

H. M. BARBER.
 VARIABLE SIZE FLAT SHEET DELIVERY MECHANISM.
 APPLICATION FILED DEC. 7, 1907.

970,366.

Patented Sept. 13, 1910.

4 SHEETS—SHEET 1.

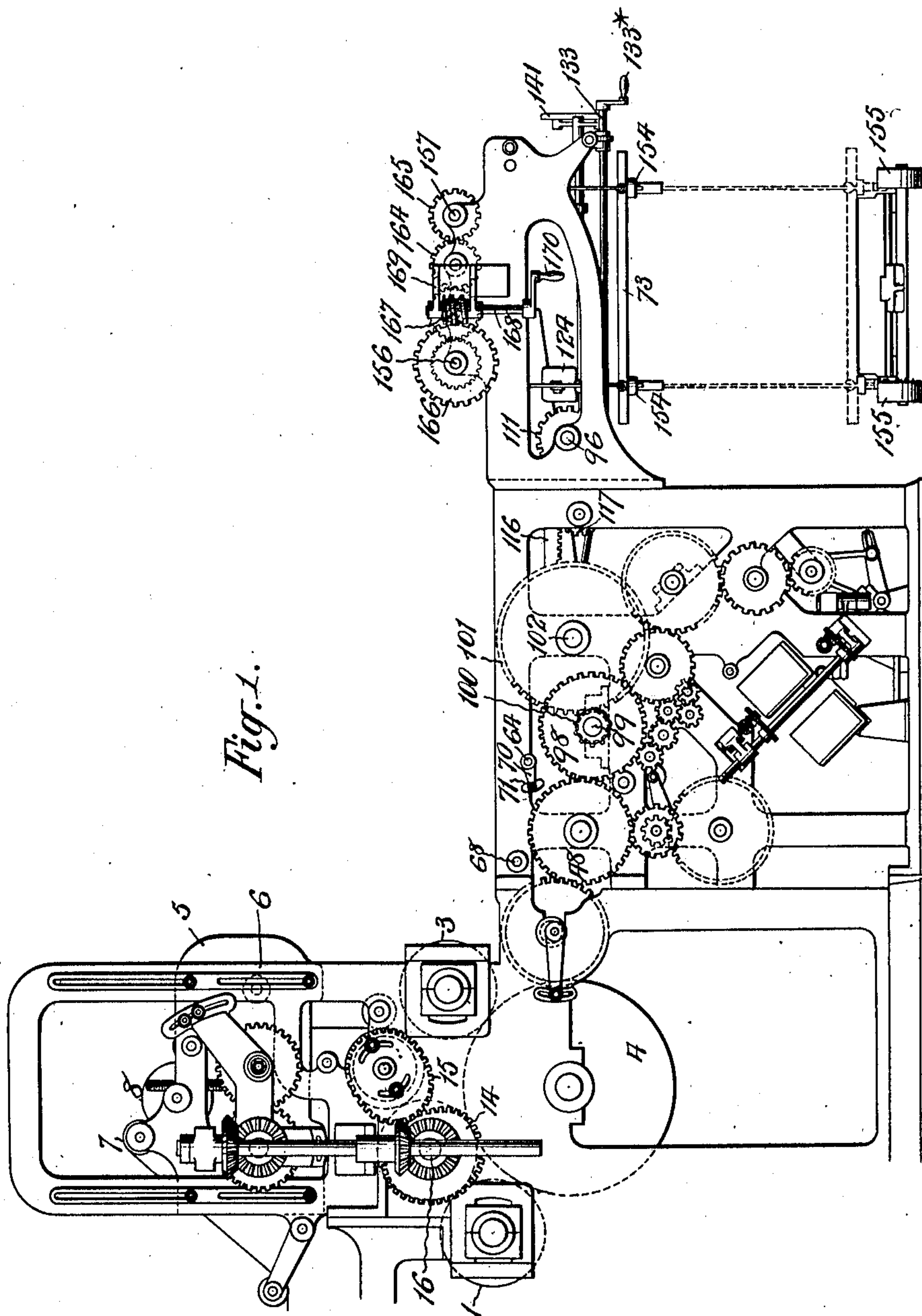


Fig. 1.

Witnesses
M. G. Giering
J. George Barry

Inventor
Howard M. Barber
 by attorney
Brown & Howard

H. M. BARBER. .
VARIABLE SIZE FLAT SHEET DELIVERY MECHANISM.
APPLICATION FILED DEC. 7, 1907.

970,366.

Patented Sept. 13, 1910.

