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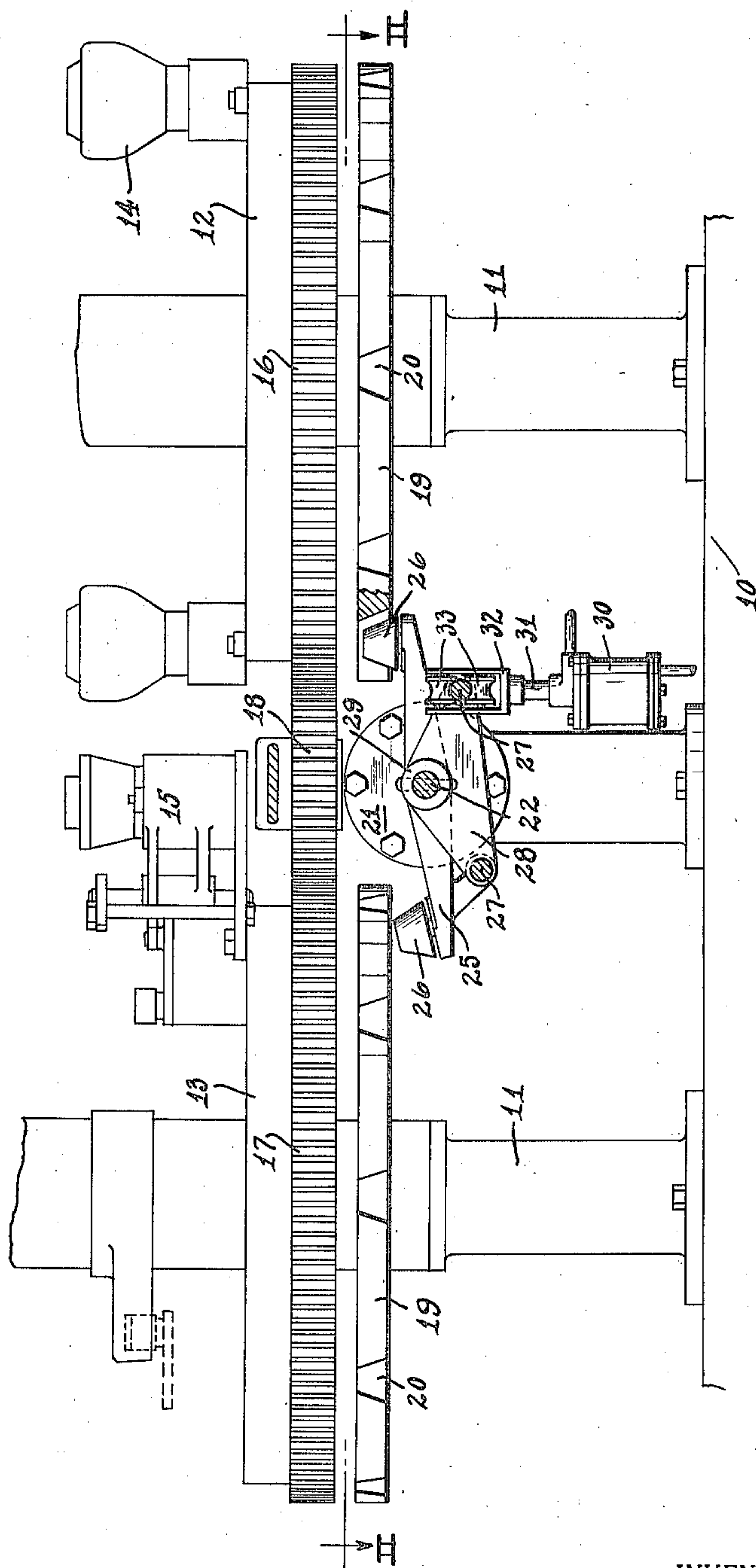
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DRIVING MECHANISM FOR GLASSWARE FORMING MACHINES

