Oct. 9, 1956

L. L. MATTHEWS

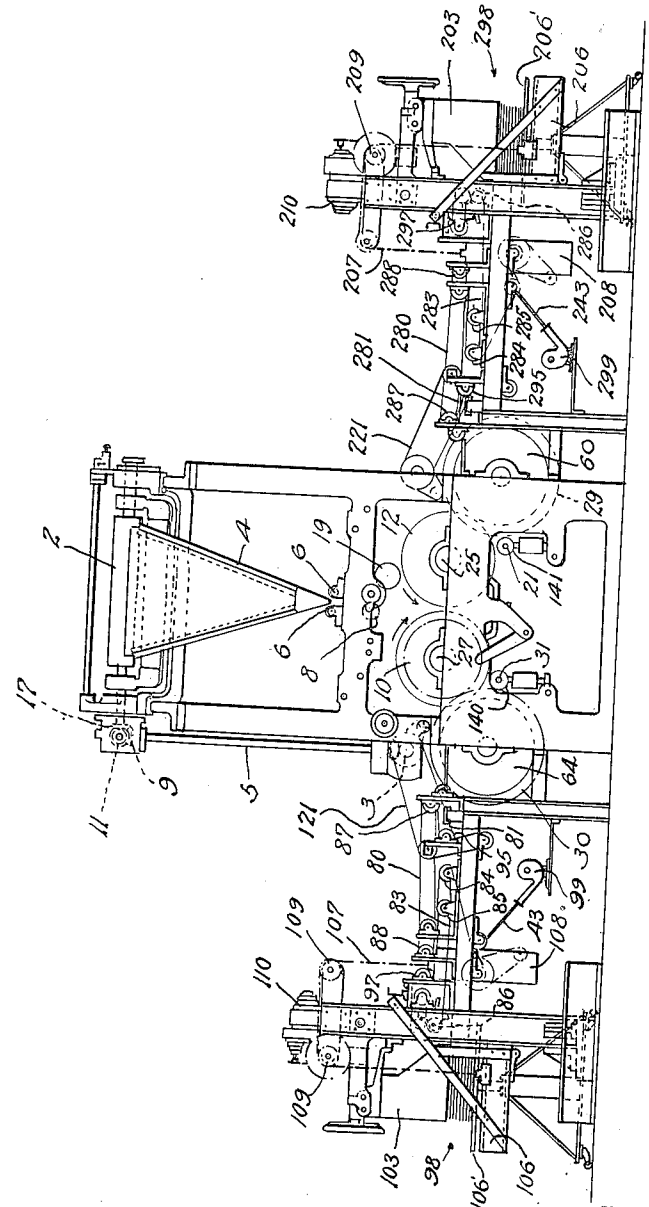
MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

2,766,039

Filed Sept. 16, 1952

11 Sheets-Sheet 1

Fig. 1.



INVENTOR.
Louis L. Matthews
BY Lines & Lines

ATTORNEYS.

Oct. 9, 1956

L. L. MATTHEWS

MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

2,766,039

Filed Sept. 16, 1952

11 Sheets-Sheet 2

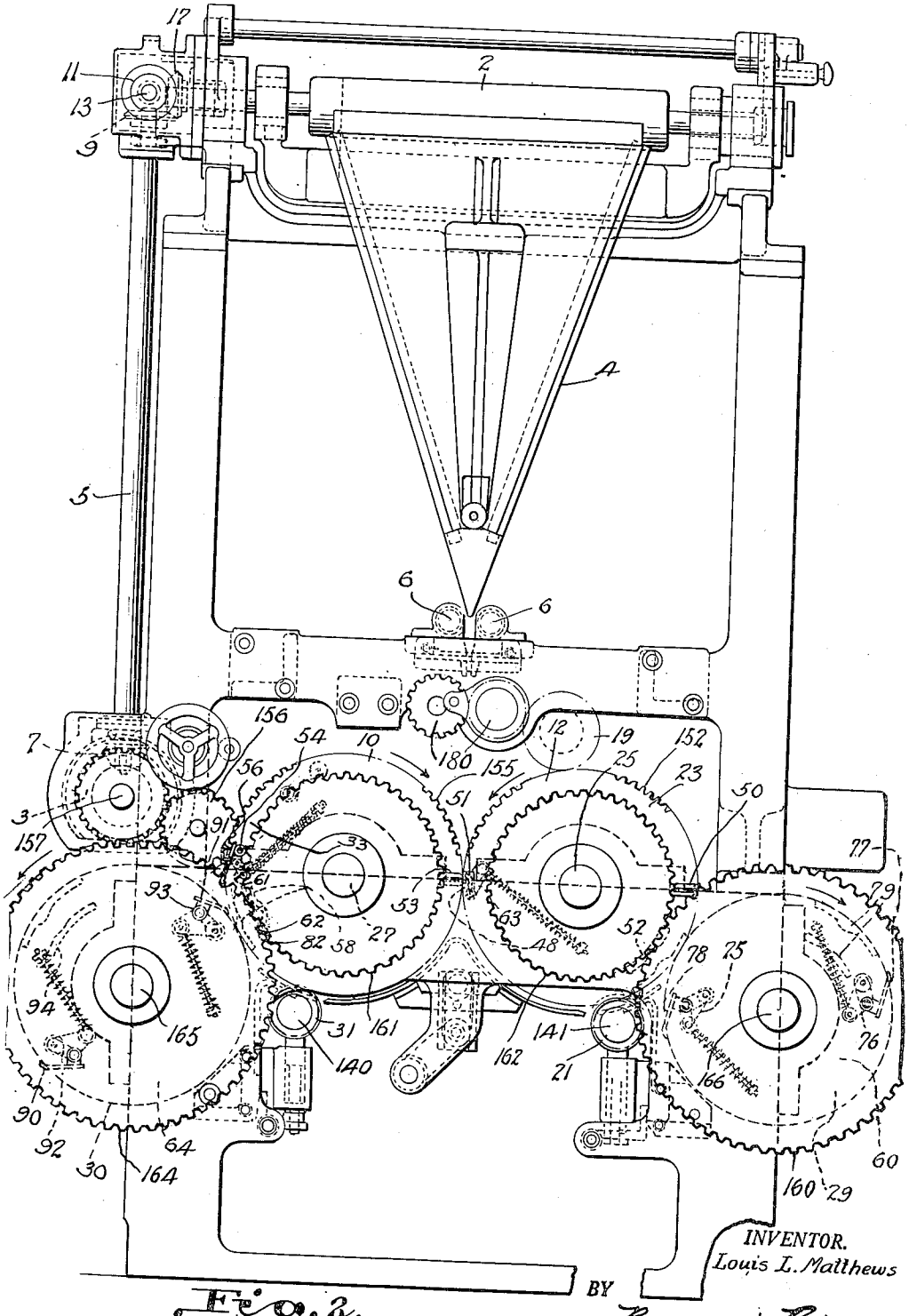


Fig. 2.

