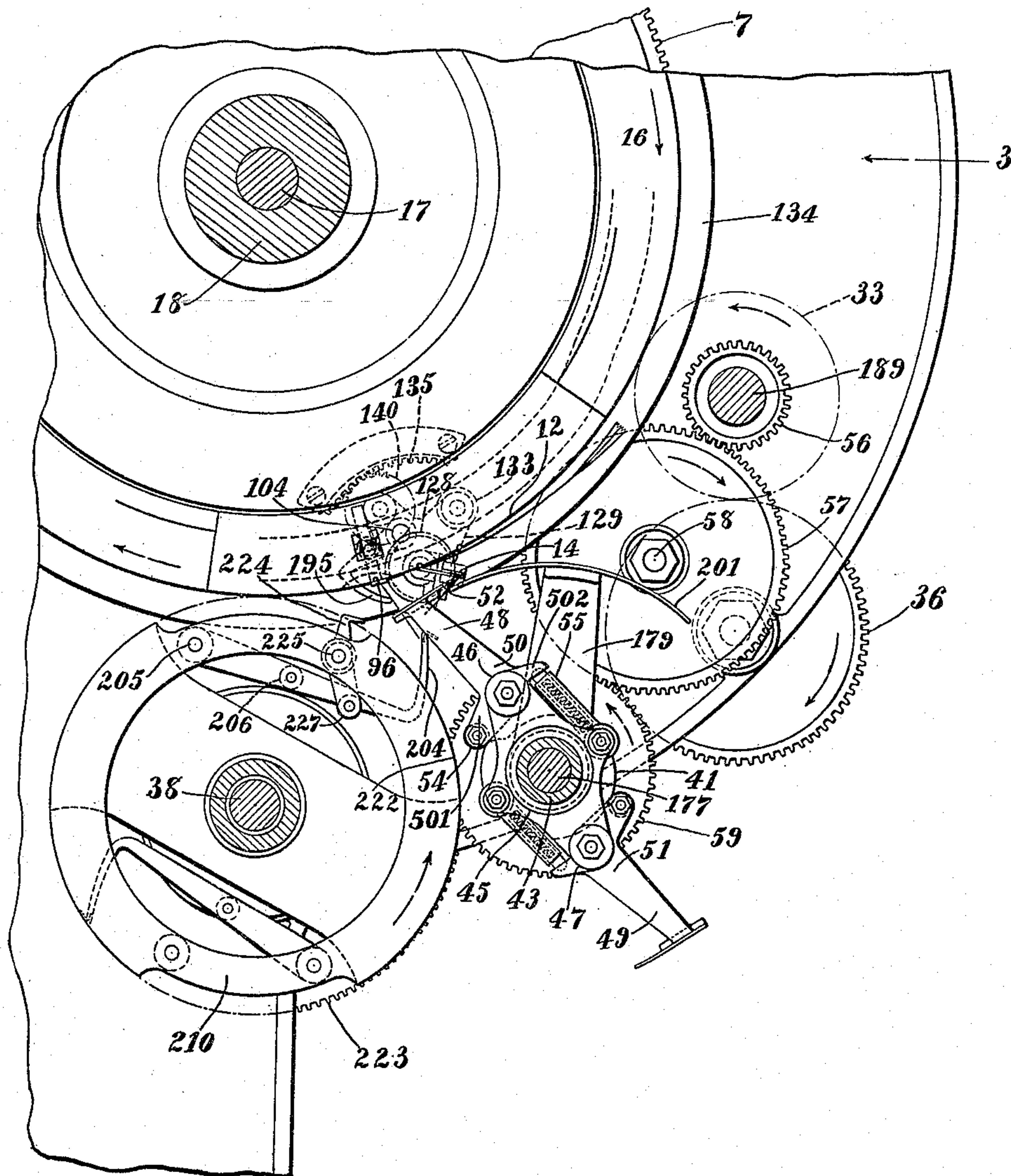


900,605.

Patented Oct. 6, 1908

4 SHEETS—SHEET 1

Fig. 1.



Witnesses:

Chas. W. LaRue

William Jordan

Inventor:

Charles F. Smith

by Wilbur M. Stone

Attorney.

900,605.

Patented Oct. 6, 1908.

