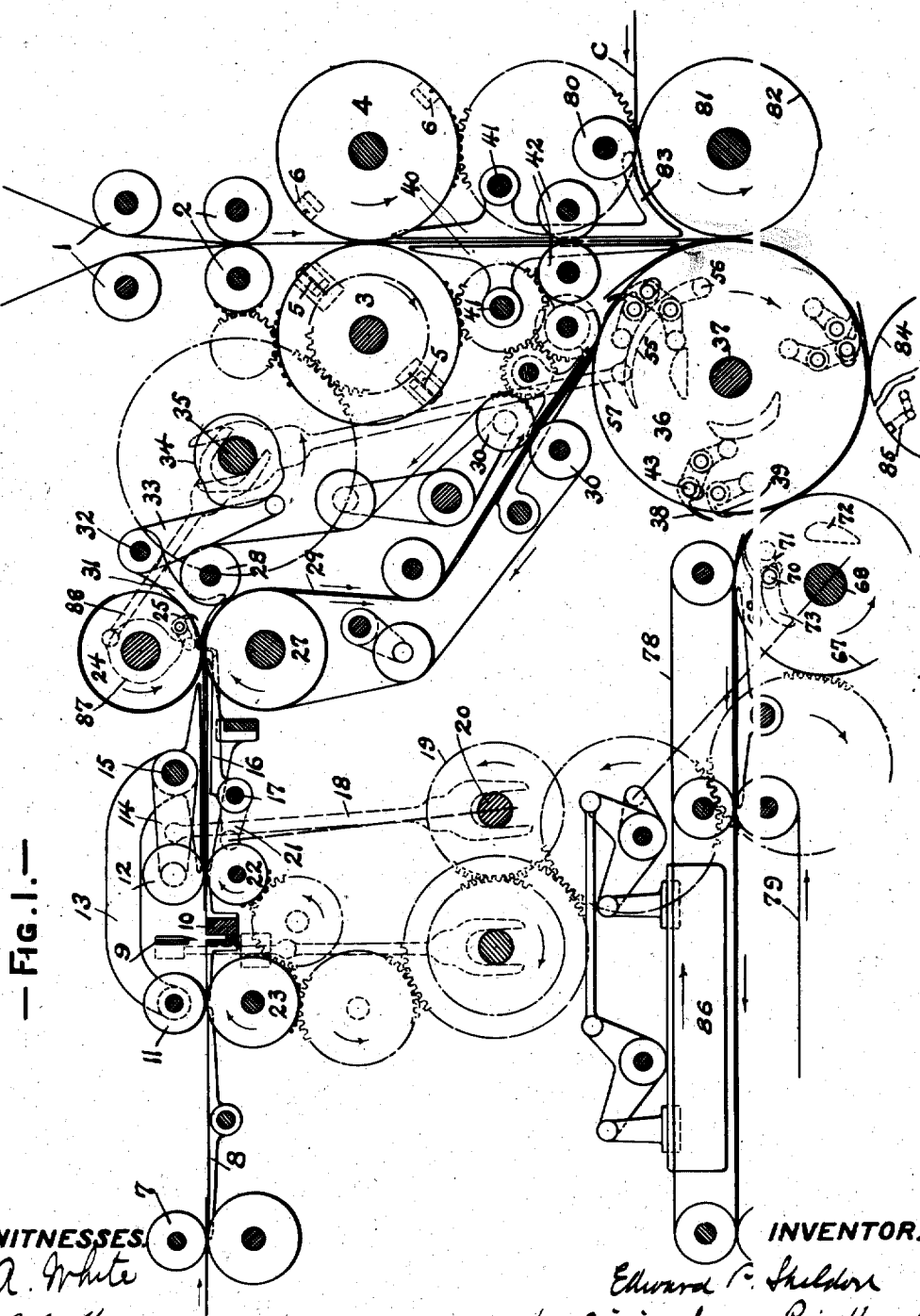


E. P. SHELDON.
MACHINE FOR ASSEMBLING PRINTED PRODUCTS.
APPLICATION FILED MAR. 12, 1910.

1,008,568.

Patented Nov. 14, 1911.

3 SHEETS—SHEET 1.



— FIG. 1.—

WITNESSES.

A. White
J. J. Harris

INVENTOR.

