

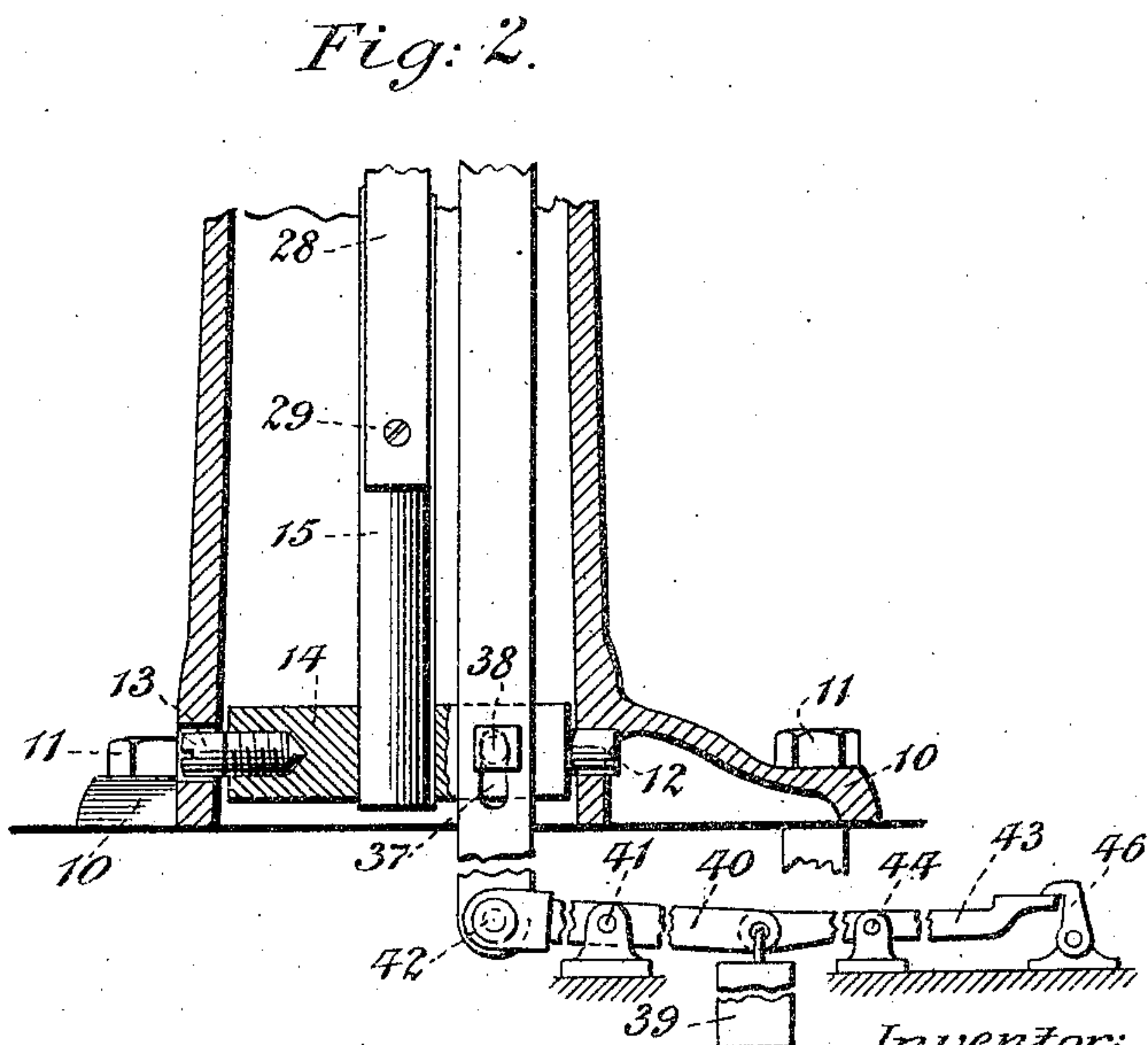
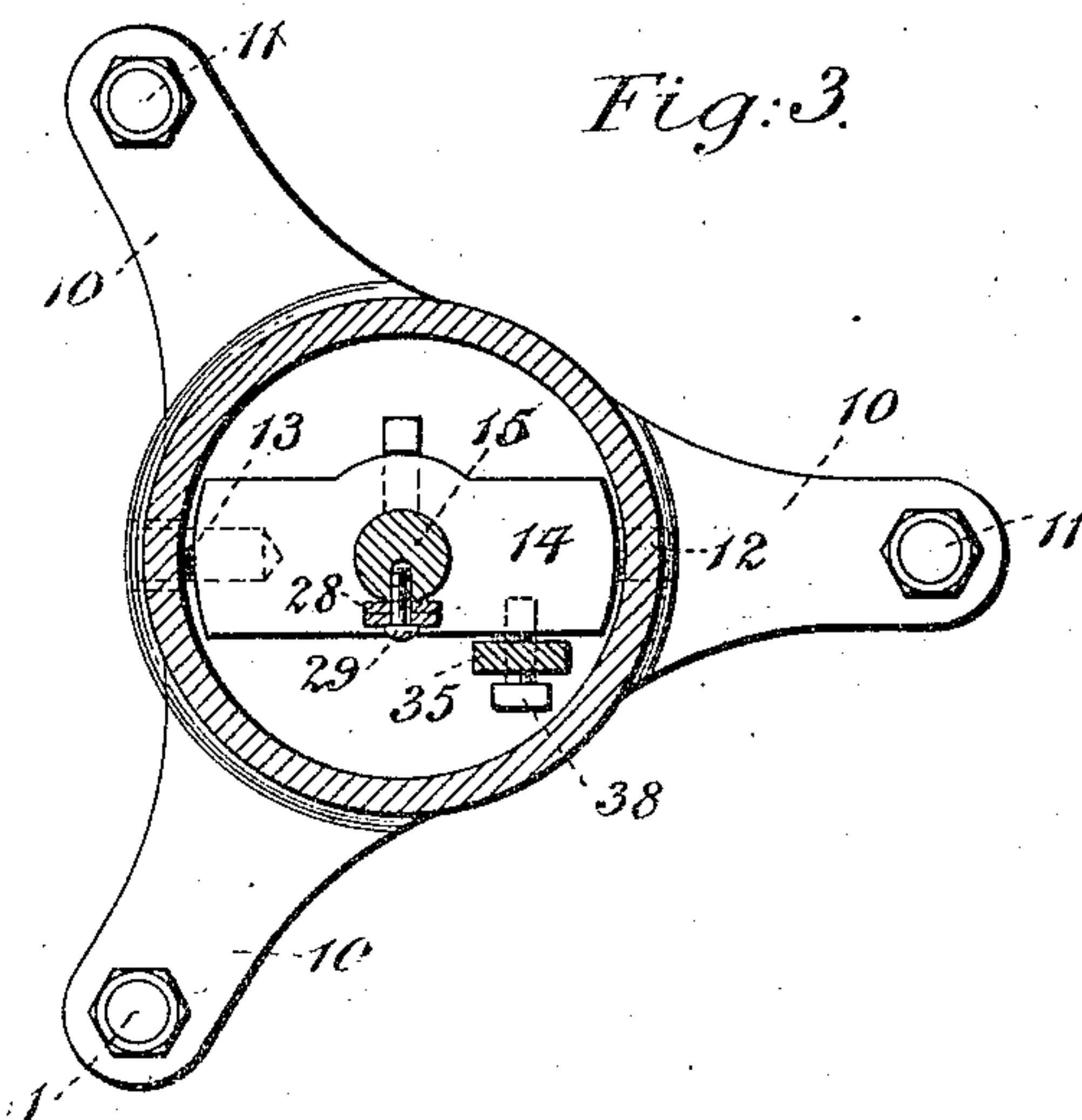