4 SHEETS—SHEET 2.

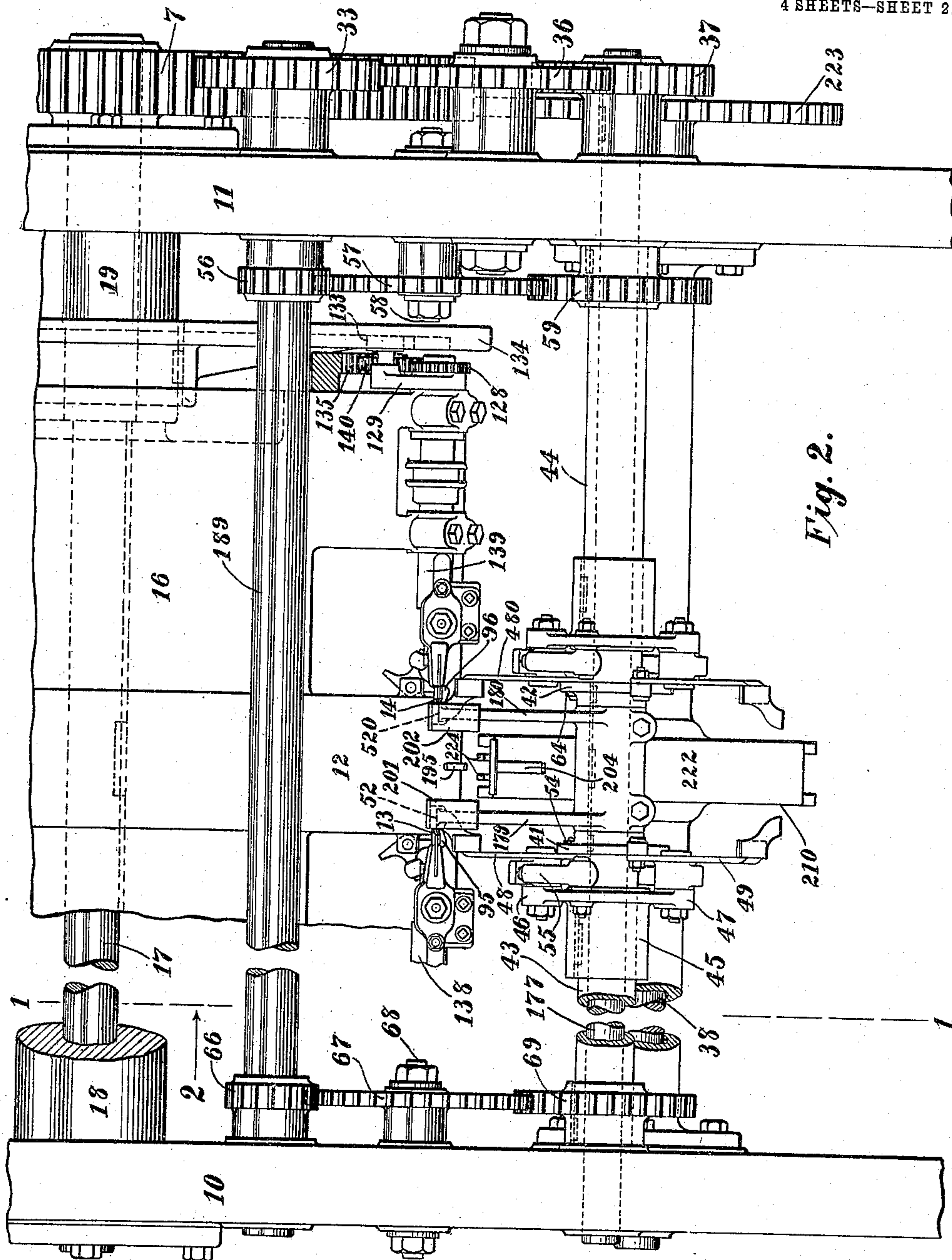


Fig. 2.

Witnesses:

