

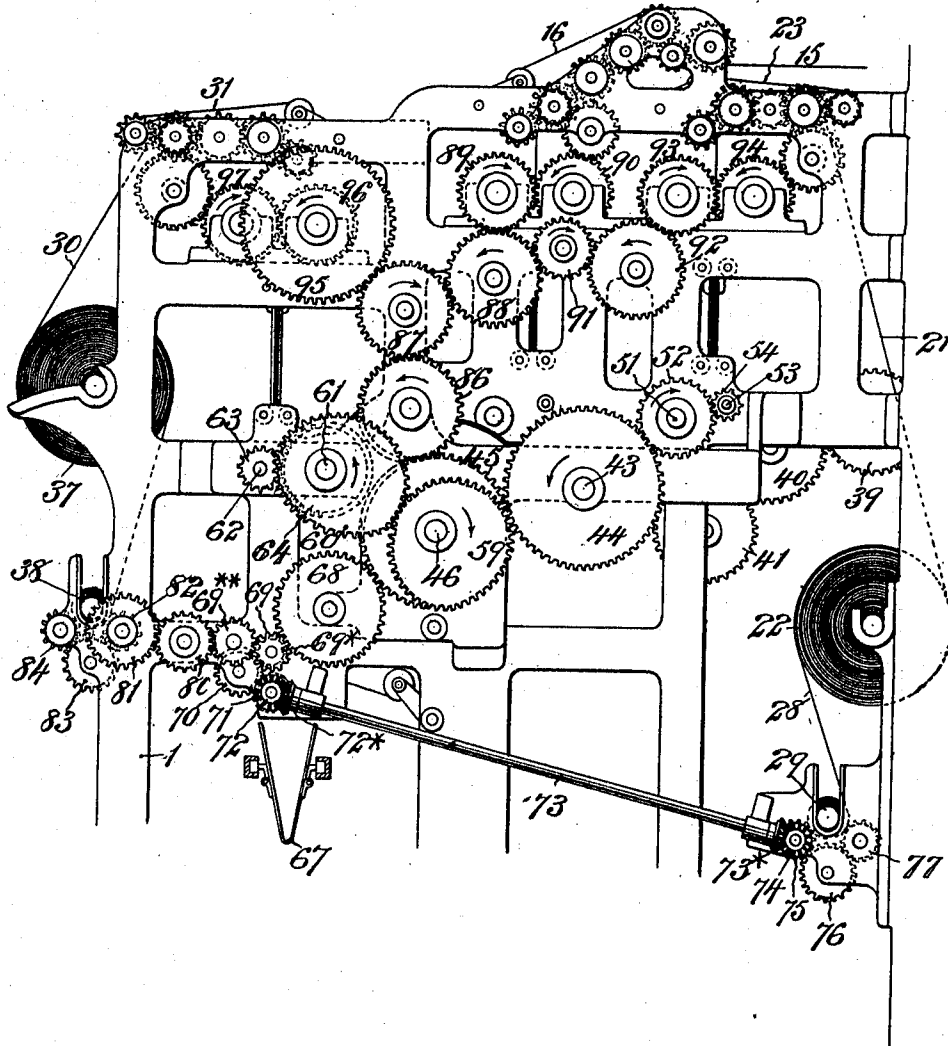
E. H. COTTRELL.
CUTTING AND FOLDING MACHINE.
APPLICATION FILED DEC. 15, 1908.

974,360.

Patented Nov. 1, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
J. George Barry
Henry Thorne.

Inventor:
Edgar H. Cottrell
by attorney
Brown & Howard

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3 SHEETS-SHEET 2.

Fig. 2.

