

No. 674,248.

Patented May 14, 1901.

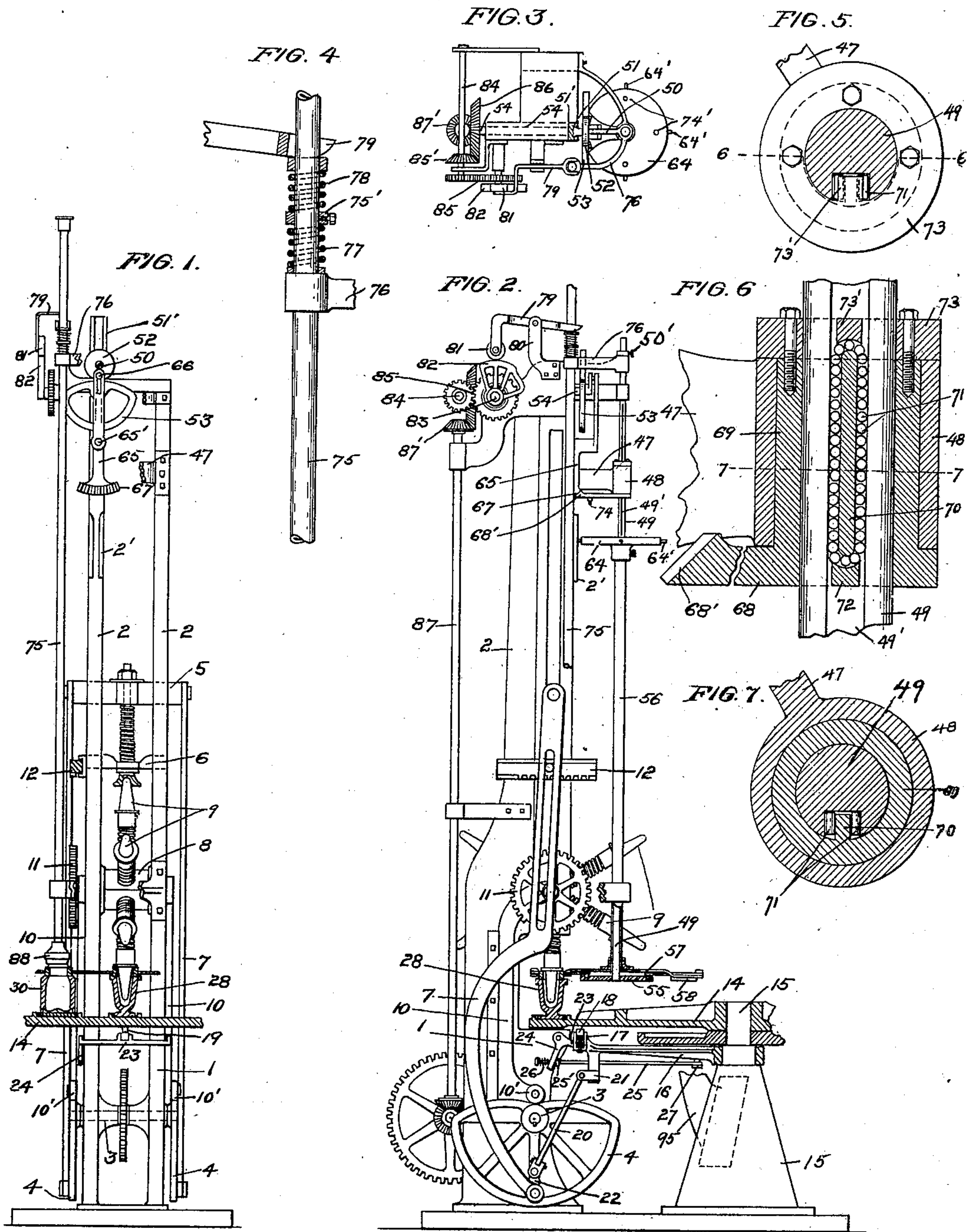
F. O'NEILL.

MACHINE FOR MANUFACTURING GLASSWARE.

(Application filed Oct. 27, 1900.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES

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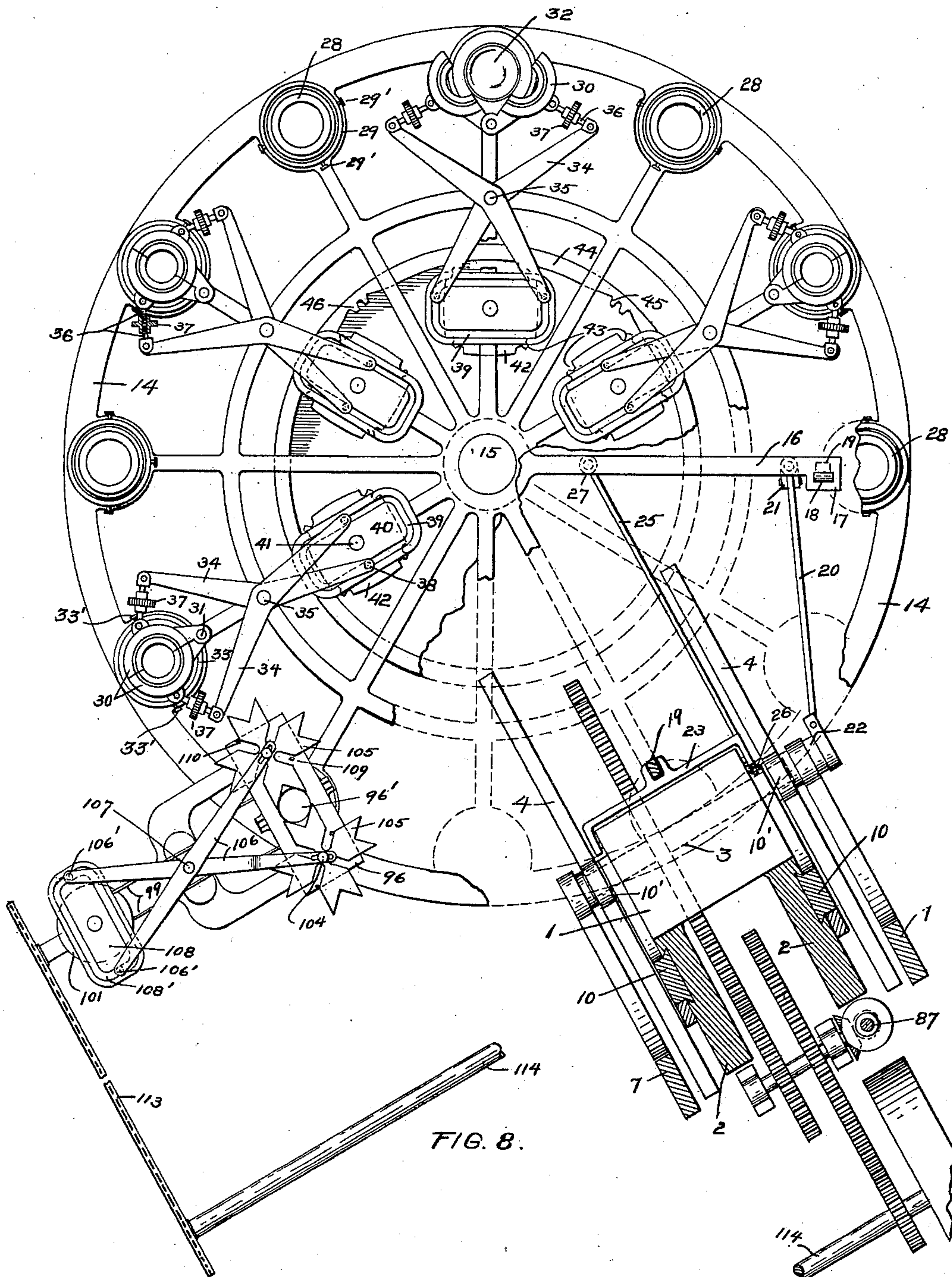
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FIG. 9.