4 SHEETS—SHEET 2.

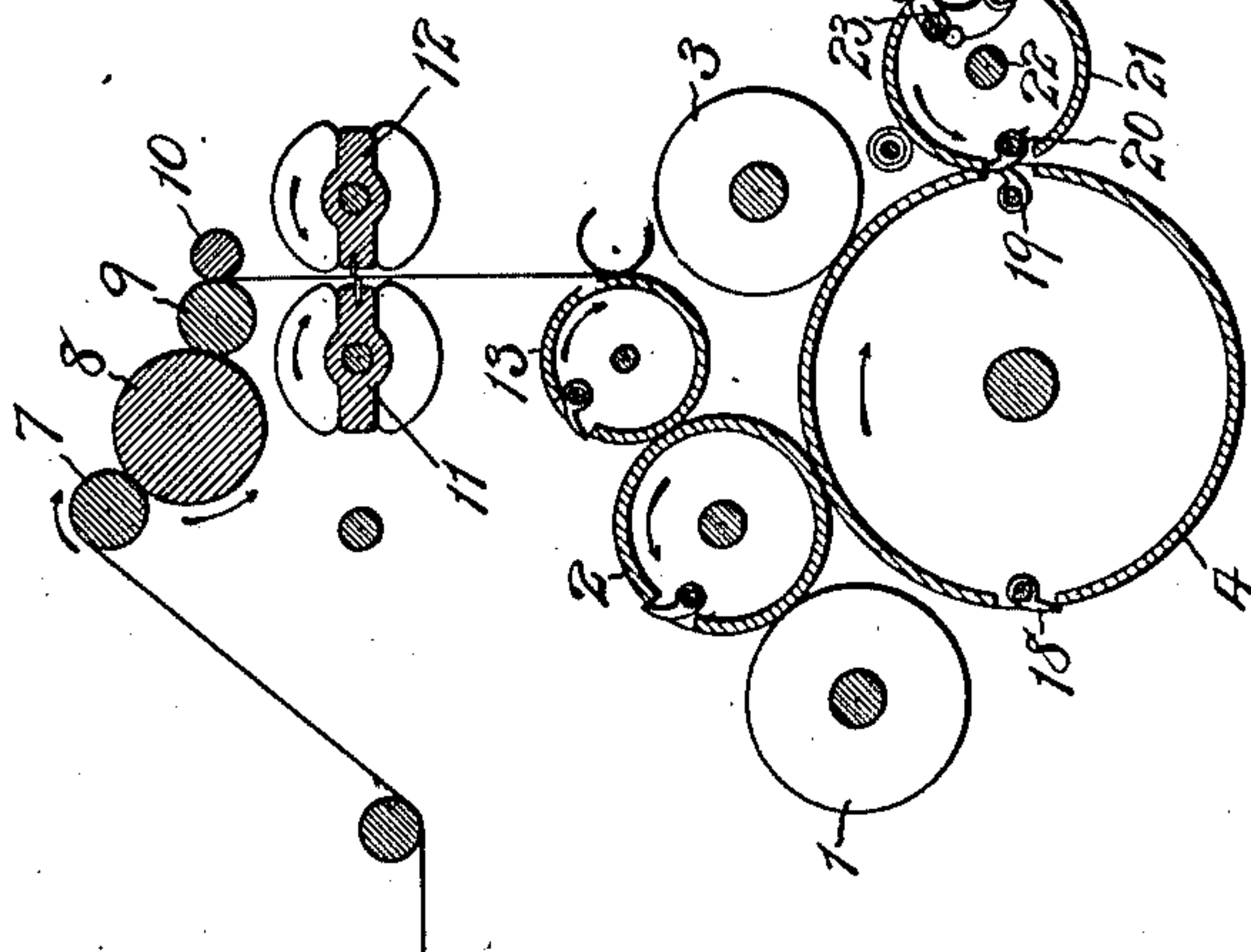
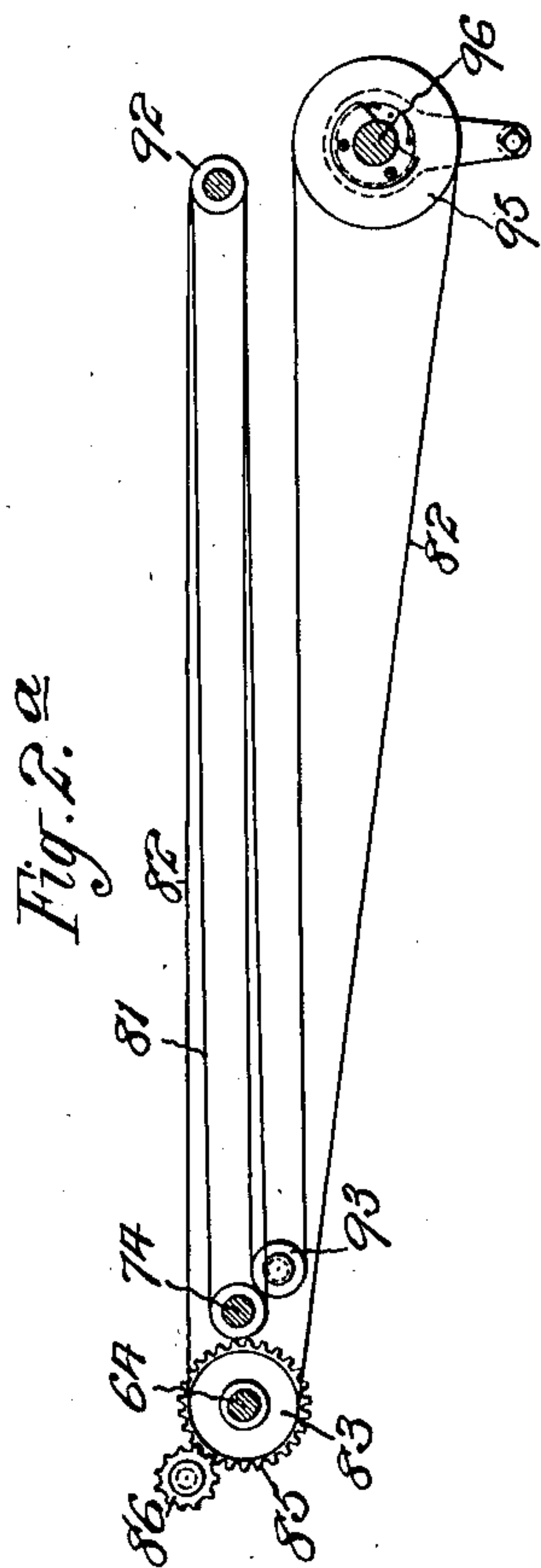


Fig. 2.

Witnesses
M. G. Gentry
J. George Barry.

