

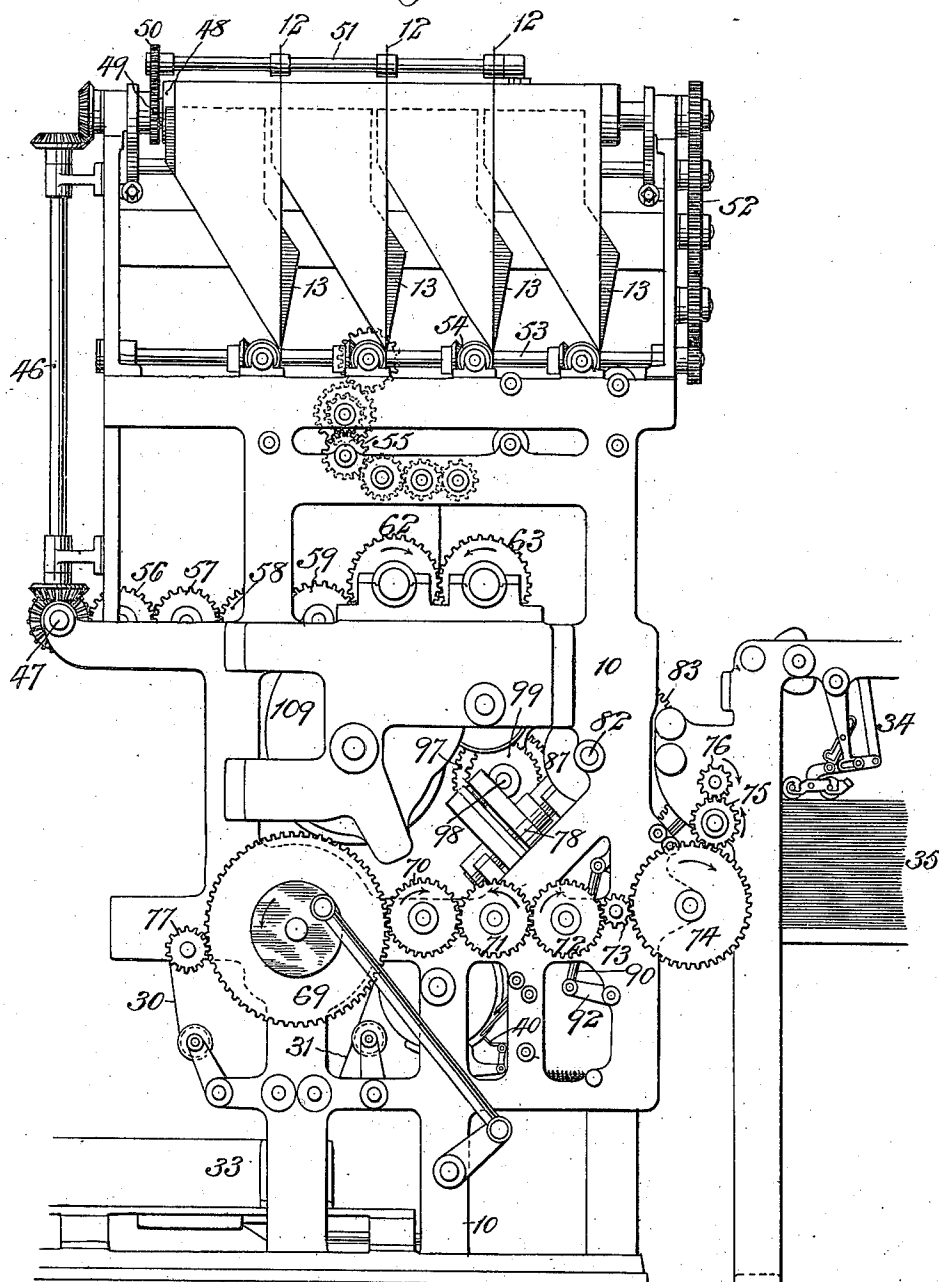
H. M. BARBER.
SHEET FEEDING AND FOLDING MECHANISM.
APPLICATION FILED JULY 2, 1907.

989,891.

Patented Apr. 18, 1911.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses:-
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Henry Thime.