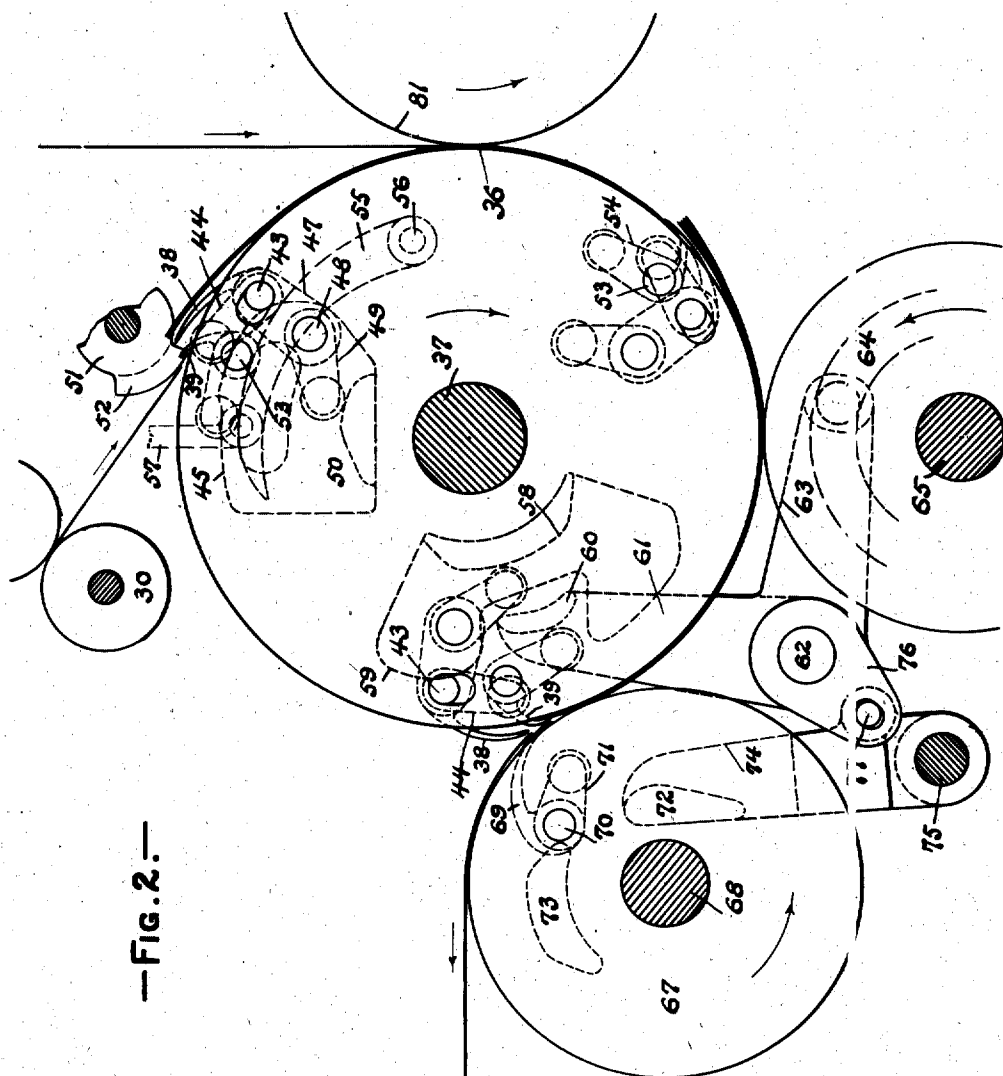
Edward P. Sheldon
by Phillips, Lewis, Rice & Kennedy
ATTY'S.

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3 SHEETS—SHEET 2.



—FIG. 2.—

WITNESSES.

A. White
J. J. Keane

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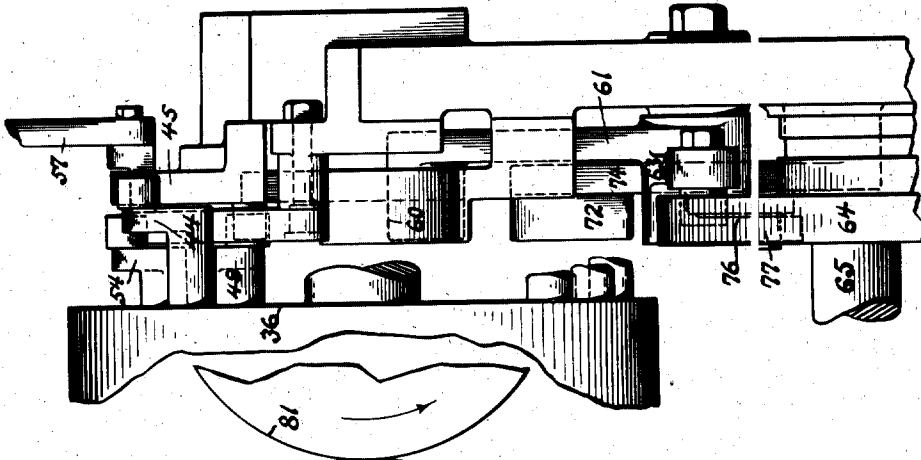
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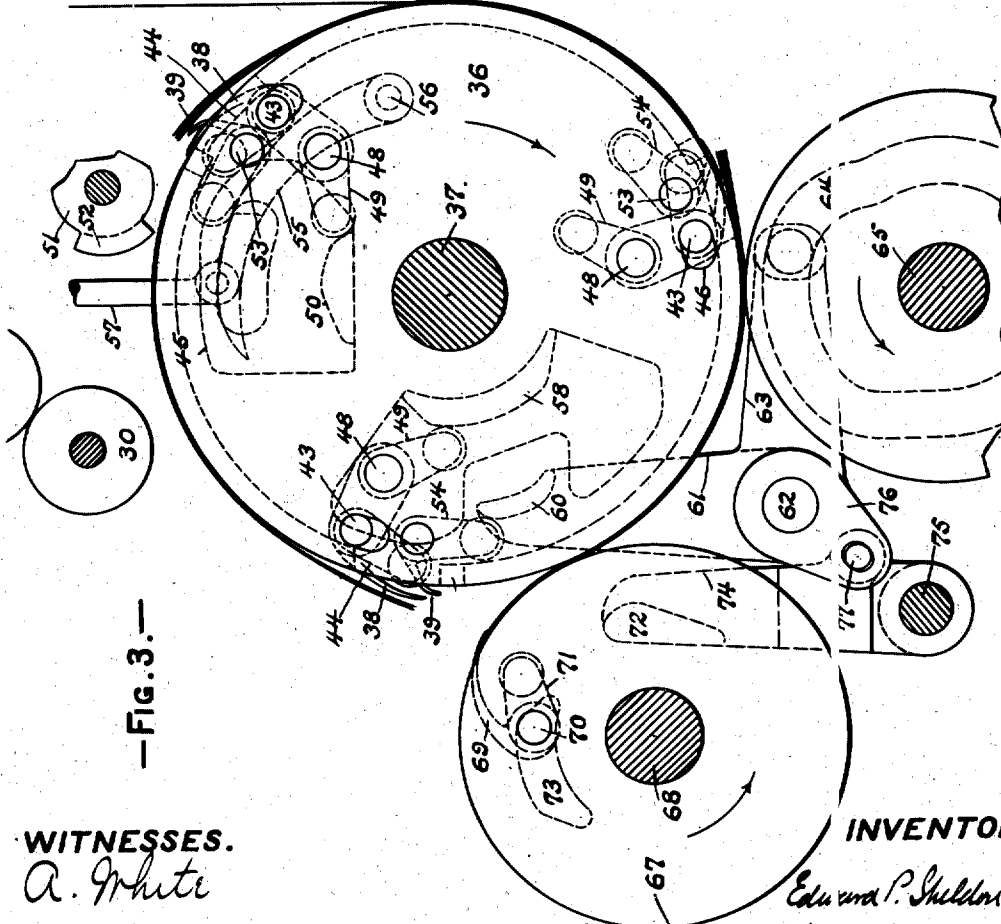
Patented Nov. 14, 1911.