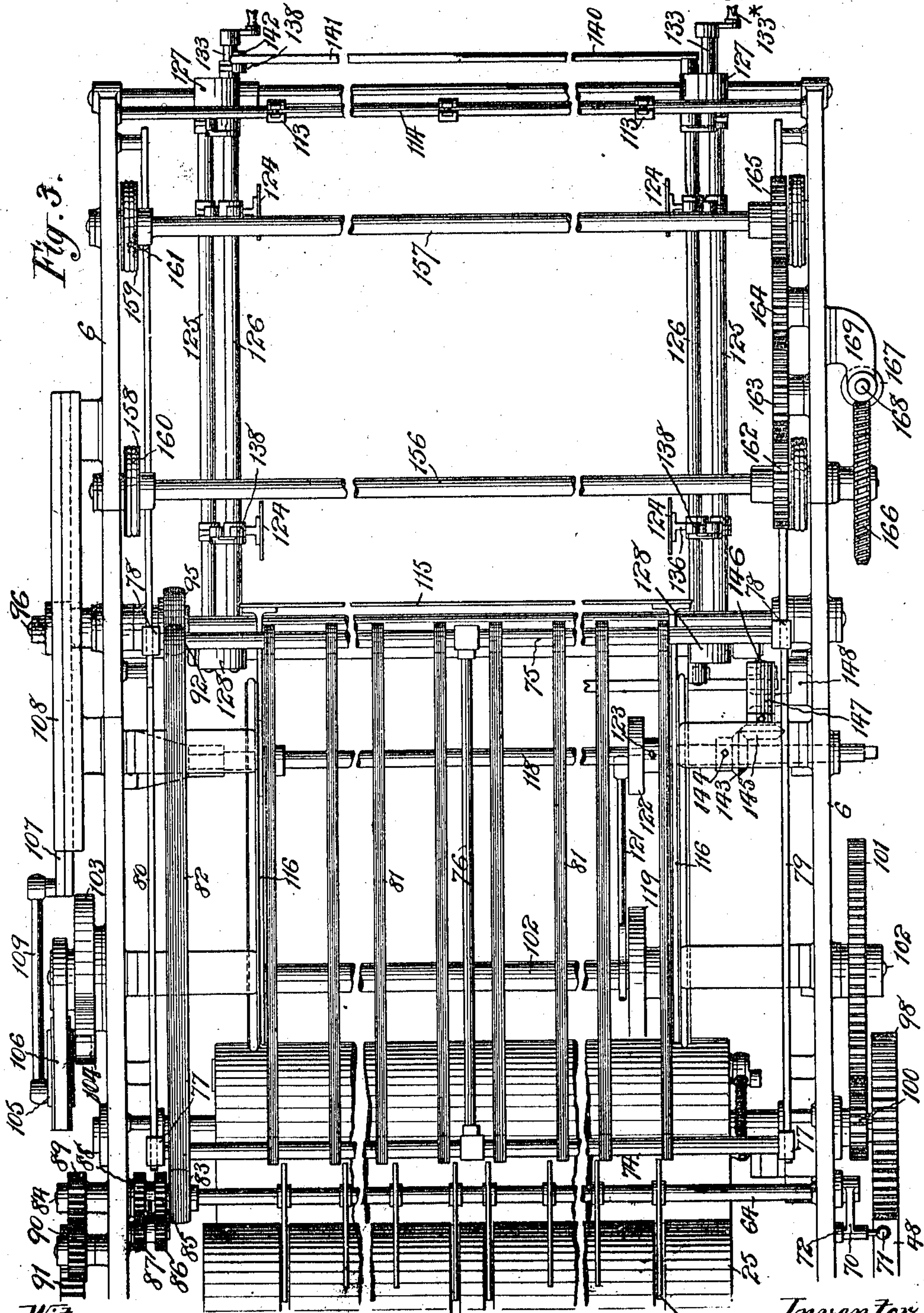
Inventor
Howard M. Barber
by attorney
Brunt & Howard

H. M. BARBER.
 VARIABLE SIZE FLAT SHEET DELIVERY MECHANISM.
 APPLICATION FILED DEC. 7, 1907.

970,366.

Patented Sept. 13, 1910.

4 SHEETS—SHEET 3.



Witnesses.
 H. Gruber,
 J. George Barry.

Inventor:
 Howard M. Barber
 by attorneys
 Brown & Ward

H. M. BARBER.
VARIABLE SIZE FLAT SHEET DELIVERY MECHANISM.

APPLICATION FILED DEC. 7, 1907.

Patented Sept. 13, 1910.

970,366.