Inventor:-
Howard M. Barber
by attorney
Mowbray & Ward

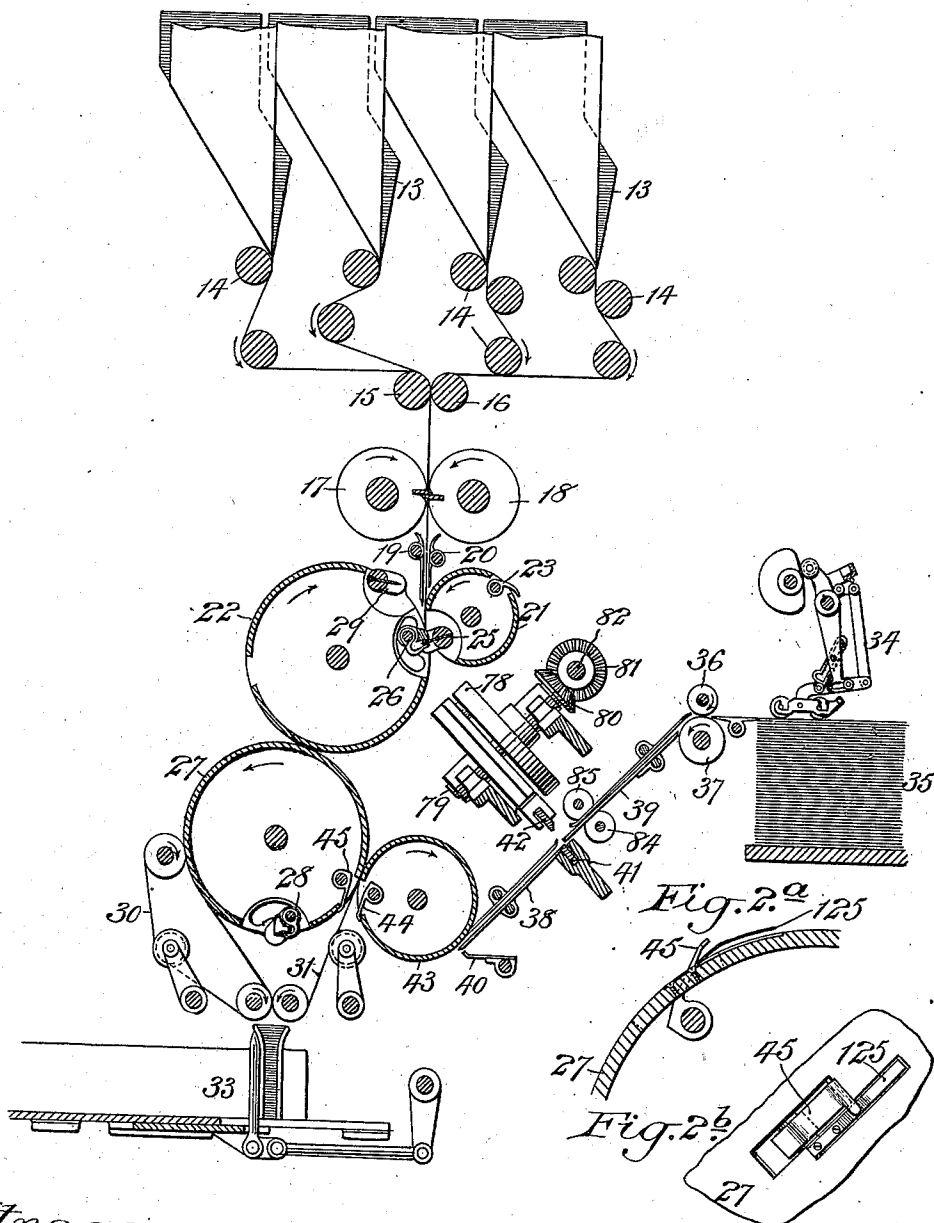
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5 SHEETS—SHEET 2.

Fig. 2.



