transfer cylinder for transferring the product to the delivery, a shaft therefor, a ring freely rotatable relatively to the shaft and contacting with the product, and a roll cooperating with the ring.

22. The combination of means for forwarding a product a delivery cylinder operating at half the speed of the product, a transfer cylinder operating at the product speed for transferring the product to the delivery, a shaft therefor, a ring freely rotatable relatively to the shaft and having a surface contacting with the product, a gear on the delivery cylinder, and a gear on the shaft in mesh therewith.

23. The combination of means for forwarding a product, delivery mechanism operating at a speed lower than the product,

a transfer cylinder for transferring the product to the delivery, a shaft therefor, a ring freely rotatable relatively to the shaft and having a surface in contact with the product, and a driven roll above the product path and co-operating with the ring.

24. The combination of means for forwarding a product, delivery mechanism operating at a speed lower than the product, a transfer cylinder for transferring the product to the delivery, a shaft therefor, a ring freely rotatable relatively to the shaft and contacting with the product, and an antifriction device on which the ring runs arranged toward the periphery of the ring.

25. The combination of means for forwarding a product, delivery mechanism operating at a speed lower than the product, a transfer cylinder for transferring the product to the delivery, a shaft therefor, a ring freely rotatable relatively to the shaft and contacting with the product, an antifriction device on which the ring runs arranged toward the periphery of the ring, and a roll co-operating with the ring.

26. The combination of means for forwarding a product at high speed, a collecting cylinder running at the speed of the product, a delivery mechanism running at a lower speed, and a pair of transfer cylinders intermediate the collecting cylinder and the delivery for transferring products to the delivery.

27. The combination of means for forwarding products at high speed, a collecting cylinder running at the speed of the products, a delivery mechanism running at a lower speed, a pair of transfer cylinders intermediate the collecting cylinder and the delivery for transferring products to the

delivery, and means for preventing the head of a following product from overlapping on the tail of a leading product while the transfer of the products is being effected.

28. The combination of means for forwarding a product at high speed, a transfer mechanism running at the speed of the product, a delivery mechanism running at a lower speed than the transfer mechanism, means whereby the transfer mechanism may be run at a higher speed than the product while it is delivering the product to the delivery mechanism, and a roll cooperating with the transfer cylinder for controlling the product while it is being transferred.

29. The combination of means for forwarding a product at high speed, a collecting cylinder running at the speed of the product, a delivery mechanism running at a lower speed, a pair of transfer cylinders intermediate the collecting cylinder and the delivery for transferring products to the delivery, and rolls cooperating with the transfer cylinders for controlling the product while being transferred.

30. The combination of means for forwarding a product at high speed, a transfer mechanism running at the speed of the product, a delivery mechanism running at a lower speed than the transfer mechanism, said mechanisms being arranged horizontally and closely adjacent, and means positively engaging and controlling the product whereby the transfer mechanism may be run at a higher speed than the product while it is delivering the product to the delivery mechanism.

In testimony whereof, I have hereunto set my hand.

EDWARD P. SHELDON.