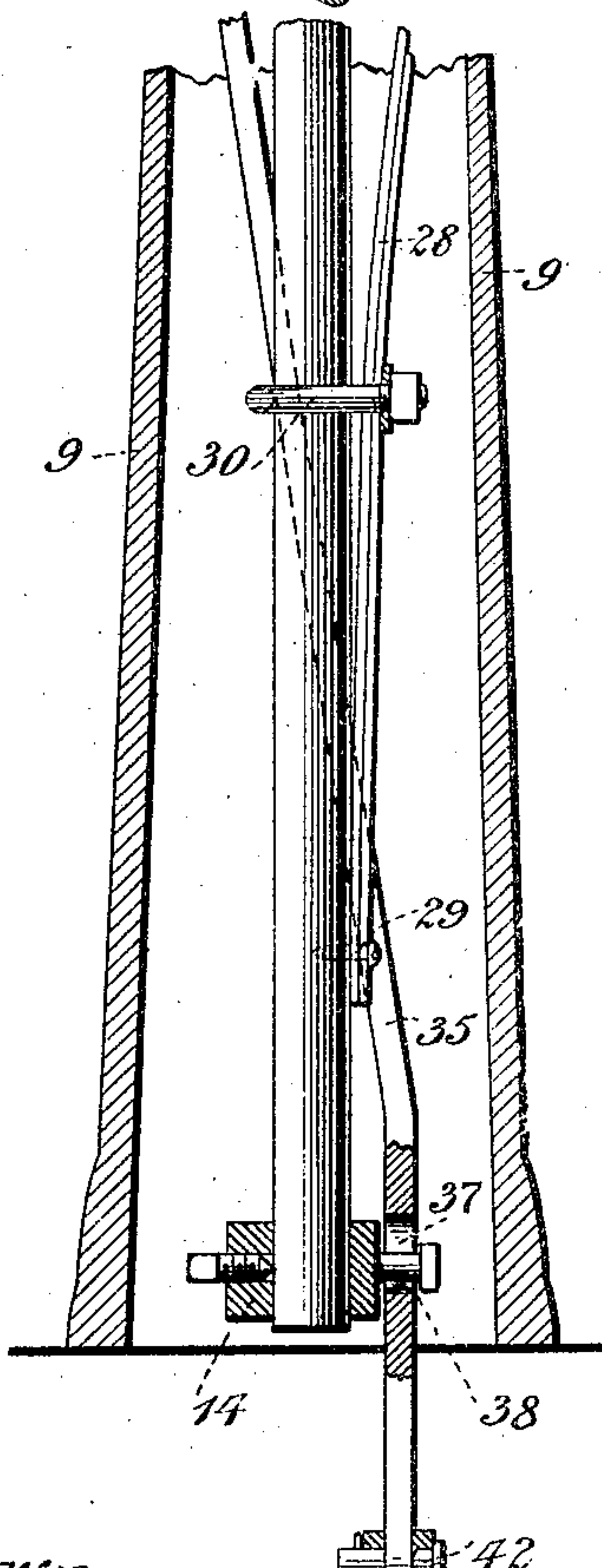
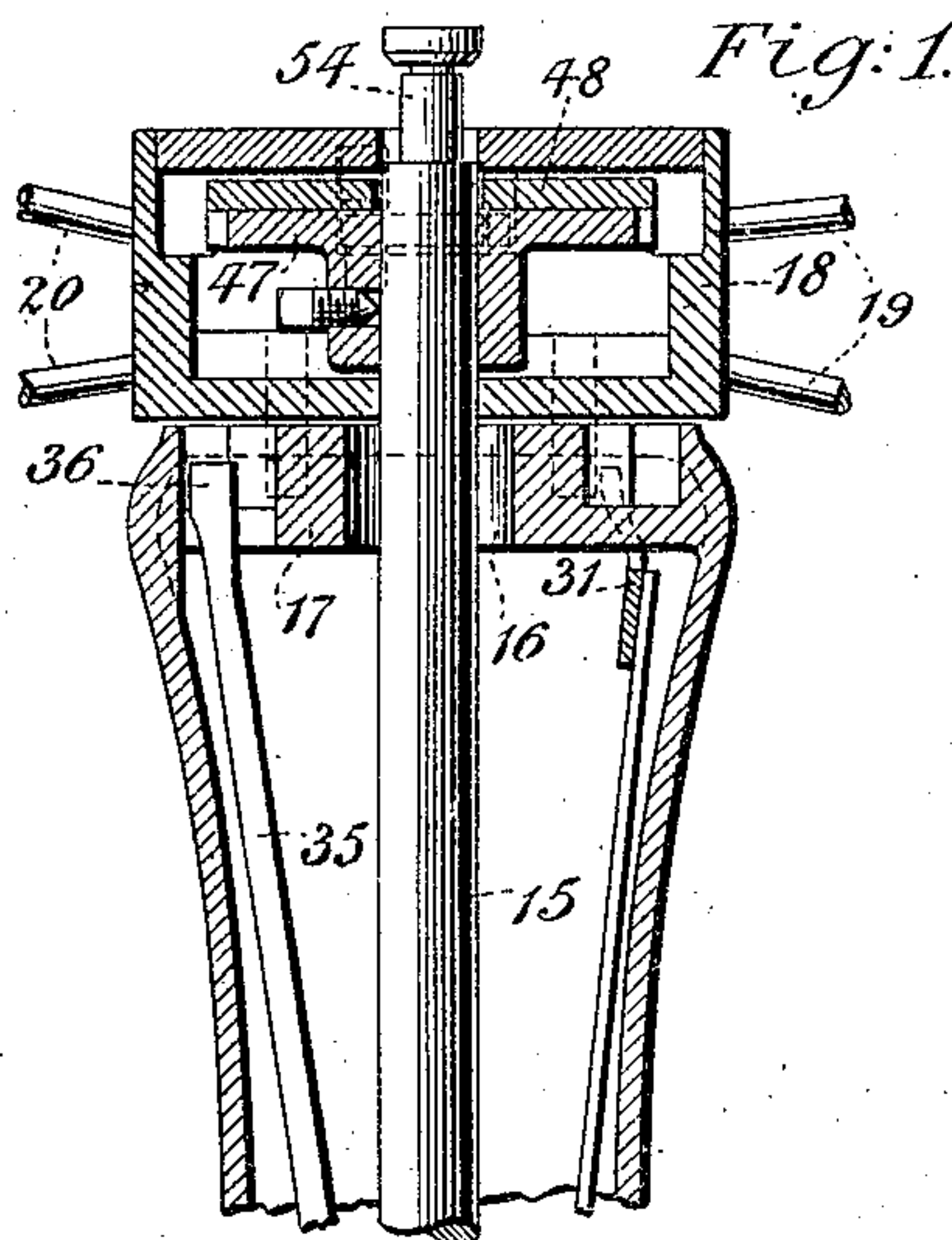
No. 861,351.