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F. George Barry,
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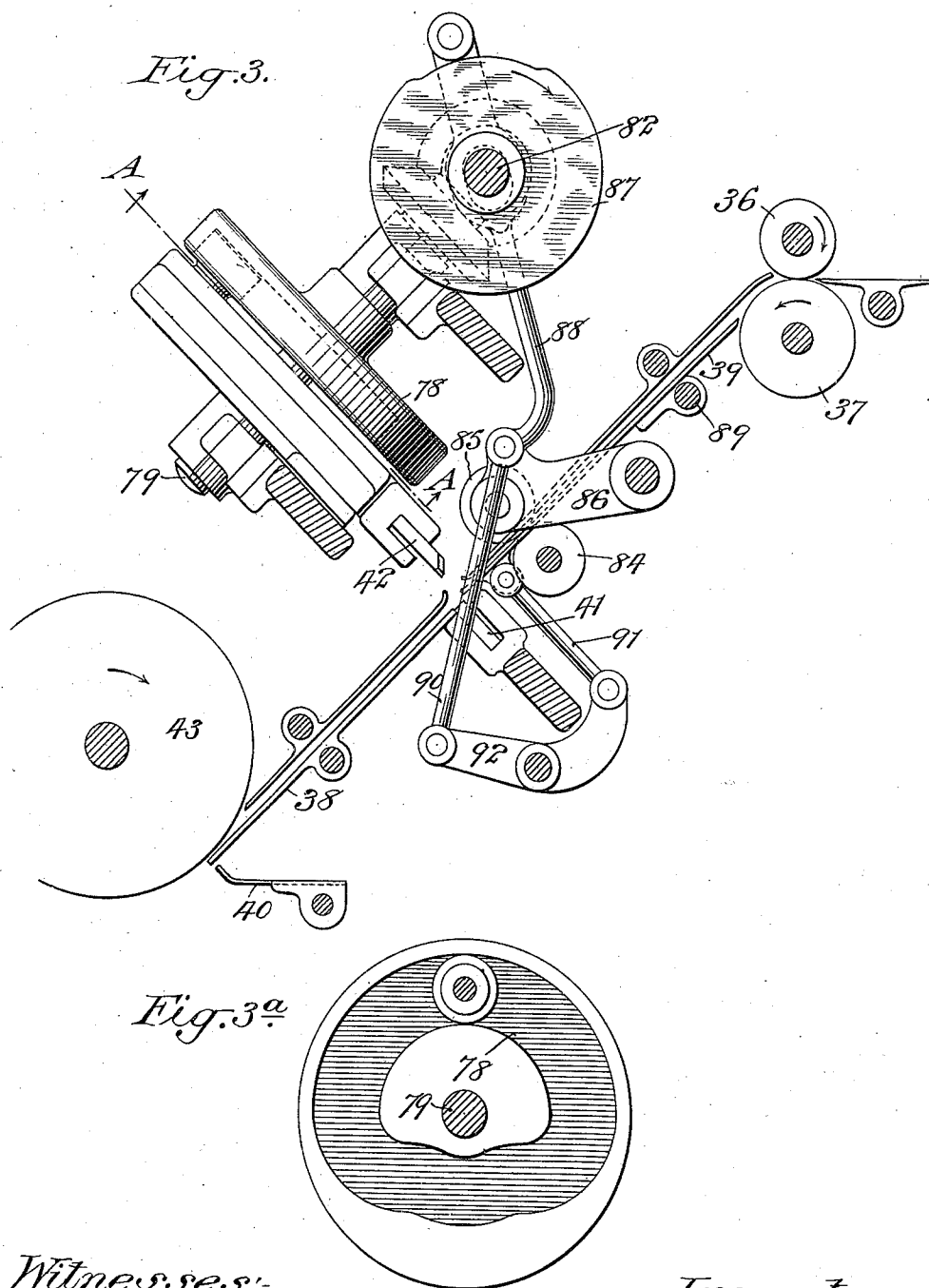
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5 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

Fig. 4.

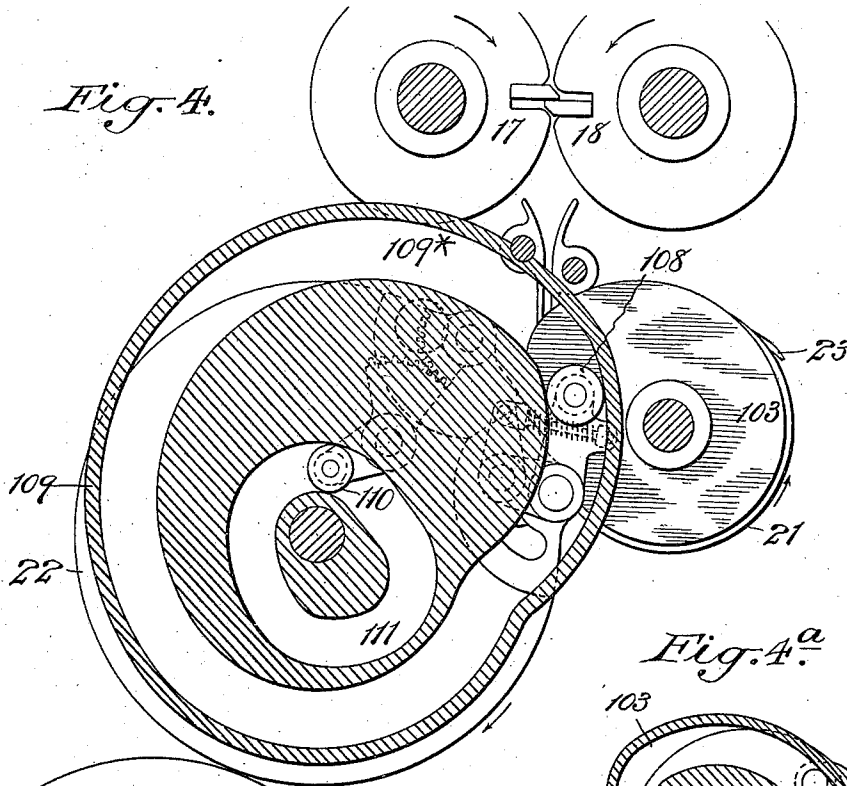
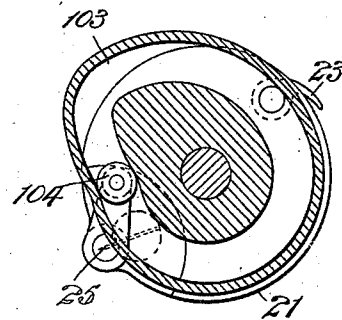


Fig. 4^a.