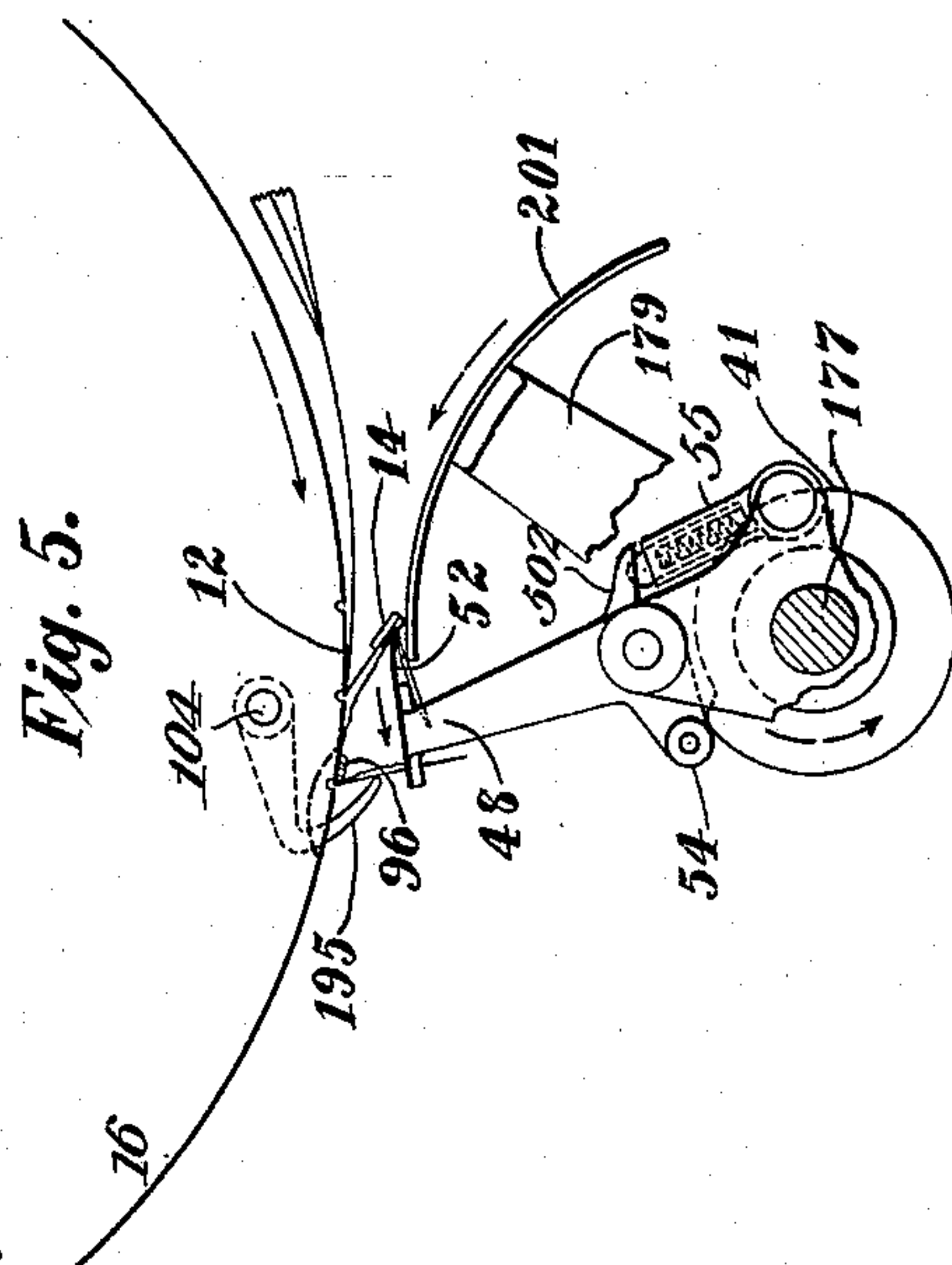
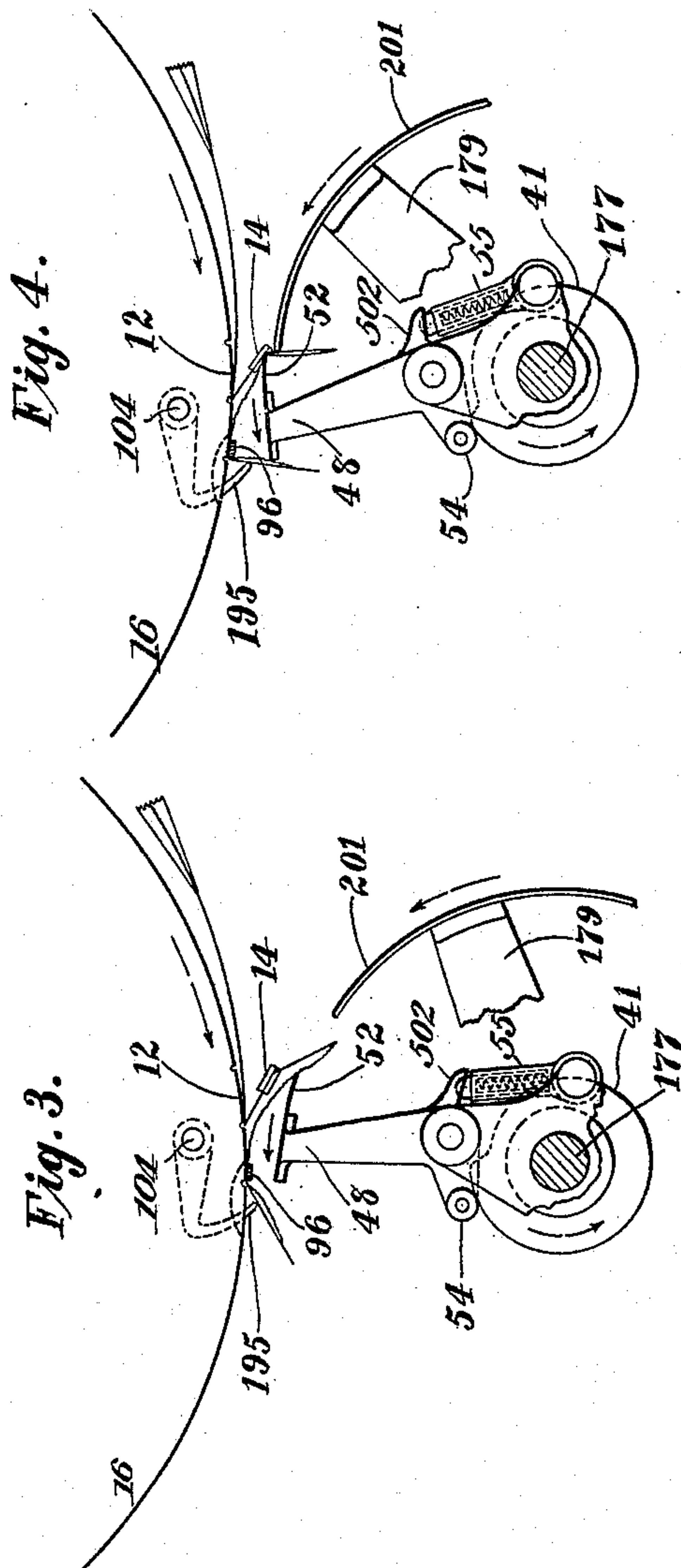
Chas. W. LaRue
William Jordan

Inventor:
Charles F. Smith
by Wilbur M. Stone
Attorney.

