

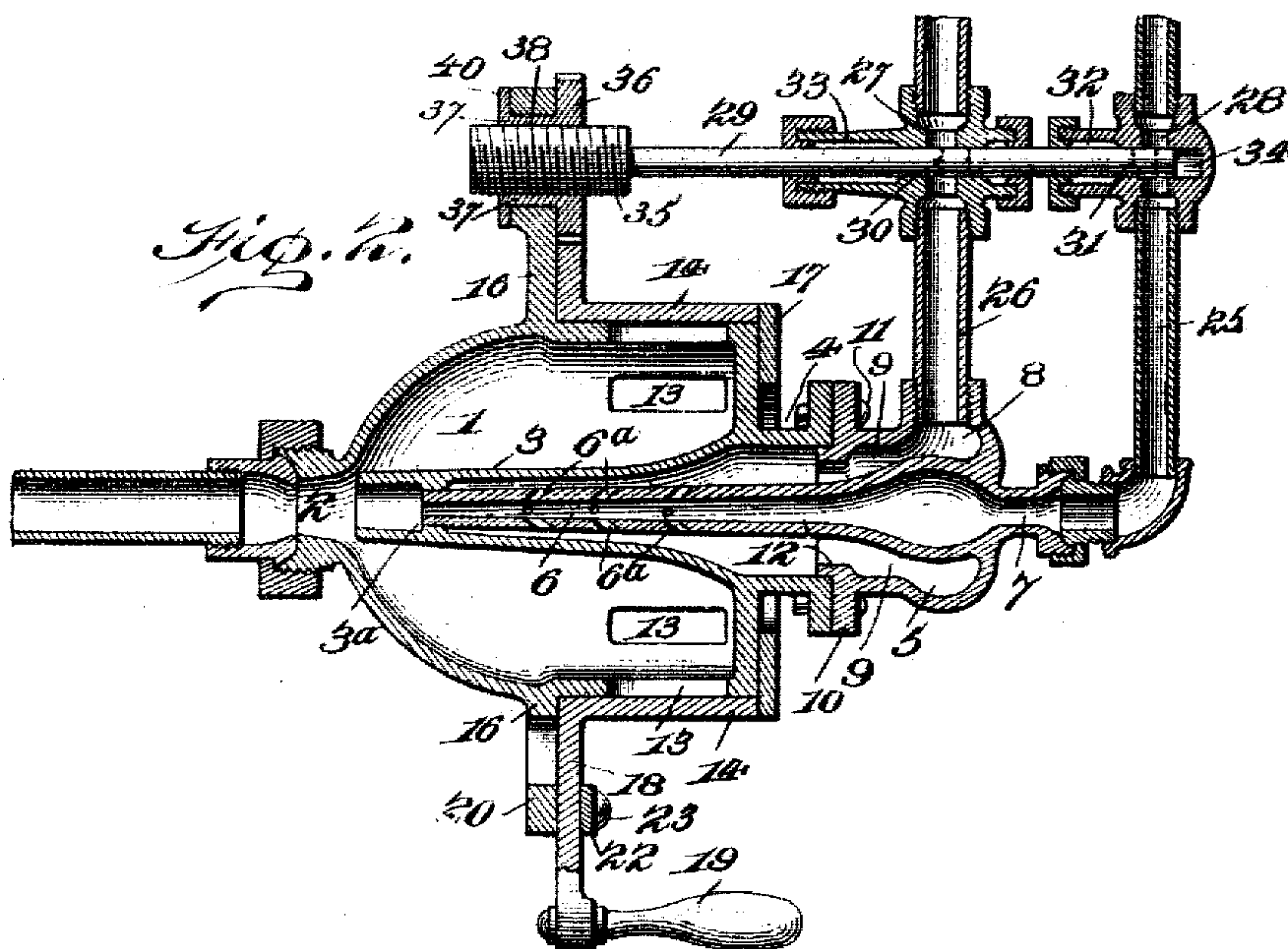