INVENTOR.
Louis L. Matthews

BY Rines and Rines

ATTORNEYS

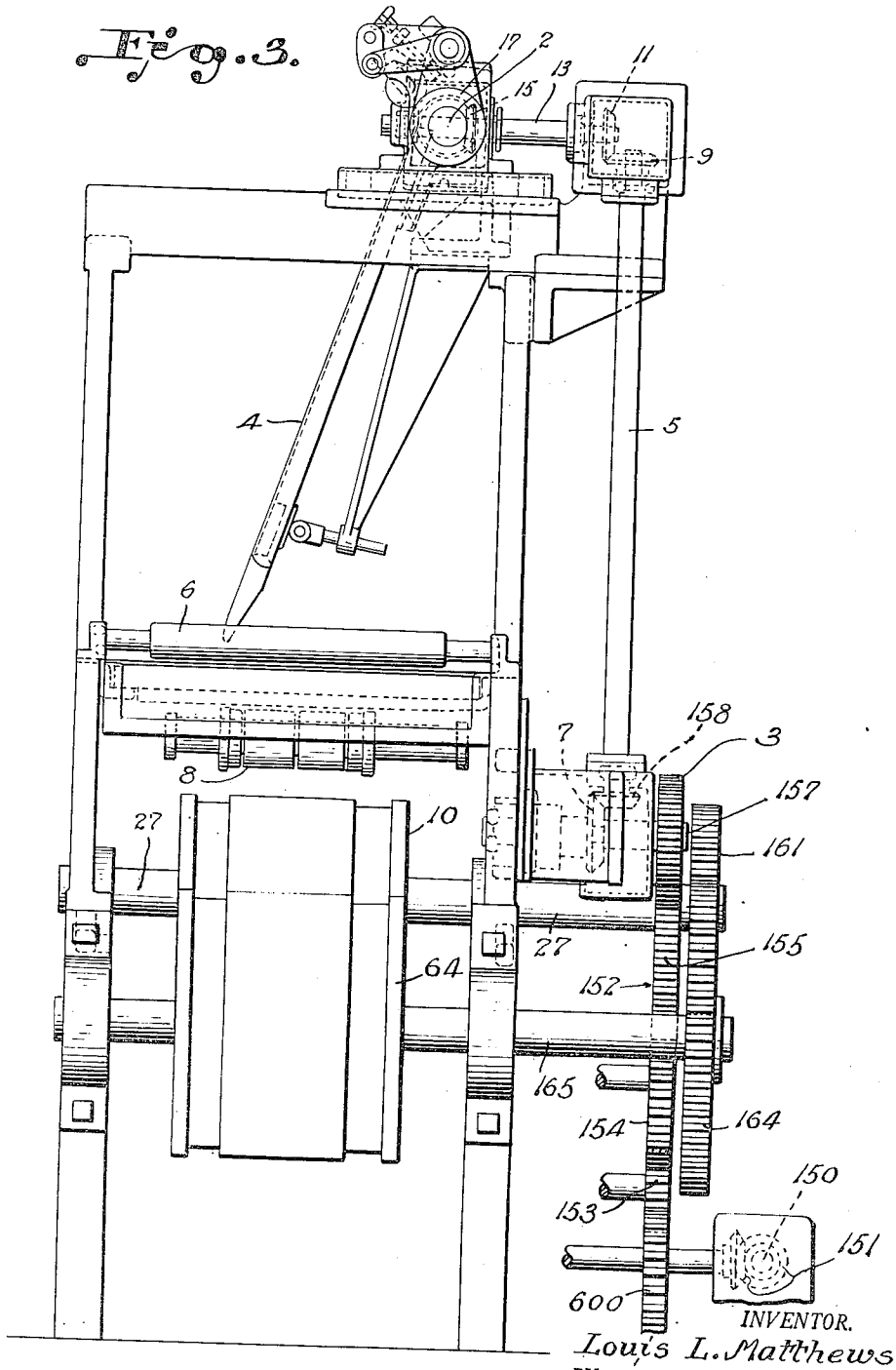
Oct. 9, 1956 L. L. MATTHEWS 2,766,039

MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

Filed Sept. 16, 1952

11 Sheets-Sheet 3

Fig. 3.



INVENTOR.
Louis L. Matthews
BY Rines and Rines
ATTORNEYS.

Oct. 9, 1956

L. L. MATTHEWS

2,766,039

MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

Filed Sept. 16, 1952

11 Sheets-Sheet 4

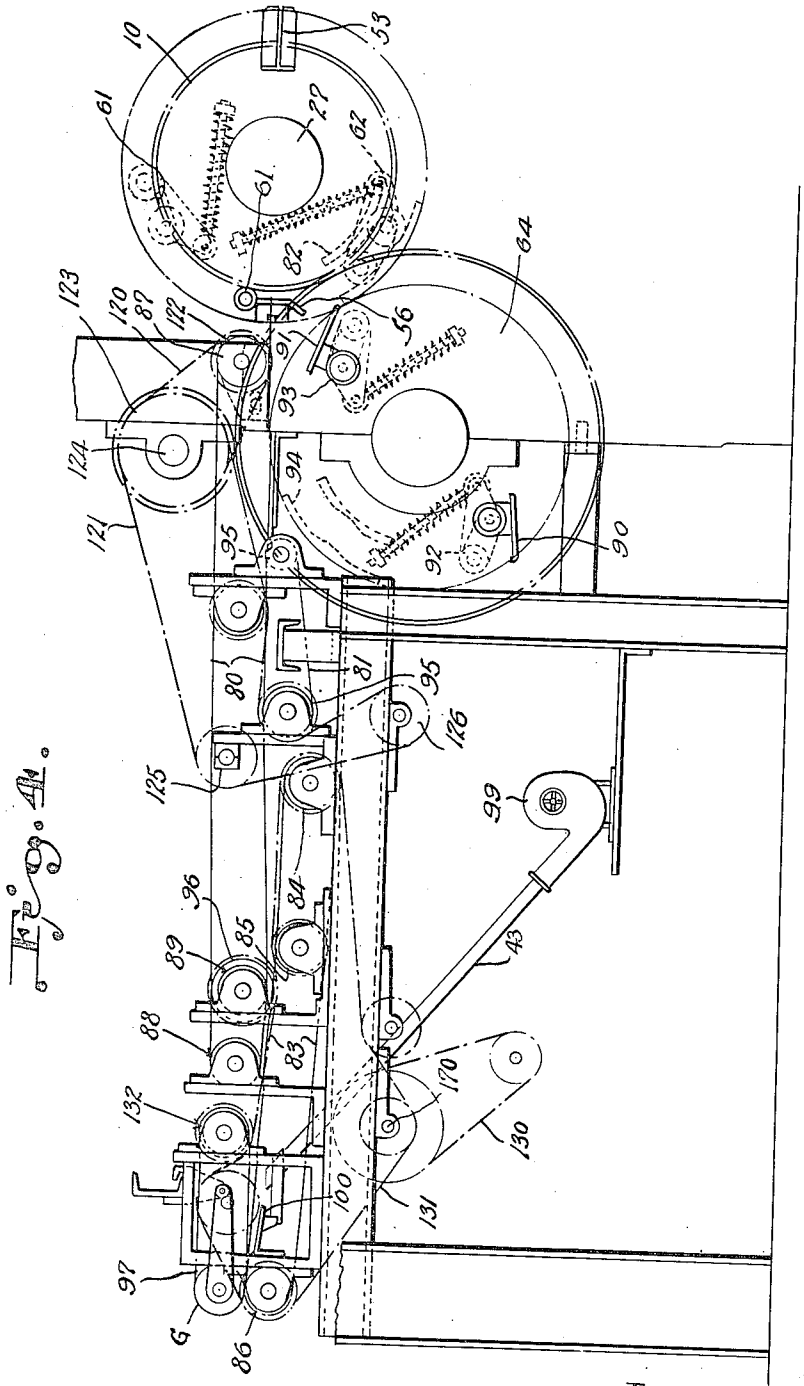


Fig. 4.

INVENTOR.
Louis L. Matthews
BY
Rines and Rines
ATTORNEYS.