4 SHEETS—SHEET 4.

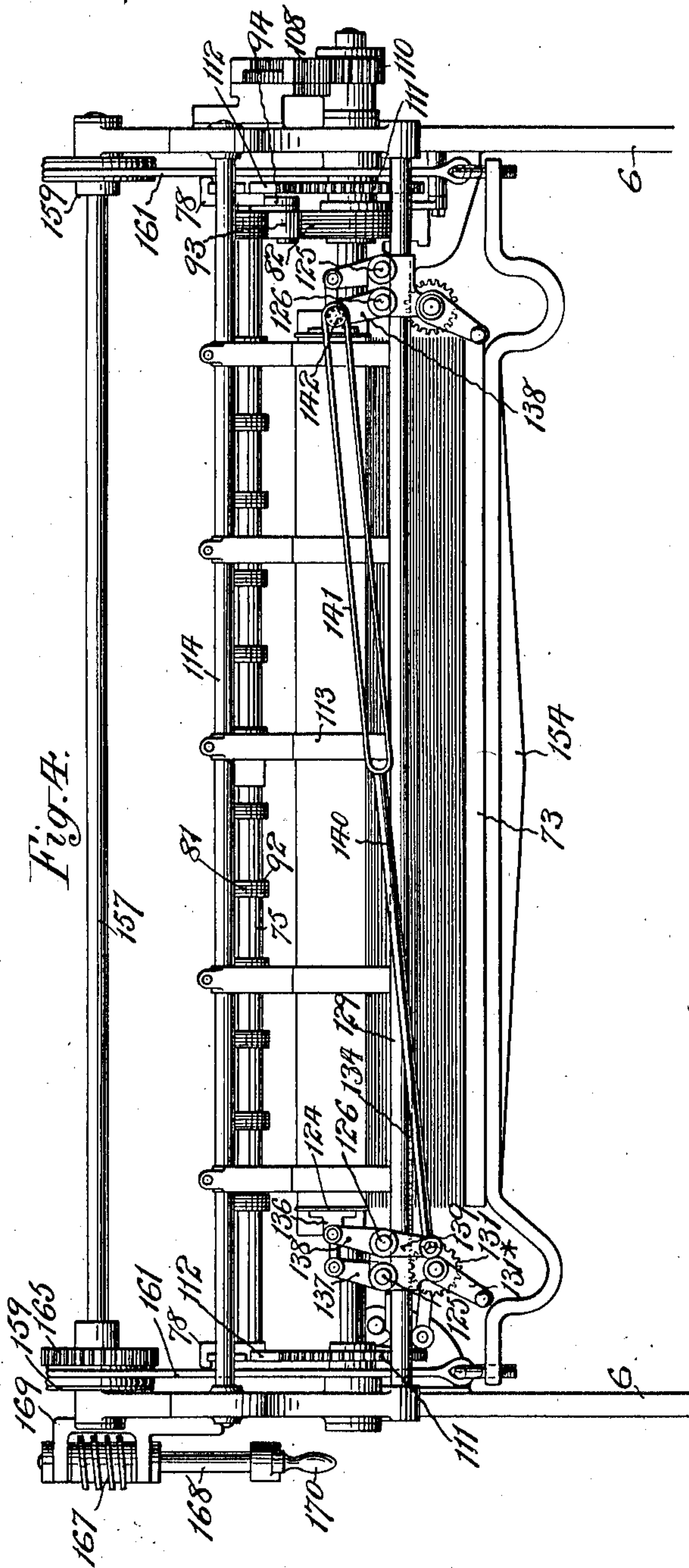


Fig. 4.

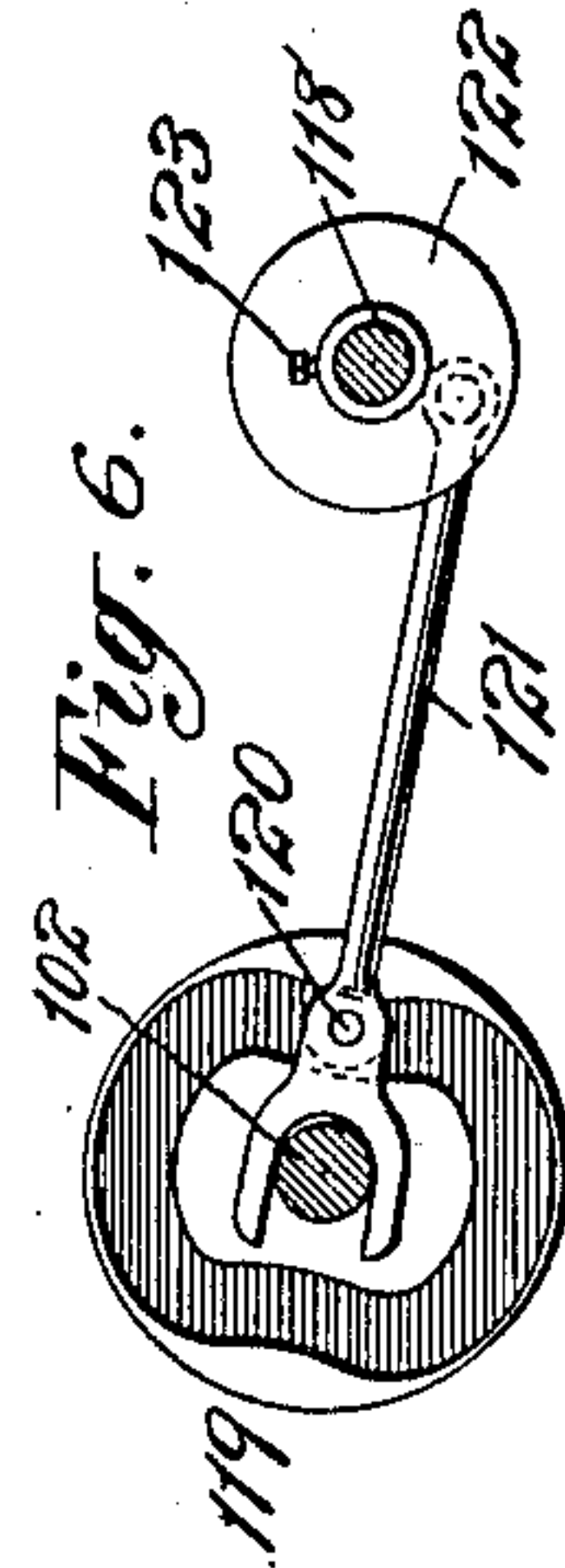


Fig. 6.