3 SHEETS—SHEET 3.

—FIG. 4.—



—FIG. 3.—



WITNESSES.

A. White

J. J. Kearns

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Edward P. Sheldon

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ATT'YS.

UNITED STATES PATENT OFFICE.

EDWARD P. SHELDON, OF NEW YORK, N. Y., ASSIGNOR TO E. HOLLAND AND CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

MACHINE FOR ASSEMBLING PRINTED PRODUCTS.

1,008,568.

Specification of Letters Patent.

Patented Nov. 14, 1911.

Application filed March 12, 1910. Serial No. 548,786.

To all whom it may concern:

Be it known that I, EDWARD P. SHELDON, a citizen of the United States, residing at New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Machines for Assembling Printed Products, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in machines for assembling printed products.

In certain printed publications, such, for instance, as weekly papers or magazines, the reading matter and much of the advertising matter can be produced on high speed rotary web printing machines. It is, however, frequently desirable to include in the publication what may be termed specially printed sheets which may differ from the web sheets either in the character of the paper, or in the character of the printing, or both. For instance, it is frequently found desirable to include in the publication a picture which may be equal in size to two pages of the publication, and it is also frequently desirable to include in the publication specially printed advertisements. Such publications frequently, also, are provided with covers of such a character as to make it advisable to produce them on machines different from these which print the main body of the publication. Further, the pages forming the publication may be so numerous as to render it impractical to print the entire publication on a single web machine without unduly increasing the number or size, or both, of the printing couples of the machines.

The present invention has for one of its objects to produce an improved mechanism for assembling printed products which is capacitated to produce a combined product by uniting with sheets severed from a web or webs what may be termed "inset" sheets and other sheets, such as cover sheets.

A further object of the invention is to produce an improved mechanism for printed products capacitated to assemble a combined product by uniting with sheets severed from a web or webs what may be termed "inset sheets," and other sheets, such as cover sheets, said mechanism also including de-

vices by which the various sheets or pages constituting the product may be secured together.

A further object of the invention is to produce an improved mechanism for assembling printed products which shall be capacitated to unite with sheets cut from a web or webs other full width sheets which may be termed "inset sheets," said product having its web sheets outside of the inset sheets.

A further object of the invention is to produce an improved mechanism for assembling printed products which shall be capacitated to unite with sheets cut from a web or webs other full width sheets which may be termed "inset sheets," said product having its web sheets outside of the inset sheets, said mechanism also including means for securing the combined product together on a line central of the sheets.

A further object of the invention is to produce an improved mechanism for assembling printed products which shall include a collecting cylinder, said cylinder being combined with mechanism for presenting to it two products at different points in the same revolution of the cylinder, the products having their heads in register, the cylinder being provided with suitable devices for taking these and a product presented on a subsequent revolution, and for manipulating these devices to effect the taking the products at the proper times and releasing the assembled product for delivery.

With these and other objects not specifically referred to in view, the invention consists in certain constructions, and in certain parts, improvements and combinations as will be hereinafter fully described and then specifically pointed out.