Oct. 9, 1956

L. L. MATTHEWS

2,766,039

MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

Filed Sept. 16, 1952

11 Sheets-Sheet 5

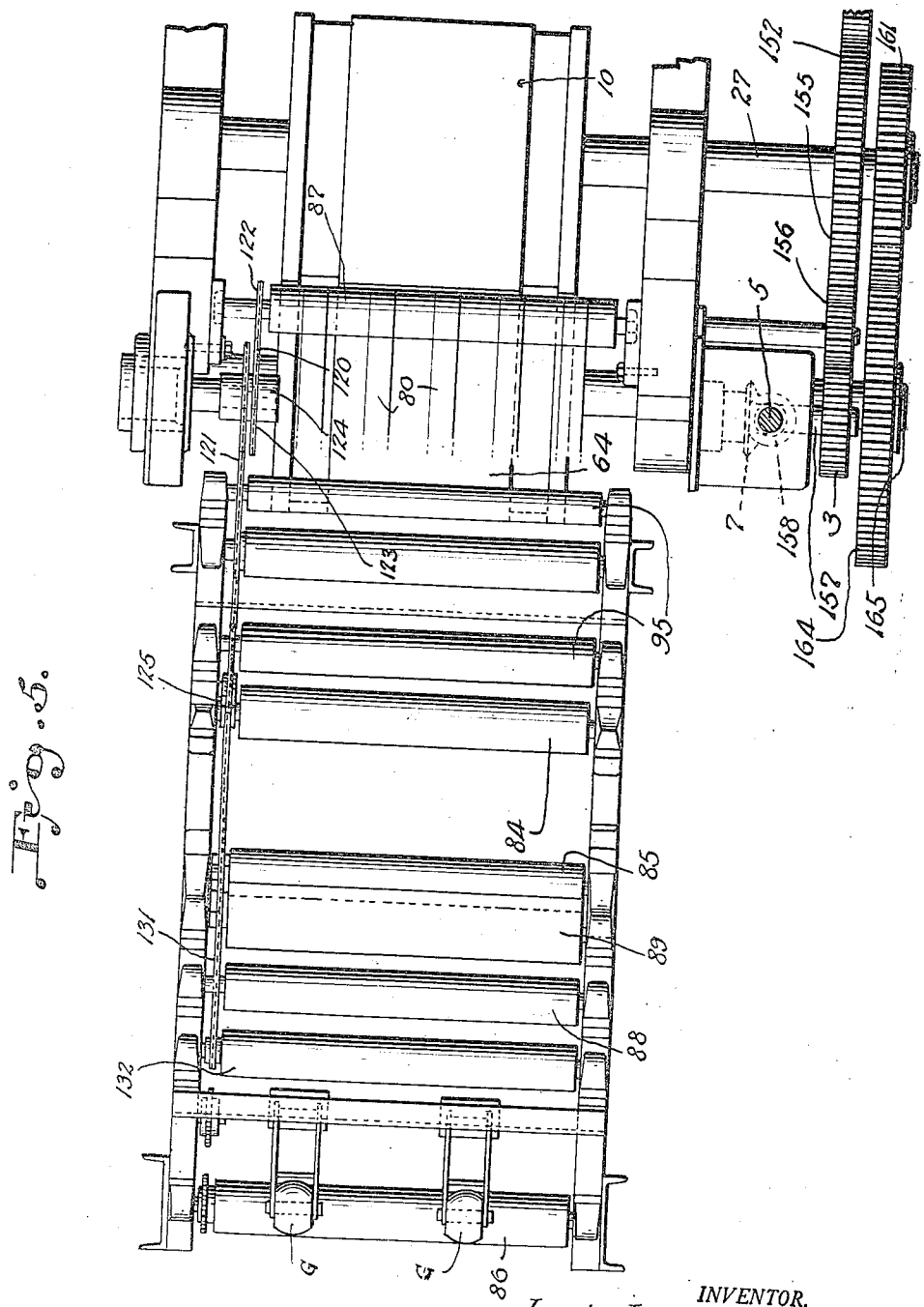


Fig. 5.

INVENTOR.
Louis L. Matthews
BY Rines and Rines
ATTORNEYS.

Oct. 9, 1956

L. L. MATTHEWS

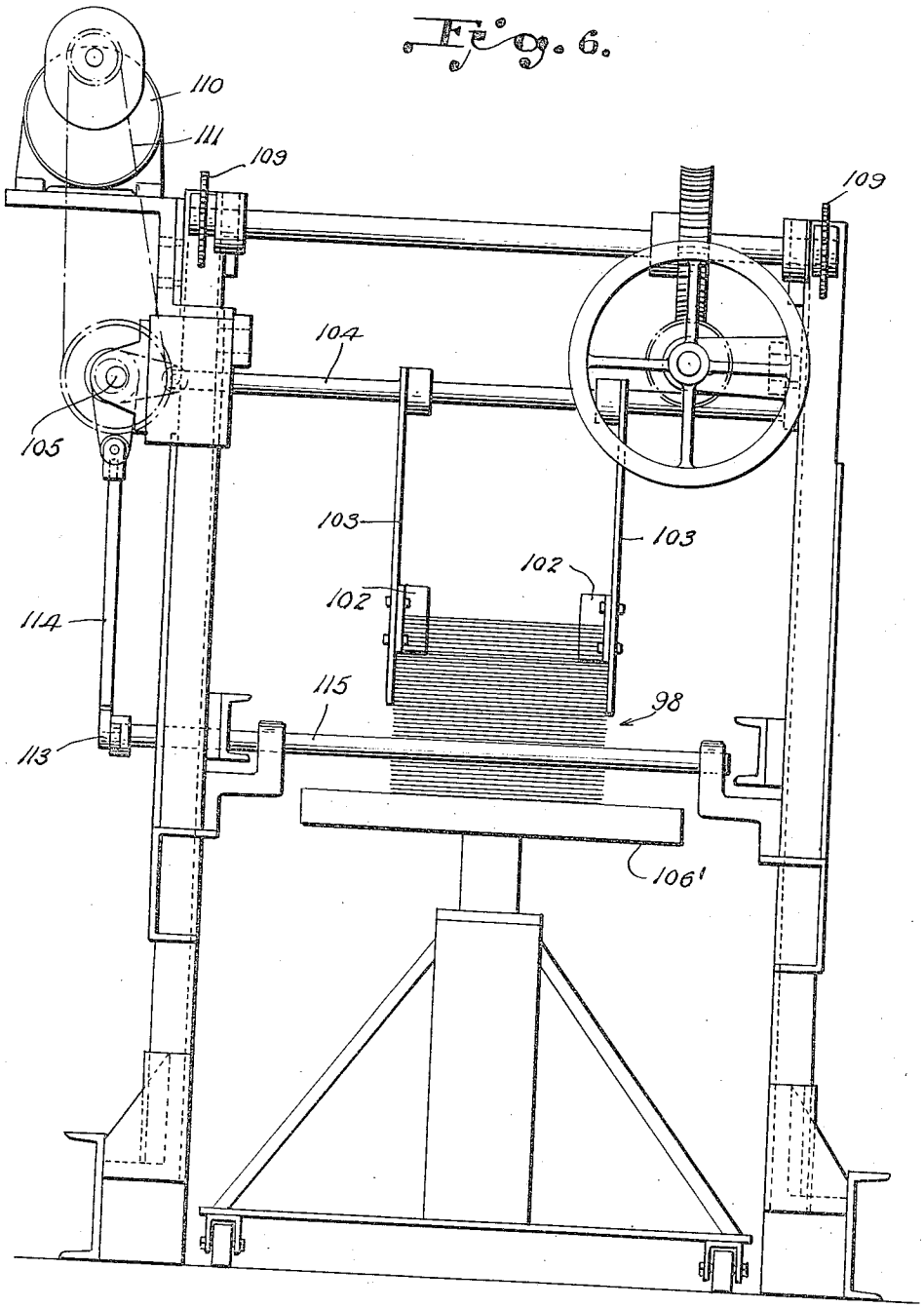
MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

2,766,039

Filed Sept. 16, 1952

11 Sheets-Sheet 6

Fig. 6.



INVENTOR.
Louis L. Matthews
BY Rines and Rines

ATTORNEYS.

Oct. 9, 1956

L. L. MATTHEWS

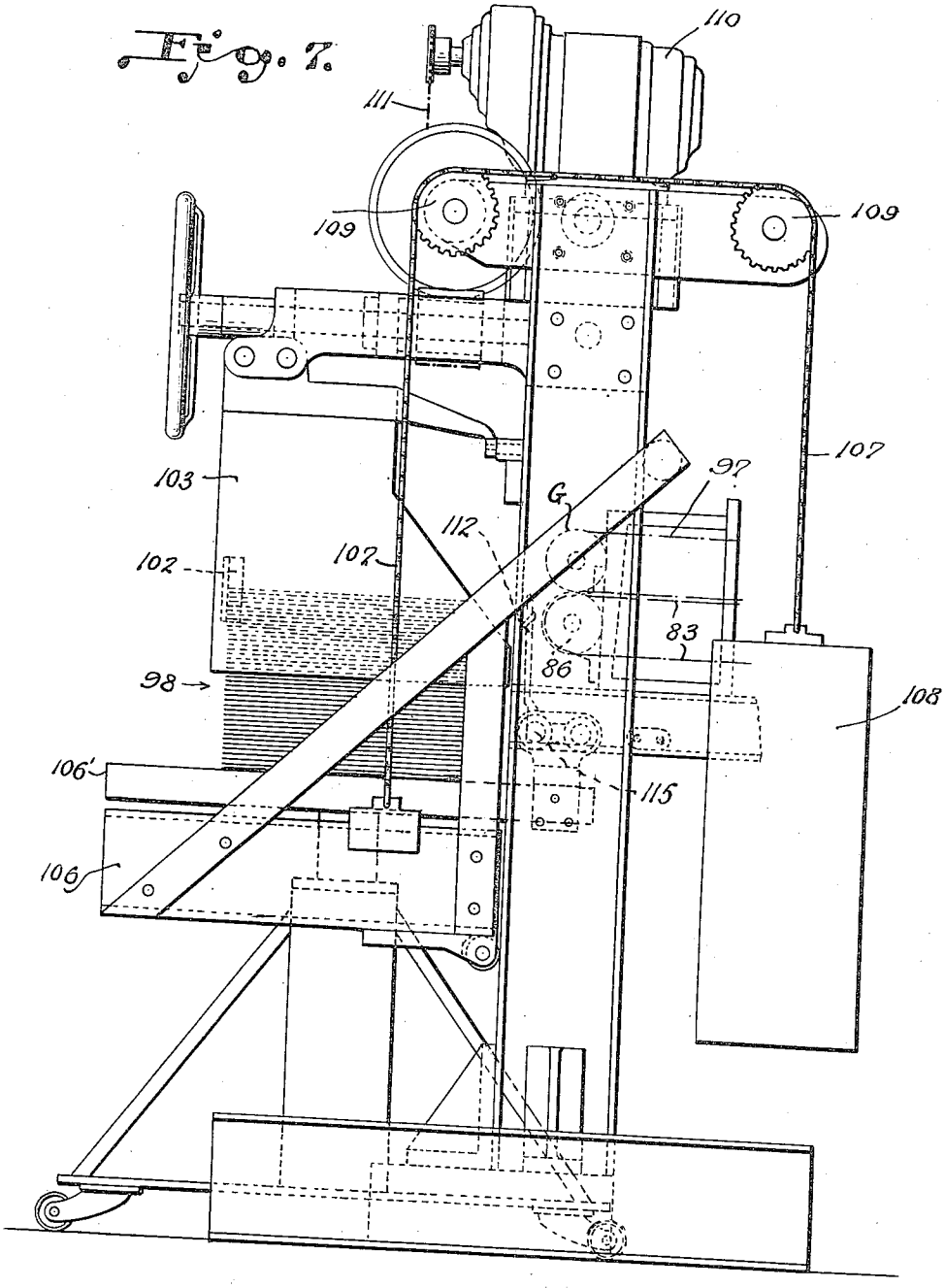
MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