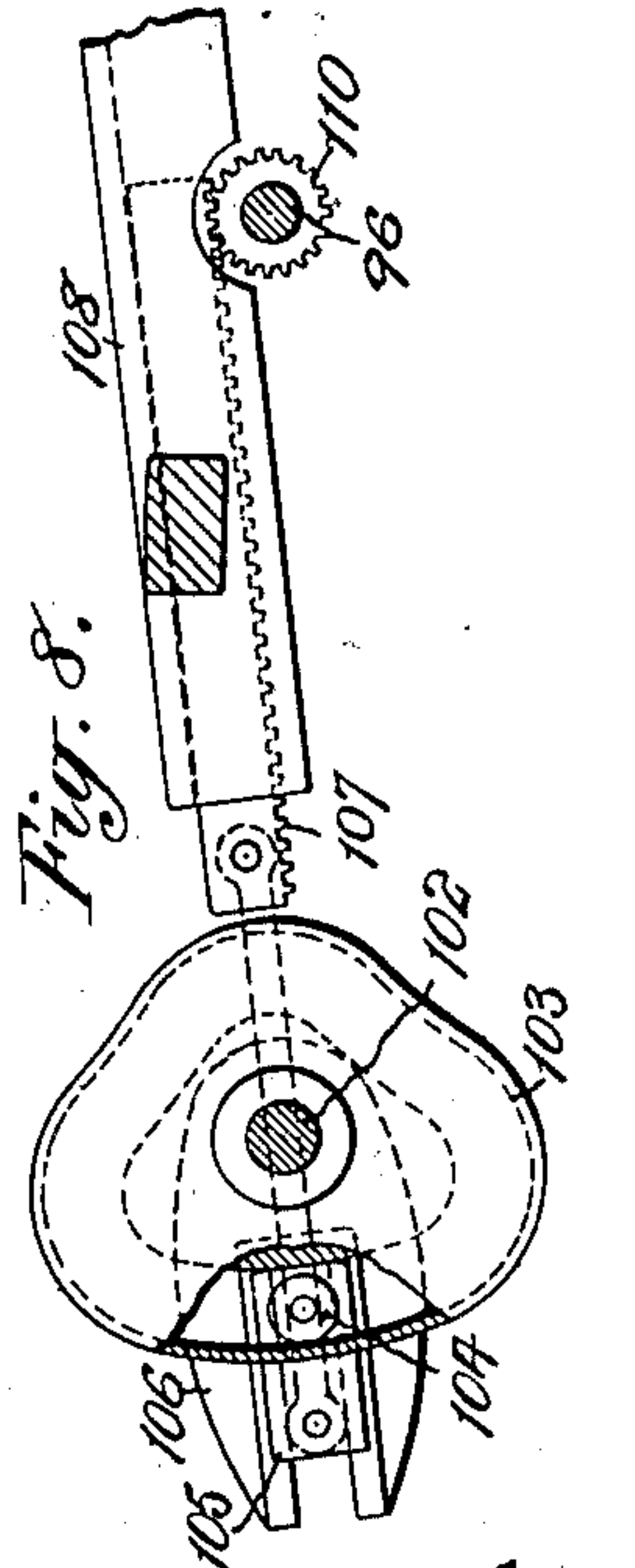


Fig. 8.

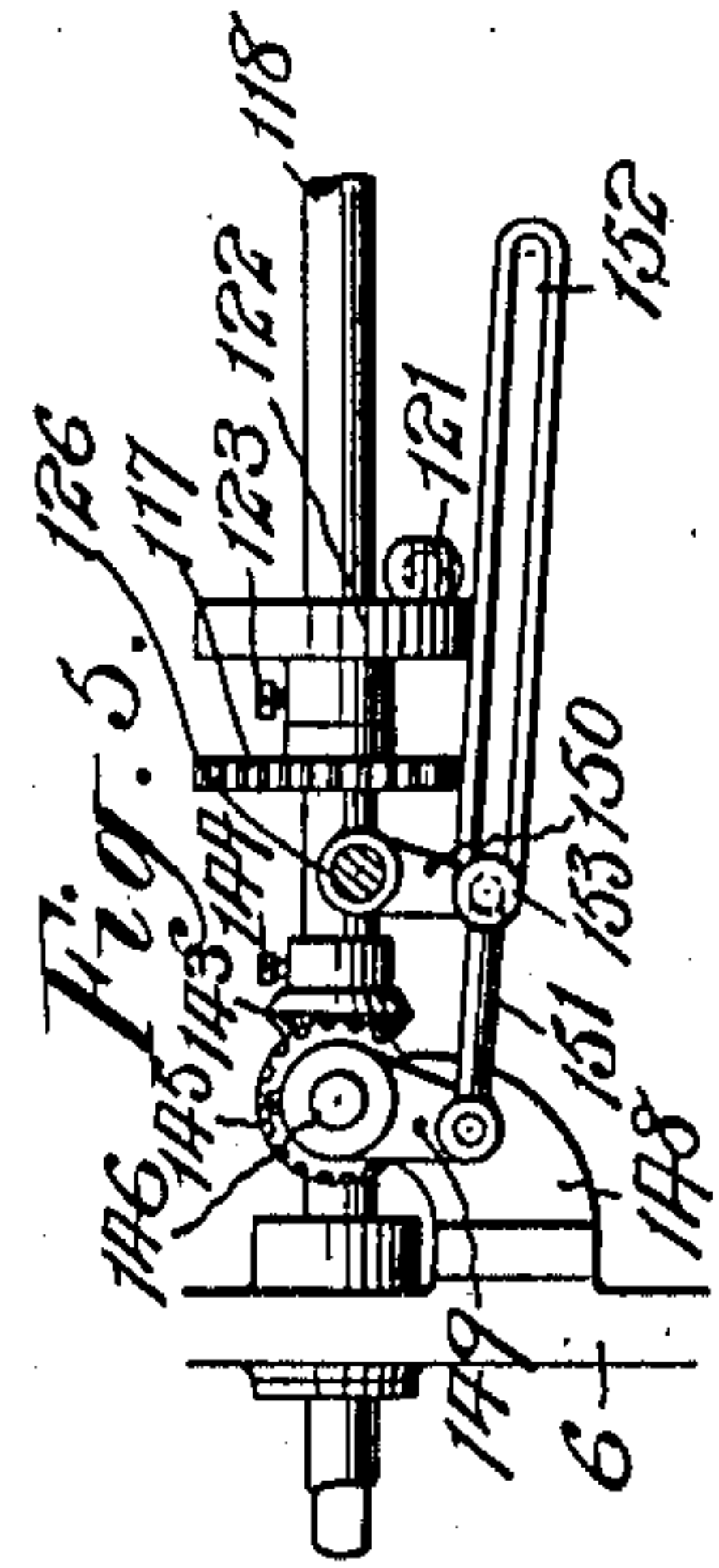


Fig. 5.