PATENTED JULY 30, 1907.

G. M. BEERBOWER.  
TURNSTILE.

APPLICATION FILED JULY 9, 1906.

2 SHEETS—SHEET 1.



Witnesses:  
*Harry R. Bauer*  
*Conrad*

Inventor:  
*George M. Beerbower*  
By  
*Stan, Cross & Bowers*  
his Attorneys.



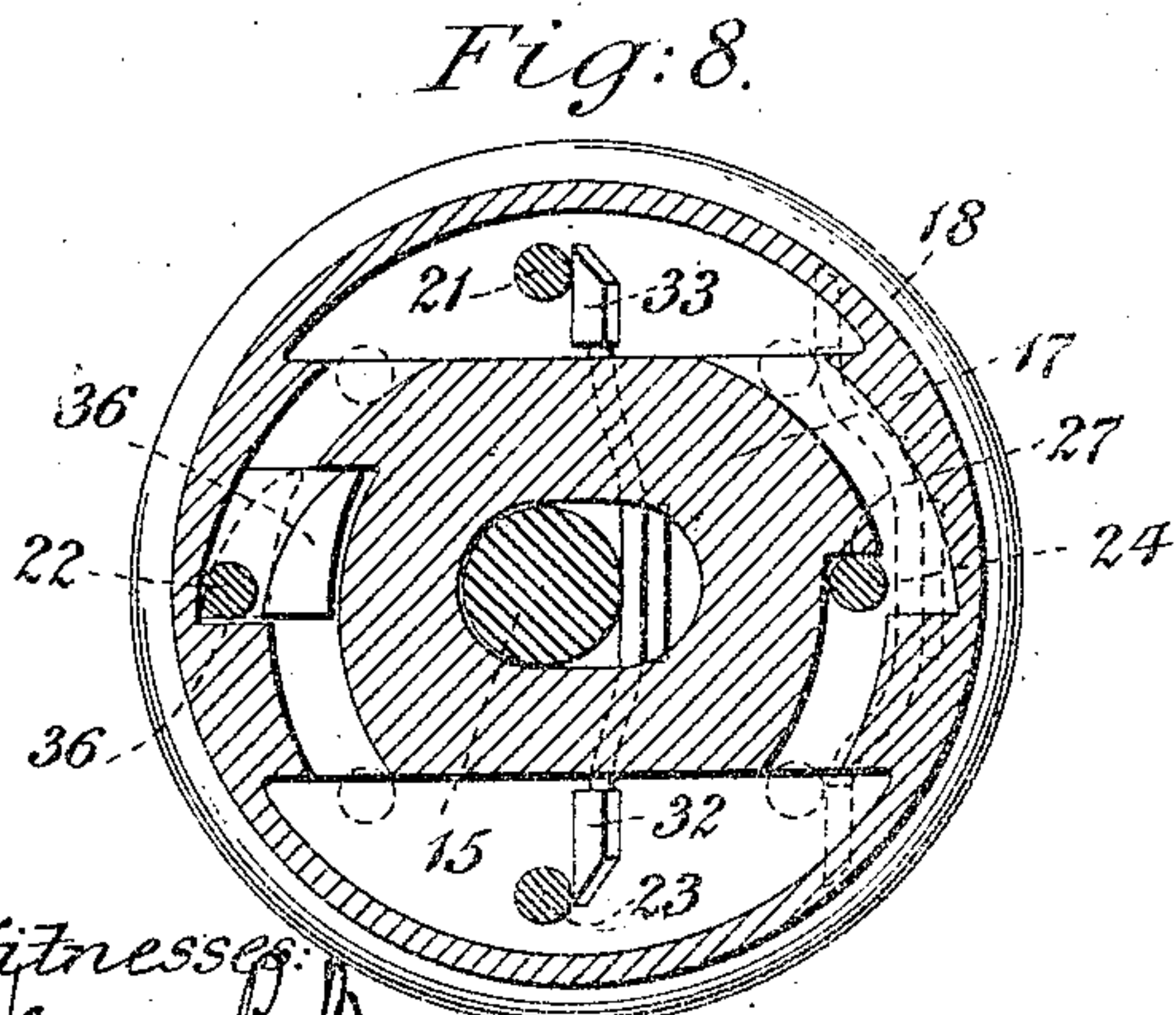
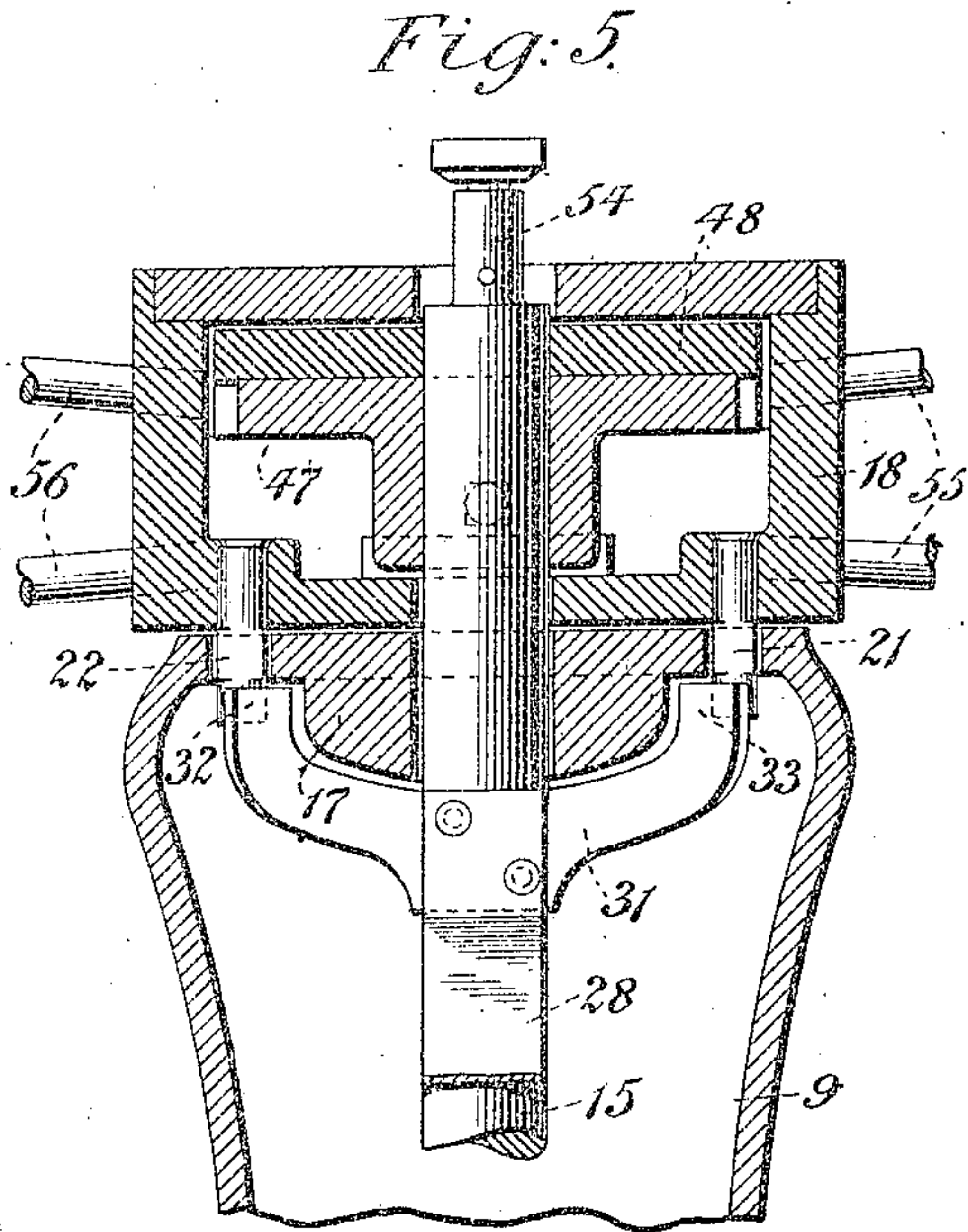