900,605.

Patented Oct. 6, 1908.

4 SHEETS—SHEET 3.



Witnesses:

Chas. W. LaRue
William Jordan

Inventor:
Charles F. Smith
by Wilbur M. Stone
Attorney.

900,605.

Patented Oct. 6, 1908.

4 SHEETS—SHEET 4.

Fig. 7.

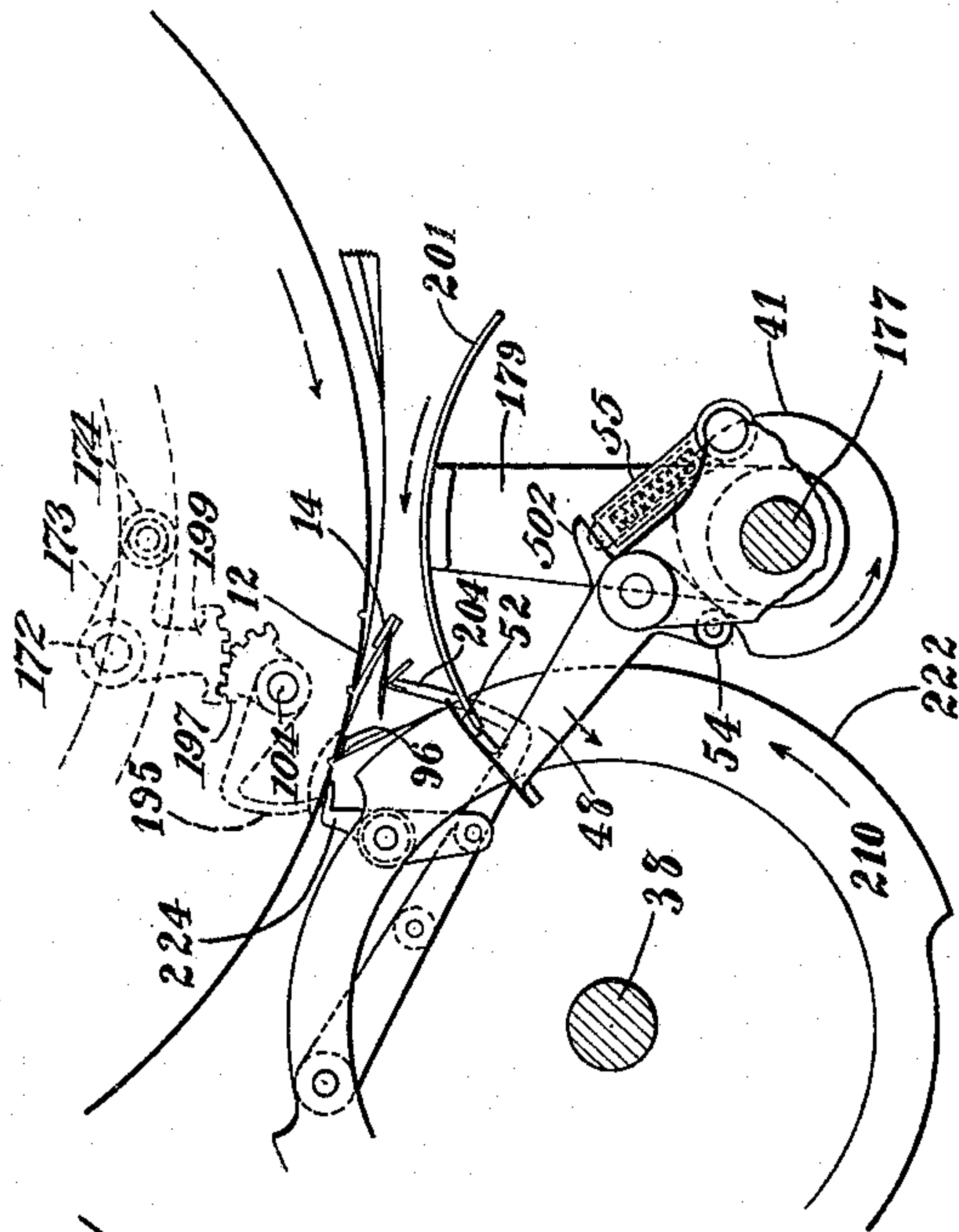
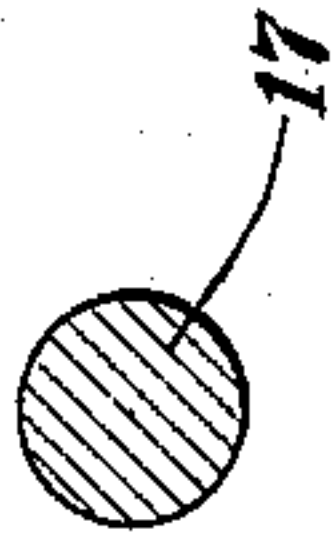
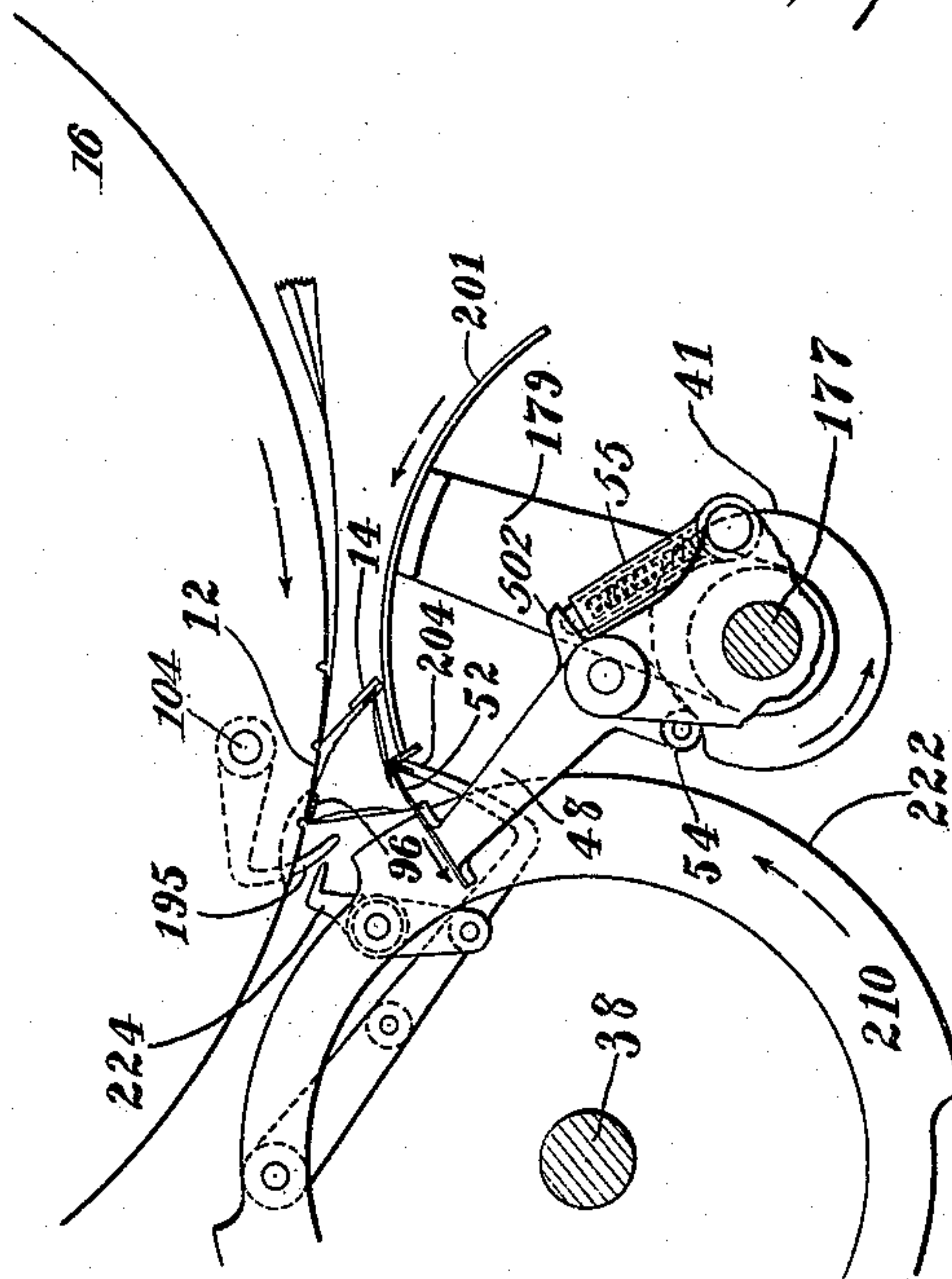


Fig. 6.



Witnesses:
Chas. W. LaRue
William Jordan

Inventor:
Charles F. Smith
by Wilbur M. Stone
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES F. SMITH, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO CONTINENTAL PAPER BAG COMPANY, A CORPORATION OF MAINE.

PAPER-BAG MACHINE.

No. 900,605.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed June 8, 1907. Serial No. 377,896.

To all whom it may concern:

Be it known that I, CHARLES F. SMITH, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Paper-Bag Machines, of which the following is a specification.

This invention relates to that class of paper-bag machines as are provided for making square-bottom paper-bags from tubular blanks having an inwardly folded tuck in each side thereof.