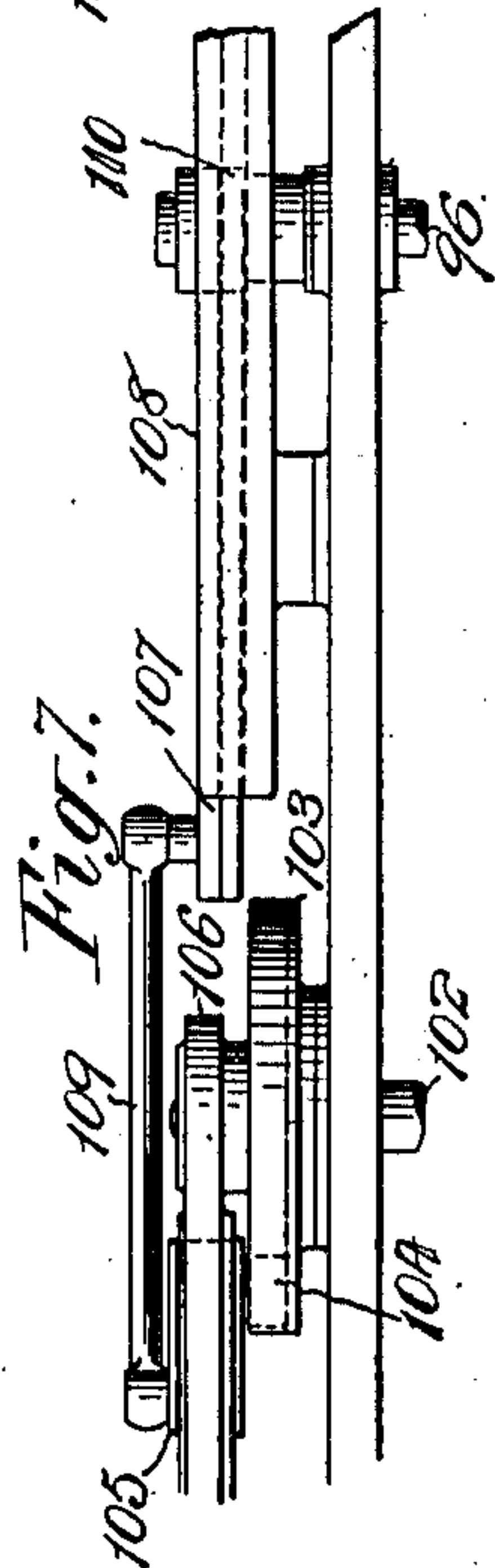


Fig. 7.

Witnesses
M. C. C. C.
J. George Barry.

Inventor
Howard M. Barber
by attorneys
Brown & Seward

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.

VARIABLE-SIZE-FLAT-SHEET-DELIVERY MECHANISM.

970,366.

Specification of Letters Patent. Patented Sept. 13, 1910.

Original application filed April 12, 1907, Serial No. 367,748. Divided and this application filed December 7, 1907. Serial No. 405,525.

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 Variable-Size-Flat-Sheet-Delivery Mechanism, of which the following is a specification.

My invention consists broadly in variable size flat sheet delivery mechanism and more particularly in mechanism arranged to deliver a collected group of variable size sheets as they are fed from a suitable source such, for instance, as a rotary printing press, flat on to a receiving board, utilizing sheet collecting and transfer cylinders, a reciprocating carriage and endless feeding tapes.

The several parts of the mechanism to be hereinafter described are so arranged that they may be readily adjusted to operate upon sheets of variable sizes.

In the accompanying drawings I have represented a rotary printing press of the perfecting type, to which press variable size sheets are fed from a mechanism which will only be generally described herein as such mechanism forms the subject-matter of a patent issued to me December 10, 1907, No. 873341, for variable size sheet cutting and feeding mechanism. I have also shown in connection with said printing press, a mechanism which is arranged to submit the variable size sheets as they are delivered one by one from a suitable source such, for instance, as a rotary printing press, to a first fold and a second fold, then cutting the folded sheets into signatures and finally submitting each of the sections to a folding operation and delivering them in signatures to a predetermined point. Such mechanism will not be specifically described herein as it forms the subject-matter of an application filed by me April 12, 1907, Serial No. 367,747, entitled variable size sheet folding, cutting and delivering mechanism.

My present invention is devoted to the variable size flat sheet delivery mechanism as hereinbefore stated.

A practical embodiment of my invention is represented in the accompanying drawings in which—

Figure 1 is a view in side elevation of a rotary printing press, showing means for cutting variable size sheets from a web and

feeding the same in perfect register to a printing press, mechanism for collecting, cutting and folding the variable size sheets as they come from the press and also mechanism for delivering collected groups of variable size sheets flat from the press on to a receiving board; Fig. 2 is a detail vertical section through the same, Fig. 2^a is a detail section showing the sheet carrying tapes and the driving belt of the reciprocating sheet delivery carrier and their operating parts; Fig. 3 is a plan view of the flat sheet delivering mechanism; Fig. 4 is an end view of the same, Fig. 5 is a detail view of the jogger operating mechanism, Fig. 6 is a detail view of the cam for operating the jiggers, Fig. 7 is a detail top plan view of the mechanism for reciprocating the carriage, and Fig. 8 is a detail section of the same.

The first plate cylinder is denoted by 1 and its impression cylinder by 2. The second plate cylinder is denoted by 3 and its impression cylinder by 4. Variable size sheets are fed to the printing cylinders in the present instance by providing a vertically adjustable carriage 5 mounted in the side frames 6, which carriage carries the web feeding rolls 7, 8, 9, 10 and the rotary cutters 11, 12. A cylinder 13 for feeding the variable size sheets from the cutters to the first impression cylinder 2 is mounted in the side frames 6 and is driven at varying surface speeds through lobed gears 14, 15, from the shaft 16 of the first impression cylinder. The second impression cylinder 4 is provided with two sets of grippers 18, 19, which are arranged to transfer the advance edges of the sheets successively one at a time to the set of grippers 20 carried by the collecting cylinder 21 of my improved flat sheet delivery mechanism. The shaft of this collecting cylinder 21 is denoted by 22 and it is mounted in suitable bearings in the side frames 6. The collecting cylinder 21 is provided with a tucking blade which is arranged to coact with a set of folding grippers 24 on the transfer cylinder 25 when the machine is used for folding, cutting and delivering variable size sheets. This folding mechanism is not used in connection with my present invention.

A set of grippers 31 is provided on the transfer cylinder 25, which grippers are ar-

ranged to receive a collected group of sheets from the grippers 20 on the collecting cylinder 21 and transfer the said collected group of sheets to the reciprocating sheet delivery carriage to be hereinafter described.

As the collected group of sheets is released from their grippers 31, it is delivered on to a plurality of stripping fingers 63 fixed to an adjustable shaft 64. Feeding pulleys 65 are mounted on a shaft 66 carried by arms 67 projecting from a shaft 68, which feeding pulleys 65 are held pressed against the periphery of the transfer cylinder 25. These feeding pulleys 65 insure the delivery of the advance edges of the collected group of sheets on to the stripping fingers 63. These stripping fingers 63 are raised out of position when the folding and cutting mechanism is in use and lowered into position to receive the collected group of sheets from the transfer cylinder when the flat sheet delivery mechanism is in use, the means employed for such purpose being an arm 70 fixed to the shaft 64 and having a locking device 71 arranged to be brought into engagement with a socket 72 on the side frames 6. The reciprocating delivery carriage for conveying the collected group of sheets from the transfer cylinder to the receiving board 73 comprises cross shafts 74, 75 and a longitudinal spacing bar 76. These cross shafts 74, 75, are provided with slides 77, 78, on their ends arranged to travel on tracks 79, 80 fixed within said side frames. Sheet carrying tapes 81 pass around pulleys on the shafts 74, 75.