Referring to the accompanying drawings—Figure 1 illustrates in side elevation so much of a mechanism embodying the invention as is necessary to an understanding thereof. Fig. 2 is a view, on an enlarged scale, of a collecting cylinder which may be employed, this view illustrating more particularly the operation of the sheet taking grippers. Fig. 3 is a view similar to Fig. 2 but with the parts in a different position. Fig. 4 is a detail side elevation illustrating more particularly the gripper operating cams.

Machines embodying the invention will in-

clude web forwarding devices which may be of any suitable construction. In the particular machine illustrated, these web forwarding devices include the bending rolls 1 and nipping rolls 2 usually employed in fast rotary printing machines. Suitable devices will also be employed for severing the web or webs passing through the web forwarding devices into sheets. While these means may be varied, in the particular machine illustrated, these devices comprise a pair of cutting cylinders 3, 4, the cutting cylinder 3 being provided with two knives, as 5, and the cylinder 4, with two cutting woods, as 6.

Machines embodying the invention, as to all its features, will include means for forwarding what may be termed, for convenience, "inset" sheets and where, as in the machine selected to illustrate the invention, a product is to be produced which comprises not only web sheets and inset sheets but also outer or cover sheets; means will be employed, for forwarding such cover sheets. The inset sheet feeding means and the cover feeding means, when both are employed, are located on opposite sides on the path of the webs or sheets cut therefrom.

The means for forwarding the sheets which have been referred to as "inset sheets" may be varied in construction, but, in the best constructions, they will be of such a character as to forward a multi-length sheet and sever the sheet into the proper sheet lengths. In the particular machine illustrated, the inset sheets referred to are forwarded by devices which include feeding rolls 7 and a guide 8 of a usual type. While the particular construction of cutting means employed may be varied, in the construction illustrated the cutting is effected by a reciprocating cutter 9 which may be operated in any usual way, this cutter cooperating with a bed or block 10.

Timing devices may be employed which may be of such a character as to time the inset sheets not only with respect to the cutting mechanism but also with respect to the subsequent devices which are to act in forwarding the sheets, in order that they may be assembled with the web sheets before referred to. While the construction of these timing devices may be varied, in the particular construction illustrated, they include two drop rolls 11, 12, the roll 11 being carried on an arm 13, and the roll 12 on an arm 14, both these arms being carried on a rock shaft 15, so that they operate simultaneously, and a sheet stop comprising fingers 16 of the ordinary type, these fingers being mounted on a shaft 17. In the construction illustrated, the shaft 15 is operated from a forked connecting rod 18 also of the usual type, this rod being connected to the arm 14 and being moved by a cam, indicated at 19, mounted on a shaft 20. The shaft 17

is provided with an operating arm 21 which may be driven from a cam of ordinary construction, not shown. The drop rolls 11, 12 cooperate with driven rolls 22, 23, as usual in such constructions.

Where, as in the machine shown, the mechanism for forwarding the inset sheets operates in connection with a multiple length sheet, there will be employed, in machines which embody the invention in its best form, mechanism for superposing the parts of the multilength sheet after it is cut into sheet lengths, so that a plurality of sheets equal in size to the web sheets will be forwarded for assembling therewith. While the superposing mechanism employed may be varied, in the particular construction illustrated, there is employed a cylinder 24 provided with suitable sheet taking grippers 25 which take the leading part of the sheet, carry it around and superpose it upon the other part.

In the operation of this part of the mechanism as so far described, a multilength sheet is first forwarded by the rolls 7, and the drop rollers, until its leading end strikes the ends of the stop fingers 16. The knife then descends and cuts, after which the leading end of the leading sheet formed by the cutter is carried around by the cylinder 24. The drop rollers 11, 12 then start off the second sheet, the stop 16 being, in the meantime, dropped, the second sheet being timed so that its leading end meets the leading end of the first sheet as the cylinder 24 completes its revolution, the two sheets being then forwarded, in the particular construction shown, by two rolls 27, 28 around which pass tapes 29, these tapes also being supported by rollers 30 and by other rollers, as is common with constructions of this class. In the construction shown, the sheets are directed into the taped pathways referred to by a switch 31 mounted on a shaft 32, this shaft being operated by an arm 33 and a cam 34 mounted on a shaft, as 35. In the particular machine illustrated, the inset sheet, or, where a plurality of sheets are forwarded, the inset sheets, are assembled with the web sheets in such a way that the inset sheets are inside of the web sheets, that is to say, they form the inside pages of the product.

The assembling mechanism, by which the web sheets and the inset sheets are united, may be varied in construction. In the best constructions and as shown, however, this assembling mechanism will include a receiving cylinder, as 36, which may be a three-part collecting cylinder, this cylinder being mounted on a shaft, as 37. In the particular machine illustrated, in order to unite the inset sheets with the web sheets in the manner stated, that is to say, to form the inside sheets of the product, the inset sheets are presented to the naked surfaces of the three-

part collecting cylinder, the web sheets being presented thereto later in but on the same revolution of the cylinder, the heads of the two sheets, when on the cylinder, being in register. The sheet receiving cylinder, where such a cylinder forms a part of the assembling mechanism, will be provided with suitable sheet taking devices the construction of which may be varied. To avoid making holes in the sheets, however, in the best construction, these sheet taking devices will consist of grippers. In the particular machine shown, the cylinder is provided, as to each of its three sheet receiving surfaces, with two sets of grippers 38, 39, one set of these grippers, as 38, operating to take the inset sheets, and the other set of grippers, as 39, taking the web sheets.