Witnesses:
F. George Barry,
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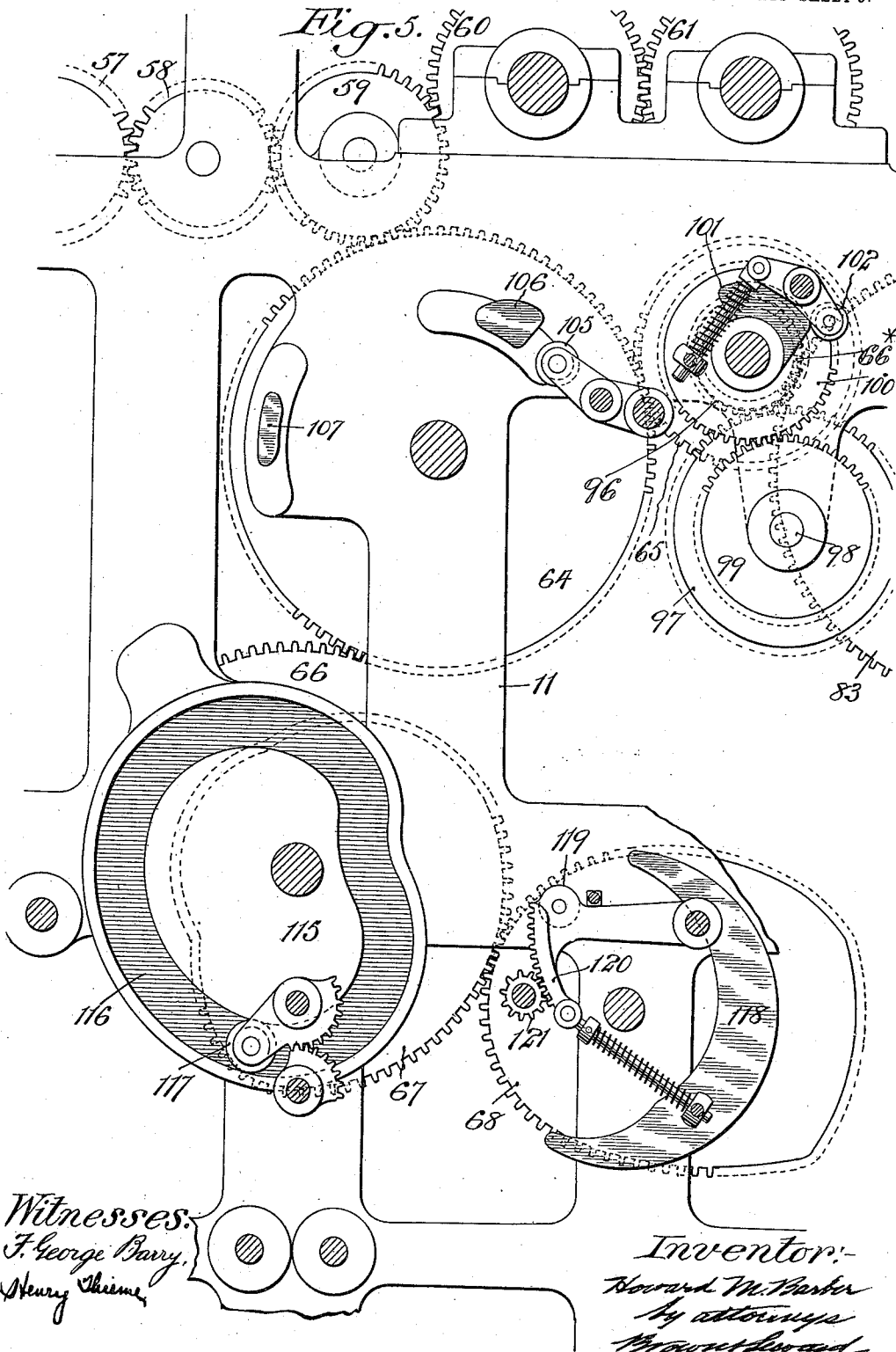
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APPLICATION FILED JULY 2, 1907.

989,891.

Patented Apr. 18, 1911.

5 SHEETS—SHEET 5.



UNITED STATES PATENT OFFICE.

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

SHEET FEEDING AND FOLDING MECHANISM.

989,891.

Specification of Letters Patent.