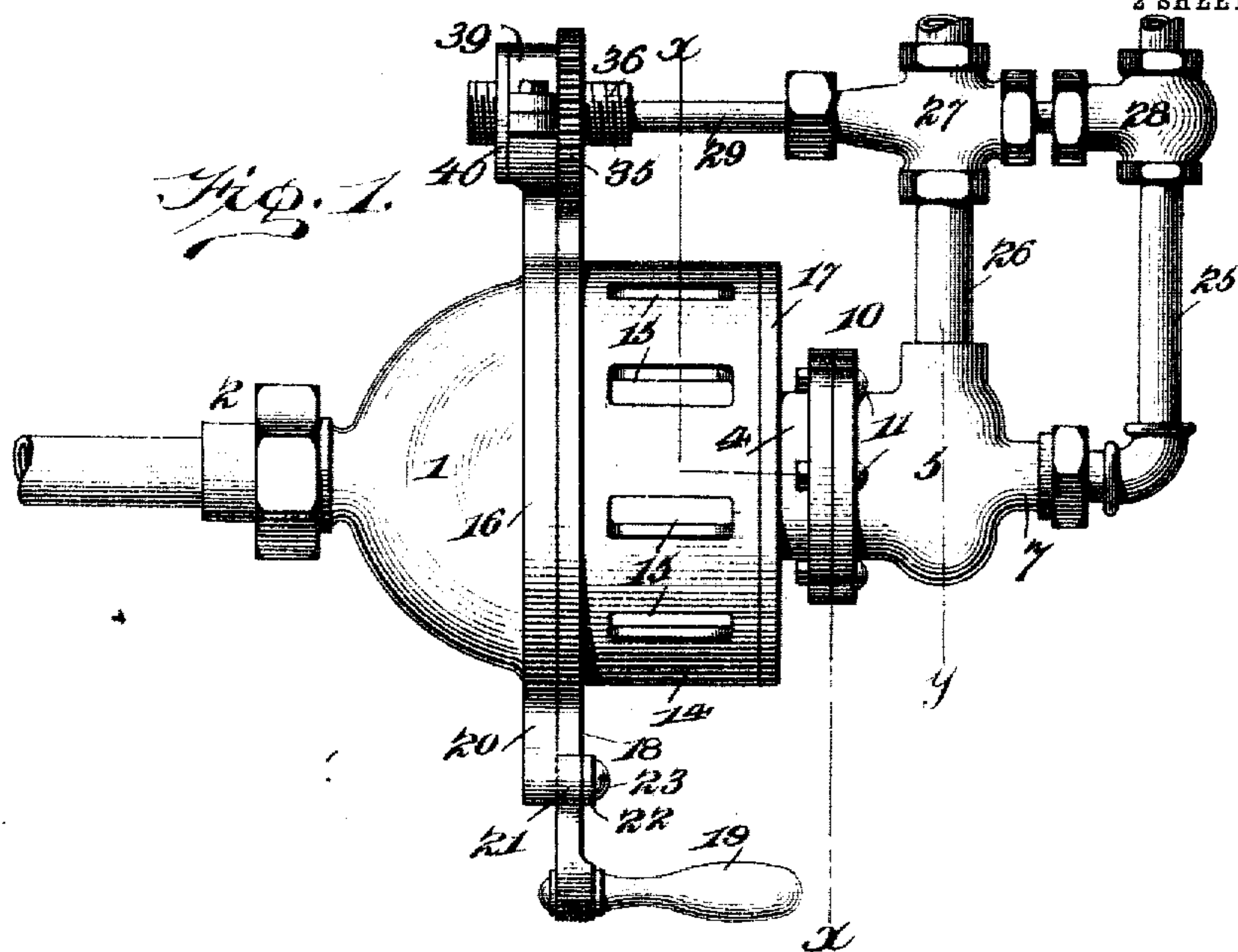
No. 812,232.