2,766,039

Filed Sept. 16, 1952

11 Sheets-Sheet 7

Fig. 7.



INVENTOR.
Louis L. Matthews
BY Rines and Rines
ATTORNEYS.

Oct. 9, 1956

L. L. MATTHEWS

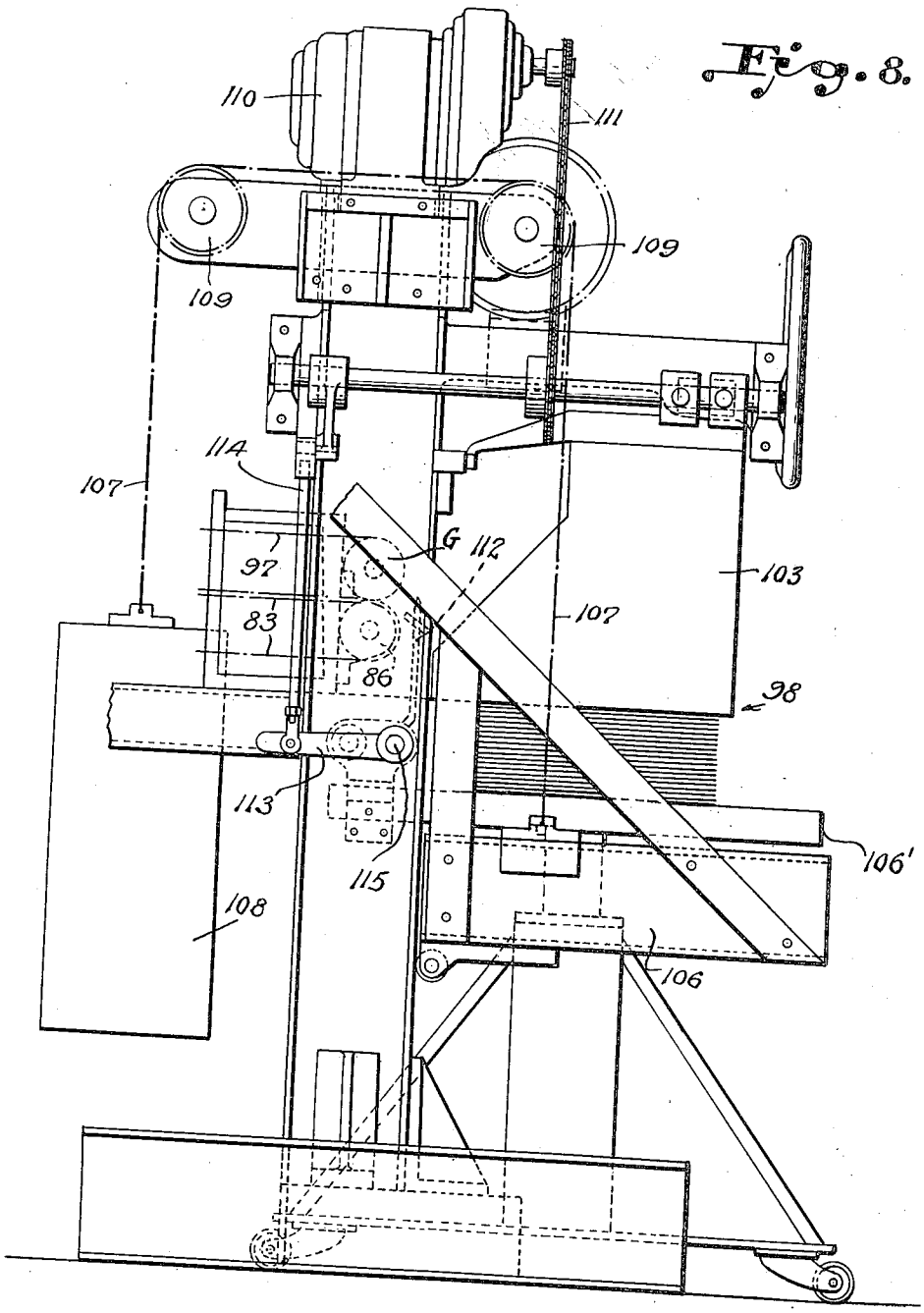
MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

2,766,039

Filed Sept. 16, 1952

11 Sheets-Sheet 8

Fig. 8.



INVENTOR.
Louis L. Matthews
BY
Rines and Rines
ATTORNEYS.

Oct. 9, 1956

L. L. MATTHEWS

MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

2,766,039

Filed Sept. 16, 1952

11 Sheets-Sheet 9

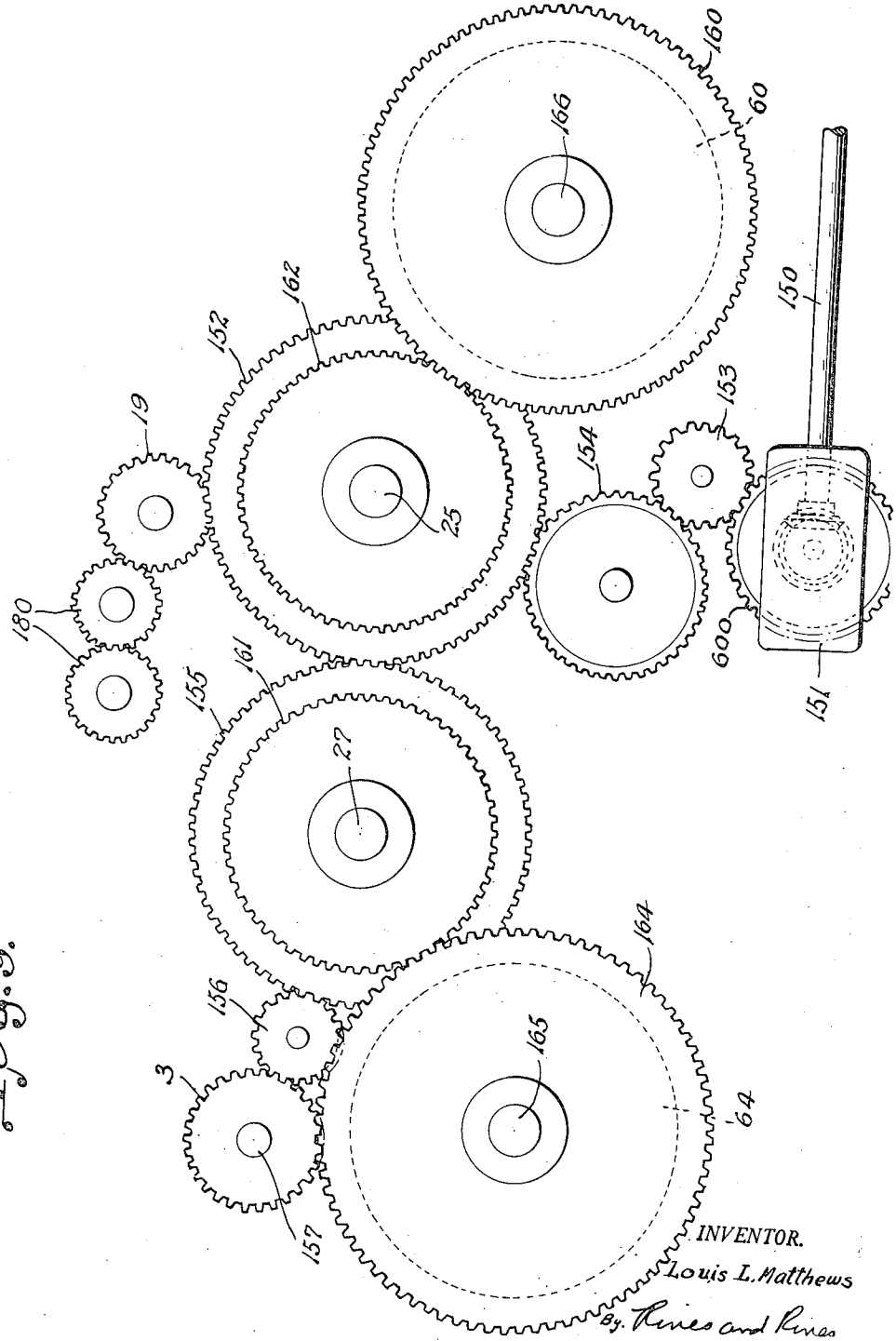


Fig. 9.