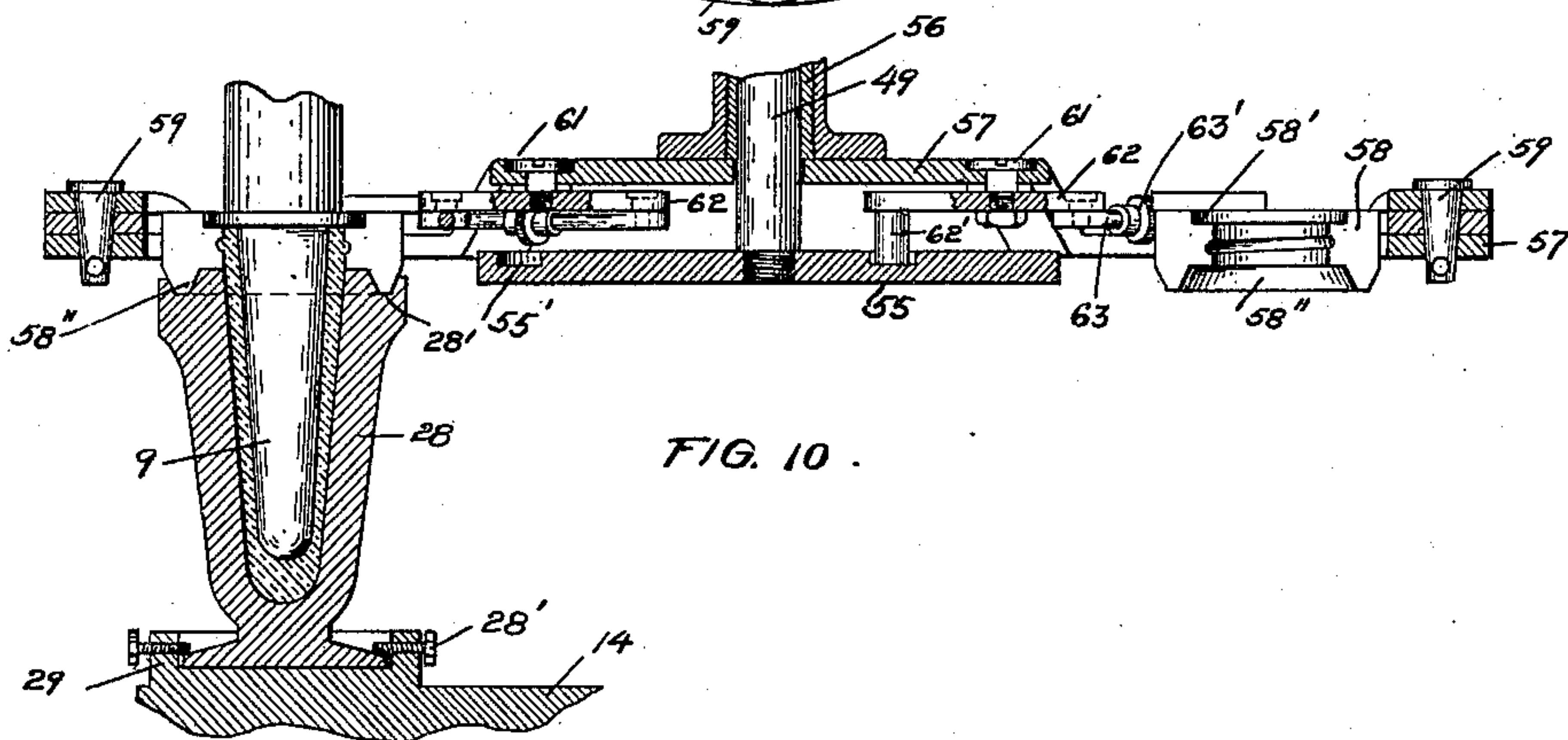
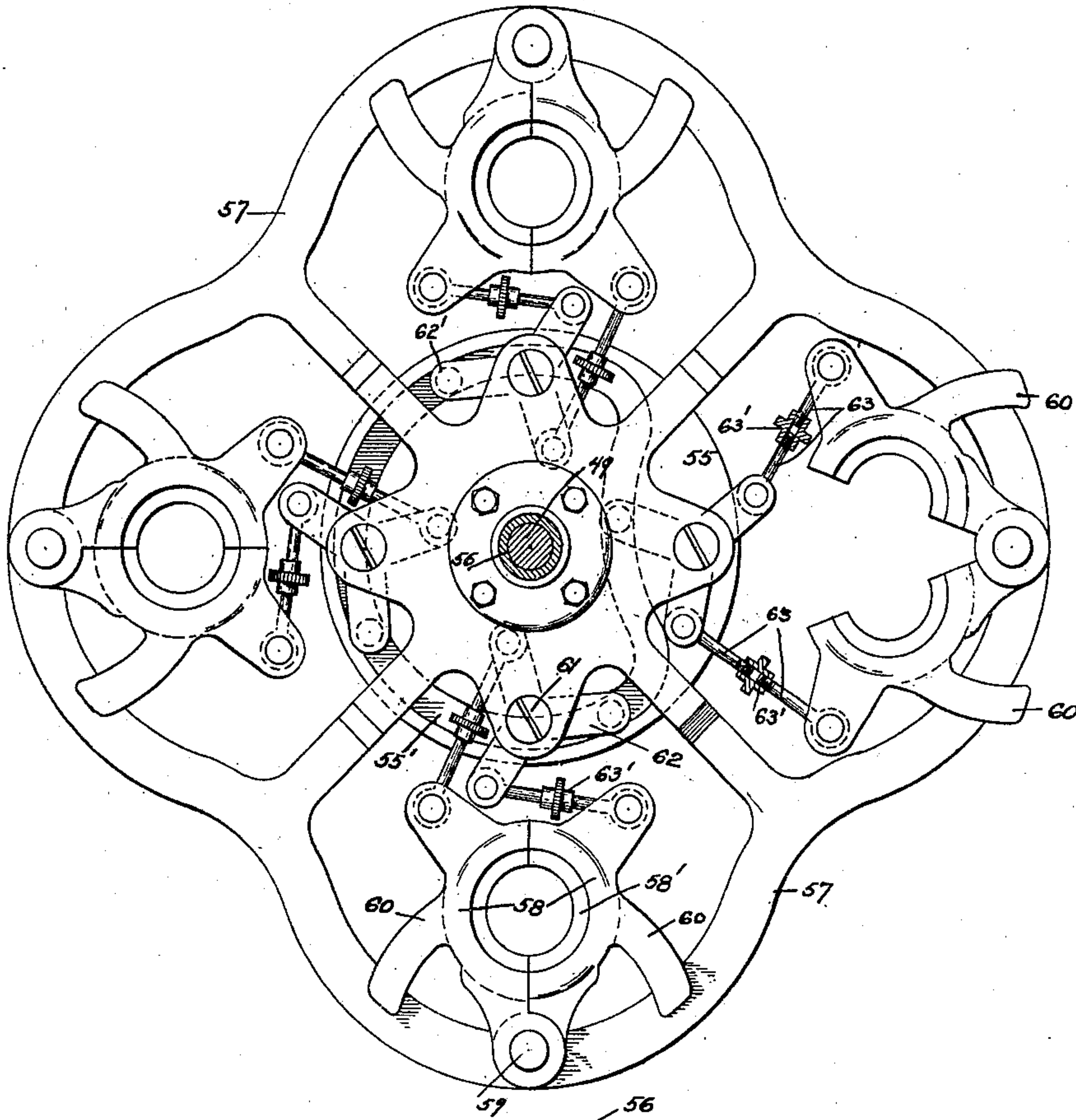


FIG. 10.