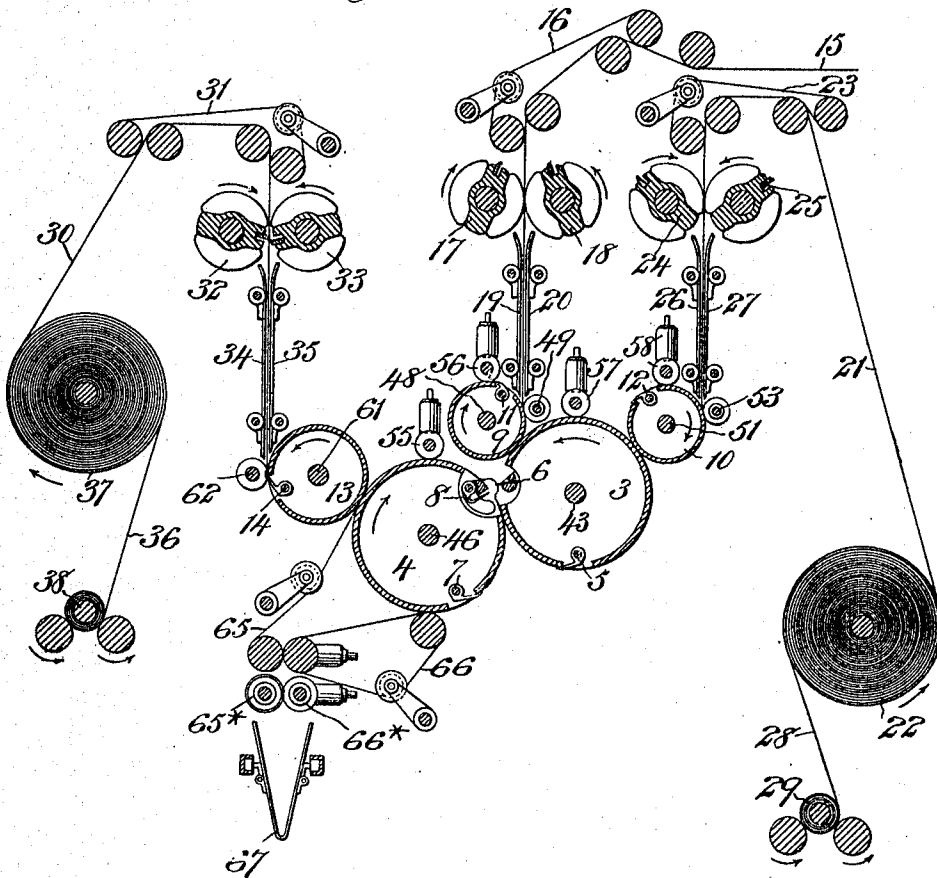
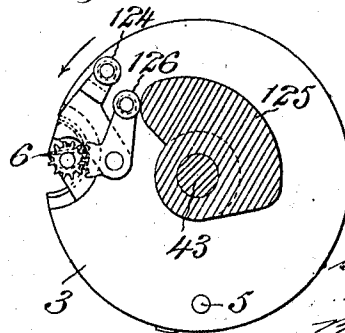


Fig. 5



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3 SHEETS—SHEET 3.

Fig. 3.