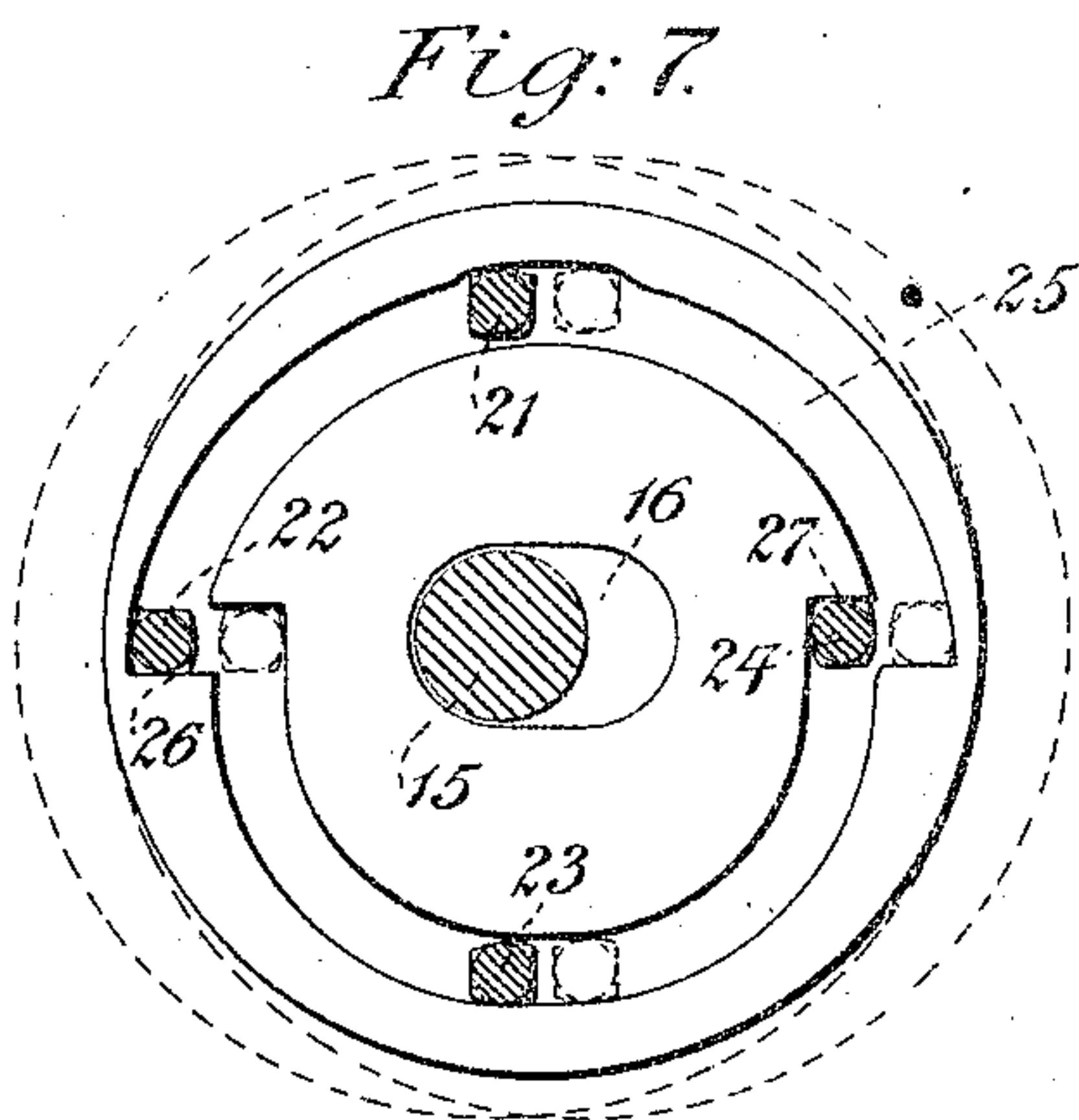
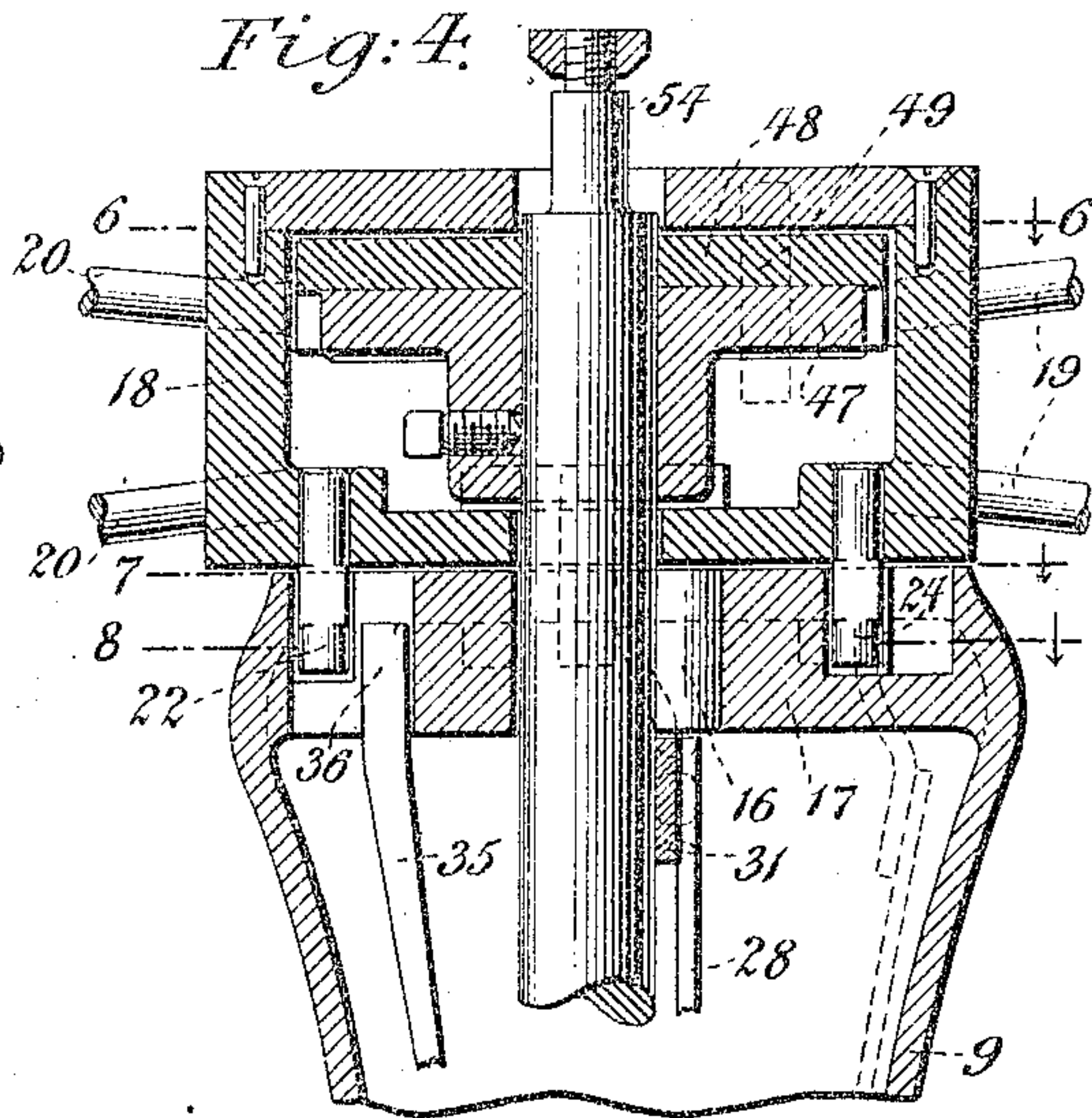
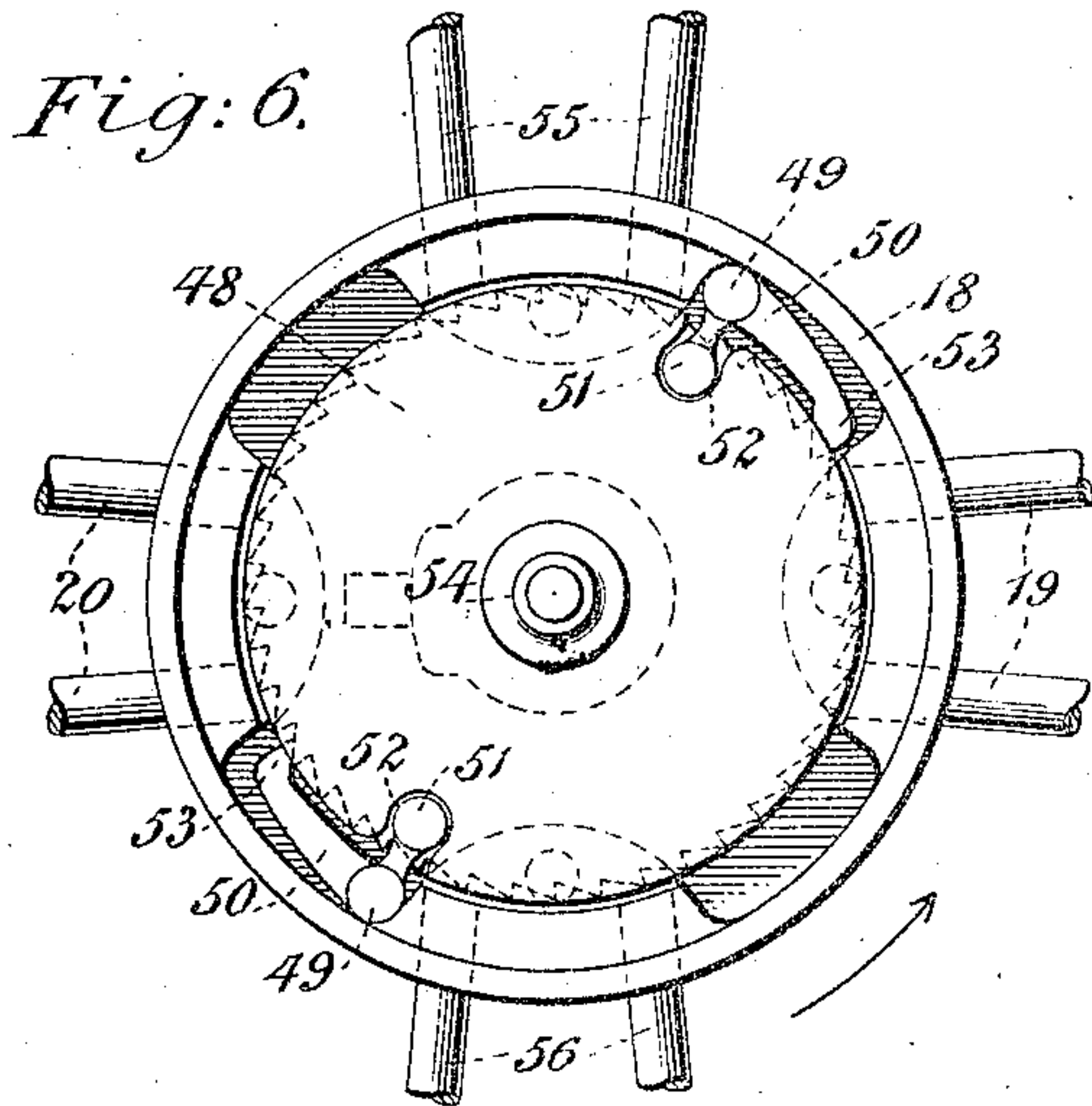
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