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4 Sheets—Sheet 4.

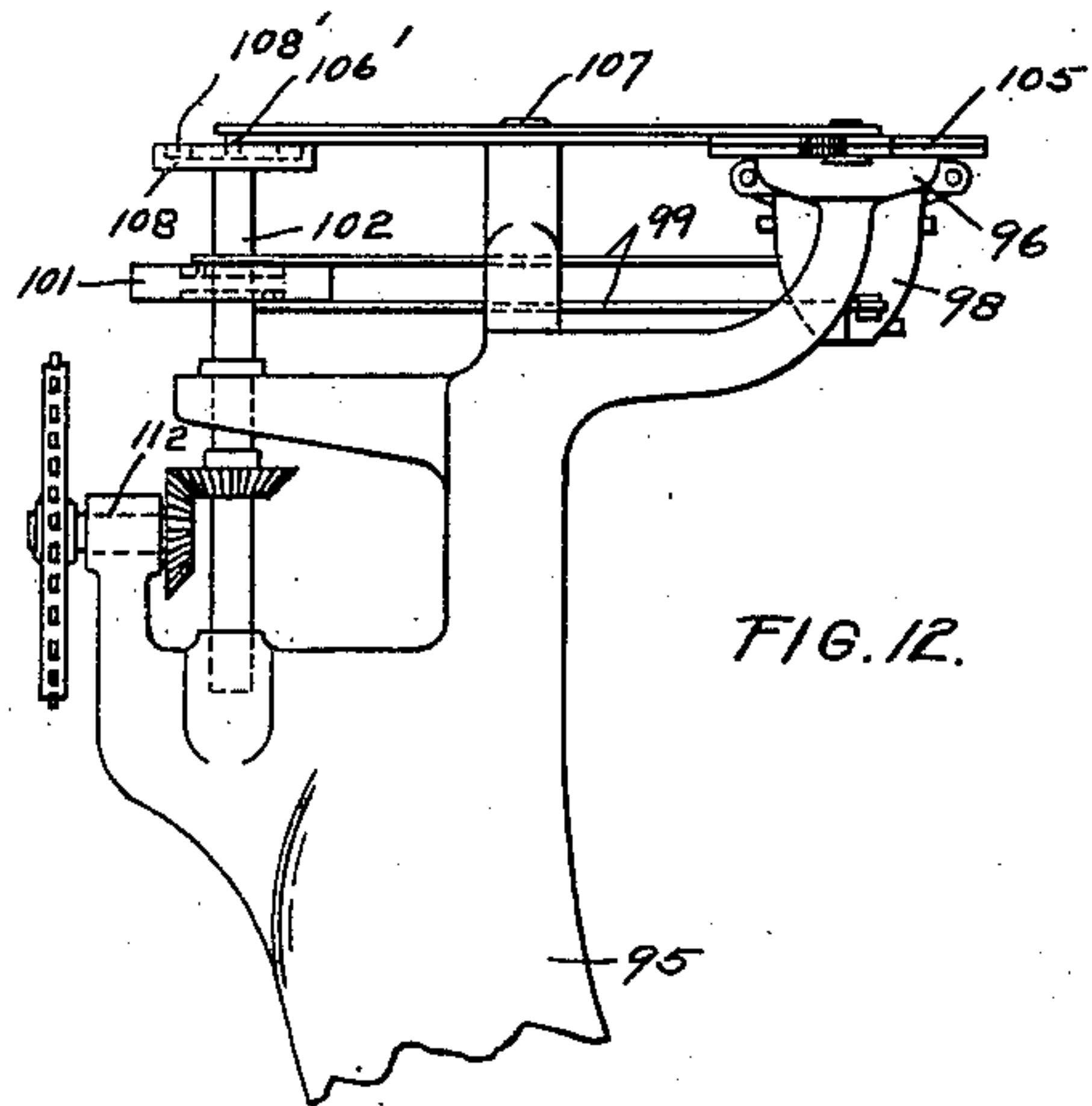


FIG. 12.

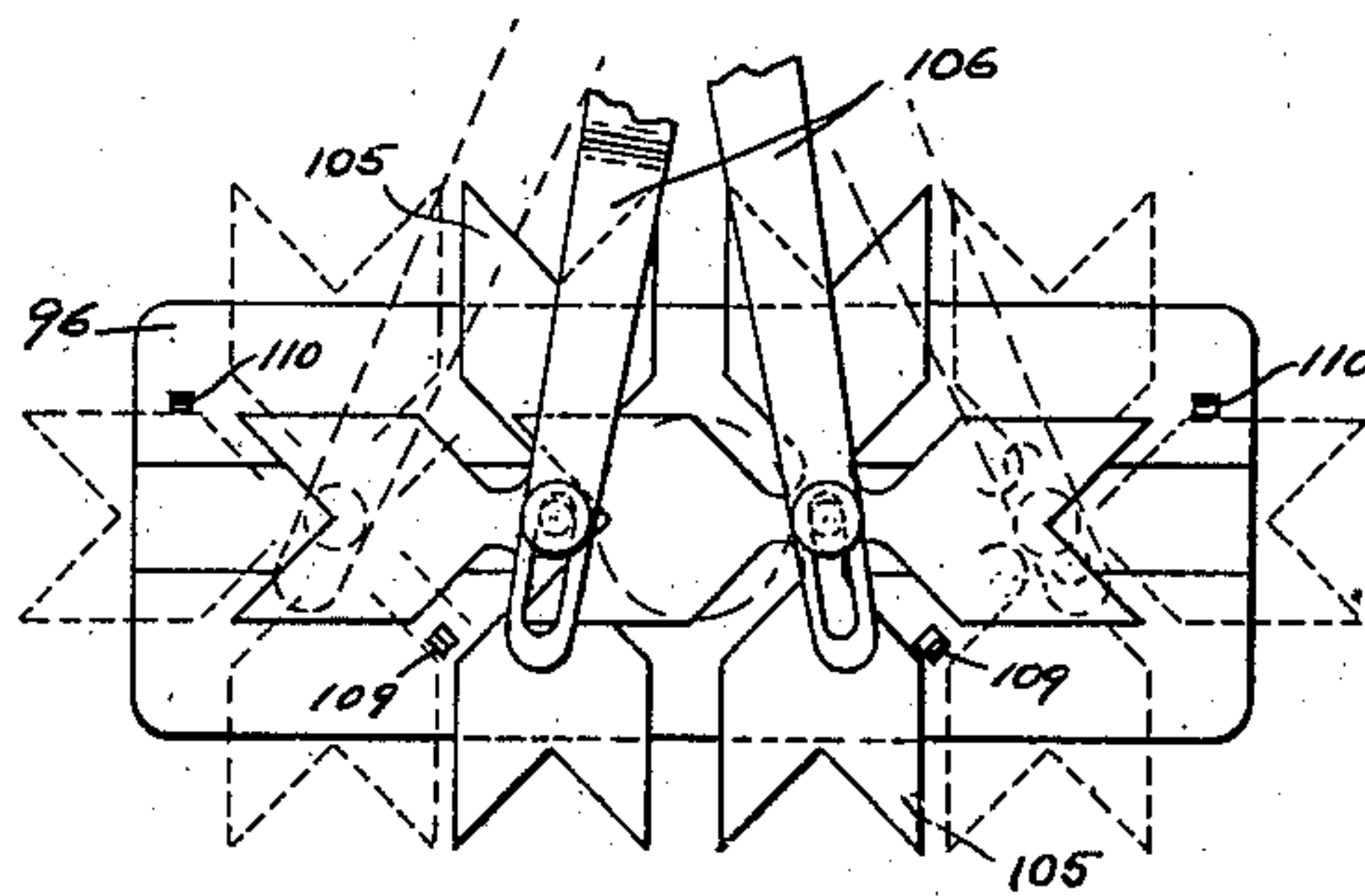


FIG. 15.