The forwarding devices for the web and web sheets will be so constructed as to properly present the web sheets to the assembling devices. In the particular machine shown, the web sheets are received from the cutters and presented to the receiving cylinder by guides, as 40, these guides being hung on rods 41 and having cooperating therewith driven rolls 42, this construction being common in web presses.

In the particular machine illustrated, the product consists of two inset sheets which form the inside pages of the publication, there being collected with each two inset sheets four successive cuts from the webs. In order that the inset sheets may form the inside pages of the product, they are, in the particular machine shown, and as has been stated, first laid against the naked surface of the cylinder, the first collection of web sheets being presented to the cylinder later in but on the same revolution of the cylinder on which the inset sheets are presented. In the particular machine shown, the grippers 38 take the inset sheets and the grippers 39 take the web sheets.

The mechanism for operating the grippers may be varied in construction, but where, as in the machine shown, the product is to include successive collections of web sheets with the inset sheets, the collection occurring in the manner which has been described, the grippers should be operated in such a way that the grippers for taking the inset sheets may, after the first collection of web sheets which is deposited on top of them, be withdrawn from beneath these web sheets and closed upon both the web and inset sheets, so that the web sheet taking grippers may be opened to receive the next collection of web sheets, thereby insuring the retention of the sheets in register, and both sets of grippers should be opened at the proper time to permit the discharge of the collected product. When, furthermore, as in the machine shown, the inset sheets are to be delivered to the naked surface of the

cylinder, and the web sheets delivered later in the same revolution, it is of course, necessary that the inset sheet taking grippers and the web taking grippers operate in succession. In the particular machine illustrated, the sheets are delivered from the rolls 30 and the taped pathway 29 to the naked surface of the cylinder, the heads of the sheets being taken by the grippers 38. These grippers (see Fig. 2) are mounted on a rock-shaft 43 which has extending from it an operating arm 44 provided with the usual roll, this roll being arranged to contact with a cam 45. The shaft 43 is mounted in arms 47 extending from a shaft 48, this shaft having an arm 49 provided with the usual roll arranged to contact with a cam 50, the cams 45 and 50 being carried on the frame of the machine. It will be understood, of course, that the shafts 43 and 48 are provided with the usual springs common in gripper construction and omitted from the illustration in the interest of clearness.

With the construction as described, the roll on the arm 49 first strikes the cam 50, this rocking the shaft 48 and drawing the grippers back. While the roll on the arm 49 is running up on the cam 50, the roll on the arm 44 is in contact with the surface of the cam 45. The first part of this cam is practically concentric, though it may be and preferably will be so formed as to exercise a slight lifting action on the grippers. Just after the roll on the arm 49 has reached the high part of the cam 50, the roll on the arm 44 strikes the high part of the cam 45, thus rocking the grippers outward from the surface of the cylinder and opening them. After the grippers have been opened they are ready to take the sheets which are at this time presented to the cylinder. A pressure roll, as 51, may be employed to hold the heads of the sheets down against the surface of the sheet taking cylinder so as to insure their being taken by the grippers. When such a roll is employed, it may, in order to set it close to the sheet taking point, have its surface cut away to form segments 52, these segments affording room for the movement of the gripper fingers.

When the heads of the sheets have come within the range of the grippers 38, the rolls on the operating arms for these grippers run off the cams 50 and 45, the grippers being closed on the sheets by the springs before referred to and not illustrated. The cylinder continues its movement with the inset sheets in the grasp of the grippers until it reaches the point where the web sheets are to be presented to it, these web sheets being, in the construction illustrated, taken by the grippers 39. These grippers are mounted on a rock-shaft 53, this shaft having an operating arm 54 provided with the usual roll.

The operating means for the shaft 53 include a swinging cam 55 pivoted at 56 to the frame of the machine, this cam being operated by a connecting rod 57 forked at its upper end to embrace the shaft 35, the end of the rod being provided with a cam roll and being operated by a closed cam on the shaft 35, as is common in such constructions, the illustration being omitted in the interest of clearness. These connections operate the swinging cam 55 so as to open the grippers just prior to the time the inset sheets are delivered, thus avoiding disturbing the heads of these sheets by the grippers. At the time the cylinder reaches the point at which the web sheets are delivered, therefore, these grippers are opened, and as these sheets are delivered with their heads in register with the inset sheets, the operating roll on the arm 54 runs off the cam and the grippers snap into closed position, the closing being effected by the usual spring construction.