GEORGE M. BEERBOWER, OF NEW YORK, N. Y.

## TURNSTILE.

No. 861,351.

Specification of Letters Patent.

Patented July 30, 1907.

Application filed July 9, 1906. Serial No. 325,199.

*To all whom it may concern:*

Be it known that I, GEORGE M. BEERBOWER, a citizen of the United States, and a resident of the city of New York, county of New York, State of New York, have invented certain new and useful Improvements in Turnstiles, of which the following is a specification.

This invention relates to turnstiles, and particularly to turnstiles adapted to register with dependable accuracy—either entirely automatically or when under the control of an attendant—the number of persons who pass therethrough. When designed to provide a check upon the returns of employees, such as those who receive admission fees, such devices should be dependable at all times and under all ordinary conditions, and be so constructed as to prevent dishonest manipulation without detection. Registering turnstiles should, therefore, be incapable of reverse rotation—i. e., in a direction contrary to that naturally imparted to the revolving arms, by the body of a person passing into the inclosure—and should be provided with means whereby, first, each quarter turn of the device—the arc of rotation naturally resulting from the pressure of the body of an individual against the impeding arms and which tends to swing said arm out of the path of movement and another arm thereinto—will through the registering mechanism, add “1” to the total shown by the indicator; and, second, movement of the arms, due to the entrance or passing of a single individual, will be through a complete arc of 90°, no more and no less, irrespective of the duration or degree of the manual force applied. Furthermore, where there are certain prerequisite conditions of admission to be complied with, for example, the turnstile should be positively locked against all movement until unlocked by an attendant after conditions fulfilled. The unlocking means generally consists in a lever within reach of the attendant, and it is highly important that it be not necessary to time the operation of the unlocking lever by the movement of the person passing or about to pass through the turnstile. In other words, where this lever is depressed and must be held depressed until the person entering has started to rotate the arms of the turnstile, and must then be released prior to rotation of said arms through an arc of 90°, it is possible, first, that the unlocking lever may be prematurely released, again locking the device prior to the start of the person therethrough, whose body will thus come more or less violently in contact with a fixed arm; or, second, said lever may be held slightly too long in its depressed position and therefore permit a person passing at greater than average speed to impart sufficient momentum to rotate the arms through two or more quadrants, thereby causing over-registration.

The objects of the present invention are, therefore, to provide a turnstile in which the registering mechanism

will be so incased as to prevent dishonest manipulation without detection; which will be incapable of reverse rotation to reduce the figures indicated by the registering mechanism; which, when at rest, has one or another of its arms at all times projecting directly across the opening or entrance; which is normally checked against rotation and is automatically released and subsequently rotatable upon the application of a slight pressure against the impeding arm and in the direction of entrance only; which is automatically rechecked when rotated through an arc of 90°; and which is provided with means insuring rotation through a complete quadrant, whether or not manual force is applied throughout the entire arc, without which two arms might be left projecting obliquely into the path of movement and leave space for the passage of a body without necessarily moving said arms and registering the entry.

A further object of the invention is to provide means for positively locking the device against all movement, and means, under the control of an attendant, for releasing said locking means, operation of which need not be timed to the movement of an entering or passing person, said locking means being automatic in action at the end of each quarter-turn.

Further objects of the invention are to provide a turnstile which is entirely free from the objectionable, rasping noise produced by the pawl and ratchet employed to prevent reverse rotation, and which shall be otherwise simple in construction, dependable in operation, and free of complicated parts and mechanisms likely to get out of order.

With the above and other ends in view, my invention consists, generally, in a turnstile normally checked against rotation, said checking means being releasable by the initial pressure against the obstructing arm.

My invention further consists in the novel means for positively limiting rotation of the arms for each individual in passing, to an arc of 90°.

My invention further consists in novel means for insuring rotation through a complete arc of 90°, whether or not manual force is applied throughout the entire arc.

My invention further consists in the novel form of locking and releasing means.

My invention further consists in means for preventing contact between the pawl and the teeth of the ratchet (employed to prevent reverse rotation) except when attempt is made to rotate the device in a reverse direction.

My invention further consists in various details of construction and in combinations of parts all as hereinafter more fully described and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, and in which



Figure 1 is a vertical, central-sectional elevation, partly broken away, of a turnstile embodying my invention. Fig. 2 is a vertical section of the lower portion thereof, with the locking device in a different position of adjustment. Fig. 3 is a sectional plan view of Fig. 2. Fig. 4 is a section similar to Fig. 1, on an enlarged scale, of the top portion of the device with the rotating part and the lock in a different position of adjustment. Fig. 5 is a vertical section through the same parts on a plane at right angles to that of Fig. 4. Figs. 6, 7 and 8, are horizontal sections taken on the lines 6-6, 7-7 and 8-8 respectively of Fig. 4.

Referring now to the drawings in detail, numeral 9 refers to a pedestal, preferably provided with a tripod base 10, which may be firmly secured to the floor or other support by means of bolts 11. Within the base of the pedestal 9 is suitably journaled, preferably by means of a fixed trunnion 12 and a removable trunnion 13, the rock-shaft 14, within which is fixed the lower end of the shaft or stem 15 which extends upward through the middle of the pedestal and through the aperture 16 in the top-plate 17. This aperture 16 is elongated, as shown in the direction of entrance, to provide for a limited lateral reciprocating movement of the upper portion of said stem 15, for which the rock-shaft 14 provides. Freely rotating upon the said shaft 15 and upon the plate 17 is the hollow head 18 which carries the rectangularly radiating arms, one or another of which at all times projects across the path of movement, as explained, and each of which preferably comprises, in order to insure strength and rigidity and to reduce the space available for the body of a person passing therethrough, a double pair of projecting rods 19-19, 20-20, 55-55 and 56-56. Suitably secured in the head 18 and projecting downwardly therefrom are the four stud-pins 21, 22, 23 and 24, equi-distant from each other and from the axial line of said head. These pins enter what I may term a cam groove 25 in the top face of plate 17. This groove 25, as shown in Fig. 7, is offset at diametrically opposite points to provide the stops or shoulders 26 and 27, against which two opposite pins normally impinge. The aperture 16 being elongated and the upper end of the shaft 15 being free to move laterally in said aperture pressure acting directly against said shaft, or indirectly through the head and the arm which obstructs movement, will cause the upper portion of said shaft to move from one end to the other of said aperture 16 and move said head 18, and therewith the pins, a corresponding distance. It will be noted that the plate 17 remains stationary, wherefore the pins 22 and 24, which have heretofore impinged against the shoulders 26 and 27, will be moved through the offset portions of the groove 25 to points immediately in front of the curved continuations of said groove (as shown by dotted lines in Fig. 7) whereupon the head 18 will be free to rotate. It will therefore be apparent that, the head and arms being normally checked against rotating movement, the initial pressure of the body against the obstructing arm, such pressure being in the same direction as the elongation of the aperture 16, will operate to move said head bodily in the manner above explained to free the pins 22 and 24 of the stops 26 and 27. Bodily movement of the head being then checked, further exertion of pres-

sure will rotate said head and swing the obstructing arm clear of the path or opening. As this arm rotates the pressure is relieved, and the pins 21 and 23, following the direction of the groove 25, will return said head to its normal position and by impinging, in turn, against the shoulders 26 and 27, respectively, positively check rotation of the arms and head when the same have moved through an arc of 90°.