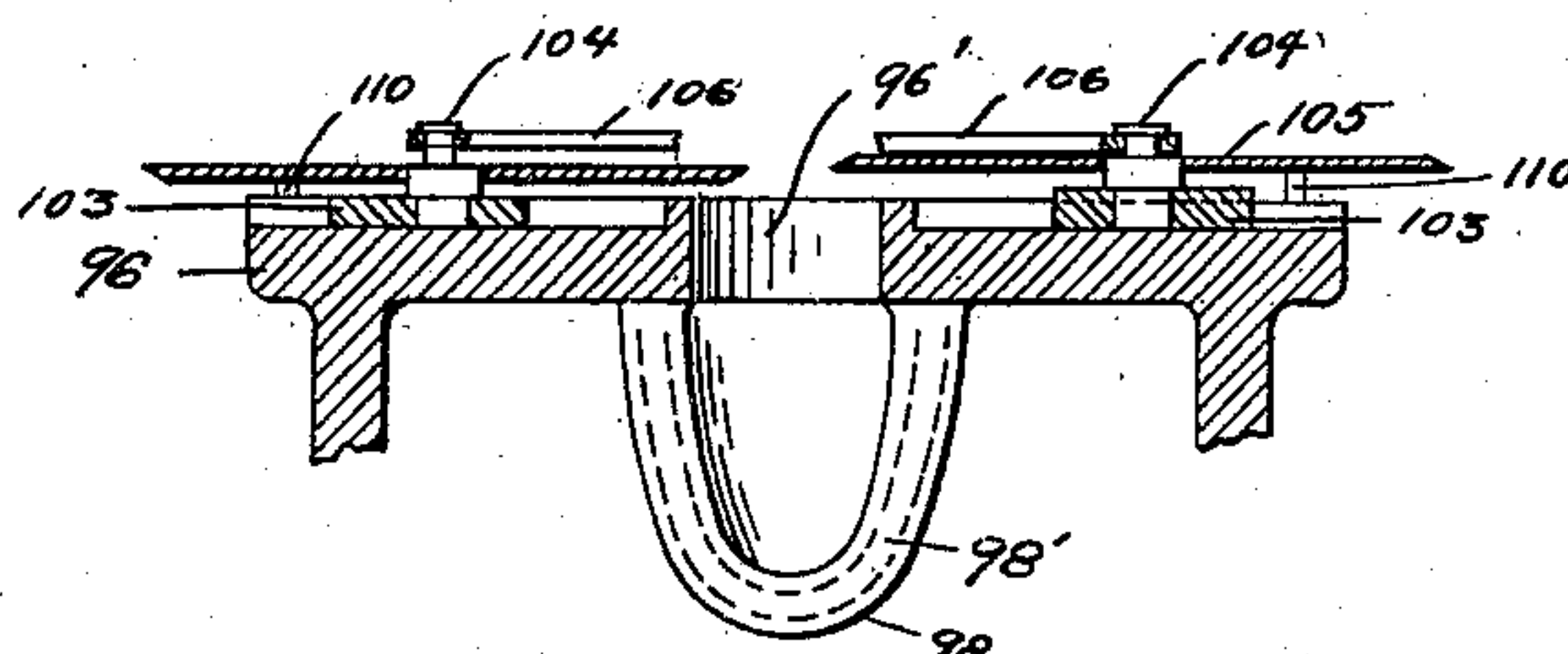


FIG. 16.

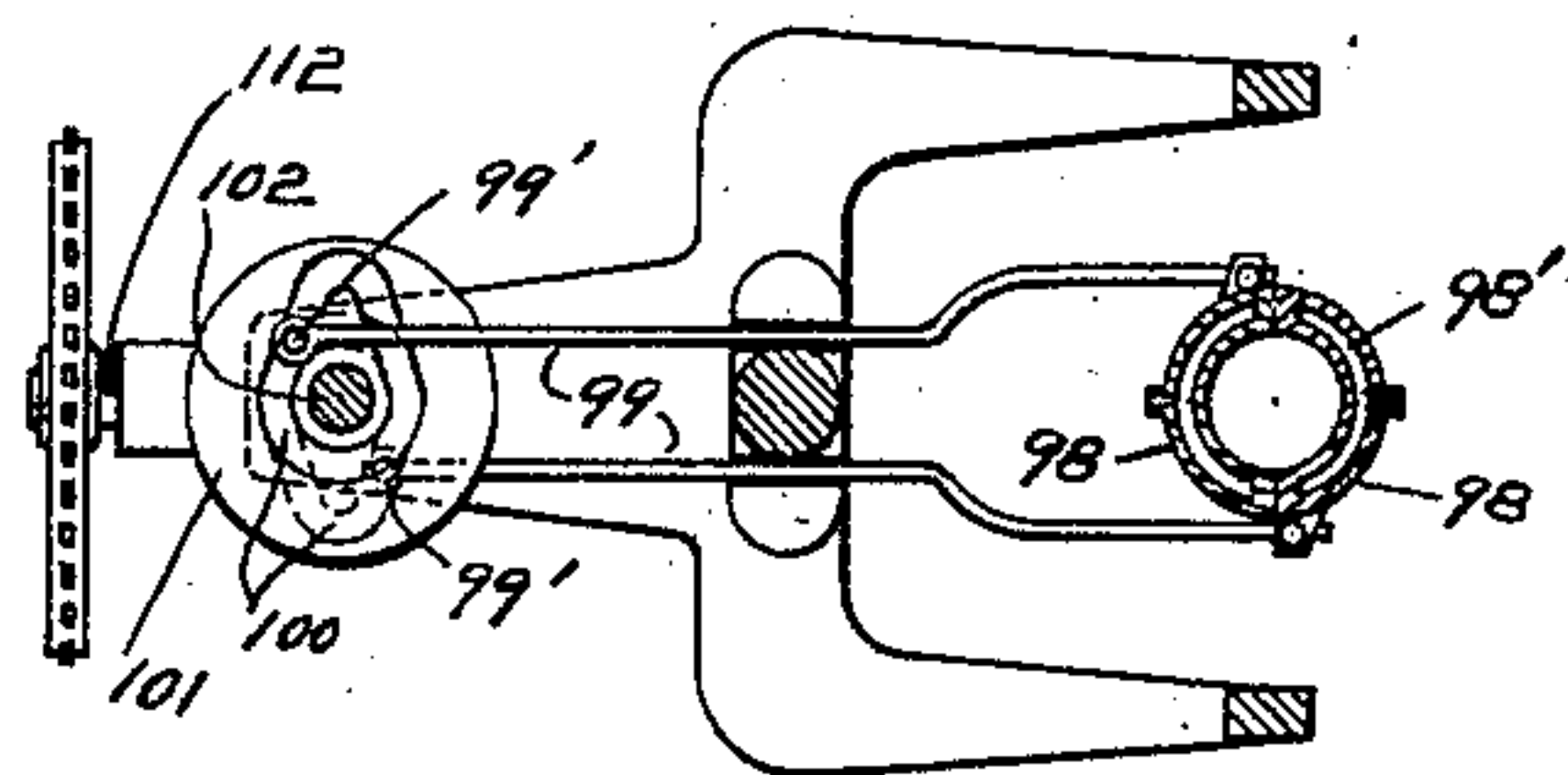


FIG. 13.