The cylinder, having taken the web sheets, continues its revolution, the product on the cylinder at this time being the inset sheets held by the grippers 38 and the web sheets held by the grippers 39, these sheets being superposed upon the grippers 38. When, as in the machine shown, successive collections of web sheets are to be made, it is desirable, as has been indicated, that the grippers which are holding the inset sheets, be withdrawn from beneath the web sheets and clamped upon the edges of both the web and inset sheets, so that the register of the sheets may be preserved during the time the web sheet grippers are taking the additional sheets necessary for the collection. To effect this, in the construction shown, cams, as 58, 59, are provided which are arranged to contact with the rolls on the arms 44, 49, after the web grippers have closed upon the sheets. These cams 58, 59 operate in the same way as the cams 45, 50, and further description of them is, therefore, unnecessary. After the grippers 38 have been thus withdrawn from beneath the sheets by the action of the cams 58, 59, they close upon the sheets and the cylinder continues its revolution. As the grippers 38 pass the taking point for the inset sheets they open and close idly, no inset sheets being presented to them, in the particular machine illustrated, at this point in the revolution of the cylinder. At the time the grippers 38 are passing the taking point for the inset sheets, the cam 55 for operating the grippers 39 is dropped and remains dropped until the grippers 38 have closed, after which this cam is actuated to open the grippers 39 so that when they arrive at the taking point for the web sheets they are ready to and do close upon these sheets. When the desired number of cuts from the web

have been accumulated, the grippers are opened to discharge the sheets.

The cams 58, 59 are located at such a point in the revolution of the cylinder that the delivery of the sheets will take place after these cams have opened the grippers 38. In order to effect the opening of the grippers 39 to enable the sheets to be delivered, there is provided a cam 60 mounted on an arm 61 extending from a shaft 62 rocked from an arm 63 and a cam 64 mounted on a shaft 65. This movement of the shaft 62 interposes the cam 60 in the path of the roll on the arm 54 and thus rocks the shaft 53 so that both sets of grippers are simultaneously opened to enable the sheets to be delivered. The cam 64 will, of course, be designed to throw the cam 60 into operative position only after the desired number of collections have been made.

The delivery of the sheets may be effected in any suitable manner. In the particular construction illustrated, the sheets are delivered by a delivery cylinder 67 mounted on a shaft 68, this cylinder being provided with a set of grippers 69. These grippers are mounted on a shaft 70 provided with an operating arm 71, this arm being operated upon by cams 72, 73. The cam 73 is mounted on an arm 74 in turn mounted on a stud 75. The arm 74 is connected by a rock arm 76 and a stud 77 with the shaft 62, so as to throw the cam 72 into operative position simultaneously with the operation of the cam 60, thus opening the grippers 69, these grippers being closed by the ordinary spring construction, not shown. In the particular machine shown, the grippers 69 deliver the sheets to conveying tapes 78, 79, the cam 73 opening the grippers for this purpose.

In the particular machine shown, it may be desired to produce a product comprising not only the inset sheets and the web sheets before referred to, but also a cover sheet or sheets which will, of course, be applied to the outside of the web sheets, and the particular machine illustrated is provided with means for effecting this. The cover web is indicated at C, the covers being intermittently fed in by rolls 80, 81, the roll 81 having a segmental operating surface 82 to effect the intermittent feeding of the covers. In the particular machine illustrated, a guide, as 83, operates in connection with the cover feeding rolls to deliver the cover simultaneously with the web sheets, as the same are taken by the grippers on the sheet receiving cylinder 36. The rolls 80, 81 will, of course, be so timed as to present a cover simultaneously with the last collection of web sheets.

In the best constructions embodying the invention, securing means will be provided for uniting the sheets on the central fold line. This may be accomplished simply by

folding, but, in the best constructions, it will be accomplished not only by folding, but also by some permanent securing means, such as stapling. In the particular construction illustrated, the shaft 65 carries a stapling roll 84, this roll being provided with stapling mechanism of the usual type, indicated at 85, actuated in the usual manner to insert the proper number of staples along the fold line of the product. In the particular machine shown, after the product has been stapled and delivered, it is presented by the tapes 78, 79 to a striking folding blade 86, operated in the usual manner, which folds the product along the fold line.

It has been heretofore stated that the roll 24 which operates to superpose the inset sheets is provided with a set of grippers for this purpose. These grippers, of course, operate, when superposing the sheets, in the manner described, only upon each second revolution of the cylinder. To effect this, the shaft which carries the roll 24 may be provided with a movable cam 87, this cam being operated from a forked rod 88 in turn operated, in the usual manner, from a cam, not shown, on the shaft 35. Should it be desired not to superpose sheets, this cam may be locked in any usual way, so as to retain the grippers open, thus permitting the sheets to pass without superposing.

The operation of the mechanism will be fully understood from the foregoing description.

Changes and variations may be made in the construction by which the invention is carried into effect. It is not, therefore, to be confined to the particular construction herein shown and described.

What is claimed is:—

1. The combination with web forwarding means, of devices for severing sheets from the webs, sheet forwarding means including timing devices located on one side of the web forwarding means, sheet forwarding means including timing devices located on the other side of said web forwarding means, and means for assembling sheets from said sheet forwarding means with the web sheets.

2. The combination with web forwarding means, of devices for severing sheets from the webs, sheet forwarding means including timing devices located on one side of the web forwarding means, sheet forwarding means including timing devices located on the other side of said web forwarding means, and means including a sheet receiving cylinder for assembling the sheets from both said sheet forwarding means with the web sheets.