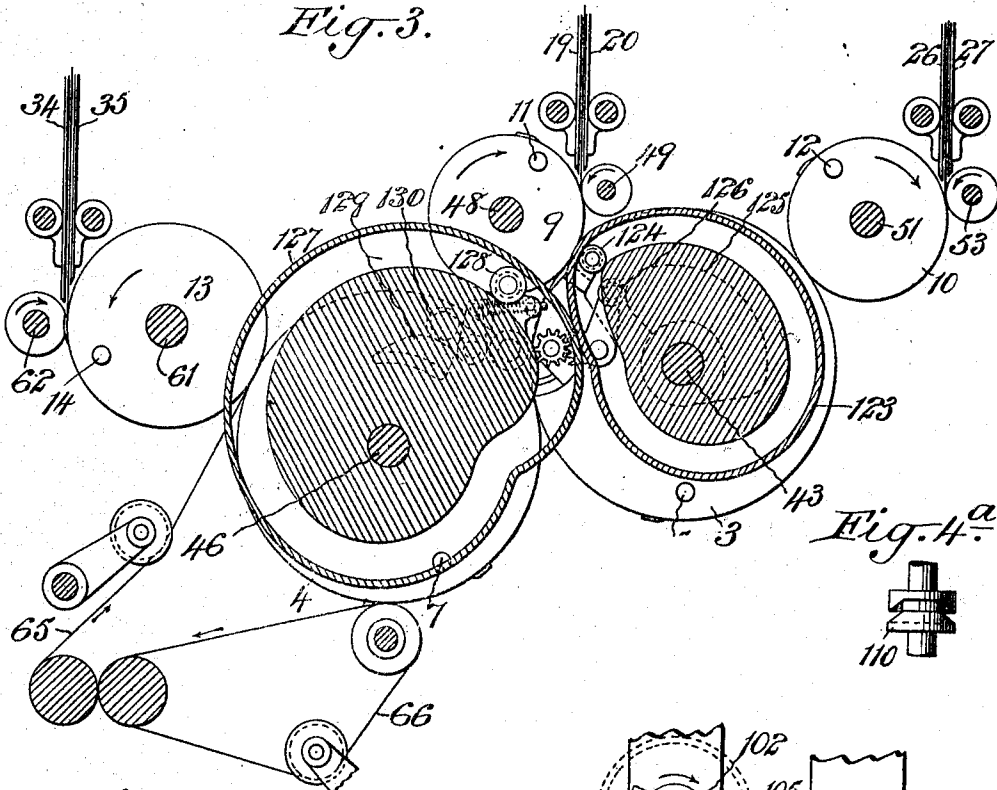
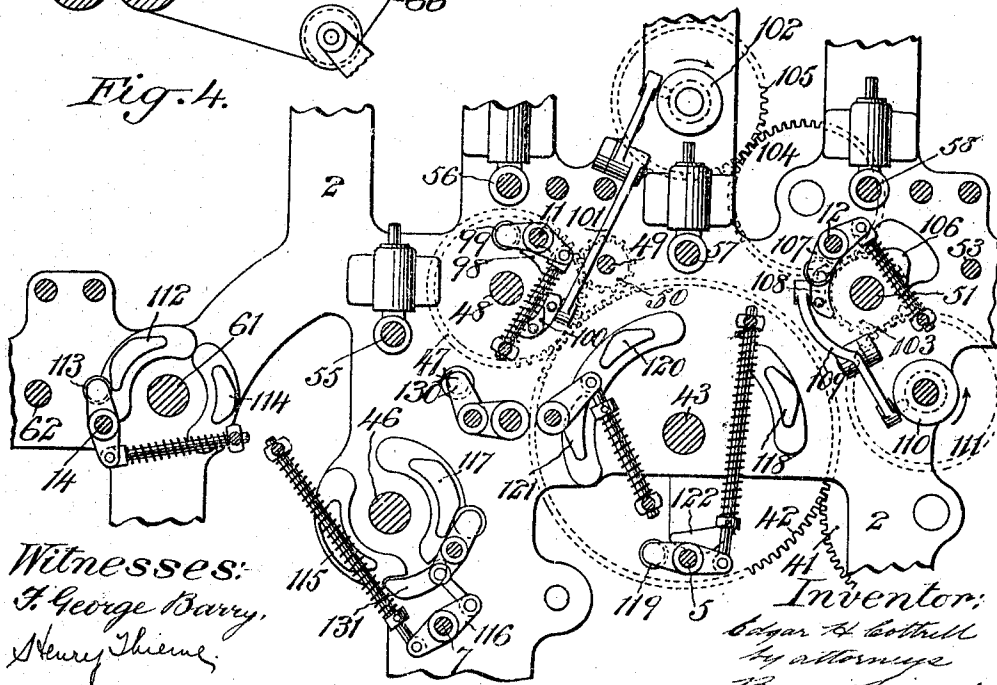


Fig. 4.^a



Witnesses:
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UNITED STATES PATENT OFFICE.

EDGAR H. COTTRELL, OF STONINGTON, CONNECTICUT, ASSIGNOR TO C. B. COTTRELL & SONS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

CUTTING AND FOLDING MACHINE.

974,360.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed December 15, 1906. Serial No. 347,926.

To all whom it may concern:

Be it known that I, EDGAR H. COTTRELL, a citizen of the United States, and resident of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Cutting and Folding Machines, of which the following is a specification.

This invention relates to an improvement in cutting and folding machines and has particularly for its object to provide novel means for associating and folding together sheets cut from the printed web fed from the press with cover and insert sheets cut and fed from previously printed webs, the mechanisms being so arranged that a plurality of sheets cut from the web fed from the press may be collected, a plurality of sheets cut and fed from the previously printed insert supply may be collected and the so collected groups of sheets be assembled with a sheet from the previously printed cover supply and the whole folded together and delivered to a predetermined point.