I have referred to the desirability of insuring full movement through a complete quadrant, even in case the natural pressure against the arm is prematurely discontinued. For this purpose I provide a yielding spring-bar 28, preferably secured to the shaft 15 at 29 and which passes through a suitable clamp 30 on said shaft to distort said bar and provide the necessary spring pressure. At the top of this bar is riveted or otherwise suitably secured the Y-shaped bearing plate 31 having the lugs 32 and 33 adapted under normal conditions to impinge against the two pins (21 and 23, Fig. 8) not in contact with the shoulder stops. This bar being yielding, it will be apparent that when the head 18 has been first freed to rotate and rotation thereof is commenced, the pin 23 (referring to Fig. 8) will force the Y-shaped bearing plate 31 of the bar 28 against the action of the spring until it assumes the position indicated by the dotted lines in Figs. 4 and 8, the pin 23 having been moved through an arc of approximately 45° or one-half of the quadrant. It will be apparent that in this position the pin 24 has passed to a corresponding point on the opposite side where the spring pressure is equally divided between the two pins and there is no tendency to further movement. If, however, rotation is continued, even to a very slight degree, the pin 23 passes between the arms of said bearing plate and is relieved of the pressure of the lug 33, while the pin 24 is directly in front of the lug 32 and receives full pressure of the spring in the bar 28. Therefore, if the arm is released prior to its having been turned by manual force through the entire quadrant, the spring-bar 28 will continue the rotation thereof until automatically rechecked in the manner explained.

As is well known, these turnstiles are at times used merely to record, for statistical purposes, for example, the number of persons who pass therethrough. In such cases, the conditions may not justify the keeping of an attendant. Where these turnstiles are used, however, to check the sales of paid admissions to an enclosure, it has been found necessary to provide some means for temporarily locking the device and preventing rotation thereof until the conditions of admission have been complied with, whereupon the attendant releases the locking mechanism and permits of the rotation of the device and operation of the registering mechanism. Such locking and releasing means have heretofore generally necessitated the depression by an attendant of an operating lever, which must be held depressed until the turnstile has commenced to rotate and the release of which must be properly timed to insure the rechecking or relocking of the device when it has been turned through a quarter revolution. To obviate the necessity for timing release of the unlocking lever, I provide a bar 35, within the pedestal 9 and extending from the bottom to the top thereof, which has formed upon its upper end the cam 36 entering a suitable mortise in



the plate 17. As a guide I provide the slot 37 in said bar, through which passes the stud-bolt 38 in the rock-shaft 14.

The bar 35 is obliquely disposed within the pedestal, or, in other words, is inclined from the perpendicular so that the force of gravity will tend to give said bar its position of greatest inclination. It has, furthermore, a slight vertical reciprocating motion, limited by the length of the slot 37, and is constantly under the action of a force—preferably provided by a weight 39 at the end of the lever 40, suitably fulcrumed at 41 and pivoted at 42 to the end of said bar 35—which tends to lift said bar to its raised or uppermost position. The head or cam 36 of said bar, when in its normally raised position, is interposed between the pin 22 (referring to Fig. 8) and the interior end of the short offset portion of the groove 25. When the cam 36 is in this position, obviously, said pin 22 is held against lateral movement and, therefore, the head 18 is locked in the position indicated in Fig. 4 and will not yield to the pressure which, as explained, would otherwise tend to release the same for rotation. The conditions of admission, such as the payment of a fee, being complied with, the attendant, with his foot or otherwise, will depress the end of the lever 43, fulcrumed at 44, which will raise the weight 39 and therewith the end of the lever 40 and depress the rod or bar 35 which, when the head thereof reaches the end of the pin 22 will, under the force of gravity, as explained, drop under said pin. Thereupon the foot of the attendant may be instantly removed from the lever 43, the bar 35 being held in its depressed condition, and the head 18 may be released and rotated in the manner explained. Upon rotation of said head, the pin 22 will be carried beyond the edge of the cam 36, whereupon said cam, the bar 35 being under action of the weight 39, will be raised into the position formerly occupied by said pin 22. As rotation is continued, the pin 21 (referring to the pins as indicated in Fig. 8) impinges against the inclined face of the cam 36 and forces the same back against gravity into a position identically similar to that indicated in Fig. 8, except that the pin 22 has passed through an arc of 90° and the pin 21 is in the position formerly occupied by the pin 22, impinging against the shoulder 26 and thus checking the head against further rotation. In this position the device is again locked against movement until the releasing operation is repeated.

When it is desired to use the turnstile without the supervision of an attendant, the lever 43 may be forced down into an engagement with any form of suitable retaining means, such as a hook 46, which will retain the bar 35 in its depressed position and permit of rotation of the head 18 freely at any time under the conditions hereinbefore set forth. It will be apparent that the releasing lever 43 should be located within any suitable form of cage or office adjacent or near to the turnstile and out of reach of those who would unwarrantably manipulate the same.

It is, of course, necessary that the head 18 be held against rotation in what I have termed a reverse direction, and while I employ one or more pawls and a ratchet to prevent such reverse rotation, I desire, at hereinbefore suggested, that my device be free from the usual grating or rasping noise caused by the pawl as it rides over the teeth of the ratchet during rotation in a

forward or operating direction. For this purpose I fix upon the shaft 15, within the head 18, the ratchet wheel 47 and place thereupon what I may term an idler 48, loose upon the shaft 15. Suitably pivoted upon a stud 49, mounted in the top plate of the head 18, is the bell-crank lever 50 having an arm 51 extending into a suitable recess 52 in said idler 48 and the other arm providing the pawl or detent 53. Obviously, when the head 18 starts to rotate in the direction indicated by the arrow in Fig. 6, the shaft being non-rotatable, and the idler 48 resting upon the fixed ratchet 47, movement of the arm 51 with said head is retarded, and the frictional resistance of said idler to movement serves to withdraw the pawl 53 from the teeth of the ratchet until said pawl contacts with the wall of the head, whereupon said frictional resistance being overcome said idler will rotate and by friction hold the pawl against said wall and entirely free of the teeth of the ratchet. There will, therefore, be no perceptible noise when the head is rotated. Should it be attempted to rotate said drum in a reverse direction, the same frictional resistance of said idler 48 will operate to retard the movement of the arm 51 and immediately serve to bring said pawl 53 back into engagement with the teeth of the ratchet, whereupon said drum is firmly held against continued movement in a reverse direction. As shown in Fig. 6, there may, if desired, be two of these pawls, so that instead of having "play" through an arc equal to the distance apart of the teeth, this arc of reverse rotation may be reduced to one-half of this distance.