Patented Apr. 18, 1911.

Application filed July 2, 1907. Serial No. 381,851.

To all whom it may concern:

Be it known that I, HOWARD M. BARBER, 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 Sheet Feeding and Folding Mechanism, of which the following is a specification.

This invention contemplates novel mechanism arranged to feed previously printed multi-cover sheets from a suitable source, sever the same into smaller cover sheets and feed them into position to be associated with the printed product as it comes from the press, and subsequently folded together with said printed product and finally delivered to any desired point.

This invention consists more specifically in providing an inclined feeding and cover cutting table on to which previously printed multi-cover sheets made up of two four-page covers, are fed, means being provided for cutting the multi-cover sheet into a front section and a back section, the front section being first fed into position to be associated with one group of sheets from the press and then the back section being fed into position to be associated with the next succeeding group of sheets from the press.

In the accompanying drawings, Figure 1 is a view of the machine in front elevation, Fig. 2 is a vertical transverse section indicating diagrammatically the several parts which coöperate to produce the associating and folding together of the printed product and the cover sheet, Fig. 2^a is a detail section showing one of the springs for lifting the advance edge of the cover sheet as it approaches the delivery tapes, Fig. 2^b is a detail plan view of the same, Fig. 3 is an enlarged detail section showing the cover feeding and cutting mechanism, Fig. 3^a is a detail section taken in the plane of the line A—A of Fig. 3, showing the cam for controlling the reciprocating knife, Fig. 4 is an enlarged detail section showing certain of the cams for controlling the operation of different parts of the machine, Fig. 4^a is a detail view of the cam for operating the tucking blade on the collecting cylinder, and Fig. 5 is an enlarged detail section taken inside the back frame of the machine.

The front frame of the machine is de-

noted by 10 and the back frame by 11. This machine is shown as provided with slitting mechanism mounted in position to divide the printed web as it comes from the press into a plurality of webs. These webs are led around half turners and rollers and are assembled into a group before reaching the cutting mechanism. In the present instance I have shown the slitting mechanism as comprising three slitters 12 arranged to slit the printed web as it comes from the press into four smaller webs, which four webs pass around four half-turners 13, from thence around rolls 14 and finally between rolls 15, 16. A pair of rotary smooth-edged cutters 17, 18, are mounted in the machine framing 10, 11, in position to receive the assembled group of webs from the press and cut sheets therefrom of the desired length. Stationary sheet guides 19, 20, are arranged in position to receive the assembled group of webs from the cutting mechanism and direct the same between the collecting and folding cylinders 21, 22. The folding cylinder 21 is provided with a set of grippers 23 and with a folding blade 25. The folding blade 25 is arranged to co-act with the floating folding jaw 26 carried by the folding cylinder 22.

The delivery cylinder is denoted by 27 and it is provided with a floating folding jaw 28 arranged to coact with the folding blade 29 carried by the folding cylinder 22. Carrying tapes 30, 31 are arranged in position to receive the signature from the delivery cylinder 27 and convey it to any desired point as, for instance, a suitable delivery mechanism 33 of the well known packer type.

The mechanism for cutting and feeding the previously printed multi-cover sheet comprises the following parts. A sheet feeding device 34 of any desired construction is arranged in position to feed the previously printed multi-cover sheets one at a time from a pile 35 between feed rollers 36, 37, on to an inclined feeding and cutting table divided transversely into a lower section 38 and an upper section 39. A movable stop 40 is located in position to engage and release the advance edge of the cover sheet after it has been fed on to the table. A cover sheet cutting mechanism is provided for severing the multi-cover sheet into two smaller cover

sheets, which cutting mechanism comprises
 a stationary knife 41 and a reciprocating
 knife 42 arranged to co-act between the up-
 per and lower sections 38, 39 of the feeding
 and cutting table. A cover sheet feeding
 cylinder 43 is provided with a set of grippers
 44 arranged to transfer cover sheets succes-
 sively to a set of grippers 45 carried by the
 delivery cylinder 27.
 Proceeding to describe the driving and oper-
 ating mechanism for the several parts: The
 slitting mechanism and the rolls for feeding
 the plurality of webs from the press to the
 cutters are driven as follows. A vertical
 shaft 46 is driven from the horizontal shaft
 47 and it in turn drives the slitting roll 48.
 This slitting roll has a geared connection
 49, 50 with the shaft 51 of the slitters 12.
 The slitting roll shaft drives the plurality
 of web feeding rolls 14 through a train of
 gears 52 which drives a cross shaft 53 having
 bevel gear connections 54 with the shafts of
 the rolls 14. The web assembling rolls 15, 16,
 are driven from one of the rolls 14 through
 a train of gears 55. A train of gears 56,
 57, 58, 59, connects the shaft 47 with the
 gear 60 of the cutter 17, which gear meshes
 with a gear 61 of the cutter 18. These cut-
 ters are connected at the opposite ends of
 their shafts through gears 62, 63. The gear
 64 on the shaft of the folding cylinder 22 is
 driven from the gear 59. A gear 65 fixed
 to the shaft of the folding cylinder 21
 meshes with the gear 64. A gear 66 fixed
 to the shaft of the delivery cylinder 27 also
 meshes with the gear 64. A variable speed
 is imparted to the cover sheet feeding cylin-
 der 43 by providing the shafts of the cylin-
 ders 27 and 43 with lobed gears 67, 68 re-
 spectively. A train of gears 69, 70, 71, 72,
 73, 74 connects the shaft of the delivery cylin-
 der 27 with the gear 75 on the shaft of the
 feeding rollers 37, which gear 75 meshes with
 a gear 76 on the shaft of the feeding rollers
 36. The tapes 30 are driven by providing
 the shaft of one of the rolls with a gear 77
 meshing with the gear 69.