A driving belt 82 passes around the pulley 83 loosely mounted on the shaft 64 concentric with a shaft 84, which pulley is driven intermittently by a train of gears 85, 86, 87, 88, 89, 90, 91, the gear 91 being mounted to rotate with the shaft of the transfer cylinder 25. This driving belt 82 leads forwardly from the pulley 83 and passes around a pulley 92 on the cross shaft 75 of the carriage. From this point the belt leads rearwardly and passes around a pulley 93 supported by a bracket 94 depending from the slide 77 at one side of the carriage. From thence the belt 82 leads forwardly and around a driving clutch pulley 95 mounted on a cross shaft 96. After passing around the pulley 95, the belt leads rearwardly and passes around the pulley 83 hereinbefore described. This arrangement of the driving belt permits the reciprocation of the carriage for bringing the collected group of sheets from the transfer cylinder to a point where the group of sheets may be deposited upon the receiving board 73.

The reciprocation of the carriage and the intermittent movement of the belt 82 and the sheet carrying tapes 81 are imparted by mechanism such as that shown, described and claimed in United States Letters Patent

No. 757,248, dated April 12, 1904, granted to me for improvements in sheet delivery mechanism for printing machines. A short statement only of the construction and operation of the said devices is therefore given herein.

The reciprocating movement of the flat sheet delivery carriage is imparted through the following mechanism. The gear 48 on the shaft of the transfer cylinder meshes with a gear 98 on the shaft 99 of the second folding cylinder not used herein. A pinion 100 on the shaft 99 meshes with a gear 101 on a cross shaft 102, which shaft passes through a stationary cam 103 in which the truck roll 104 of a slide 105 is located, which slide 105 is fitted to reciprocate in an arm 106 fixed to rotate with the shaft 102. A rack 107 is mounted in a guide 108 fixed to the side frame 6, which rack is connected to the slide 105 through a connecting rod 109. A rack 107 engages a pinion 110 on the shaft 96, which shaft has fixed thereto gears 111, 111, which mesh with racks 112, 112, carried by the slides 77, 78, of the carriage.

The mechanism for receiving and jogging sheets of variable sizes on the receiving board 73 as they are delivered flat from the delivery carriage is arranged as follows. Stationary stops 113 are clamped to a cross bar 114 in position to engage the advance edges of the sheets as they are delivered on to the pile. A longitudinally movable jogger 115 is provided with rearwardly extended rack bars 116 which are engaged with pinions 117 fast to a cross rock shaft 118. A rocking movement is imparted to the shaft 118 from the rotary shaft 102 by providing said shaft with a box cam 119 in which the truck roll 120 of a connecting rod 121 is located, this rod 121 having its rear end supported on the shaft 102 and its front end connected to a crank 122 adjustably secured to the cross shaft 118 by a set screw 123. This crank 122 is shown in the present instance as a disk. The back jogger 115 may be adjusted to any desired position to accommodate it to variable size sheets by releasing the set screw 123 of the crank 122 and rotating the shaft 118 by hand to advance or withdraw the back jogger 115 until it is brought into the desired position. The set screw 123 is then tightened to permit the cam 119 on the rotary shaft 102 to rock the same to impart a reciprocating movement to the back jogger.

The side joggers are denoted by 124 and are here shown as arranged in pairs. Pairs of parallel longitudinal bars 125, 126, form supports for the pairs of joggers and are themselves supported at their ends by carriages 127, 128, mounted on front and rear cross bars 129, 130 supported by the side frames 6. Each of the pairs of side joggers is independently adjustable toward and

away from the other pair by providing the front and rear carriages 127, 128 of each pair of said side bars 125, 126, with gears 131, 132, carried by a hand shaft 133, the said gears meshing with racks 134, 135 in said front and rear cross bars 129, 130. These shafts 133 are provided with suitable crank handles 133*. The joggers 124 are adjustable longitudinally of the machine along their supporting side bars 125, 126. Each of the joggers 124 is provided with a parallel movement by pivoting the shank 136 of the jogger to rocking arms 137, 138. Both of the side bars 126 have the arms 138 of the joggers fixed thereto so that when these bars are rocked the proper movement is imparted to the joggers. These bars 126 are connected to rock together by providing the bar 126 at one side of the machine with a depending arm 139 and connecting it by a cross rod 140 with one of the arms 138 of the other bar. To permit the joggers to be adjusted toward and away from each other, the cross rod 140 is provided with an elongated loop portion 141 and the arm 138 with which said rod 140 engages, is provided with a set screw 142 for clamping said arm to the rod 140 at any desired point along the loop portion 141. The rocking bar 126 at one side of the machine has its movement imparted to it from the rock shaft 118 as follows. The said rock shaft 118 has a bevel gear 143 adjustably secured thereto by a set screw 144, which bevel gear engages a bevel gear 145 on a stud shaft 146 supported in a bearing 147 carried by a bracket 148 secured to the side frame 6. This shaft 146 has fixed thereto a depending arm 149 which is connected to an arm 150 depending from the bar 126, through a connecting rod 151. To permit the joggers to be adjusted laterally of the machine, the connecting rod 151 is provided with an elongated loop portion 152 and the arm 150 is provided with a set screw 153 for clamping the arm at any desired position along the loop portion 152. By loosening the said screw 144 of the bevel gear 143, the shaft 118 can be rotated by hand to adjust the back jogger 115 without disturbing the adjustment of the side joggers 124.