The registering mechanism forms no part of this invention. I have shown a stud 54 projecting from the stem or shaft 15, through a suitable aperture in the top plate 55 of the head 18. To the top of this head and to the stud 54 may be secured in any suitable manner any desired form of registering mechanism and the casing therefor. The shaft 15 being fixed and the head 18 being rotatable, it will be apparent that the fixed and movable parts of a registering or counting device may readily be applied to the top of the turnstile proper.

Many modifications of minor details of my improved turnstile will doubtless readily suggest themselves to those skilled in the art to which it appertains and I therefore do not desire that my invention be limited to the specific form herein shown and described.

1. A turnstile having the arm carrier normally checked against rotation and releasable through initial bodily movement of the obstructing arm and its carrier in the direction of rotation.

2. A turnstile having the arm-carrier normally checked against rotation, releasable through the initial bodily movement of the obstructing arm and its carrier in the direction of rotation and automatically rechecked at the end of each quarter turn.

3. In a turnstile, a rotating head, means normally checking said head against rotation, and means operable by a limited, lateral, bodily movement of said head to release said checking means.

4. In a turnstile, a rotating head, means normally checking said head against rotation, means operable by a limited, lateral, bodily movement of said head to release said checking means, and means for automatically rechecking said head at the end of each quadrant.

5. In a turnstile, the combination of an oscillating shaft, a head rotatable thereon, means normally checking rotation of said head, and means operable by a limited lateral bodily movement of said head and shaft to release said checking means.



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6. In a turnstile, the combination of an oscillating shaft, a head rotatable thereon, means normally checking rotation of said head, and means operable by a limited lateral bodily movement of said head and shaft to release said checking means, said shaft being returned to normal and said head to checked position by rotation through one quadrant.

7. In a turnstile, the combination, with the rotating head and arms, of means normally checking rotation of said head and means for releasing said head for rotation through one quadrant only, said releasing means being automatically operable upon the application of pressure against the impeding arm and consequent bodily movement of said arm and head in the direction of rotation.

8. In a turnstile, the combination, with the rotating head and arms and automatically releasable means for checking rotation of said head at the end of each quadrant, of additional means for locking said checking means against release, and means for rendering said locking means inoperable.

9. In a turnstile, the combination, with the rotating head and arms and automatically releasable means for checking rotation of said head at the end of each quadrant, of additional means for locking said checking means against release, and means for rendering said locking means inoperable until said head is rotated and rechecked.

10. In a turnstile, the combination, with the rotating head and arms and automatically releasable means for checking rotation of said head at the end of each quadrant, of means normally locking said head in its checked position, said locking means being under manual control to release and automatically operable to relock said head each time rotation is checked.

11. In a turnstile, a rotating head, means normally checking said head against rotation, means operable by a limited, lateral, bodily movement of said head to release said checking means, and means for preventing said lateral movement whereby said head is locked in its checked position.

12. In a turnstile, a rotating head, means normally checking said head against rotation, means operable by a limited, lateral, bodily movement of said head to release said checking means, means for automatically rechecking said head at the end of each quadrant, and manually releasable means automatically locking said head against lateral movement each time rechecked against rotation.

13. In a turnstile, the combination of a rotatable head and arms, means for automatically continuing rotation through a complete quadrant after manual rotation through a fractional portion thereof, and means for positively checking said head after rotation through a complete quadrant, said checking means being releasable through initial bodily movement of the obstructing arm and said head in the direction of rotation.

14. In a turnstile, the combination of a rotatable head and arms, means for automatically continuing rotation through a complete quadrant after manual rotation through a fractional portion thereof, means for positively checking said head after rotation through a complete quadrant, said checking means being releasable by the initial pressure against the obstructing arm, and means for locking said head against such release, said locking means being automatically operable each time rotation is checked.

15. In a turnstile, the combination of a rotatable head provided with a plurality of projections equidistant from themselves and from the axis of said head, and a stationary member having a groove in which said projections travel, a portion of said groove terminating in a stop against which each projection in turn impinges to check rotation of said head, the impinging projection being freed for continued rotary movement by a slight lateral movement of said head.

16. In a turnstile, the combination of a rotatable head provided with a plurality of projections equidistant from each other and equidistant from the axis of said head, a stationary member having a groove in which said projections travel, a portion of said groove terminating in a stop against which each projection in turn impinges to check rotation of said head, the impinging projection being freed for continued rotary movement by a slight lateral movement of said head, a member normally interposed to lock said head against such lateral movement, and means for withdrawing said member and automatically holding the same in its withdrawn position until rotation is started, said member being automatically returned to relock said head when rotation is again checked.

17. In a turnstile, the combination, of an arm-supporting, rotatable head provided with four stud-pins equidistant from each other and equidistant from the axis of said head, and a stationary plate, having a groove into which all of said pins project and in which they travel as said head is rotated, said groove being provided with an off-set portion providing a shoulder against which each pin in turn impinges to stop rotation of said head, and said head being freed for continued rotary movement by a slight lateral movement thereof to carry said impinging pin through the off-set portion of said groove and to a point immediately in front of the curved continuation thereof.

18. In a turnstile, the combination, of an arm-supporting, rotatable head provided with four stud-pins equidistant from each other and equidistant from the axis of said head, a stationary plate having a groove into which all of said pins project and in which they travel as said head is rotated, said groove being provided with an off-set portion providing a shoulder against which each pin in turn impinges to stop rotation of said head and said head being freed for continued rotary movement by a slight lateral movement thereof to carry said impinging pin through the off-set portion of said groove and to a point immediately in front of the curved continuation thereof, a member normally interposed in said off-set portion to stop movement of said impinging pin therethrough, and means for withdrawing said member, automatically checking the same in its withdrawn position and releasing it to similarly stop the next pin in turn.

19. In a turnstile, the combination, with a rotatable head, of a fixed ratchet, a pawl pivoted to and movable with said head and adapted to engage the teeth of said ratchet, means for holding said pawl free from said teeth during rotation of said head in one direction and automatically returning said pawl into engagement with a tooth when rotation in a contrary direction is started.

20. In a turnstile, the combination, with a rotatable head, of a fixed ratchet, a pawl pivoted to and movable with said head and adapted to engage the teeth of said ratchet, a pawl-controlling lever, and a resistance adapted to retard movement of said pawl-lever, whereby said pawl is held free of the teeth of said ratchet during rotation in one direction and is thrown into engagement with one of said teeth when rotation in a contrary direction is started.

21. In a turnstile, the combination, with a rotatable head, of a fixed ratchet within said head, a free disk resting upon said ratchet and rotatable thereupon when the frictional resistance has been overcome, a lever pivoted to and within said head and rotatable therewith having one arm projecting into a peripheral recess in said disk and the other arm provided with a detent movable into and out of engagement with the teeth of said ratchet.

In witness whereof, I have signed my name to the foregoing specification in the presence of two subscribers.

GEORGE M. BEERBOWER.

Witnesses:

HENRY R. BAUER,

FRED H. BOWERSOCK.