INVENTOR.
Louis L. Matthews
By Rines and Rines
ATTORNEYS.

Oct. 9, 1956

L. L. MATTHEWS

MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

2,766,039

Filed Sept. 16, 1952

11 Sheets-Sheet 10

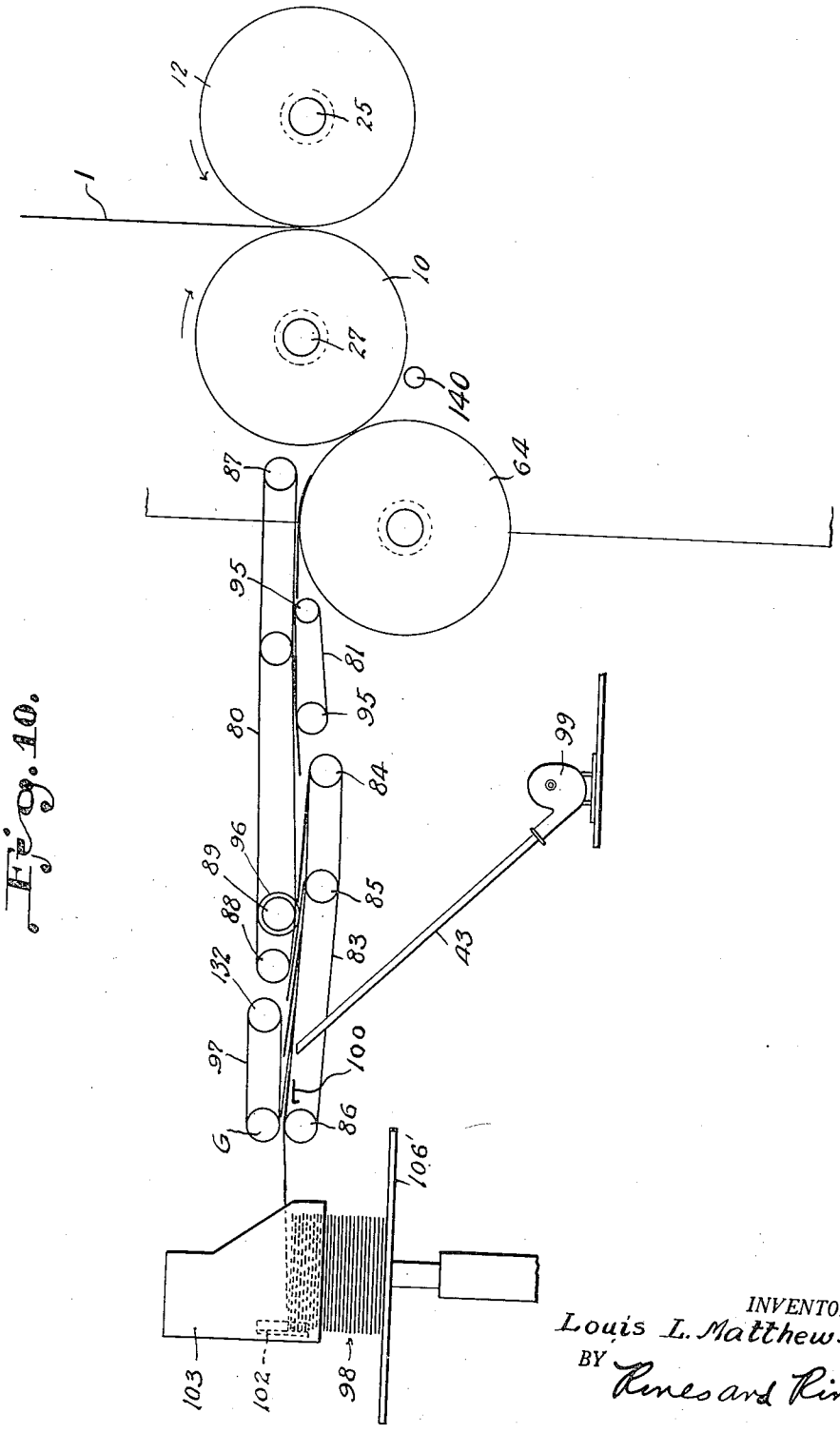


Fig. 10.

INVENTOR.
Louis L. Matthews
BY
Rines and Rines
ATTORNEYS.

Oct. 9, 1956

L. L. MATTHEWS

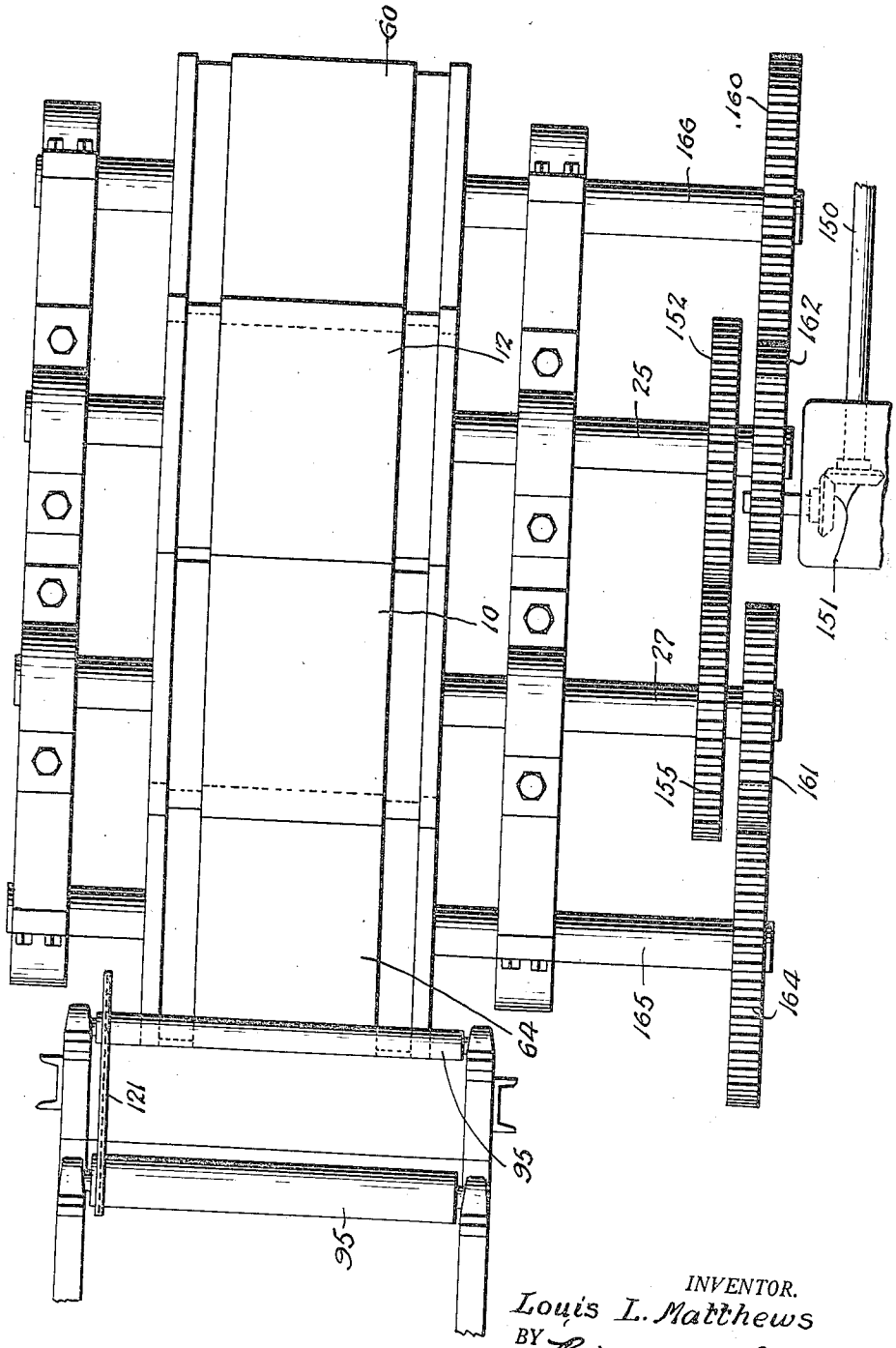
MACHINE FOR FOLDING, CUTTING, FEEDING AND STACKING SHEET MATERIAL

2,766,039

Filed Sept. 16, 1952

11 Sheets-Sheet 11

Fig. 11.