The flat sheet receiving board 73 is raised and lowered by hand and may be readily moved out of position when the required amount of sheets has been stacked thereon, by means of a truck. The side frames of the receiving board 73 are denoted by 154 and the front and rear traction wheels of the truck by 155. Transverse pulley shafts 156, 157 are mounted in suitable bearings in the side frames 6 and the pulleys on the said shafts are denoted by 158, 159 respectively. Rear and front flexible connections 160, 161, are connected at their lower ends to the side

frames 154 of the board and they are arranged in position to be wound upon and unwound from the pulleys 158, 159. The pulley shafts 156, 157, are geared together through gears 162, 163, 164, 165. The means which I have shown for manually raising and lowering the receiving board comprises a gear 166 fast on the shaft 156, which gear meshes with a worm 167 fixed to a vertical hand shaft 168 supported in a bracket 169 secured to the side frame 6. This shaft 168 is provided with a suitable crank handle 170.

In operation, the rear and side joggers for the flat sheet receiving board are first adjusted to the proper positions for the particular sized sheets which are to be delivered flat on to the board. The stripping fingers 63 are then lowered into position to coact with the transfer cylinder 25. The grippers 20 on the collecting cylinder 21, and the grippers 31 on the transfer cylinder 25 and their cams are then adjusted with respect to each other for collecting and transferring sheets of a predetermined size from the second impression cylinder 4 to the flat sheet delivery carriage.

The second impression cylinder 4 as it rotates, will deliver four sheets successively from its grippers 18, 19, to the grippers 20 on the collecting cylinder 21. After four sheets have been collected on the cylinder 21, they are delivered to the grippers 31 on the transfer cylinder 25. After the four sheets have been delivered to the transfer cylinder, the grippers 31 are opened at the proper time to deliver the advance edges of the collected group of four sheets on to the stripping fingers 63. The feeding pulleys 65 will, by their coaction with the transfer cylinder 25, feed the collected group of four sheets on to the reciprocating flat sheet delivery carriage which at this time is at the limit of its rearward movement. The delivery carriage tapes 81 which are driven at the same speed as the advancing collected group of sheets, will feed the group of sheets along until it is delivered on to the carriage. The carriage will then be caused to move to the limit of its forward movement over the receiving board 73. When this position is reached, the carriage stops and reverses, the driving pulley 83 being at the same time thrown out of operation and the driving clutch pulley 95 also held against reverse movement. This operation will allow the tapes to roll out from under the collected group of sheets as the sheet delivery carriage returns to the limit of its rearward movement, thus depositing the collected group of sheets on to the receiving board 73. The back and side joggers will bring the collected group of sheets into alinement with the previously deposited sheets on the sheet receiving board.

As the pile of sheets increases in height on the receiving board, the board may be lowered until the required amount of sheets is stacked thereon. The board is lowered 5 onto the truck and the flexible connections 160, 161, are then disconnected from the side frames 154, thus permitting the truck with its load to be removed and a new board substituted. This new receiving board may 10 be attached to the flexible connections 160, 161, and raised into position to receive the groups of sheets from the reciprocating delivery carriage.

The parts shown and described but not 15 claimed herein, form the subject-matter of a co-pending application filed by me April 12, 1907, Serial No. 367,748, entitled variable size flat sheet delivery mechanism, of which application this present application is a 20 division.

What I claim is:

1. A sheet receiving board, means arranged to deposit variable size sheets flat thereon, stops for the advance edges of the 25 sheets, side joggers for the sheets and means for adjustably supporting the side joggers comprising cross shafts having racks thereon, jogger carriages mounted on said cross shafts, manually operated shafts carried by 30 said carriages and having gears meshing with said racks, pairs of parallel longitudinal bars forming supports for the side joggers and means for rocking said bars.

2. A sheet receiving board, means arranged to deposit variable size sheets flat 35 thereon, stops for the advance edges of the sheets, side joggers for the sheets and means for adjustably supporting the side joggers comprising cross shafts having racks thereon, jogger carriages mounted on said cross 40 shafts, manually operated shafts carried by said carriages and having gears meshing with said racks, pairs of parallel longitudinal bars forming supports for the side joggers, means for rocking said bars and ad- 45 justable means for connecting the two pairs of parallel longitudinal bars to rock together.

3. A sheet receiving board, means arranged to deposit variable size sheets flat 50 thereon, stops for the advance edges of the sheets, side joggers for the sheets, laterally adjustable supports for the joggers, adjust-

able means connecting the side joggers whereby the joggers on one side of the board 55 are operated from the joggers on the other side of the board, and means adjustably connected to one set of side joggers for operating both sets of side joggers.

4. A sheet receiving board, means arranged to deposit variable size sheets flat 60 thereon, stops for the advance edges of the sheets, a back jogger for the sheets, means for adjusting the back jogger bodily comprising a rack carried by the jogger, a cross 65 shaft, a pinion thereon meshing with said rack and means for rocking said shaft to impart the reciprocating movement to the jogger through said rack and pinion.

5. A sheet receiving board, means arranged to deposit variable size sheets flat 70 thereon, stops for the advance edges of the sheets, a back jogger for the sheets, means for adjusting the back jogger bodily comprising a rack carried by the jogger, a cross 75 shaft, a pinion thereon meshing with said rack and means for rocking the said shaft to impart the reciprocating movement to the jogger through said rack and pinion, said last named means comprising a crank se- 80 cured to said cross shaft, a rotary shaft, a cam thereon and a connecting rod engaged by said cam and secured to said crank.

6. A sheet receiving board, means arranged to deposit variable size sheets flat 85 thereon, stops for the advance edges of the sheets, a back jogger for the sheets, means for adjusting the back jogger bodily comprising a rack carried by the jogger, a cross 90 shaft, a pinion thereon meshing with said rack and means for rocking said shaft to impart the reciprocating movement to the jogger through said rack and pinion, said last named means comprising a rotatively ad- 95 justable crank secured to said cross shaft, a rotary shaft, a cam thereon and a connecting rod engaged by said cam and secured to said crank.

In testimony, that I claim the foregoing as my invention, I have signed my name in 100 presence of two witnesses, this fifth day of December A. D. 1907.

HOWARD M. EARBBER.

Witnesses:

A. R. STILLMAN,
G. BURDICK.