The reciprocations of the knife 42 are con-
 trolled by a box cam 78 fixed to rotate with
 a short inclined shaft 79. This cam is driven
 by a bevel gear connection 80, 81, from a
 horizontal shaft 82, which shaft is provided
 with a gear 83 which is driven from the
 folding cylinder 22 through the gears 64, 65,
 66*. The gear 73 is fixed to the shaft of the
 feed rollers 84 arranged to coact with feed
 rollers 85 carried by a rocking arm 86. The
 feed rollers 85 are brought into and out of
 engagement with the feed rollers 84 by
 means of a cam 87 on the shaft 82, which
 cam controls the movement of a rod 88 con-
 nected to the rocking arm 86. The upper
 rear section 39 of the cover cutting and feed-
 ing table is hinged at 89 near its upper end
 and its free lower end is raised and lowered

by the cam 87 through the rod 88, rocking
 arm 86, connecting rods 90, 91 and rock
 lever 92.

The stop 40 is brought into and out of
 position to engage the advance edge of the
 cover sheet by means of a cam 93 fixed to
 rotate on the shaft of the cover sheet feeding
 cylinder 43, which cam engages a rocking
 arm 94 connected to the stop 40 by a rod 95.

The mechanism arranged to open the set
 of grippers 23 on the folding cylinder 21
 every other revolution of the cylinder so that
 every other group of assembled sheets from
 the press may be engaged by the said grip-
 pers, is as follows. A gear 96 is fixed to the
 shaft of the folding cylinder 21, which gear
 meshes with a gear 97 mounted on a stud
 shaft 98. A gear 99 is also mounted on this
 stud shaft 98 and is fixed to rotate with the
 gear 97. This gear 99 meshes with a gear
 100 loosely mounted on the shaft of the fold-
 ing cylinder 21. This gear 100 has fixed
 thereto a cam 101 which is arranged to
 travel at one-half the speed of the cylinder
 21 so that it will engage the gripper operat-
 ing stud roller 102 every other revolution of
 the said cylinder. A stationary box cam
 103 is arranged in position to engage the
 stud roller 104 which controls the movement
 of the tucking blade 25 carried by the fold-
 ing cylinder 21. The floating folding jaw
 26 on the folding cylinder 21 is opened to
 receive the tucking blade 25, by the engage-
 ment of its operating stud roller 105 with
 a stationary cam 106. This floating folding
 jaw 26 is also opened at the proper time to
 permit the folding off of the assembled two
 groups of sheets to the delivery cylinder 27
 by the engagement of the stud roller 105
 with a stationary cam 107. The floating of
 the folding jaw 26 is accomplished through
 the engagement of its stud roller 108 with
 the outer cam groove 109* in the stationary
 box cam 109.

The floating of the tucking blade 29 on
 the cylinder 22 is accomplished by the en-
 gagement of its stud roller 110 with the in-
 ner cam groove 111 of the box cam 109. The
 opening of the floating folding jaw 28 on the
 delivery cylinder 27 is accomplished at the
 time of coaction with the tucking blade 29
 on the cylinder 22, by means of a stationary
 cam 112 which engages the stud roller 113.
 The opening of the floating folding jaw at
 the proper time to release the associated
 groups of sheets and cover sheet for deliver-
 ing the same between the carrier tapes 30,
 31, is accomplished through a stationary cam
 114 which engages the said roller 113. The
 floating of the folding jaw 28 is accomplished
 by means of a stationary cam 115, the
 groove 116 of which engages the operating
 stud roller 117 of the said floating folding
 jaw. The set of grippers 44 on the cover
 sheet feeding cylinder 43 is opened to trans-

fer the sheet to the grippers 45 on the delivery cylinder 27 and is caused to remain open until the advance edge of the next succeeding cover sheet has been fed thereto, by means of a crescent cam 118 which engages a stud roller 119 which carries a curved segment 120 having a toothed engagement with the pinion 121 of the gripper shaft. The set of grippers 45 on the delivery cylinder 27 is opened to receive the advance edge of the cover sheet from the grippers 44 by means of a stationary cam 122 which engages the operating stud roller 123 of said set of grippers 45. This set of grippers is again opened at the time of fold by a stationary cam 124 which is arranged in position to engage the stud roller 123.