PATENTED FEB. 13, 1906.

L. RHODES.
INJECTOR.

APPLICATION FILED APR. 21, 1904.

2 SHEETS—SHEET 1.



Inventor

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By

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Witnesses

H. G. Dieterich

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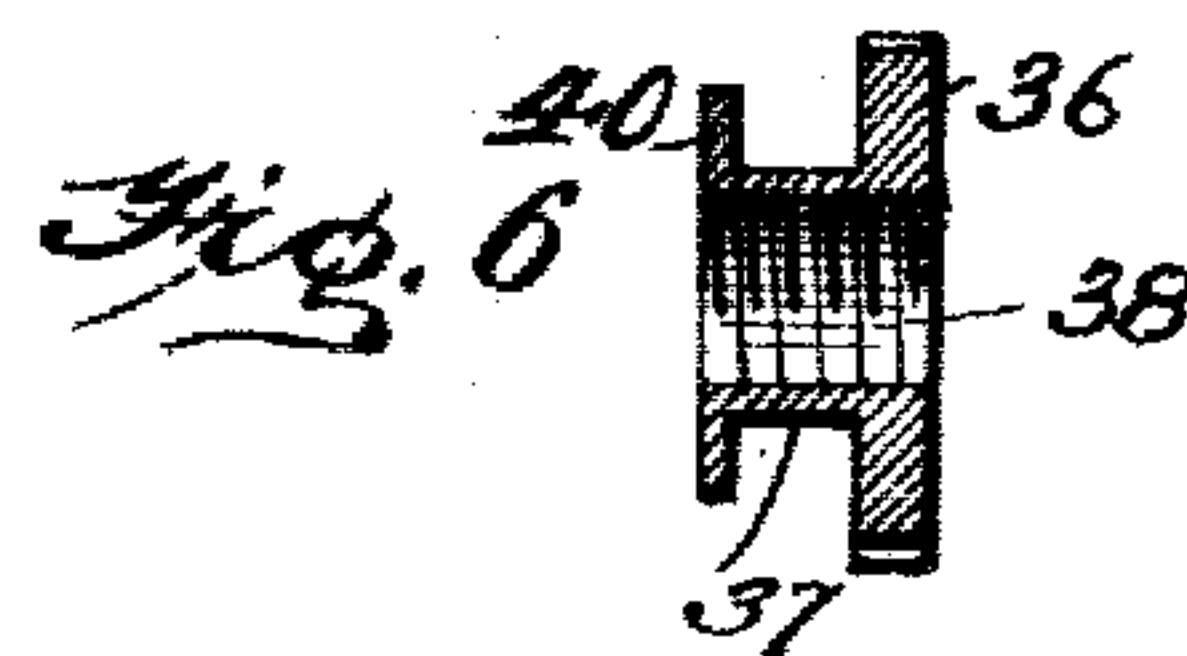
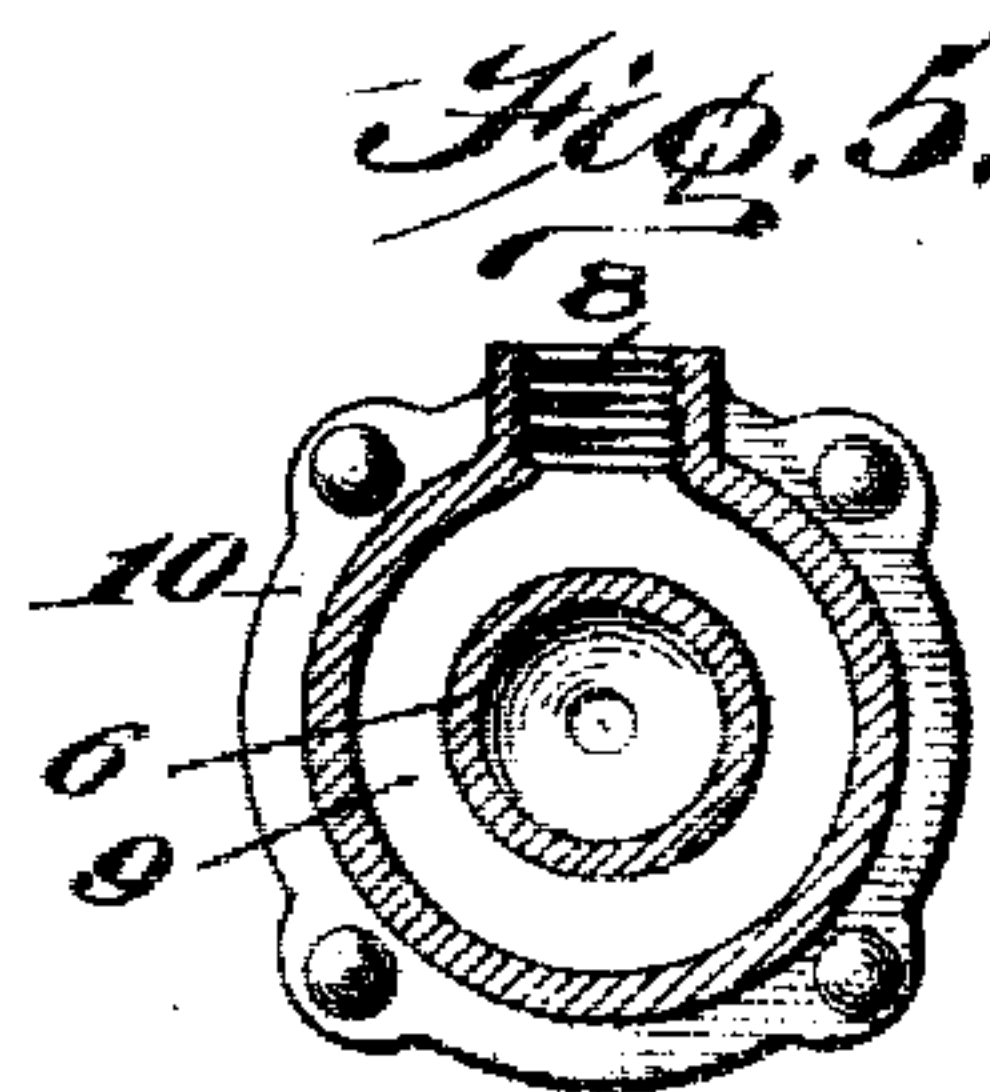