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Fig. 1



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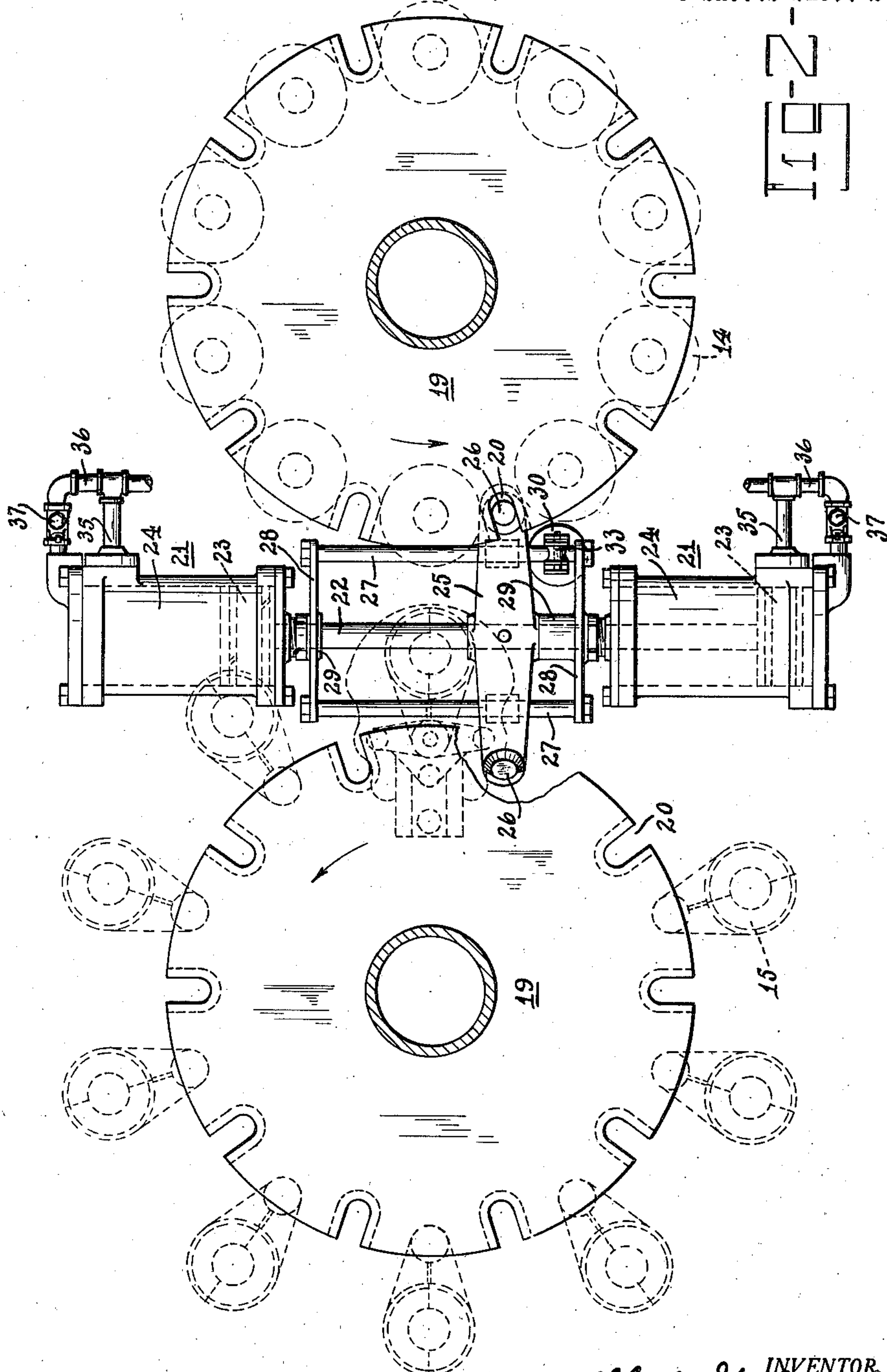
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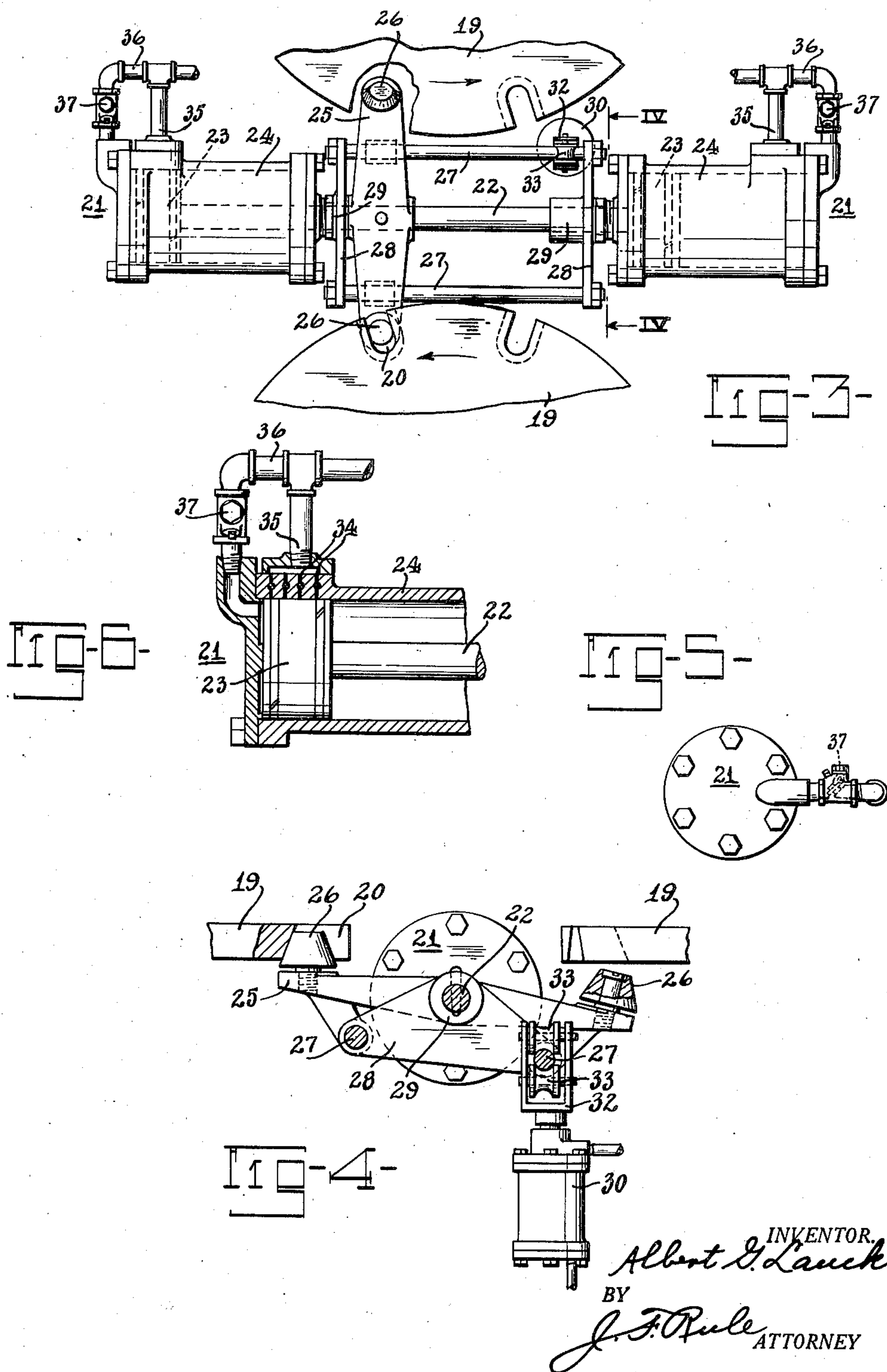
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DRIVING MECHANISM FOR GLASSWARE FORMING MACHINES