INVENTOR.
Louis L. Matthews
BY Rines and Rines
ATTORNEYS.

United States Patent Office

2,766,039

Patented Oct. 9, 1956

2,766,039

MACHINE FOR FOLDING, CUTTING, FEEDING, AND STACKING SHEET MATERIAL

Louis L. Matthews, Westerly, R. I., assignor to Maxson Automatic Machinery Company, Westerly, R. I., a corporation of Rhode Island

Application September 16, 1952, Serial No. 309,894

6 Claims. (Cl. 270—21)

The present invention relates to machines for feeding and stacking sheet material. The invention is particularly related to the feeding and stacking of folded material units, such as signatures for use as the covers and sections of magazines, pamphlets, catalogs, books and the like.

According to present-day practice, a web of sheet material is first fed vertically downward to a folder, and the folded web is then fed further between a pair of horizontally disposed rollers, which are provided with cutter elements for cutting it into the required folded units. The folded and cut units are fed alternately to the right and to the left, to identically operating mechanisms including gripper rolls. In due course, the gripper rolls release the units, at times when the grippers are positioned at the bottoms of the rolls, in order to deposit the units, in overlapping relation, upon similar conveyors. The operation is costly and inefficient, requiring the aid of skilled operators to jog the units into alinement and remove them from the conveyors.

An object of the present invention, accordingly, is to provide a new and improved machine for feeding and stacking sheet material.

A further object is to provide a new and improved machine for feeding and stacking folded units, and, more particularly, units of the above-described character.

Other and further objects will be explained hereinafter and will be particularly pointed out in the appended claims.

With the above ends in view, a feature of the invention resides in releasing the head of each unit, whether or not folded, at, preferably, the upper level of the gripper roll, depositing the released units upon a conveyor at that upper level, lapping the deposited units and feeding the lapped units upon tables, where they become automatically jogged into alinement.

The invention will now be more fully described in connection with the accompanying drawings, in which:

Fig. 1 is a front elevation of a folding, feeding and stacking machine constructed in accordance with a preferred embodiment of the invention;

Fig. 2 is a similar elevation, upon a larger scale, of a central or folding portion of the machine illustrated in Fig. 1;

Fig. 3 is a similarly enlarged side elevation, looking from the right, parts of the machine being omitted, however, for clearness;

Fig. 4 is a front elevation similar to Fig. 2 of the left-hand feeding-and-stacking portion of the machine illustrated in Fig. 1, but upon a still larger scale;

Fig. 5 is a corresponding plan;

Fig. 6 is a still further enlarged side elevation of the machine shown in Fig. 1, looking from the left with many parts omitted, in order not to confuse the drawing;

Figs. 7 and 8 are corresponding front and rear elevations;

Fig. 9 is a detail of the driving mechanism;

Fig. 10 is a schematic view, upon an enlarged scale,

illustrating the operation of the central or folding portion and the left-hand feeding-and-stacking portion of the machine; and

Fig. 11 is a plan similar to Fig. 5, but upon an enlarged scale, illustrating further details of the central portion of the machine.

A web of paper or other sheet material, shown at 1 in Fig. 10, may be fed by a roll 2, Figs. 1 and 2, downwardly over a triangular former 4, for folding it, to a pair of idle nipping rollers 6 and a pair of feed rollers 8. The feed rollers 8 feed the folded web to cooperative cutting rolls 10 and 12, for cutting the web into signatures. From the cutting rolls 10 and 12, the signatures are transferred alternately to a delivery cylinder 60, and a delivery cylinder 64. The cutter roll 12 and the cylinder 60 will hereinafter be designated as the right-hand cutter roll and the right-hand cylinder, respectively, and the cutter roll 10 and the cylinder 64, as the left-hand cutter roll and the left-hand cylinder, respectively.

The left-hand cutter roll 10 is rotated clockwise, and the right-hand cutter roll 12 counter-clockwise, as indicated by the arrows, by a mechanism hereinafter discussed. They are shown occupying a position in which a knife 53, Fig. 2, projecting from the periphery of the left-hand cutter roll 10, extends into a block 48 upon the periphery of the right-hand cutter roll 12 to sever a signature from the folded web.

The right-hand cutter roll 12 is shown provided also with a knife 50, diametrically opposite to the knife block 48, and the left-hand cutter roll 10 is shown similarly provided with a cutter block 54, diametrically opposite to the knife 53. After the cutter rolls 10 and 12 have become rotated through a half-revolution each, therefore, the knife 50 and the cutter block 54 will cooperate, similarly to the above-described cooperation of the knife 53 and the cutter block 48, to cut another signature from the folded web.

Two signatures will thus be cut from the folded web corresponding to each complete rotation of each of the cutter rolls 10 and 12.

The direction of rotation of the cutter rolls 10 and 12, as indicated by the arrows, will be considered as forward. Behind the line where the knife 53 severs the folded web, but within the limits of the knife block 48, the cutter roll 12 is provided, along its periphery, with a set of outwardly spring-pressed impaling pins 51. These impaling pins, therefore, become spring-pressed outward, into the leading edge of the folded web, substantially at the same time that the knife 53 and the knife block 48 have cooperated to sever a signature along a line just forward of the action of these impaling pins 51. During the further rotation of the cutter rolls 10 and 12, therefore, the impaling pins 51 will carry the impaled leading edge of the folded web under and around the right-hand cutter roll 12. In due course, the knife 50 and the cutter block 54 will sever the folded web, as above-described. At substantially the same time that the knife 50 and the cutter block 54 have effected this severing, a set of outwardly spring-pressed impaling pins 56, similar to the impaling pins 51, provided along the periphery of the cutter roll 10, within the limits of the knife block 54, have become spring-pressed outward, into a leading edge of the folded web, behind the line of cut produced in the folded web by the knife 50 and the cutter block 54. During the further rotation of the cutter rolls 10 and 12, therefore, the impaling pins 56 will carry the impaled leading edge of the folded web under and around the left-hand cutter roll 10.

In this manner, the successively cut signatures are alternately carried under and around the right-hand cutter roll 12 and the left-hand cutter roll 10. Two such

signatures will thus be cut from the folded web and carried alternately under and around the cutter rolls **10** and **12** corresponding to each complete rotation of each of these two cutter rolls. The number of signatures thus cut from the folded web and alternately carried under and around the cutter rolls **10** and **12**, corresponding to each complete rotation of each of the cutter rolls may be increased, however, by providing additional knives on each of the cutter rolls **10** and **12**, and additional cooperating knife blocks upon the other cutter roll. The knives and knife blocks will be disposed alternately, at equiangularly spaced distances, on each cutter roll, as is well understood in the art. Only a single knife and a single knife block are shown upon each of the cutter rolls **10** and **12**, for purposes of clarity and ease of description only. In practice, each of the cutter rolls **10** and **12** is usually provided with pairs of such knives and knife blocks, disposed as above described. The cutter rolls **10** and **12** are also provided with as many sets of impaling pins as there are knife blocks, positioned within the limits of the respective knife blocks, and operating, as above described, to carry the leading edges of the folded web alternately under and around the right-hand and the left-hand cutter rolls **10** and **12**.

The impaling pins **51** carry the leading edge of the severed signature impaled thereby to the right-hand delivery cylinder **60**, whereupon a fixed cam **52** retracts the impaling pins **51** by engaging a link **63**, in opposition to the action of the spring pressure exerted thereon to force the impaling pins **51** outward. A pressure roller **141** upon a shaft **21** serves to hold the signature against the under surface of the right-hand cutter roll **12** during its transfer from this cutter roll **12** to the delivery cylinder **60**. The impaling pins **56** similarly carry the leading edge of the severed signature impaled thereby to a left-hand delivery cylinder **64**, whereupon a fixed cam **58** retracts the impaling pins **56** by engaging a link **61**, in opposition to the action of the spring pressure exerted thereon to force the impaling pins **56** outward. A pressure roller **140** upon a shaft **31** operates, similarly to the operation of the pressure roller **141**, to hold the signature against the under surface of the left-hand cutter roll **10** during its transfer from this cutter roll **10** to the delivery cylinder **64**. The construction for effecting this result will not be more fully described herein, for it is well known, and is disclosed, for example, in Letters Patent 2,501,836, issued March 28, 1950, to P. B. Cottrell & Sons Company, as assignee of Howard M. Barber.