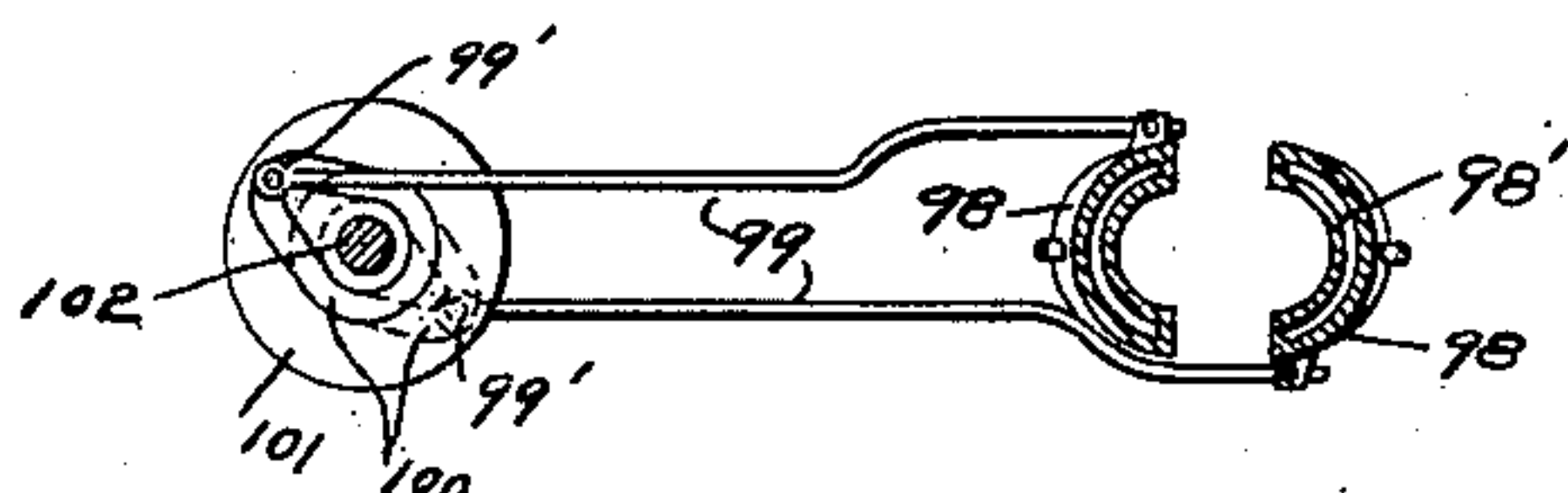


FIG. 14.

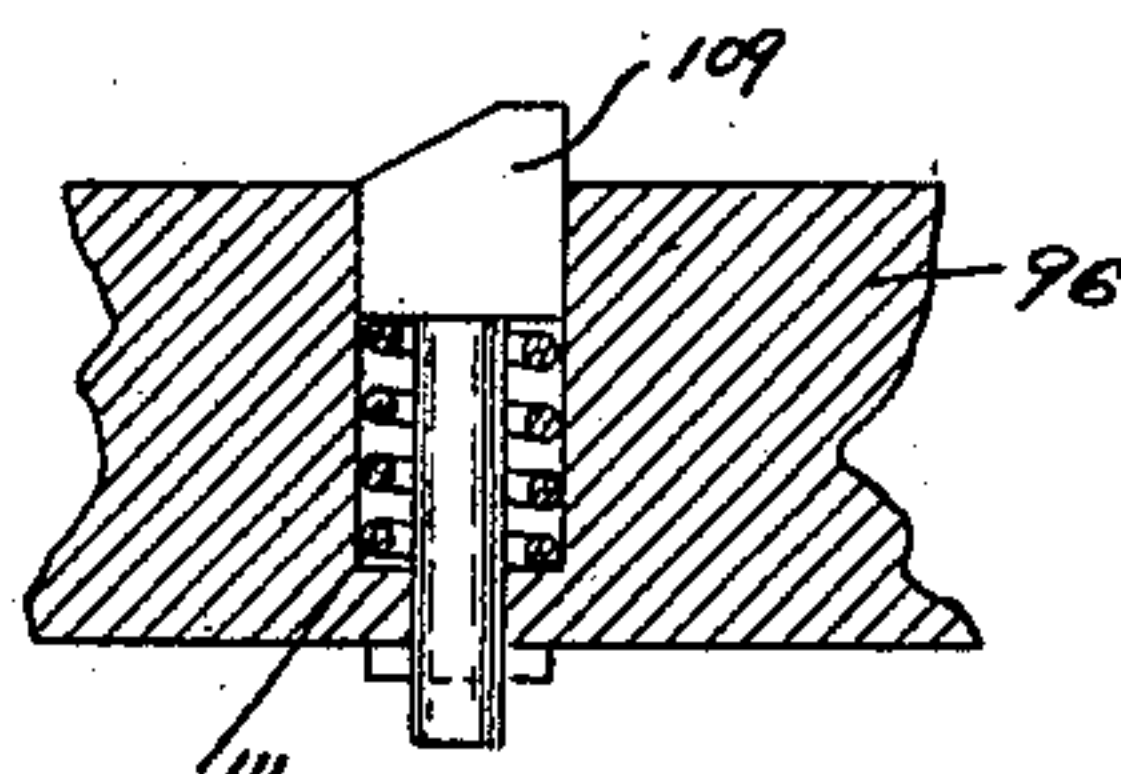


FIG. 17.