In the accompanying drawings, Figure 1 is a view in side elevation of a portion of a cutting and folding machine showing the geared connections for driving the several parts at their proper speeds with relation to one another, Fig. 2 is a vertical longitudinal section through the portion of the machine shown in Fig. 1, Fig. 3 is an enlarged detail section taken inside the side framing showing more clearly the cams for actuating the folding mechanism of the folding cylinders, Fig. 4 is a detail section on an enlarged scale adjacent to the opposite side framing showing the arrangement of the cams for controlling the operations of the grippers on the several cylinders, Fig. 4^a is a detail plan of one of the cams for controlling the operation of the opening cam for the grippers on the sheet collecting cylinders, and Fig. 5 is a detail section showing the cam for controlling the movement of the floating folding blade on the male folding cylinder.

The side frames of the machine are denoted by 1 and 2. Male and female folding cylinders 3 and 4 are mounted between the side frames, the male cylinder being provided with a set of grippers 5 and a floating folding blade 6 and the female folding cylinder being provided with a set of grippers 7 and floating folding jaws 8 which are arranged to coact with the floating folding blade 6 of the male folding cylinder. Collecting cylinders 9 and 10 are arranged adjacent to the male folding cylinder 3, the collecting cylinder 9 being provided with a set of grippers 11 and the collecting cylinder 10 with a set of grippers 12. A transfer cylinder 13 is located adjacent to the female folding cylinder 4, which transfer cylinder is provided with a set of grippers 14. The web 15 is fed from the printing press, not shown herein, past feeding tapes 16 through rotary cutters 17, 18, and from thence between stationary guides 19, 20 into position to be engaged by the set of grippers 11 on the collecting cylinder 9. A previously printed insert web 21 leads from a roll 22 past feeding tapes 23, through rotary cutters 24, 25 and from thence between stationary guides 26, 27, into position to be engaged by the set of grippers 12 of the collecting cylinder 10. The previously printed insert web 21 may be wound with an offset web 28 for preventing the smutting of the insert web, the offset web being wound off the roll 22 on to the roll 29 as the insert web is unwound from the roll 22. The previously printed cover web 30 leads past the feeding tapes 31 through the rotary cutters 32, 33, and between stationary guides 34, 35, into position to be engaged by the set of grippers 14 of the transfer cylinder 13. The cover web 30 is wound with the offset web 36 on the roll 37 to prevent smutting of the cover web and the offset web 36 is unwound from the roll 37 on to the roll 38 as the cover web 30 is unwound from the said roll 37.

The several mechanisms are driven from the press through the train of gears 39, 40, 41, the gear 41 meshing with a gear 42 fixed to the shaft 43 of the male folding cylinder 3. The female folding cylinder 4 is driven at the same speed as the cylinder 3 by means of a gear 44 on the shaft 43 of the cylinder 3, which meshes with a gear 45 on the shaft 46 of the female folding cylinder 4. The collecting cylinder 9 is driven two revolutions to one of the male folding cylinder 3, by a gear 47 fixed to the shaft 48 of the cylinder 9, which gear 47 meshes with the gear 42 of the cylinder 3. The feed roller shaft 49 for the cylinder 9 is driven from the said cylinder by means of a gear 50 which meshes

pers 7 and floating folding jaws 8 which are arranged to coact with the floating folding blade 6 of the male folding cylinder. Collecting cylinders 9 and 10 are arranged adjacent to the male folding cylinder 3, the collecting cylinder 9 being provided with a set of grippers 11 and the collecting cylinder 10 with a set of grippers 12. A transfer cylinder 13 is located adjacent to the female folding cylinder 4, which transfer cylinder is provided with a set of grippers 14. The web 15 is fed from the printing press, not shown herein, past feeding tapes 16 through rotary cutters 17, 18, and from thence between stationary guides 19, 20 into position to be engaged by the set of grippers 11 on the collecting cylinder 9. A previously printed insert web 21 leads from a roll 22 past feeding tapes 23, through rotary cutters 24, 25 and from thence between stationary guides 26, 27, into position to be engaged by the set of grippers 12 of the collecting cylinder 10. The previously printed insert web 21 may be wound with an offset web 28 for preventing the smutting of the insert web, the offset web being wound off the roll 22 on to the roll 29 as the insert web is unwound from the roll 22. The previously printed cover web 30 leads past the feeding tapes 31 through the rotary cutters 32, 33, and between stationary guides 34, 35, into position to be engaged by the set of grippers 14 of the transfer cylinder 13. The cover web 30 is wound with the offset web 36 on the roll 37 to prevent smutting of the cover web and the offset web 36 is unwound from the roll 37 on to the roll 38 as the cover web 30 is unwound from the said roll 37.