The right-hand delivery cylinder **60** is shown provided with diametrically oppositely disposed grippers **77** and **78**, respectively under the control of spring-controlled links **76** and **75**, similar to the spring-controlled links **61** and **63**, and a fixed cam **79**, similar to the fixed cams **52** and **58**. The operation of these, too, will not further be described herein, because it is well known, and is disclosed in the said Letters Patent. Similar remarks apply to diametrically oppositely disposed grippers **90** and **91** of the left-hand delivery cylinder **64**, the corresponding respective spring-controlled links **92** and **93** therefor, and the corresponding respective fixed cam **94**. It will suffice to state that the grippers **77** and **78** are operated in timed relation to grip the leading edges of the signatures presented under the right-hand cutter roll **12**, as they are released by the impaling pins **51**, and that the grippers **90** and **91** are similarly operated in timed relation to grip the leading edges of the signatures presented from under the left-hand cutter roll **10**, as they are released by the impaling pins **56**.

Though the description above is of mechanism that is largely well known in the prior art, there is a very important respect in which, according to the present invention, there is a decided departure therefrom. Unlike the prior-art practice, the fixed cams **79** and **94** are shown positioned, not near the lower portions of the respective delivery cylinders **60** and **64**, but, on the contrary,

near their upper portions. The grippers **77** and **78** and the grippers **90** and **91**, will therefore be controlled, by the respective fixed cams **79** and **94**, so as to release the signatures gripped thereby at a level near the upper portions of the delivery cylinders **60** and **64**, and preferably at a time when the thus-releasing grippers occupy their uppermost positions on these delivery cylinders. The signatures will therefore be released substantially tangentially with respect to the uppermost portions of the delivery cylinders **60** and **64**; and, without reversal of direction, the released heads of the signatures traveling unconfined to between a pair of substantially horizontally disposed, relatively high-speed tapes **280** and **281**, at the right, Fig. 1, and to between a pair of similarly disposed tapes **80** and **81** at the left, Figs. 1, 4 and 10.

The further operation at the left of the machine will be described with particular reference to the enlarged showing of Fig. 4 and the schematic showing of Fig. 10. The operation at the right of the machine is identical therewith, and corresponding elements thereof are designated by the same reference numerals, but augmented by 200.

The tapes **80** are shown mounted around rolls **87** and **88**, and the tapes **81** around rolls **95**. The signatures received by these tapes **80** and **81** from the delivery cylinder **64** are confined during their high-speed travel between these tapes **80** and **81**. The signatures are then delivered to relatively low-speed tapes **83**, shown mounted over rolls **84**, **85** and **86**, and disposed below the high-speed tapes **80**. The leading edge of each signature is received by the low-speed tapes **83** from the high-speed tapes **80** and **81** in a region of bend formed between the roll **85** and an upper roll **89** thereabove. The surface of the roll **89** may be provided with a plurality of preferably plastic rings **96** for softening the impact upon the leading edges of the signature as they are received from the tapes **81**, at high speed, between the roll **89** and the low-speed tapes **83**, and the leading edges of the signatures become gripped or pressed, on opposite sides, between the tapes **83**, below, and the rings of the upper roll **89**, above. Because of the resulting reduction in speed of the signatures, they become overlapped upon the low-speed tapes **83**. In this overlapped relation, they are then fed by these low-speed lower tapes **83** and co-operating short low-speed upper tapes **97**, at relatively low speed, over a guide **100**, between the forward roll **86** of the tapes **83** and forward segment rolls G, Figs. 4 and 5, of the tapes **97**, against stops **102**, Figs. 6 and 10, on to a rollable table **106'** in a jogging-and-stacking area **98**. A blower **99** directs an air draft through an inclined nozzle **43** against the signatures during their travel over the guide **100**.

The stops **102** are carried by side jogger blades **103**, more particularly shown in Fig. 6, that are laterally oscillated by a shaft **104** through an eccentric **105** under the control of a chain drive **111** from a motor **110**. The side joggers **103** align the signatures laterally in the area **98**, and back-and-forth moving rear joggers **112**, Fig. 8, align the signatures against the stops **102** from the rear. These rear joggers are fixed to a shaft **115**, Figs. 6 and 8, that is rocked by a lever **113** fixed thereto by an arm **114** that is also driven from the motor **110**. For the table **106'** may be substituted a different table or platform (not shown) supported by the arms **106** that become automatically lowered, by degrees, in order to maintain the level of the stack or pile of signatures approximately uniform. This may be effected in any desired manner, as by means of chains **107** mounted over sprockets **109** and fixed at one end to the table or platform-supporting arms **106** and, at the other end to a counterweight **108**, Fig. 8.

Preferred mechanism for driving the various parts of the machine will now be described. It is obvious, from the operation explained above, that the delivery cylinders **60** and **64** should be operated at half the speed of the cutter rolls **10** and **12**. The cutter rolls **10** and **12**,

furthermore, should be driven synchronously with the roll 2 and the feed rollers 8. To this end, a driven lay shaft 150, Figs. 3, 9 and 11, that may be driven from the printing press printing the web, drives a gear 152, Fig. 11, upon the shaft 25 of the cutter roll 12 through bevel gears 151 and further coacting gears 600, 153 and 154. The cutter roll 10 is driven at the same speed of rotation through the coaction of the gear 152 with a gear 155 upon the shaft 27 carrying the cutter roll 10. The gear 155 also drives a gear 3 through an intermediate gear 156, thereby driving a bevel gear 7 on the shaft of the gear 3. The bevel gear 7, in turn, drives a further bevel gear 158 to rotate a vertically disposed shaft 5 at the upper end of which is provided still a further bevel gear 9. The gear 9 drives a cooperating bevel gear 11 to rotate a horizontally disposed shaft 13, thereby to drive cooperating bevel gears 15 and 17 and synchronously to rotate the web feed roll 2.

The gear 152 upon the shaft 25 of the cutter roll 12 also drives a further smaller gear 19 that engages the gear 180 of the right-hand feed roller 8 which, in turn, meshes with a similar gear 189 upon the shaft of the left-hand feed roller 8, thereby to drive the feed rollers 8, synchronously with the driving of the roll 2 and the cutter rolls 10 and 12.

The delivery cylinders 64 and 60 are respectively driven at half the speed of the cutter rolls 10 and 12 by the appropriate gear ratio of gears 161 and 162 upon the respective shafts 27 and 25, and cooperating respective gears 164 and 160 upon the shafts 165 and 166 of the respective delivery cylinders 64 and 60.

Synchronously with the rotation of the gear 3, the shaft 124 and its gear 123 are rotated, driving the gear 122 upon the shaft of the tape roll 87 by a chain 120, Figs. 4 and 5, thereby to drive the tapes 80. A further chain 121 driven by the shaft 124, Figs. 4 and 5, drives the forward tape roll 95 of the tapes 81, passing over the gears 125 and 126. The relatively high-speed tapes are thus driven at a speed high enough to remove the signatures from the respective delivery cylinders promptly and rapidly upon the delivery of the heads or leading edges of the signatures to the high-speed tapes from the delivery cylinders upon the opening of the delivery-cylinder grippers to release the signatures from the delivery cylinders. The low-speed tapes 83 and 97 are respectively driven by a chain 131 passing from a driving shaft 170, rotated by a chain drive 130, over a gear on the front roll 86 of the tapes 83, the rear roll 132 of the tapes 97 and the rear roll 84 of the tapes 83.