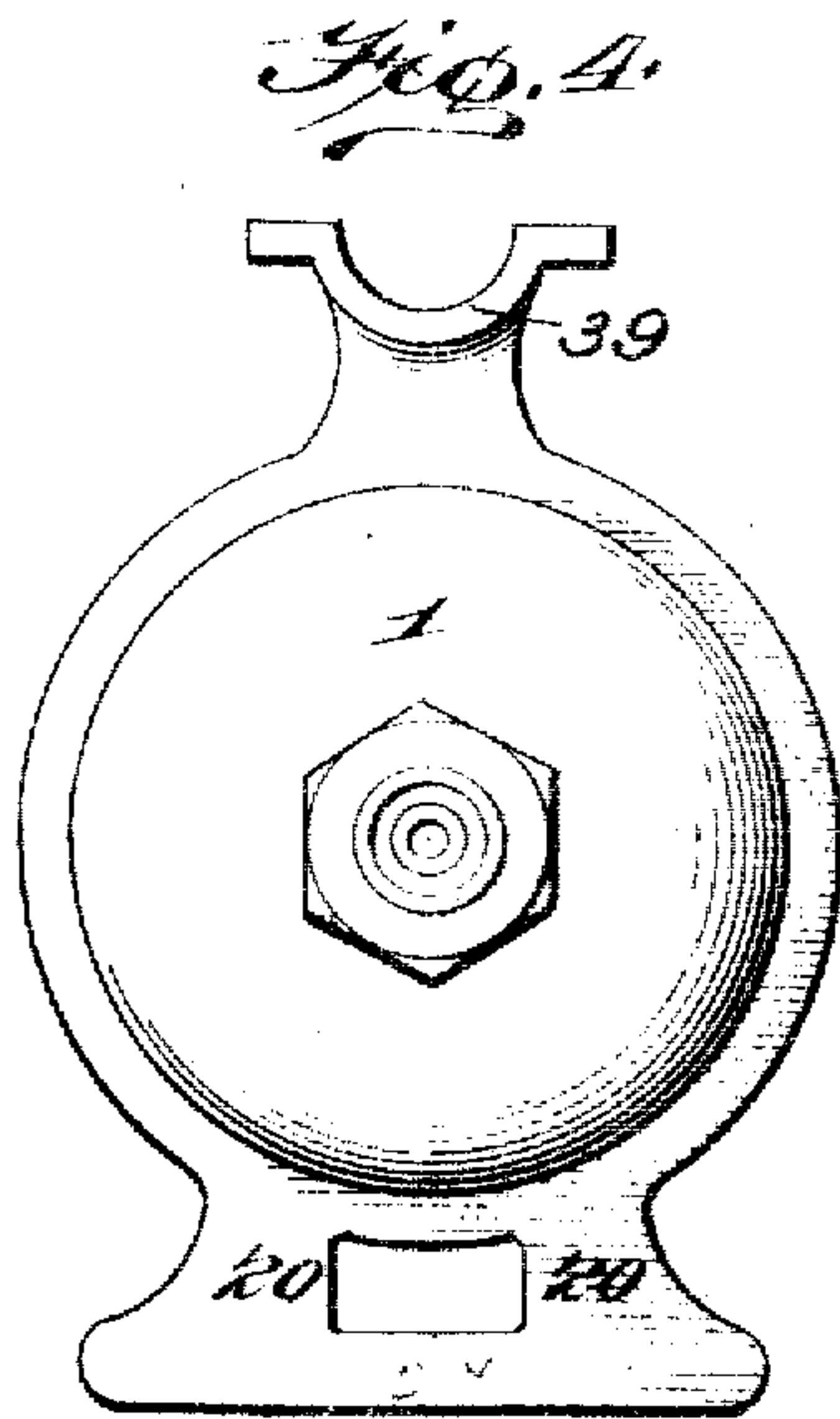
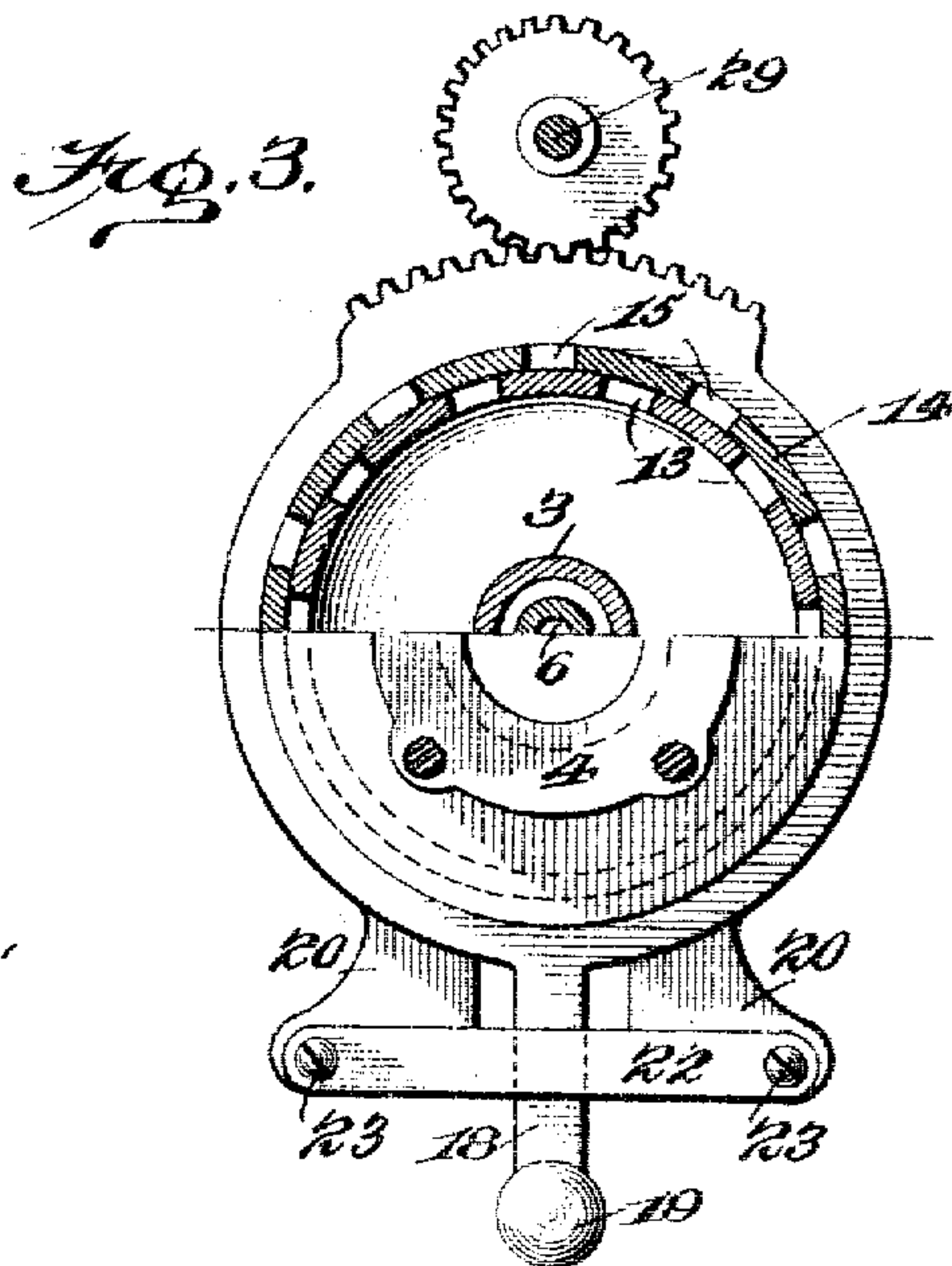
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2 SHEETS—SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