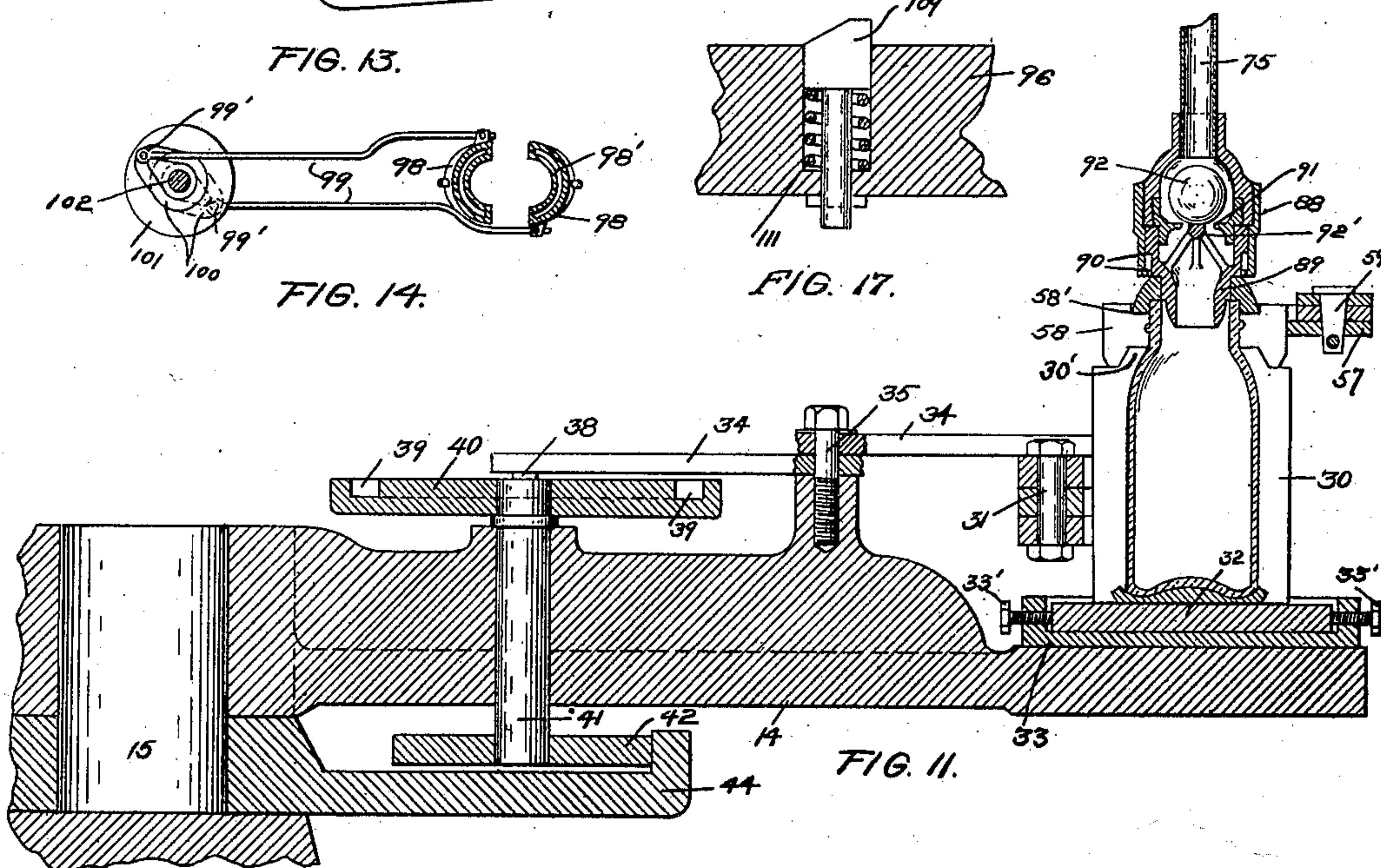


FIG. 11.

WITNESSES

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UNITED STATES PATENT OFFICE.

FRANK O'NEILL, OF KINGSVILLE, CANADA.

MACHINE FOR MANUFACTURING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 674,248, dated May 14, 1901.

Application filed October 27, 1900. Serial No. 34,680. (No model.)

To all whom it may concern:

Be it known that I, FRANK O'NEILL, a citizen of the United States, residing at Kingsville, in the county of Essex, Province of Ontario, Canada, have invented new and useful Improvements in Machines for Manufacturing Glassware, of which the following is a specification.

This invention relates to machines for manufacturing glassware; and one object thereof is to improve, simplify, and render more effective the operation of the machine patented to me July 10, 1900, No. 653,523.

A further object is to provide improved mechanism for measuring and delivering the molten glass to the molds.

The invention consists in the novel features of construction and in the combination and arrangement of parts hereinafter fully described and claimed, and illustrated by the accompanying drawings, in which—

Figure 1 is a front elevation of a portion of the machine. Fig. 2 is side elevation showing a portion of the mold-carrier in vertical section. Fig. 3 is a top plan view of the upright portion of the machine. Fig. 4 is a detail view of a portion of the blowpipe. Figs. 5, 6, and 7 are detail views, on an enlarged scale, of the neck-mold-actuating mechanism, Fig. 5 being a plan view, Fig. 6 a vertical section on line 6 6 of Fig. 5, and Fig. 7 a sectional plan view on line 7 7 of Fig. 6. Fig. 8 is a plan view, partly in section and with portions of the mold-carrier broken away. Fig. 9 is a plan view of the neck-mold carrier. Fig. 10 is a vertical cross-sectional view on line 10 10 of Fig. 9, together with a view of a plunger and press-mold. Fig. 11 is a vertical sectional view of a portion of the mold-carrier, showing a blow-mold, a neck-mold, and the blowing-head in blowing adjustment. Fig. 12 is a side elevation of the glass measuring and severing mechanism. Fig. 13 is a sectional plan view of the same, showing the measuring-font closed; and Fig. 14 is a similar view with the font open. Fig. 15 is a plan view, on an enlarged scale, of the glass-severing mechanism, the knives being shown closed together in solid lines and open or apart in dotted lines. Fig. 16 is a vertical sectional view of the same with the

knives open. Fig. 17 is a detail view of one of the knife-shifting latches.

Referring to the drawings, 1 is the base, and 2 the upright portion, of the machine-frame.

3 is the main base-shaft, 4 the cams on said shaft, 5 the cross-head, carrying depressor 6, and 7 the pitmen, connecting head 5 and cams 4.

8 is the plunger-shaft, 9 the plungers, arranged radially on the shaft, and 10 the vertical side bars depending from shaft 8 and carrying rollers 10' at their lower ends, which operate on cams 4 to reciprocate the plungers.

11 is a gear mounted on the vertically-reciprocating plunger-shaft, which when in raised position engages rack 12, which is reciprocated horizontally by pitman 7. Thus a partial rotation is imparted to the plunger-shaft between the up and down strokes thereof, the movement being sufficient to present the plungers successively for pressing.

The mold carrier or table 14 is rotatably mounted on post 15, and intermittent motion is imparted thereto for positioning the molds by arms 16, revoluble on post 15 and carrying at its outer end head 17. Movable vertically in the head is the beveled spring-held latch 18, which engages one of lugs 19, depending from carrier 14, thus advancing the latter the required distance at each forward oscillation of arm 16. Said arm is oscillated by rod 20, having at its outer end a swivel connection 21 with head 17 and at its inner end pivotally connected to crank 22, secured to the wrist-pin of pitman 7. The carrier is held immovable, with the operative press and blow molds in proper position, by the automatic engagement of one of the carrier-lugs 19 with the depressible latch 23. The latch is pivotally secured to base 1 and is formed with a depending arm 24, and movable through the latter is one end of rod 25, provided with stop 25' and carrying spring 26, arranged between arm 24 and the extremity of the rod. The opposite end of the rod is pivotally connected at 27 to arm 16. With arm 16 and rod 25 at the backward limit of their movement, as in Figs. 2 and 8, spring 26 is inactive and latch 23 depressed by its own weight, with the mold-carrier free to advance. As

soon, however, as arm 16 begins to advance rod 25 is moved inward slowly, causing spring 26 to contact against latch-arm 24, thus slowly raising the latch to position for engaging and holding the carrier for the next operation, the spring allowing the latch to be depressed by the advancing lug 19 and causing the latch to automatically engage said lug.

The press-molds 28, which are positioned successively over base 1 and beneath and in line with the plungers, are removably secured by screws 28' in cup-holders 29, fixed to carrier 14.

The blow-molds 30 are arranged on carrier 14 in the circle of the press-molds and alternately therewith. Each mold 30 is made in two parts, united on the inner side by hinge 31. The mold-sections are dovetailed at their lower ends to close around the beveled mold-bottom 32, the latter being removably secured by screws 33' in cup-holders 33, fixed to carrier 14. Crossed levers 34 are secured to the carrier by fulcrum-bolt 35 and at their outer ends are connected with the mold-sections by links 36, each link being in two parts united by a turnbuckle 37, whereby a very exact adjustment may be made. The inner ends of the levers carry pins 38, which depend into the continuous oblong groove 39 of plate 40. This plate is secured centrally to the upper end of shaft 41, journaled vertically in carrier 14. At the lower end of said shaft is gear 42, of substantially square outline and indented at the corners to form teeth 43.

44 is a circular guide fixed to post 15 beneath carrier 14. The edges of gear 42 traverse the inner periphery of this guide, holding the gear against rotation, with the blow-molds closed. At separated points the guide 44 is toothed at 45 and 46. Teeth 45 when engaged by the teeth at one of the corners of gear 42 impart a quarter-turn thereto, thus turning plate 40 and spreading levers 34 in such manner as to open the mold, as seen in Fig. 8, when the completed article is removed therefrom. Moving on to teeth 46 another quarter-turn is imparted to the gear, which closes the mold, the latter remaining closed until teeth 45 are reached on the succeeding revolution of the carrier.