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9 Claims. (Cl. 49—9)

The present invention relates to improvements in driving mechanism for glassware forming machines and more particularly to means for driving machines of the type including blank and finishing mold tables arranged side by side and adapted for rotation in a step-by-step fashion.

Ordinarily glassware forming machines of the above type are driven by means of a single fluid motor of the horizontal piston type, driving connection between the motor and tables being obtained by means of rack and pinion mechanism. This rack and pinion mechanism is so actuated that the tables are indexed or moved in a step-by-step fashion by operation of the motor in one direction only, the reversal of the motor being an idle operation. Cushioning means in the form of a cylinder and piston therein suitably connected to the rack bar, reduces the shock and functions as a safety medium as is well known.

The present invention has for an object, the provision of a novel driving mechanism through the employment of which higher production speeds and higher operating efficiency can be obtained.

Another object is the provision of dual fluid operated piston motors connected together by means including devices for operatively engaging the mold tables in alternation, each motor functioning while operating in one direction to index the tables and in the other direction as a cushioning cylinder.

A further object is the provision of novel means for operatively connecting the fluid motors and mold tables.

Other objects will be in part apparent and in part pointed out hereinafter.

In the drawings:

Fig. 1 is a fragmentary side elevational view with parts in section illustrating somewhat diagrammatically a conventional two-table glassware forming machine embodying the present invention.

Fig. 2 is a sectional plan view taken substantially along the line II—II of Fig. 1.

Fig. 3 is a fragmentary plan view of the driving mechanism and portions of the two mold tables.