My present improvements are applicable to various types of paper-bag machines but are herein illustrated as applied to the general type of machine set forth in United States Patent Number 864435, granted to me August 27, 1907, and to which reference may be had.

The present application relates directly to improvements in the mechanisms which are provided for folding over the end flaps of the diamond-fold to complete the bag bottom.

In the drawings accompanying this specification is shown such portions of a paper-bag machine of the class specified as will serve to illustrate my improvements. Therein Figure 1 is a sectional side elevation on line 1, 1 of Fig. 2 and looking in the direction of arrow 2 therein. Fig. 2 is a front elevation looking in the direction of arrow 3 of Fig. 1. Figs. 3 to 7 inclusive are diagrammatic side elevations corresponding with Fig. 1 and illustrating successive steps in the operation of my improved machine.

Said machine comprises a revoluble carrier 16 fixed on shaft 17 which in turn is rotatably mounted in sleeves 18, 19 inreaching from and fast to side frames 10, 11 respectively. Said carrier 16 is provided with one or more folding-beds as 12. Said folding-bed 12 is provided with the usual side-clips 95, 96 for holding the bag-blank thereto. Said side-clips may be operated by some convenient means not shown. Mounted on opposite sides of folding-bed 12 and traveling therewith are turn-over-grippers indicated in a general way by 13, 14 respectively. Said grippers are provided for gripping opposite sides of the upper ply of the tucked bag-blank and for turning it over to form the diamond-fold. Said turn-over grippers

13, 14 are mounted for oscillation on trunnions 138, 139 respectively. The means provided for oscillating gripper 14 comprises an arm 129 turning freely on trunnion 139: Said arm bears a roll 133 for engagement with fixed cam 134; pivotally mounted on arm 129 is gear 140 for engagement with internal segment gear 135 secured to the side of carrier 16; gear 140 also meshes with gear 128 fixed to turn-over-gripper 14. Thus by means of a relatively small movement of roll 133 about trunnion 139 a largely increased movement of gear 128 and gripper 14 is produced about said trunnion. Gripper 13 is oscillated by means similar to those just described for actuating gripper 14. As my present improvement does not relate to the formation of the diamond-fold, further description of the means of forming said diamond-fold is omitted.

For folding the end-flaps of the diamond-fold to complete the bag-bottom the following means are provided. In suitable bearings in side frames 10, 11 is mounted shaft 177. Said shaft has fixed thereon arms 179, 180 carrying flap-folders 201, 202. These folders comprise blade-like members curved substantially concentric with shaft 177 about which they rotate. Shaft 177 also has mounted thereon gear 37 which through gears 36 and 33 is actuated from gear 7 on carrier-shaft 17. Also gear 37 is of such size relative to gear 7 that shaft 177 is caused to make one revolution for each passing folding-bed on carrier 16 and in an anti-clockwise direction. Also the length of arms 179, 180 is such that folders 201, 202 are caused to travel at a linear speed in excess of the linear speed of the folding-bed.

Fixed to shaft 177 adjacent to but outboard arms 179, 180 are cams 41, 42 and mounted for free rotation on said shaft are sleeves 43, 44 all respectively. On said sleeves are mounted mechanisms which are right and left duplicates of each other and a description of one will therefore suffice for both. On the inboard end of sleeve 43 adjacent to cam 41 is fixed hub 45 for revolution therewith. Said hub is provided with two oppositely disposed ears 46, 47 in which are pivotally mounted rear-flap-tuckers 48, 49, all respectively. Said tuckers comprise arms 50, 51 terminating at their free ends in blades as 52 on arm 50. Said blade 52 is located radially slightly beyond rear-flap-

folder-blade 201 and within the plane of rotation thereof, but not so as to interfere with that rotation. Arm 50 has two ears extending in opposite directions adjacent to its pivotal point. In one of these 501 is mounted roll 54 for engagement with cam 41. Against the other ear 502 one end of spring 55 impinges to urge roll 54 to engagement with said cam 41. The other end of said spring 55 abuts against a suitable ear or hub 45.

Rear-flap-tucker 480 is located opposite (relative to the path of the bag-blank) to rear-flap-tucker 48 for coöperation therewith. Said tucker 480 is similarly mounted to tucker 48 and is actuated by similar means all as hereinbefore described in connection with tucker 48. Tucker 480 is provided with a blade 520 similar to blade 52 of tucker 48 and with a roll 64 for engagement with cam 42.

Sleeves 43, 44, are caused to revolve by the following means. Gear 33 already referred to is fixed to and drives shaft 189 mounted for rotation in suitable bearings in side frames 10, 11. Inboard and adjacent to side frame 11 gear 56 is fixed on shaft 189, and through idle gear 57 on stud 58 in frame 11 drives gear 59 fixed on sleeve 44. Inboard and adjacent to side frame 10 gear 66 is fixed on shaft 189 and through intermediate gear 67 on stud 68 in frame 10 drives gear 69 fixed on sleeve 43. Said gearing is so proportioned as to cause sleeves 43, 44 to rotate in unison in an anti-clockwise direction, Fig. 1, and at such speed as to cause the rear-flap-tuckers to travel at a normal peripheral speed equal or approximate to that of the folding-bed.