Extending frontward from the upper part of frame 2 is bracket 47, having vertical socket 48, and movable therethrough is shaft 49, supported at its upper end by arm 50. Shaft 49 extends through an aperture in arm 50 and carries an adjustable stop 50', which rests on the top face of the arm, thus maintaining the shaft and arm in proper relative position. The inner end of arm 50 is secured to a vertical slide 51, movable in a guideway 51' on frame 2, whereby the arm is braced laterally during its vertical reciprocations. Carried by arm 50 is roller 52, and this roller rides on the periphery of cam 53, the latter being mounted on shaft 54, which is rotated in a manner presently to be explained.

Shaft 49 hangs suspended over mold-carrier

14 and at its lower end supports plate 55, formed with cam-groove 55'. Movable vertically with shaft 49 and revoluble thereon is tubular shaft 56, carrying at its lower end and just above plate 55 the neck-mold carrier 57, having its periphery depressed or lowered, as shown in Figs. 9 and 10.

58 represents the sectional neck rings or molds, hinged at 59 to the periphery of carrier 57. The back of each mold-section has a projecting arm 60, which extends over the top of the carrier-periphery and forms a support in addition to the hinge.

Fulcrumed at 61 to the under side of the central portion of carrier 57 are the triangular or three-arm levers 62. Two of the arms of each lever are connected by links 63 with the mold-sections, while the third arm carries pin 62', which depends into groove 55' of plate 55. While the said pins traverse the concentric part of groove 55' the neck-molds are held closed, and are only opened by the pins traversing the cam portion of the groove, as seen in Fig. 9. Each of links 63 is made in two parts, united by turnbuckle 63', whereby accurate adjustment may be had.

The under sides of each neck mold or ring 58 is formed with the annular tapering flange 58'', which fits groove 28' in the top of each press-mold, insuring a tight and accurate connection, the tapering of the flange and groove serving to center the neck-mold on the blow-mold, and flange 58'', fitting around the reduced and tapered extremity 30' of the blow-mold, provides for an accurate centering and union of said parts and without interfering with the opening of the neck-mold.

65 is a lever fulcrumed between its ends at 65' to frame 2. The upper end of the lever is slotted to receive crank-pin 66, projecting from cam 53. At the lower end of the lever is a toothed segment 67, which meshes with a corresponding segment 68', carried by arm 68, the latter being formed with a vertical bearing portion 69, which is journaled and adapted to oscillate horizontally in socket 48. Shaft 49 moves vertically through bearing 69 of arm 68, being formed with an elongated keyway 49' to receive key or spline 70 of said arm-bearing. Key 70 is inclosed in a succession of bearing-rollers 71, which are held in place at the bottom by projection 72 of arm 68 and at the top by projection 73' of cap-plate 73, said projections extending into keyway 49', as shown in Figs. 5, 6, and 7, and being narrower than the same they have no contact with the shaft, and as the rollers hold the key or spline from such contact a perfect anti-friction-spline connection is had. The connection described causes shaft 49 to oscillate with arm 68 when the latter is actuated by lever 65. Depending from arm 68 is pin 74, which is adapted to enter successively apertures 74' of plate 64, secured to the upper end of shaft 56. By this means said shaft is partially rotated, together with the neck-mold carrier at its lower end, thereby changing the

positions of the neck-molds for the successive operations, as will be presently explained. Pins 64' project from the periphery of plate 64, one of which moves in guide 2' on frame 2 during the vertical movement of shaft 56 and the neck-mold carrier, thereby holding said parts against horizontal oscillation when moving vertically as well as when in lowered position.

75 is a blast or blow pipe carried by arm 76, which extends laterally from arm 50, the upper end of the pipe being adapted to receive a hose (not shown) extending to a supply of compressed air. The pipe extends loosely through arm 76, with a coiled spring 77 thereon interposed between the arm and stop 75' on the pipe. Above the stop is a second coiled spring 78, and embracing the pipe above this spring is the forked free end of lever 79. This lever is fulcrumed between its ends to bracket 80 and at its rear depending end carries roller 81, which rides on cam 82, the latter being secured to shaft 83. This shaft is actuated by shaft 84 through interposed gearing 85, and said shaft is driven by beveled pinion 85', meshing with gear 86 on the rear end of shaft 54. Vertical shaft 87 transmits power from the base of the machine to shaft 54, having pinion 87' at its upper end meshing with gear 86, as shown.

At the lower end of pipe 75 is the valved blowing-head, which consists of the shell or body portion 88, fixed to the pipe, and the base part 89, telescoping part 88, with stops 90 to limit the movement. Each neck ring or mold is formed at its top with an annular depression 58', into which the blowing-head section 89 fits, thus making a tight joint. Section 88 is formed with a valve-seat 91 to receive ball-valve 92, and section 89 carries a spider 92', which lifts and sustains the ball from its seat when the pipe is depressed for blowing, as in Fig. 11. As soon as the pipe is raised section 88 moves upward on section 89, restoring the valve to its seat and shutting off the air.

The operations of pressing and blowing are carried on simultaneously in adjacent molds while mold-carriers 14 and 57 are at rest, the latter being in its lowermost position, with adjacent neck-molds 58 closed and resting on adjacent press and blow molds. With the molten glass in the press-mold the plunger descends and presses in the neck-mold the neck portion of the jar or other article. At the same time the next adjacent blow-mold is in position beneath the blowpipe. Spring 77 sustains the blowpipe with the blowing-head normally clear of the neck-mold. When, however, the pipe is depressed by lever 79, which occurs simultaneously with the depression of the plunger, the blowing-head is in position on the neck-mold against the pressure of spring 77 and the parts of the blowing-head moving together valve 92 is opened and air admitted for the blowing operation. During this operation the upper spring 78, which is

also contracted by the pressure of lever 79, holds the pipe depressed with the blowing-head firmly seated on the neck-mold. After the article has been blown cam 82 releases lever 79, when the blowpipe is free to respond to the upward pressure of spring 77, thus automatically closing the valve, as before described. At the completion of the concurrent pressing and blowing operations and before shafts 49 and 56 begin to rise the motion of lever 65 is reversed, reversing the motion of arm 68, and shaft 49, turning with said arm by reason of the spline connection, cam-plate 55 is turned sufficiently to pass pin 62' into the offset 55', as seen in Fig. 9, thus opening the neck-mold 58 away from the article in the blow-mold. Shafts 49 and 56 are then raised by cam 53, raising with them the neck-mold carrier 57, whereby the pressed blank is lifted by its neck-mold from the press-mold and the previously-opened neck-mold is raised from the blow-mold. The vertical movement of shaft 56 engages plate 64 with pin 74 at one of apertures 64', and at this juncture the lower end of lever 65 begins its forward reciprocation, thus imparting to said plate and to the neck-mold carrier a quarter of a revolution. During this operation the mold-carrier has been advanced, placing a fresh blow-mold in position to receive the previously-pressed blank, which is lowered thereinto. At the same time a fresh neck-mold 58 is lowered to position on the fresh press-mold beneath the plunger and the operation of pressing and blowing is repeated. As the blow-mold moves forward by the advance of carrier 14 it is automatically opened and the completed article removed. The mold is then closed automatically and so remains until ready to discharge another finished article. A variety of ware may be produced by conforming the several molds and plungers to the work in hand, as will be understood.