Fig. 4 is a sectional elevational view taken substantially along the line IV—IV of Fig. 3.

Fig. 5 is an end elevational view of one of the fluid motors showing in dotted lines, the one-way check valve in the air supply line.

Fig. 6 is a fragmentary sectional view through

one of the fluid motors showing the cushioning device embodied therein.

The present invention is illustrated in conjunction with a conventional two-table glassware forming machine of the type ordinarily employed in the manufacture of milk bottles, this machine including a base 10, a pair of vertical stationary columns 11 upon which blank and finishing mold tables 12 and 13 respectively are mounted for rotation. An annular series of blank molds 14 is arranged upon the blank mold table 12 and an annular series of partible finishing molds 15 is carried by the finishing mold table 13. Ring gears 16 and 17 are secured to the lower sides of the blank and finishing mold tables 12 and 13 respectively and have driving connection to each other through an intermediate gear 18 or pinion. The tables are designed for intermittent or step-by-step rotation about their vertical axes so that the molds are brought in succession to a series of stations providing for charging of the molds and a cycle of operations by means of which measured quantities of molten glass are transformed into finished articles and at the proper time discharged from the finishing molds.

The driving mechanism which constitutes the present invention includes a pair of disks 19 or circular horizontally disposed plates suitably connected to the lower side of the ring gears 16 and 17 whereby they may rotate as a unit. Each disk is provided with an annular series of notches 20 or recesses which open through the periphery thereof. The walls of these notches may be tapered upwardly as shown or otherwise suitably shaped. Arranged between the two tables and below the intermediate gear 18 or pinion is mechanism for operatively engaging the disks 19 in alternation and imparting step-by-step movement thereto.

This mechanism includes a pair of opposed fluid operated motors 21 arranged at opposite sides of a center line extending through the axes of the tables, the motors being connected together by a piston rod 22 having a piston 23 at each end disposed within the corresponding motor cylinder 24. Secured to the piston rod 22 is a double rocker arm 25 carrying at its opposite ends, tapered rollers 26 which are designed for engagement with the recesses in the disks 19.

As indicated above, these rollers are adapted for engagement one at a time with the disks 19. To effect such engagement, the double rocker arm is slidably supported upon a pair of horizontal guide rods 27 extending parallel with the

piston rod 22 and constituting part of a frame disposed between the motors and two mold tables. Cross members 28 are suitably connected to the opposite ends of the guide rods 27 and formed with bearings 29 or guides for the piston rod 22. This frame, to which the double rocker arm is slidably connected, is intended to be rocked about the axis of the piston rod 22 at regular time intervals in order to effect operative engagement between the motors and mold tables in alternation.

Rocking of the frame and therefore the double rocker arm 25 is obtained by means of a vertical piston motor 30 disposed below the frame and at one end thereof, said motor being connected to the latter by means of a piston rod 31 having a fork 32 at its outer end in which a pair of grooved rollers 33 are mounted. These rollers (Figs. 1 and 4) engage opposite sides of one of the guide rods 27 and thereby operatively connect the frame and motor 30. The motor 30 may be air operated and obviously is timed to rock the frame and double rocker arm 25 in synchronism with operation of the two motors 21. The rocking of the double arm 25 by the motor 30 causes the piston rod 22 and the pistons 23 connected thereto to be rocked within the cylinders 24. Any well known timer, of which many have been developed for controlling bottle machine operations, may be employed in synchronizing operation of the several mechanisms herein shown.

A cushioning device is built into the outer end of each motor 21, the construction including a series of graduated ports 34 in the exhaust line 35 by means of which the rate of exhaust of air under pressure from the motor cylinders may be regulably controlled. Thus, the cushioning effect may be varied at will. For details concerning this feature, reference may be had to Soubier Patent #1,977,742 dated October 23, 1934. Air under pressure is supplied to each of the motors by way of a supply pipe 36 and a check valve 37 which closes automatically immediately upon discontinuing the flow of air under pressure through the pipe 36.

In view of the above, it is apparent that operation of the mechanism involves application of air under pressure to the motors one at a time so that each may operate alternately as a driving medium and a cushioning device. In Fig. 1 the parts are illustrated at the termination of an indexing operation and the tapered roller 26 at the right end of the double rocker arm, is about to be disengaged from the disk on the blank mold table. This is accomplished, as stated heretofore, by operation of the motor 30, which operation simultaneously effects engagement between the other tapered roller and the disk carried by the finishing mold table 13. Immediately thereafter, the motor 21 at the lower side of Fig. 2 will operate to index the tables, the other motor functioning as a cushioning device as is apparent.

Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

1. In combination, a pair of mold tables arranged side by side for rotation about separate vertical axes, means for imparting rotary motion to the tables including a pair of fluid operated piston motors, table engaging mechanism arranged between the piston motors and actuated by operation of the latter one at a time, and means forming a part of said mechanism and

operable to effect engagement between said mechanism and the tables in alternation.

2. In combination, a pair of mold tables arranged side by side for rotation about separate vertical axes, gears providing driving connection between said tables, means for imparting step-by-step rotation to said tables including a pair of fluid operated piston motors arranged at opposite sides of a center line extending through the axes of said tables, a piston rod connecting the two motors, table engaging mechanism carried by said piston rod, and means for effecting operating connection between the mechanism and the tables in alternation.

3. In combination, a pair of mold tables arranged side by side for rotation about separate vertical axes, gears providing driving connection between the tables, means for imparting step-by-step rotation to the tables including a pair of fluid operated piston motors arranged at opposite sides of a center line extending through the axes of said tables, a piston rod connecting the two motors, table engaging mechanism carried by said piston rod, means for effecting operative engagement between the mechanism and tables one at a time and means whereby each of the motors operates alternately to move the tables and as a cushioning device.

4. In driving mechanism of the character described, a pair of opposed axially aligned horizontal piston motors, a piston rod connecting the motors, a frame mounted for rocking movement upon the piston rod, means for rocking said frame at regular time intervals, a double rocker arm attached to the piston rod for movement therewith in the direction of the length of said frame, rollers at the opposite ends of the rocker arm to engage a movable element and means whereby rocking of said frame correspondingly moves the arm.

5. In driving mechanism of the character described, a pair of opposed axially aligned horizontal piston motors, a piston rod connecting the motors, a frame mounted for rocking movement about the axis of the piston rod, means for rocking said frame at regular time intervals, a double rocker arm attached to the piston rod for movement therewith in the direction of the length of said frame, rollers at the opposite ends of the rocker arm, means whereby rocking of said frame correspondingly moves the arm, and means whereby each motor alternately functions to move the rocker arm and as a cushioning device for the other motor.

6. In combination, a pair of mold tables arranged side by side for rotation about separate vertical axes, gears providing driving connection between the tables, a disk carried by each table and arranged below the corresponding gear, each said disk having an annular series of recesses therein, a pair of fluid operated piston motors, a piston rod connecting the motors, rollers carried by the piston rod, means for causing operative engagement of the rollers with the recessed disks one at a time, and means whereby each motor operates alternately to move the piston rod in one direction and as a cushioning device for the other motor.

7. In combination, a pair of mold tables arranged side by side for rotation about separate vertical axes, gears providing driving connection between the tables, a disk carried by each table and arranged below the corresponding gear, each said disk having an annular series of recesses therein, a pair of fluid operated piston motors, a

5 piston rod connecting the motors, a frame mounted for rocking movement upon and about the axis of the piston rod, a double rocker arm carried by the piston rod, rollers at the opposite ends of the rocker arm and means for rocking the frame and arm to thereby effect operative engagement between the rollers and recesses one at a time.

10 8. In combination, a pair of mold tables arranged side by side for rotation about separate vertical axes, gears providing driving connection between the tables, a disk carried by each table and arranged below the corresponding gear, each said disk having an annular series of recesses therein, a pair of fluid operated piston motors, a 15 piston rod connecting the motors, a frame mounted for rocking movement on the piston rod, a double rocker arm carried by the piston rod, rollers at the opposite ends of the rocker arm, and means for rocking the frame and arm to thereby 20 effect operative engagement between the rollers and recesses one at a time, each motor including an

exhaust valve adjustable to regulate the rate of exhaust whereby the motors operate as cushioning devices as well as means to impart movement to the tables.

9. Driving mechanism of the character described, comprising a pair of opposed axially aligned piston motors, pistons therein, a piston rod connecting the pistons, means whereby each motor operates alternately to move the pistons and piston rod in one direction and cushion operation thereof in the other direction, means at least in part carried by the piston rod for effecting operative connection between said rod and a movable element at regular time intervals, said means carried by the piston rod including a 15 frame mounted for rocking movement about the axis of the rod, a double rocker arm carried by the rod and at least in part slidingly supported on the frame and means for rocking the frame. 20

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