3. The combination with web forwarding means, of devices for severing sheets from the webs, intermittently operating sheet forwarding means located on one side of the web forwarding means, intermittently oper-

ating sheet forwarding means located on the other side of the web for forwarding means, and means including a collecting cylinder for assembling the sheets from both said sheet forwarding means with the web sheets.

4. The combination with web forwarding means, of devices for severing sheets from the webs, sheet forwarding means including timing devices located on one side of the web forwarding means, sheet forwarding means including timing devices located on the other side of said web forwarding means, means for assembling sheets from said sheet forwarding means with the web sheets, and means for securing the combined product thus formed together.

5. The combination with web forwarding means, of devices for severing sheets from the webs, sheet forwarding means including timing devices located on one side of the web forwarding means, sheet forwarding means including timing devices located on the other side of said web forwarding means, means including a sheet receiving cylinder for assembling the sheets from both said sheet forwarding means with the web sheets, and means for securing the combined product thus formed together.

6. The combination with web forwarding means, of devices for severing sheets from the webs, intermittently operating sheet forwarding means located on one side of the web forwarding means, intermittently operating sheet forwarding means located on the other side of the web forwarding means, means including a collecting cylinder for assembling the sheets from both said sheet forwarding means with the web sheets, and means for securing the combined product thus formed together.

7. The combination with web forwarding means, of devices for severing sheets from the webs, sheet forwarding means including timing devices located on one side of the web forwarding means, sheet forwarding means including timing devices located on the other side of said web forwarding means, means for assembling sheets from said sheet forwarding means with the web sheets, and means for stapling the combined product.

8. The combination with web forwarding means, of devices for severing sheets from the webs, sheet forwarding means including timing devices located on one side of the web forwarding means, sheet forwarding means including timing devices located on the other side of said web forwarding means, means including a sheet receiving cylinder for assembling the sheets from both said sheet forwarding means with the web sheets, and means for stapling the combined product.

9. The combination with web forwarding means, of devices for severing sheets from the webs, intermittently operating sheet for-

warding means located on one side of the web forwarding means, intermittently operating sheet forwarding means located on the other side of the web forwarding means, means including a collecting cylinder for assembling the sheets from both said sheet forwarding means with the web sheets, and means for stapling the combined product.

10. The combination with web forwarding means, of devices for severing sheets from the webs forwarded thereby, a collecting cylinder located on one side of the web sheet path, intermittently operating sheet feeding means on the collecting cylinder side of the web sheet path and operating to present sheets to the naked surface of the cylinder, and intermittently operating cover feeding means located on the other side of the web sheet path, said cover feeding means also presenting covers to the collecting cylinder.

11. The combination with web forwarding means, of devices for severing sheets from the web forwarded thereby, a collecting cylinder located on one side of the web sheet path, intermittently operating sheet feeding means on the collecting cylinder side of the web sheet path and operating to present sheets to the naked surface of the cylinder, intermittently operating cover feeding means located on the other side of the web sheet path, said cover feeding means also presenting covers to the collecting cylinder, and means for stapling the combined product together.

12. The combination with means including timing devices for forwarding a product comprising a plurality of full width sheets, of web feeding devices, means for severing a full width product from the web or webs forwarded by the web feeding devices, and means for associating and folding the sheet product and the web product to form a combined product with the web sheet outside the other sheets.

13. The combination with means including timing devices for forwarding a product comprising a plurality of full width sheets, of web feeding devices, means for severing a full width product from the web or webs forwarded by the feeding devices, means for associating and folding the sheet product and the web product to form a combined product with the web sheets outside the other sheets, and means for securing the combined product on a line central of the sheets.

14. The combination with means including timing devices for forwarding a product comprising a plurality of full width sheets, of web feeding devices, means for severing a full width product from the web or webs forwarded by the feeding devices, means including a sheet receiving cylinder for assembling the sheet and web products

into a combined product with the web sheets outside the other sheets, and means for folding the combined product on a line central of the sheets.

15. The combination with means including timing devices for forwarding a multi-length sheet, of severing devices operating to cut said sheet into sheet lengths, means for superposing said sheet lengths, devices for forwarding the product, web feeding devices, means for severing a product from the web or webs forwarded by the web feeding devices, and means for assembling the sheet product and the web product into a combined product with the web sheets outside the other sheets.

16. The combination with means including timing devices for forwarding a multi-length sheet, of severing devices operating to cut said sheet into sheet lengths, means for superposing said sheet lengths, devices for forwarding the product, web feeding devices, means for severing a product from the web or webs forwarded by the web feeding devices, means for assembling the sheet product and the web product into a combined product with the web sheets outside the other sheets, and means for folding the combined product on a line central of the sheets.

17. The combination with means including timing devices for forwarding a multi-length sheet, of means for severing said sheet into sheet lengths, means for superposing said sheet lengths, devices for forwarding the product thus formed, web feeding devices, means for severing a product from the web or webs forwarded by the feeding devices, and means including a sheet receiving cylinder for assembling the products into a combined product with the web sheets outside the other sheets.