The mechanism for measuring and delivering molten glass to the press-molds is arranged above mold-carrier 14 and in advance of the pressing-plungers. Said mechanism is here shown supported by a bracket 95, secured to post 15 and having the horizontal frame portion 96 overhanging the path of the molds. Hinged to opposite sides of frame 96 are the sections of the depending and vertically-bifurcated measuring font or vessel 98. Extending from each section of the font is a rod 99, said rods being provided at their opposite ends with pins 99', which play in cam-grooves 100 in the upper and lower faces of disk 101. This disk is mounted on shaft 102, and rotation of said shaft swings the font-sections on their hinges in opposite directions, thus alternately opening and closing the font at the bottom, as will be understood. Dovetailed slides 103 are arranged in depressions in the top of frame 96 on opposite sides of opening 96', which is immediately over the font, and pivotally mounted at 104 on said slides are the four-blade knives 105, and above the

knives and secured to pivots 104 are the extremities of levers 106. These levers cross each other and are fulcrumed at 107, and at their rear ends carry pins 106', which depend into oblong groove 108' of plate 108, the latter being secured to the upper end of shaft 102. By this means the active knife-blades are reciprocated across opening 96' in scissors fashion and sever the glass which has dropped from a punty into the measuring-font.

Each of knives 105 is provided with several blades, four being here shown, so that fresh blades are presented for each cutting operation, thus preventing overheating. Turning of the knives on pivots 104 is accomplished automatically by the depressible stops 109, arranged in depressions in frame 96 and held normally raised by springs 111. Said stops are in the path of reciprocation of the knives, and, being beveled, are depressed by the inactive laterally-projecting blades when the knives move together for cutting, the stops rising automatically as soon as the blades pass thereover. When the knives recede, stops 109 form abutments, which the knives can pass only by turning on their pivots, and thus the knives are given a quarter-turn and present fresh blades for the next operation. Stops 110, constructed and arranged like stops 109, are beveled in the direction of rotation of the knives and are depressed by the knives when rotating, but serve to prevent the knives from rotating when passing over stops 109. The blade edges are notched, as shown, so as to draw the depending mass of glass to the center of opening 96' before severing it. Shaft 102 is here shown geared to shaft 112, the latter being driven by sprocket chain or belt 113, extending from the main drive-shaft 114 of the machine. If desired, a hopper of suitable form (not shown) may be provided for directing the glass to opening 96'.

In operation the glass is carried from the tank or melting-pot on a punty and permitted to drop into and fill the font 98 and is then severed by the knives. The font is then opened automatically, as described, and discharges its contents into the press-mold, then at rest beneath the font and which is about to pass to the pressing position. The font-sections are cored at 98' to permit a circulation of water, which may be supplied in any suitable manner, (not shown,) thereby maintaining the font at proper temperature.

With this mechanism the exact amount of glass required to form each article may be determined, severed from the remainder, and effectively delivered to the press-molds, the operation of the machine being so timed that each press-mold is charged while at rest and just before taking position for the pressing operation. There is considerable variation in jars and other glass articles as now manufactured, some containing more glass than others, causing thick bottoms, &c. With my improved mechanism the glass is accurately

measured and the ware is of uniform thickness. It will be understood that the size of font will be determined by the ware being manufactured and that the font may be varied along with the several molds to meet a diversity of uses.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, the combination of a support, a blowpipe movable vertically therethrough, a stop on the pipe, a spring interposed between the support and stop, a second spring on the pipe above the stop, and pipe-depressing mechanism adapted to bear on the upper end of said second spring.

2. In a machine of the character described, the combination of vertically-movable neck-molds, a support movable therewith, a blowpipe carried by and movable vertically in said support, a spring for holding the pipe normally raised in the support, and means for depressing the pipe in the support during the blowing operation.

3. The combination of a blowpipe and a blowing-head thereto, said head having a fixed valve-seat, a ball-valve, and a vertically-movable extremity portion adapted to lift and sustain the valve from the seat.

4. The combination of a blowpipe and a blowing-head thereon, said head having a fixed valve-seat, a ball-valve, and a vertically-movable extremity portion formed with a spider adapted to lift and sustain the ball from the seat.

5. In a machine of the character described, the combination of frame 2 having a vertical guideway, slide 51 movable therein, arm 50 projecting from the slide and supporting shaft 49, and means for vertically reciprocating the arm.

6. In a machine of the character described, the combination of a vertically-movable and revoluble neck-mold carrier, and means for holding the carrier against rotation when moving vertically.

7. In a machine of the character described, the combination of vertically-movable shafts 49 and 56, the latter being revoluble on shaft 49, a fixed vertical guide, and projection on shaft 56 movable in said guide when the shaft is moving vertically, whereby the shaft is held against rotation.

8. In a machine of the character described, the combination of vertically-movable shafts 49 and 56, the latter being revoluble on shaft 49, frame 2, guideway 2' thereon, plate 64 on shaft 56, and pins 64' projecting from the plate and adapted to move successively in guide 2', thereby holding shaft 56 from rotating while moving vertically.

9. In a machine of the character described, the combination of bracket 47, arm 68 adapted to turn horizontally in the bracket and carrying an inwardly-projecting key, shaft 49 extending through and movable vertically in

the arm and formed with a keyway, and rollers interposed between adjacent faces of the key and keyway.

10. In a machine of the character described, the combination of carrier 57, sectional neck-molds 58 hinged within the carrier, and projections 60 on the mold-sections extending over the carrier.

11. In a machine of the character described, the combination of carrier 14, actuating-arm 16, vertically-swinging latch 23, and a longitudinally-yielding connection between the arm and latch.

12. In a machine of the character described, the combination of carrier 14, actuating-arm 16, latch 23, and rod 25 secured at one end to arm 16, and at its opposite end having a yielding connection with the latch.

13. In a machine of the character described, the combination of carrier 14, actuating-arm 16, vertically-swinging latch 23, rod 25 secured at one end to arm 16 and at its opposite end movable through the latch, and a coiled spring confined on the rod between the end thereof and the latch.

14. In a machine of the character described, the combination of movable molds, a measuring-font positioned above the path traveled by the molds, molten-glass-cut-off mechanism immediately above the font, and means for discharging the contents of the measuring-font into the molds as they are positioned successively thereunder.

15. In a machine of the character described, the combination of movable molds, a two-part measuring-font positioned above the path traveled by the molds, molten-glass-cut-off mechanism immediately over the font, and means for opening and closing the font-sections for discharging the contents thereof into the molds as they are positioned successively thereunder.

16. In a machine of the character described, the combination of movable molds, a measuring-font above the path traveled by the molds, molten-glass-cut-off mechanism immediately over the font, and mechanism operating to alternately actuate the cut-off and to discharge the contents of the measuring-font into the molds.

17. In a machine of the character described, the combination of a vertically-bifurcated

glass-measuring font, hinges upon which the sections swing, and mechanism for opening and closing the sections.

18. In a machine of the character described, the combination of a vertically-bifurcated measuring-font, hinges for the font-sections, and a revoluble cam operatively connected to the sections for opening and closing them.

19. In a machine of the character described, the combination of a vertically-bifurcated measuring-font, hinges for the font-sections, a revoluble cam, and rods connected to the font-sections and actuated by the cam to open and close the same.

20. In a machine of the character described, the combination of a vertically-bifurcated measuring-font, rods extending from the font-sections, reciprocating knives above the font, the crossed knife-actuating levers, shaft 102, and cams on the shaft for actuating said rods and levers.

21. In a machine of the character described, the combination of glass-cutting knives rotatably mounted and adapted to be reciprocated bodily, the knives having a plurality of cutting edges.

22. In a machine of the character described, the combination of glass-cutting knives rotatably mounted and adapted to be reciprocated bodily, the knives having a plurality of cutting edges, and mechanism operating automatically to turn the knives and present fresh cutting edges for each succeeding operation.

23. In a machine of the character described, the combination of a frame, cooperating knives slidable thereon toward and from each other, the knives being pivotally mounted and having a plurality of cutting edges, depressible beveled stops projecting from the frame into the path of the knives, the stops being depressed by the knives during the forward reciprocations of the latter and operating to turn the knives on the backward reciprocation thereof.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANK O'NEILL.

Witnesses:

ELIHU SCRATCH,
GEO. W. BURKHART.