The advance edge of the cover sheet is raised away from the cylinder as it approaches the carrying tapes 30, so that the cover sheet will pass over the outside of the tapes as the folding jaw 28 brings the folded product into position to be delivered by the tapes 30, 31. This is accomplished by providing the cylinder 27 with springs 125 the free ends of which are permitted to lift as the grippers 45 are opened.

In operation, as the printed web comes from the press it is slit into a plurality of narrower webs, in the present instance four, which are brought together and passed through the cutting mechanism where they are subdivided into groups of four sheets each. As the first group of sheets is fed to the folding cylinders, it is seized by the grippers 23 on the folding cylinder 21. The rotary movement of the cylinder 21 brings this group of sheets around into position to be assembled with the next succeeding group of sheets, the second group of sheets being passed free between the folding cylinders. Just before this second group is severed by the cutting mechanism from the narrow webs, the two assembled groups are engaged by the tucking blade 25 of the cylinder 21 which will co-act with the floating folding jaw 26 of the cylinder 22 for folding the said two assembled groups on to the folding cylinder 22.

A pile of previously printed multi-cover sheets is provided, each multi-cover sheet in the present instance consisting of two four-page covers. These multi-cover sheets are fed one at a time down on to the inclined cover cutting and feeding table until the advance edge of the sheet is engaged by the stop 40. The multi-cover sheet is then severed by the cover cutting mechanism into two covers, the back cover sheet being held by the closing of the knives 41, 42 and the front cover sheet being held by the stop 40. As the grippers 44 on the cover feeding cylinder 43 come around into position to seize the advance edge of the front cover sheet, the stop 40 is withdrawn, thus permitting the grippers

to transfer the cover sheet on to the grippers 45 on the delivery cylinder 27. As the delivery cylinder 27 rotates it will bring the cover sheet into position to be associated with the folded assembled two groups of sheets on the cylinder 22. The so associated cover sheet and sheets from the press are then folded off on to the delivery cylinder 27 by the coaction of the tucking blade 29 with the floating folding jaw 28. Just before the tucking operation begins, the grippers 45 are released and the springs 125 will throw the advance edge of the cover sheet outwardly away from the periphery of the cylinder 27, thus permitting the folded signature to be brought down into engagement with the delivery tapes 30, 31, by the jaw 28. In the meantime the back cover sheet will be fed into position to be transferred to the delivery cylinder 27 in time to be folded with the next succeeding two groups of sheets from the press. This is accomplished by the opening of the knives 41, 42, and the bringing together of the feeding rollers 84, 85. To prevent the advance edge of the back cover sheet from striking the upper edge of the lower section 38 of the cutting table, the lower edge of the upper section 39 of the cutting table is raised as hereinbefore described. The variable speed drive for the cylinder 43 permits the cylinder to be rotated slowly at the time of receiving the cover sheet from the cutting and feeding table and at the surface speed of the delivery cylinder 27 at the time the cover sheet is transferred thereto.

What I claim is:

1. A delivery cylinder, mechanism for assembling sheets fed from the press, in groups, and feeding them successively to the delivery cylinder and mechanism for feeding a multicover sheet to a predetermined point, severing it into a plurality of covers and feeding the covers successively to the delivery cylinder to be associated with successive groups of assembled sheets from the press.

2. A delivery cylinder, mechanism for assembling sheets fed from the press, in groups, and feeding them successively to the delivery cylinder, mechanism for feeding a multicover sheet to a predetermined point, severing it into a plurality of covers and feeding the covers successively to the delivery cylinder to be associated with successive groups of assembled sheets from the press, and means for folding each assembled group of sheets from the press and cover together and delivering the same.

3. A delivery cylinder, mechanism for assembling sheets fed from the press, in groups, folding the same together, and feeding them successively to the delivery cylinder, and mechanism for feeding a multicover sheet to a predetermined point, severing it

into a plurality of covers and feeding the covers successively to the delivery cylinder to be associated with successive groups of folded sheets from the press.

5 4. A delivery cylinder, mechanism for assembling sheets fed from the press, in groups, folding the same together, and feeding them successively to the delivery cylinder, mechanism for feeding a multicover
10 sheet to a predetermined point, severing it into a plurality of covers and feeding the covers successively to the delivery cylinder to be associated with successive groups of folded sheets from the press, and means for
15 folding each assembled group of sheets from the press and cover together and delivering the same.