Pivotally mounted at 104 in carrier 16 beneath folding-bed 12 is front-flap-folder 195. Said front-flap-folder is provided to lift and partly fold up the front-flap of the diamond-fold after the rear flap has been folded thereunder and to assist the entrance of the diamond-folded bag-blank with its partly folded front-flap into the bite of delivery cylinder 210 with the folding-bed to complete the folding of said front-flap. Said front-flap-folder 195 (see Fig. 7) has fixed thereto segment gear 197 meshing with similar segment gear 199 pivoted at 172 in carrier 16. Said segment gear has an arm 173 bearing roll 174 for engagement with fixed cam 100. By these means said front-flap-folder 195 may be actuated to perform its part in folding the front-flap of the diamond fold.

Fixed on shaft 38 supported for revolution in side frames 10, 11, is delivery cylinder 210. Said cylinder is caused to revolve at a uniform surface speed with that of folding-bed 12 by means of gear 223 fixed on shaft 38 and which gear is in mesh with and driven by gear 7. Delivery cylinder 210 is

provided with one or more folding or ironing-beds as 222. Said ironing-bed 222 is provided with a front-clip 224 pivoted at 225 therein and which bears a roll 227 for engagement with the usual fixed cam not shown. Delivery cylinder 210 is provided with one or more rear-flap-retaining-fingers (corresponding in number with the number of ironing-beds on said cylinder) as 204. Said finger 204 is pivotally mounted at 205 in cylinder 210 and is provided with a roll 206 thereon for engagement with the usual fixed cam not shown.

Operation: As the present improvements pertain directly to the folding of the front and rear flaps of the diamond-fold to complete the bag-bottom, in the description of the operation of my invention it is assumed that the tucked paper tube properly held on folding-bed 12 by side-clips 95, 96, has had the diamond-fold formed thereon by means of turn-over-grippers 13, 14 and that said diamond-fold has been ironed or flattened down by means not shown. Also it is assumed that said diamond-folded blank has had the usual two creases formed thereacross for defining the lines on which the front and rear flaps respectively are to be folded over, and that paste has been applied to the face of said diamond-fold, all by means not shown but well-known in the art. Thereupon turn-over-grippers 13, 14 swing on their axes a short distance in a clockwise direction from the face of folding-bed 12 to the position shown in Fig. 3 thereby lifting the rear portion of the diamond-fold to present the rear-flap thereof for engagement with the rear-folding means. Rear-flap-tuckers 48, 480, each having their cam-rolls, as 54 of tucker 48 on a concentric portion of its cam as 41, are traveling in unison and at a linear speed substantially the same as that of the bag-blank. Said tuckers thereupon present their blades, as blade 52 of tucker 48, for engagement with the rear portion of the diamond-fold, Fig. 3. Also rear-flap-folders 201, 202 traveling at a greater linear speed, are rapidly approaching the rearward side of the rear-flap. At the same time front-flap-folder 195 swings outwardly from below the face of folding-bed 12 and commences to lift and fold over the front-flap of the diamond-fold, all as shown in Fig. 3. The bag-blank continuing its onward movement with folding-bed 12 rear-flap-tuckers 48, 480 engage the rearward portion of the diamond-fold, press down any ballooned portions thereof and counteract any tendencies to buckle or misfold under the action of the rear-flap-folders, Fig. 4. The operative edges of the blades, as 52, of the rear-flap-tuckers have now rolled into a position of approximate coincidence with the rear edges of turn-over-grippers 13, 14 and furnish a defining edge for the folding

over of the rear-flap of the diamond-fold (on the line of the previously formed creases therein) by the rapidly advancing rear-flap-folders 201, 202. At the same time front-flap-folder 195 has continued to fold the front-flap, all as shown in Fig. 4. Rear-flap-tuckers 48, 480 continuing to maintain their positions relative to the diamond-fold, rear-flap-folders 201, 202 advance and fold the rear-flap over onto said rear-flap-tuckers. Also front-flap-folder 195 continues its operation on the front-flap and folds it up between the heels of blades 52, 520 of the rear-flap-tuckers, all as shown in Fig. 5. Rolls 54, 64 of rear-flap-tuckers 48, 480 are now engaged by the advancing low portions of cams 41, 42, all respectively. Blades 52, 520 are thereby withdrawn from engagement with the bag-blank and pass on each side respectively of delivery cylinder 210. At the same time rear-flap-retaining-finger 204 in said delivery cylinder 210 swings outwardly therefrom and between the advancing noses of rear-flap-folders 201, 202 takes up the work of folding the rear-flap, begun by said rear-flap-folders. The face of the partly folded front-flap now passes into contact with delivery cylinder 210 and front-flap-folder 195 withdraws from engagement with said front-flap, Fig. 6. Turn-over-grippers 13, 14 now swing on their axes in an anti-clockwise direction carrying the rear portion of the diamond-fold back toward the folding-bed and rear-flap-retaining finger 204 continues to advance against the rear-flap and folds it down onto the body of the diamond-fold under the front-flap, Fig. 7. Said front-flap is then folded up over the rear-flap by the onward movement of ironing-bed 222 of cylinder 210. The leading end of the then nearly completed bag-bottom now passes between its folding-bed 12 and ironing-bed 222, to the latter of which it is gripped by front-clip 224. Front-flap-folder 195 and rear-flap-retaining-finger 204 thereupon withdraw and side-clips 95, 96 and turn-over-grippers 13, 14 release their hold on the now completed bag. Said bag is then conducted between its folding-bed 12 and ironing-bed 222, and upon the release of clip 224 is discharged from the machine.