18. The combination with means including timing devices for forwarding a multi-length sheet, of means for severing said sheet into sheet lengths, means for superposing said sheet lengths, devices for forwarding the product thus formed, web feeding devices, means for severing a product from the web or webs forwarded by the feeding devices, means including a sheet receiving cylinder for assembling the products into a combined product with the web sheets outside the other sheets, and means for folding the combined product on a line central of the sheets.

19. The combination with means for forwarding a multi-length sheet, of means for severing said sheet into sheet lengths, sheet timing devices, means for superposing the sheets, web feeding devices, means for severing a product from the web or webs forwarded by the web feeding devices, and means including a sheet receiving cylinder for assembling the superposed sheet product

and the web product into a combined product with the web sheets outside the superposed sheets.

20. The combination with means including timing devices for forwarding a multi-length sheet, of means for severing it into sheet lengths, means including a detaining cylinder for superposing the sheet lengths to form a sheet product, forwarding devices for said product, web feeding devices, means for severing a product from the web or webs forwarded by the feeding devices, and means including a sheet receiving cylinder for assembling the sheet and web products into a combined product with the web sheets outside the other sheets.

21. The combination with means including timing devices for forwarding a multi-length sheet, of means for severing it into sheet lengths, means including a detaining cylinder for superposing the sheet lengths to form a sheet product, forwarding devices for said product, web feeding devices, means for severing a product from the web or webs forwarded by the feeding devices, means including a sheet receiving cylinder for assembling the sheet and web products into a combined product with the web sheets outside the other sheets, and means for folding the combined product on a line central of the sheets.

22. The combination with a sheet receiving cylinder, of devices for presenting sheets to the naked surface of the cylinder, a set of sheet taking and holding devices operating upon the sheets thus presented, web feeding devices, means for severing a product from the web or webs forwarded by the feeding devices, means for presenting the web sheets to the sheet receiving cylinder later in the same revolution with the heads of the sheets already on the cylinder, a set of sheet taking and holding devices for the web sheets, and means for releasing both sets of taking and holding devices to deliver the sheets.

23. The combination with a sheet receiving and collecting cylinder, of means for presenting a product thereto at one point in its revolution, a set of taking and holding devices for said product, means for presenting a second product to the cylinder later in the same revolution, the heads of the two products being in register, a set of sheet taking and holding devices for the second product, means for opening the set of sheet taking devices for the first product between the taking point of the second set and its own taking point on each revolution of the cylinder, and means for opening the set of taking devices for the second product on any desired revolution of the cylinder while the first set is thus opened.

24. The combination with a sheet receiving

and collecting cylinder, of means for presenting a product to the naked surface of the cylinder at one point in its revolution, a set of grippers for said product, means for presenting a second product to the cylinder later in the same revolution, the heads of the two products being in register, a set of grippers for the second product, means for opening the set of grippers for the first product on each revolution of the cylinder between the taking point of the set of grippers for the second product and its own taking point, and means for opening the second set of grippers on a desired revolution of the cylinder while the first set of grippers is thus opened.

25. The combination with a sheet receiving and collecting cylinder, of means for presenting a product to the naked surface of the cylinder at one point in its revolution, a set of grippers for said product, means for presenting a second product to the cylinder later in the same revolution of the cylinder, the heads of the two products being in register, a set of grippers for the second product, cams for opening each set of grippers at their taking point, a cam for opening the set of grippers for the first product on each revolution of the cylinder between the taking point for the set of grippers for the second product and its own taking point, a cam for opening the second set while the first set is thus opened, and means for operating said cam so that the second set of grippers may be thus opened on a desired revolution of the cylinder.

26. The combination with a sheet receiving and collecting cylinder, of sheet feeding means, said means operating to deliver the sheets to the naked surface of said cylinder at one point in its revolution, a set of grippers for taking this sheet product, means for presenting web sheets to the cylinder after the other sheets have been presented and on the same revolution of the cylinder, the heads of the two groups of sheets being in register, a set of grippers for the web sheets, a cam operating each set of grippers at its taking point, a cam for opening the set of grippers for the sheet product on each revolution of the cylinder between the taking point of the set of grippers for the web sheets and its own taking point, a cam for operating the web sheet grippers while the other set of grippers is thus opened, and means for operating said cam to cause it to thus open the web sheet grippers on a desired revolution of the cylinder.

27. The combination with a sheet receiving and collecting cylinder, of sheet feeding means, said means operating to deliver the sheets to the naked surface of said cylinder at one point in its revolution, a set of grippers for taking this sheet product, means for presenting web sheets to the cylinder after

the other sheets have been presented and on the same revolution of the cylinder, the heads of the two groups of sheets being in register, a set of grippers for the web sheets, 5 a cam operating each set of grippers at its taking point, a cam for opening the set of grippers for the sheet product on each revolution of the cylinder between the taking point of the set of grippers for the web 10 sheets and its own taking point, a cam for operating the web sheet grippers while the other set of grippers is thus opened, means for operating said cam to cause it to thus

open the web sheet grippers on a desired revolution of the cylinder, and a delivery 15 including a folding mechanism to which the product is transferred when both sets of grippers are thus opened.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing 20 witnesses.

EDWARD P. SHELDON.

Witnesses:

F. W. H. CRANE,
LOUIS ROEHM.