with the gear 47. The previously printed insert sheet supply collecting cylinder 10 is driven two revolutions to one of the male folding cylinder 3, by providing the shaft 51 of the cylinder 10 with a gear 52 which meshes with the gear 44 of the cylinder 3. The feed roller shaft 53 for the cylinder 10 is provided with a gear 54 which meshes with the gear 52 on the shaft 51 of the cylinder 10. Sheet pressure rollers 55, 56, 57, 58 engage the peripheries of the cylinders 4, 9, 3 and 10 respectively. The previously printed cover sheet transfer cylinder 13 is driven a revolution for every revolution of the female folding cylinder 4 but at varying speeds by irregular gears 59, 60, the gear 59 being fixed to the shaft 46 of the cylinder 4 and the gear 60 being fixed to the shaft 61 of the cylinder 13. The feed roller shaft 62 for the cylinder 13 is provided with a gear 63 which meshes with a gear 64 fixed to the shaft 61 of the said cylinder 13.

Carrying tapes 65, 66 are arranged to convey the assembled and folded group of press, insert and cover sheets from the folding cylinder 4, through slitters 65*, 66* to a predetermined point, such for instance as a collecting pocket carrier 67 like that shown in my United States Letters Patent No. 749,362 dated January 12, 1904.

The insert offset roll 29 is driven from the gear 45 of the cylinder 4 through a train of gears 68, 69, 69*, 70, 71, 72, 72*, shaft 73 and train of gears 73*, 74, 75, 76, 77. The cover offset roll 38 is driven from the gear 68 through a train of gears 69, 69**, 80, 81, 82, 83, 84. The rotary cutters 17, 18, are driven from the gear 45 through a train of gears 86, 87, 88, 89, 90 and the rotary cutters 24, 25, are driven from the gear 88 through a train of gears 91, 92, 93, 94. The rotary cutters 32, 33 are driven from the gear 87 through a train of gears 95, 96, 97. The feeding tapes 23, 16 and 31 are driven from their respective cutters by suitable gearing which need not be specifically described.

The set of grippers 11 on the sheet collecting cylinder 9 is opened every revolution to receive the advance edge of a sheet by means of a fixed cam 98 which engages the gripper lever 99 at the proper time. The set of grippers 11 is opened every second revolution to transfer a collected group of two sheets to the set of grippers 5 on the male folding cylinder 3, by means of a movable opening cam 100, which cam is thrown into and out of position to engage the lever 99 by means of a rock lever 101 operated by a cam 102 driven from the shaft 51 of the collecting cylinder 10 through gears 103, 104, 105. The set of grippers 12 on the collecting cylinder 10 is opened every revolution to receive the advance edge of a sheet from the cutters 24, 25, by a stationary cam

106 which is arranged in position to engage the gripper opening lever 107 at the required time. This set of grippers 12 is opened every second revolution of the collecting cylinder for transferring the collected group of two sheets to the set of grippers 5 on the folding cylinder 3, by means of a movable opening cam 108, which cam is moved into and out of the path of the lever 107 by a lever 109 which is operated by a cam 110, which cam is driven from the gear 103 on the shaft 51 through a gear 111. The set of grippers 14 on the transfer cylinder 13 is opened to receive the advance edge of the cover sheet as it leaves the guides 34, 35, by means of a fixed cam 112 which is arranged in position to engage the gripper opening lever 113 at the proper time. Another fixed cam 114 is arranged in position to engage the lever 113 at the proper time to transfer the advance edge of the cover sheet from the set of grippers 14 to the set of grippers 7 on the female folding cylinder 4. A fixed cam 115 is arranged in position to engage the opening lever 116 of the set of grippers 7 at the proper time to receive the advance edge of the cover sheet from the set of grippers 14. A second fixed cam 117 is arranged in position to engage the lever 116 of the set of grippers 7 at the proper time to transfer the advance edge of the cover sheet to the set of grippers 5 on the male folding cylinder 3. A fixed cam 118 is arranged in position to engage the opening lever 119 of the set of grippers 5 on the male folding cylinder 3 at the proper time to receive the collected group of two insert sheets from the collecting cylinder 10. A second fixed cam 120 is arranged in position to engage the lever 119 at the proper time to open the set of grippers 5 to receive the collected group of two sheets from the main press. A third fixed cam 121 is arranged in position to engage the lever 119 to open the set of grippers 5 to receive the advance edge of the cover sheet from the set of grippers 7. A fourth fixed cam 122 is arranged in position to engage the lever 119 to open the set of grippers 5 to release the advance edges of the sheets at the proper time of folding the same from the male folding cylinder on to the female folding cylinder.