LEVI RHODES, OF SPOKANE, WASHINGTON, ASSIGNOR TO MOTOR TRACTION COMPANY, OF SPOKANE, WASHINGTON, A CORPORATION.

INJECTOR.

No. 812,232.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed April 21, 1904. Serial No. 204,282.

To all whom it may concern:

Be it known that I, LEVI RHODES, a citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented new and useful Improvements in Injectors, of which the following is a specification.

This invention has especial relation to that class of injector-burners utilizing oil as a fuel in which steam furnishes the injecting force, as well as the means for vaporizing the oil and mixing the vapor with air.

One object of the invention is to produce a compact, simple, and inexpensive construction of an injector-burner of the above character having the usual nozzles for the steam, oil, and air projecting one within the other, and also make provision for ready and convenient access to the interior and exterior of the nozzles and to the interior of the casing forming a part of the structure in order that the same may be kept clean.

Another object is to make provision by which the injector is adapted to receive a simple form of shutter for controlling the admission of air thereto and so cooperate with said shutter and its operating means as to produce an effective and convenient operation of said shutter and maintain said shutter in any position in which it may be adjusted.

A further object is to provide the oil-inlet and steam-inlet of an injector with valves operated as a result of the operation of the air-controlling shutter, whereby a single operation will control the admission of the steam, oil, and air and cause their supply to the injector to be always in the proper proportions.

The invention consists in forming the injector-body of two separable parts, one comprising a main shell or nozzle having air-admission ports and an interior nozzle and the other comprising a cap or end section for closing said interior nozzle, having an oil-inlet and a projecting steam-nozzle formed therewith and extending therethrough and adapted to extend within the said interior nozzle.

The invention further consists in certain other novel features in the construction and arrangement of parts, all as hereinafter described and specifically pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a view of the injector in side elevation; Fig. 2, a vertical longitudinal section taken centrally

through the injector; Fig. 3, a transverse vertical section taken on the line $z z$ of Fig. 1; Fig. 4, a front end view; Fig. 5, a transverse section taken on the line $y y$ of Fig. 1, and Fig. 6 a section view of the pinion for operating the valve-stem.

The main body-section of the injector comprises the shell 1, which is of cylindrical form, tapering at one end to form the nozzle 2 and cast with an interior nozzle 3, projecting from the other end and having an outer flanged extension 4. The body structure of the injector is completed by a cap or end section 5, cast with a projecting perforated nozzle 6, extending therethrough and having an inlet 7 at one end of said nozzle for the admission of steam. A chamber is formed within said cap-section for receiving the oil through the inlet 8 at the side of this section, and this chamber forms a continuation of the oil-space 9, formed between the projecting part of the steam-nozzle and the nozzle 3, into which the steam-nozzle projects when the two castings or sections are connected.

The size of the steam-nozzle 6 at its extremity is such as to fit the tapering bore of the nozzle 3, thereby giving a support one to the other. In the present instance the nozzle 3 is shown provided with an annular boss 3^a, which gives the desired support without diminishing the length of the oil-space 9 between the two nozzles. The oil-nozzle being closed by the seating of the steam-nozzle therein, provision is made for the passage of oil by a series of forwardly-inclining apertures 6^a, formed in the nozzle 6 along its length, which apertures facilitate greatly the uniform feeding of the oil from the outer surface of the nozzle over which it is distributed to the interior of the steam-nozzle. These oil-distributing apertures can also be effectively employed in conjunction with passageways formed between the seating-surfaces of the nozzles 3 and 6. (Not shown.)

The cap-section 5 is provided with a flange 10, by which it is secured to the flanged extension 4, preferably by bolts 11 passing therethrough. This cap-section is formed with an annular portion 12, extending beyond its flange and adapted to fit within the nozzle 3, and thereby conduct the oil below the joints and at the same time assist in retaining the two sections together. When taken apart, the two sections or castings give

ready access to every surface thereof, so that the injector can be quickly cleaned and maintained always in an effective condition.