5. A delivery cylinder, mechanism for assembling a plurality of groups of sheets
20 fed from the press, together, and feeding them successively to the delivery cylinder, and mechanism for feeding a multicover sheet to a predetermined point, severing it into a plurality of covers and feeding the
25 covers successively to the delivery cylinder to be associated with successive assembled groups of sheets from the press.

6. A delivery cylinder, mechanism for assembling a plurality of groups of sheets
30 fed from the press, together, and feeding them successively to the delivery cylinder, mechanism for feeding a multicover sheet to a predetermined point, severing it into a plurality of covers and feeding the covers
35 successively to the delivery cylinder to be associated with successive assembled groups of sheets from the press, and means for folding each of the assembled groups of sheets from the press and cover together and de-
40 livering the same.

7. A delivery cylinder, mechanism for assembling a plurality of groups of sheets fed from the press, together, folding the same together and feeding them successively
45 to the delivery cylinder and mechanism for feeding a multicover sheet to a predetermined point, severing it into a plurality of covers and feeding the covers successively to the delivery cylinder to be associated with
50 successive assembled and folded groups of sheets from the press.

8. A delivery cylinder, mechanism for assembling a plurality of groups of sheets fed from the press, together, folding the
55 same together and feeding them successively to the delivery cylinder, mechanism for feeding a multicover sheet to a predetermined point, severing it into a plurality of covers and feeding the covers successively to
60 the delivery cylinder to be associated with successive assembled and folded groups of sheets from the press, and means for folding each associated folded group of sheets from the press and cover together and delivering
65 the same.

9. A delivery cylinder, a multicover cutting and feeding table, means for feeding a multi-cover sheet thereto, means for severing the sheet into a plurality of covers while
70 on the said table and a cover transfer cylinder arranged to transfer the covers one at a time from the feeding table to the said delivery cylinder.

10. In combination, a delivery cylinder, a multi-cover sheet cutting and feeding table, 75 means for feeding a multi-cover sheet thereto, means for severing the sheet into a plurality of covers while on the said table, a transfer cylinder arranged to transfer the covers one at a time from the feeding table
80 to the delivery cylinder and means for feeding the assembled sheets from the press to the said delivery cylinder.

11. In combination, a delivery cylinder, a multicover sheet cutting and feeding table, 85 means for feeding a multicover sheet thereto, means for severing the sheet while on the said table into a plurality of covers, means for feeding the covers one at a time to the delivery cylinder, and folding cylinders ar-
90 ranged to fold and deliver assembled sheets from the press to the said delivery cylinder.

12. In combination, a delivery cylinder, a multi-cover sheet cutting and feeding table, 95 means for feeding a multi-cover sheet thereto, means for severing the sheet into a plurality of covers, a transfer cylinder arranged to transfer a cover to the delivery cylinder and folding cylinders arranged to fold and deliver assembled sheets from the
100 press to the said delivery cylinder.

13. In combination, a delivery cylinder, a multicover sheet cutting and feeding table, means for feeding a multicover sheet thereto, means for severing the sheet into a plu-
105 rality of covers, means for feeding a cover to the delivery cylinder and folding cylinders arranged to fold and deliver assembled groups of sheets from the press to said delivery cylinder, one of the folding cylinders
110 and the delivery cylinder being arranged to fold the cover and the folded assembled groups of sheets from the press, together on the delivery cylinder.

14. In combination, a delivery cylinder, a 115 multi-cover sheet cutting and feeding table, means for feeding a multi-cover sheet thereto, means for severing the sheet into a plurality of covers, a transfer cylinder arranged to transfer a cover to the delivery
120 cylinder and folding cylinders arranged to fold and deliver assembled sheets from the press to the said delivery cylinder, one of the folding cylinders and the delivery cylinder being arranged to fold the cover and the folded assembled group of sheets from the
125 press together on the delivery cylinder.

15. Mechanism for assembling sheets fed from the press, and mechanism for feeding
130 a multicover sheet to a predetermined point,

severing it into a plurality of covers, feeding one cover into position to be associated with a group of sheets from the press, holding the succeeding cover against movement temporarily and finally feeding it into position to be associated with the next succeeding group of sheets from the press.

16. Mechanism for assembling sheets fed from the press, a cutting and feeding table and mechanism for feeding a multi-cover sheet thereto, severing it into a plurality of covers thereon, feeding one cover into position to be associated with a group of

sheets from the press, holding the succeeding cover against movement temporarily and finally feeding it into position to be associated with the next succeeding group of sheets from the press. 15

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this twenty eighth day of June A. D. 1907. 20

HOWARD M. BARBER.

Witnesses:

A. R. STILLMAN,
G. BURDICK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