The coaction of the folding devices on the cylinders 3 and 4 is obtained as follows. A fixed box cam 123 is arranged to control the floating movement of the blade 6 through the truck roller 124 and a cam 125 is arranged to control the tucking movement of the said blade by its engagement with the stud roller 126. A fixed cam 127 is arranged to control the floating of the folding jaws by its engagement with the truck roller 128 and a fixed cam 129 is arranged to control the opening of said jaws by its engagement with the stud roller 130. The opening

of the floating jaws to release the folded signature at the proper time to permit it to be fed between the tapes 55, 56 is controlled by a stationary cam 131, which engages a stud roller 130².

The movements of the parts hereinabove described are so timed with respect to each other that the rotary cutters 17, 18, and the sheet collecting cylinder 9 complete two revolutions to one revolution of the folding cylinders so that two sheets at a time are transferred to the grippers 5 on the folding cylinder 3. The rotary cutters 24, 25 and the collecting cylinder 10 also complete two revolutions to one revolution of the folding cylinders so that two insert sheets are transferred at a time to the grippers 5 on the folding cylinder 3. The rotary cutters 32, 33 and the transfer cylinder 13 rotate one revolution for one revolution of the folding cylinders so that one cover sheet at a time is transferred to the grippers 7 on the folding cylinder 4. The irregular gears 59, 60 are so shaped that the cylinder 13 will be caused to travel at the speed of the cover web at the time the grippers 14 engage the advance edge of the cover sheet and at the surface speed of the folding cylinder 4 at the time that the advance edge of the cover sheet is transferred to the grippers 7.

In operation, the cutters 24, 25, cut successively sheets from the insert web and feed them down between the guides 26, 27 into position to have the advance edge of an insert sheet engaged by the grippers 12 on the collecting cylinder 10. After two insert sheets have been collected on the cylinder 10, they are transferred to the grippers 5 on the folding cylinder 3 when the said grippers are brought together with the grippers 12. In the meantime the cutters 32, 33 cut successive sheets from the cover web and feed the sheets one at a time down between the guides 34, 35, into position to have the advance edge of each cover sheet engaged by the grippers 14 on the transfer cylinder 13. The cover sheet on the cylinder 13 is transferred to the folding cylinder 4 when the grippers 7 of the folding cylinder and the grippers 14 of the transfer cylinder are brought together. The rotary cutters 17, 18, cut sheets from the web fed from the main press and feed them down between the guides 19, 20 into position to be collected upon the cylinder 9. After the grippers 11 have engaged the advance edges of two sheets, the two sheets are transferred to the folding cylinder 3 as the grippers 5 and grippers 11 are brought together. The further rotary movement of the folding cylinders 3 and 4 bring the grippers 5 and grippers 7 together and thus permit the advance edge of the cover sheet on the folding cylinder 4 to be transferred to the folding cylinder 3. As the folding mechanism of the

two cylinders 3 and 4 is brought into co-action, the grippers 5 are opened to release the advance edges of the collected group of sheets. The folded signature is then brought down by the rotary movement of the cylinder 4, between the tapes 65, 66 and the jaws 8 of the folding mechanism are opened to permit the tapes 65, 66 to feed the folded signature between the slitters 65, 66, from whence the signatures drop into the pockets in the carrier 67. Means for imparting the successive movements of the pocket carriers to collect a series of folded signatures therein forms no part of the present invention and will therefore not be specifically described, it being understood that the folded signature from the tapes may be slit into the required number of smaller signatures and then deposited at proper intervals into the pocket carrier to produce the result desired.

It can be readily understood that instead of transferring the advance edge of the cover sheet from the folding cylinder 4 to the folding cylinder 3 to be combined with the insert and main web sheets thereon, the opening of the grippers may be so timed that the cover sheet will not be transferred to the cylinder 3 but will be fed between the cylinders and have its advance edge released from the grippers 7 in ample time to permit the assembled insert, main web and cover sheets to be folded together and fed between the tapes 65, 66.