The action of the steam is such as to produce a suction upon the oil falling on the exterior of the steam-nozzle, and the oil, which is vaporized by the heat of the steam, is drawn through the aperture 6^a and mixes with the steam and is carried through the nozzle 3 and mixed with air drawn through the ports 13, formed around the periphery of the main shell or nozzle and adjacent the rear end thereof. By the arrangement of the air-ports shown a supply of air is admitted equally on all sides of the nozzle 3, so that the charge of vaporized oil and steam will be mixed uniformly with the air admitted.

The device for regulating the admission of air consists of a shutter-sleeve 14, fitted over the cylindrical portion of the main nozzle or shell 1 and provided with openings 15 to correspond to and register with the ports 13. This shutter-sleeve is held upon the nozzle 1 between the flange 16, cast with the nozzle, and the flange-ring 17, attached to the rear end of said nozzle, and is rotated by an arm 18, carrying a handle 19, whereby to vary the size of the air-admission ports after the usual manner.

A projection 20 is cast with the flange 16 on the under side of the main nozzle 1 and carries at its ends rearwardly-projecting stops 21 to engage the arm 18 and limit its throw. A bar or strap 22 is secured to the ends of these stops by means of screws 23 and forms a frictional contact or bearing member which will at all times engage the arm 18 and supply the necessary friction to maintain it in any position to which it may be moved by the operator. The arm 18 is also held and guided between the bearing-bar 22 and the bar 24, which forms a part of the cast projection 20. It will be readily understood that should any adjustment be required in order to provide against the wear of the arm 18 upon the bar 22 it can be effected by the screws 23, which will also serve as adjusting-screws.

In order that the operation of the air-controlling shutter may control also the flow of oil and steam, the steam-inlet is provided with an inlet-section of pipe 25, which is in parallelism with a lateral oil-inlet section 26, so that each may be provided with a valve-fitting 27 and 28, respectively, which will be so positioned that a single valve-stem 29 can be employed for operating the valves of each in unison. The valve-stem is provided with the usual passage-ways 30 and 31, and to admit the extension of the stem through the fitting 28 said fitting is provided with a stuffing-box 32 at each end, while the fitting 27 has but a single stuffing-box 33, the valve end of the valve-stem fitting within a bearing-socket

34 within the latter valve-fitting. This valve-stem extends forward to a point intermediate the ends of the main casting or shell 1 and is formed at its end with an enlarged screw-threaded portion 35, which receives a pinion 36, formed with a hub or journal 37, having a screw-threaded bore 38 for coöperation with the screw-threads of the valve-stem. The journal 37 has bearing within the boxing 39, the lower half of which is an integral part of the main casting, while the upper half is removably secured to the lower half in the usual manner. This journal 37 of the pinion is also formed with an outer flange 40 to provide a thrust-bearing by which to retain the pinion in its fixed plane of rotation.

Motion is imparted to the pinion 36 by means of the circular rack 41, forming a part of the flange 14^a of the rotary air-controlling shutter. It will be seen that the pinion being in a fixed plane of rotation its action upon the screw-threads of the valve-stem will be to impart a longitudinal movement to the stem and that the rotation in one direction advances the stem, while the reverse rotation withdraws it.

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

1. In an injector, the combination with the air-nozzle having air-admission ports, of a revoluble shutter for controlling said ports, means for operating the shutter an oil-nozzle projecting within said air-nozzle, an oil-inlet having a valve, a steam-nozzle projecting within said oil-nozzle, a steam-inlet having a valve, and means operated by the shutter to simultaneously control said valves, substantially as described.

2. In combination with a rotary air-controlling shutter of an injector having an oil and a steam inlet, of a single valve-stem for controlling both of said inlets, and means whereby the operation of the shutter will operate said stem, substantially as and for the purpose set forth.

3. In an injector, the combination with an air, an oil, and a steam nozzle, of a rotary shutter for controlling the admission of air to the air-nozzle, having a rack, a pinion operated by said rack, having a screw-threaded bore, a valve-stem for controlling the flow of both oil and steam, having screw-threads thereon adapted to gear with the threaded bore of said pinion, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEVI RHODES.

Witnesses:

H. L. HERKELRATH,
B. W. WOOLVERTON.