I claim:

1. The combination of a folding bed, means for holding a bag-blank thereon, means for forming the diamond fold on the bag-blank, a rear-flap-tucker and a rear-flap-folder, mounted upon a common axis independent of the folding bed, means for actuating the rear-flap-tucker, means for actuating the rear-flap-folder for folding the rear flap over the rear-flap-tucker, and means for folding the front flap.

2. The combination of a revoluble folding-bed, means for holding a bag-blank thereon,

means for forming the diamond fold on the bag-blank, a rear-flap-tucker and a rear-flap-folder, revolubly mounted upon a common axis independent of the folding-bed and remote from the axis thereof, means for actuating the rear-flap-tucker at a variable speed, means for actuating the rear-flap-folder, and means for folding the front flap.

3. The combination of a folding-bed, means for holding a bag-blank thereon, means for forming the diamond-fold on the bag-blank, a revolubly mounted rear-flap-tucker, means for actuating the same at a variable speed, a rear-flap-folder revolubly mounted concentric with the rear-flap-tucker, means for actuating the rear-flap-folder at a uniform speed for folding the rear-flap over said rear-flap-tucker, and means for folding the front flap.

4. The combination of a revoluble folding-bed, means for holding a bag-blank thereon, means for forming the diamond-fold on the bag-blank, means for folding the front flap of the diamond fold, means, including a rear-flap-tucker and a rear-flap-folder, revolubly mounted upon a common axis independent of the folding-bed and remote from the axis thereof, for folding the rear flap of the diamond fold, means for actuating the rear-flap-tucker and means for actuating the rear-flap-folder.

5. The combination of a revoluble folding-bed, means for holding a bag-blank thereon, means including a pair of oppositely-disposed turn-over-grippers for forming the diamond-fold on the bag-blank, means for oscillating said turn-over-grippers; a rear-flap-folder and a rear-flap-tucker, each revolubly mounted independent of the folding-bed and co-axial with each other, means for actuating the rear-flap-tucker at a variable speed, means for actuating the rear-flap-folder and means for folding the front flap of the diamond fold.

6. The combination of a revoluble folding-bed, means for holding bag-blank thereon, means, including a pair of oppositely-disposed turn-over-grippers, for forming the diamond-fold on the bag-blank, means for oscillating said turn-over-grippers; a front-flap-folder mounted below the face of the folding-bed, means for operating the front-flap-folder; a revoluble rear-flap-folder and means for actuating the same, a rear-flap-tucker revolubly mounted concentric with the rear-flap-folder, means for actuating the rear-flap tucker; a delivery cylinder mounted for revolution on an axis parallel with the axis of revolution of the folding-bed, a retaining finger carried in the delivery cylinder and means for actuating said finger for holding the rear-flap down after said rear-flap has been folded over the rear-flap-tucker by the rear-flap-folder.

7. In a paper bag machine having means for holding the bag-blank and means for forming the diamond fold thereon the combination of a rear-flap-tucker and a rear-flap-folder, revolubly mounted upon a common axis independent of the blank holding and diamond forming means, means for actuating the rear-flap-tucker, means for actuating the rear-flap-folder for folding the rear flap over the rear-flap-tucker, and means for folding the front flap.

8. In a paper-bag machine the combination of a rear-flap-folder and a rear-flap-tucker each revolubly mounted independent of the folding-bed and coaxial with each other, means for actuating the rear-flap-tucker at a variable speed and means for actuating the rear-flap-folder.

9. In a paper-bag machine the combination of a rear-flap-folder and a rear-flap-tucker mounted coaxially upon a fixed axis,

means for actuating the rear-flap-tucker and means for actuating the rear-flap-folder.

10. In a paper-bag machine the combination of a rear-flap-folder and a rear-flap-tucker mounted coaxially upon a fixed axis, means for actuating the rear-flap-tucker at a variable speed and means for actuating the rear-flap-folder.

11. In a paper-bag machine the combination of a rear-flap-folder and a rear-flap-tucker each mounted for continuous rotation about a common axis, means for actuating the rear-flap-folder and means for actuating the rear-flap-tucker.

Signed this 6th day of June, nineteen hundred and seven (1907) in the presence of two subscribing witnesses.

CHARLES F. SMITH.

Witnesses:

CHAS. W. LA RUE,
WILBUR M. STONE.