It will be seen that the machine as hereinabove set forth accomplishes the assembling and folding together of sheets from the main press and from the insert and cover supplies without the necessity of employing formers, turning-bars or carrying tapes.

What I claim is:

1. Means for collecting a group of sheets cut and fed from the main web, a folding cylinder, and means for causing the cylinder to collect thereon a plurality of previously printed insert sheets fed from one source of supply, and a previously printed cover sheet fed from another source of supply with the said collected group of sheets cut and fed from the main web.
2. Means for collecting a group of previously printed insert sheets fed from one source of supply, means for collecting a group of sheets cut and fed from the main web, a folding cylinder and means for causing the cylinder to collect thereon the collected group of previously printed insert sheets and a previously printed cover sheet fed from another source of supply with the collected group of sheets cut and fed from the main web.
3. Means for collecting a group of two previously printed insert sheets fed from one source of supply, means for collecting

two sheets cut and fed from the main web, a folding cylinder and means for causing the folding cylinder to collect thereon the collected group of two previously printed insert sheets and a previously printed cover sheet fed from another source of supply with the collected group of two sheets cut and fed from the main web.

4. Means for collecting a group of sheets cut and fed from the main web, folding cylinders, means for causing one of the cylinders to collect thereon a plurality of previously printed insert sheets fed from one source of supply and a previously printed cover sheet fed from another source of supply with the group of sheets cut and fed from the main web, and co-acting folding devices arranged to fold the sheets together and deliver them at a predetermined point.

5. Means for collecting a group of previously printed insert sheets fed from one source of supply, means for collecting a group of sheets cut and fed from the main web, folding cylinders, means for causing one of the cylinders to collect thereon the group of previously printed insert sheets and a previously printed cover sheet fed from another source of supply with the group of sheets cut and fed from the main web, and co-acting folding devices arranged to fold the sheets together and deliver them at a predetermined point.

6. Means for collecting a group of two previously printed insert sheets fed from one source of supply, means for collecting a group of two sheets cut and fed from the main web, folding cylinders, means for causing one of the cylinders to collect thereon the group of two previously printed insert sheets and a previously printed cover sheet fed from another source of supply with the group of two sheets cut and fed from the main web, and co-acting folding devices arranged to fold the sheets together and deliver them at a predetermined point.

7. Means for collecting a group of previously printed insert sheets fed from one source of supply, means for collecting a group of sheets cut and fed from the main web, folding cylinders, and means for causing one of the cylinders to successively collect thereon the group of previously printed insert sheets, the group of sheets cut and fed from the main web and a previously printed cover sheet fed from another source of supply.

8. Means for collecting a group of two previously printed insert sheets fed from one

source of supply, means for collecting a group of two sheets cut and fed from the main web, folding cylinders, and means for causing one of the cylinders to successively collect thereon the group of two previously printed insert sheets, the group of two sheets cut and fed from the main web and a previously printed cover sheet fed from another source of supply.

9. Means for collecting a group of previously printed insert sheets fed from one source of supply, means for collecting a group of sheets cut and fed from the main web, folding cylinders, means for causing one of the cylinders to successively collect thereon the group of previously printed insert sheets, the group of sheets cut and fed from the main web and a previously printed cover sheet fed from another source of supply, and co-acting folding devices arranged to fold the sheets together and deliver them at a predetermined point.

10. Folding cylinders, collecting cylinders for delivering insert sheets and main web sheets to one of the folding cylinders and a transfer cylinder arranged to deliver sheets to the other folding cylinder.

11. Folding cylinders, collecting cylinders for delivering insert sheets and main web sheets to one of the folding cylinders, a transfer cylinder arranged to deliver sheets to the other folding cylinder and means for folding the sheets together and delivering them at a predetermined point.

12. Folding cylinders, insert sheet and main web sheet collecting cylinders arranged to travel two revolutions to one revolution of the folding cylinders and a cover sheet transfer cylinder arranged to travel one revolution to one revolution of the folding cylinders.

13. Folding cylinders, insert sheet and main web sheet collecting cylinders arranged to travel two revolutions to one revolution of the folding cylinders, a cover sheet transfer cylinder arranged to travel one revolution to one revolution of the folding cylinders, and means for imparting a variable surface speed to the cover sheet transfer cylinder.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this 13th day of December 1906.

EDGAR H. COTTRELL.

Witnesses:

FREDK. HAYNES,
LODA M. EGBERT.