Other types of drive mechanism can, of course, be employed. It will be understood that the features of novelty, moreover, may be embodied in other machines and in machines of other types and that modifications will suggest themselves to those skilled in the art without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A machine of the class described having, in combination, a downward extending folder, means for feeding a web forward over the folder to fold it, means for severing the folded unit successively into signatures, two delivery cylinders each provided with peripherally disposed grippers, two presser rolls, impaling pins for successively impaling the successive heads of the folded unit rearward of each signature and for carrying the said heads alternately toward the respective presser rolls, means for successively withdrawing the impaling pins from the said heads to enable the presser rolls to deliver the said heads to the grippers of the respective delivery cylinders, means for rotating the delivery cylinders in timed relation to the speed of rotation of the cutter rolls, two sets of relatively high-speed delivery tapes, one set disposed near the top of each delivery cylinder, means for actuating the grippers to release the signatures when they reach substantially the tops of the delivery cylinders in order to permit the heads of the released signatures to travel unconfined beyond the delivery cylinders to the respective high-speed tapes, means for driving the relatively high-speed tapes at a speed high enough to remove the signatures from the respective delivery cylinders upon the release of the signatures by the grippers from the respective delivery cylinders, two sets of relatively low-speed tapes to which the respective sets of relatively high-speed tapes deliver the signatures in order to cause the signatures to become lapped, two tables upon which the relatively low-speed tapes respectively deliver the lapped signatures at relatively low speed, and means for jogging the signatures as they arrive on their respective tables in order to aline them.

2. A machine of the class described having, in combination, a downward extending folder, means for feeding a web forward over the folder to fold it, two horizontally disposed cutter rolls contacting tangentially along a line to which the folded unit is fed forward between the cutter rolls, means for rotating the cutter rolls in opposite directions at the speed of feed of the folded unit, the cutter rolls being each provided with alternately disposed knife and knife block or knives and knife blocks spaced from one another at the same angular interval along their peripheries and positioned so that each knife of each cutter roll shall cooperate with a knife block of the other cutter roll along the said line of contact to sever the folded unit successively into signatures, a delivery cylinder disposed near each cutter roll, each delivery cylinder being provided with peripherally disposed grippers, presser rolls disposed under the respective cutter rolls between the respective cutter rolls and the respective delivery cylinders, the cutter rolls being provided with sets of impaling pins, each set rearward of the line of severing of the signatures, for successively impaling the successive heads of the folded web rearward of each signature, as it becomes severed from the folded unit, and for thereafter carrying the said heads alternately under and around the respective cutter rolls toward the respective presser rolls, means for successively withdrawing the impaling pins from the said heads to enable the presser rolls to deliver the said heads to the grippers of the respective delivery cylinders, means for rotating the delivery cylinders in timed relation to the speed of rotation of the cutter rolls, means for actuating the grippers to release the signatures when they reach the tops of the delivery cylinders in order to permit the heads of the released signatures to travel unconfined beyond the delivery cylinders, two tables, two sets of relatively high-speed tapes, one set disposed near the top of each delivery cylinder, for receiving the heads of the released signatures traveling unconfined from the delivery cylinders and for thereafter feeding the signatures, at relatively high speed, toward the respective tables, means for driving the relatively high-speed tapes at a speed high enough to remove the signatures from the respective delivery cylinders upon the release of the signatures by the grippers from the respective delivery cylinders, two sets of relatively low speed tapes for receiving the signatures from the respective sets of relatively high speed tapes in order to cause the signatures to become lapped therein and for thereafter delivering the lapped signatures, at relatively low speed, to the respective tables, and means for jogging the signatures as they arrive on the respective tables in order to aline them.

3. A machine of the class described having, in combination, a downward extending folder, means for feeding a web forward over the folder to fold it, two horizontally disposed cutter rolls contacting tangentially along a line to which the folded unit is fed forward between the cutter rolls, means for rotating the cutter rolls in opposite directions at the speed of feed of the folded unit, each cutter roll being provided with a knife and a knife block diametrically disposed with respect to each other along their peripheries and positioned so that the knife of each cutter roll shall cooperate with the knife block of the

other cutter roll along the said line of contact to sever the folded unit successively into signatures, a delivery cylinder disposed near one of the cutter rolls and provided with a peripherally disposed gripper, a presser roll disposed under the said one cutter roll between the said one cutter roll and the delivery cylinder, the said one cutter roll being provided with impaling pins rearward of the line of severing of the signatures for impaling the head of the folded unit rearward of each signature, as it becomes severed from the folded unit, and for thereafter carrying the said head under and around the said one cutter roll toward the presser roll, means for successively withdrawing the impaling pins from the said head to enable the presser roll to deliver the said head to the gripper of the delivery cylinder, means for rotating the delivery cylinder in timed relation to the speed of rotation of the cutter rolls, means for actuating the gripper to release the signatures when they reach the top of the delivery cylinder in order to permit the heads of the released signatures to travel unconfined beyond the delivery cylinder, a table, a set of relatively high-speed delivery tapes disposed near the top of the delivery cylinder for receiving the heads of the released signatures traveling unconfined from the delivery cylinder and for thereafter feeding the signatures, at relatively high speed, toward the table, means for driving the relatively high-speed tapes at a speed high enough to remove the signatures from the respective delivery cylinders upon the release of the signatures by the grippers from the respective delivery cylinders, a set of relatively low-speed tapes for receiving the signatures from the set of relatively high-speed tapes in order to cause the signatures to become lapped thereon and for thereafter delivering the lapped signatures, at relatively low speed, to the table, and means for jogging the signatures as they arrive on the table in order to aline them.

4. A machine of the class described having, in combination, a downward extending folder, means for feeding a web forward over the folder to fold it, means for severing the folded unit successively into signatures, two delivery cylinders each provided with peripherally disposed grippers, two presser rolls, impaling pins for successively impaling the successive heads of the folded unit rearward of each signature and for carrying the said heads alternately toward the respective presser rolls, means for successively withdrawing the impaling pins from the said heads to enable the presser rolls to deliver the said heads to the grippers of the respective delivery cylinders, means for rotating the delivery cylinders in timed relation to the speed of rotation of the cutter rolls, two delivery tapes, one disposed near the top of each delivery cylinder, means for actuating the grippers to release the signatures when they reach substantially the tops of the delivery cylinders in order to permit the heads of the released signatures to travel unconfined beyond the delivery cylinders to and upon the respective tapes, means for driving the relatively high-speed tapes at a speed high enough to remove the signatures from the respective delivery cylinders upon the release of the signatures by the grippers from the respective delivery cylinders, and two tables upon which the tapes respectively deliver the signatures.

5. A machine of the class described having, in combination, a downward extending folder, means for feeding a web forward over the folder to fold it, means for severing the folded unit successively into signatures, two delivery cylinders each provided with peripherally disposed grippers, two presser rolls, impaling pins for successively impaling the succesive heads of the folded unit rearward of each signature and for carrying the said heads alternately toward the respective presser rolls, means for successively withdrawing the impaling pins from the said heads to enable the presser rolls to deliver the said heads to the grippers of the respective delivery cylinders, means for rotating the delivery cylinders in timed relation to the speed of rotation of the cutter rolls, two sets of relatively high-speed delivery tapes, one set disposed near the top of each delivery cylinder, means for actuating the grippers to release the signatures when they reach substantially the tops of the delivery cylinders in order to permit the heads of the released signatures to travel unconfined beyond the delivery cylinders to and upon the respective high-speed tapes, means for driving the relatively high-speed tapes at a speed high enough to remove the signatures from the respective delivery cylinders upon the release of the signatures by the grippers from the respective delivery cylinders, two sets of relatively low-speed tapes to which the respective sets of relatively high-speed tapes deliver the signatures in order to cause the signatures to become lapped, and two tables upon which the relatively low-speed tapes respectively deliver the lapped signatures at relatively low speed.

6. A machine of the class described having, in combination, a downward extending folder, means for feeding a web forward over the folder to fold it, means for severing the folded unit successively into signatures, two delivery cylinders each provided with peripherally disposed grippers, means for delivering the successive heads of the folded unit alternately to the grippers of the respective delivery cylinders, means for rotating the delivery cylinders in timed relation to the speed of rotation of the cutter rolls, two sets of relatively high-speed delivery tapes, one set disposed near the top of each delivery cylinder, means for actuating the grippers to release the signatures when they reach substantially the tops of the delivery cylinders in order to permit the heads of the released signatures to travel unconfined beyond the delivery cylinders to the respective high-speed tapes, means for driving the relatively high-speed tapes at a speed high enough to remove the signatures from the respective delivery cylinders upon the release of the signatures by the grippers from the respective delivery cylinders, two sets of relatively low-speed tapes to which the respective sets of relatively high-speed tapes deliver the signatures in order to cause the signatures to become lapped, and two tables upon which the relatively low-speed tapes respectively deliver the lapped signatures at relatively low speed.

References Cited in the file of this patent

UNITED STATES PATENTS

1,357,680	Barber	Nov. 2, 1920
2,211,046	Barber	Aug. 13, 1940
2,261,972	Matthews	Nov. 11, 1941
2,371,190	Saul	Mar. 13, 1945
2,399,445	Meyer	Apr. 30, 1946
2,501,836	Barber	Mar. 28, 1950