

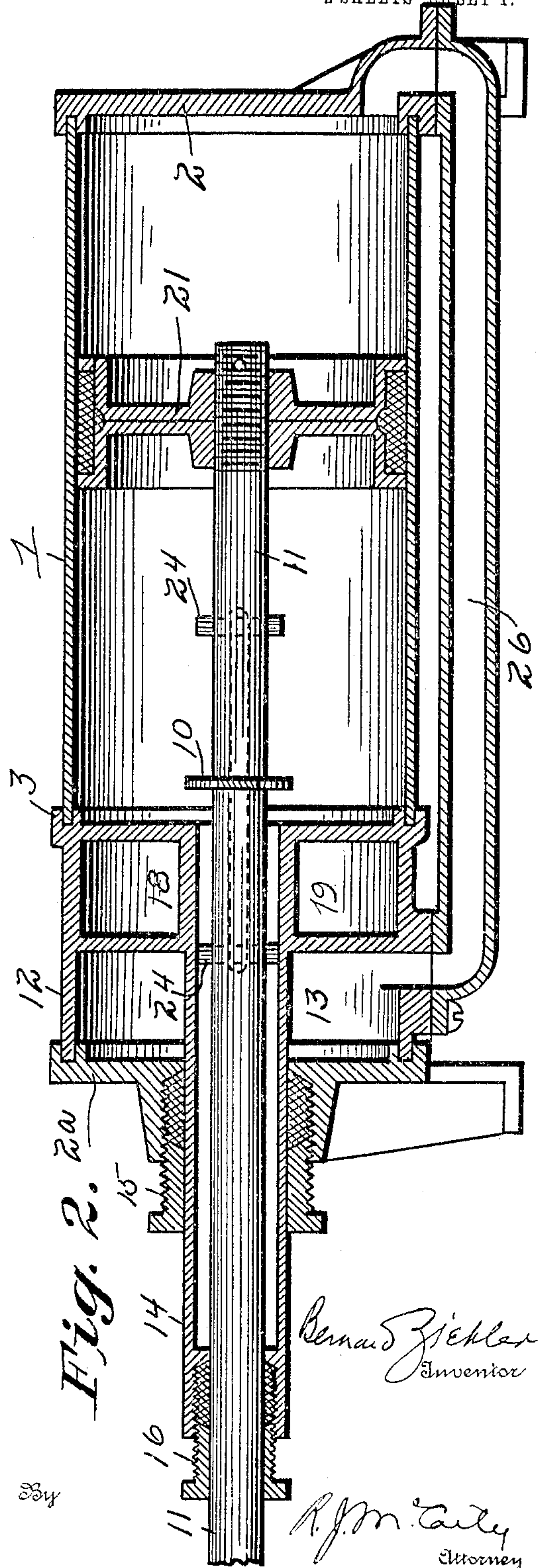
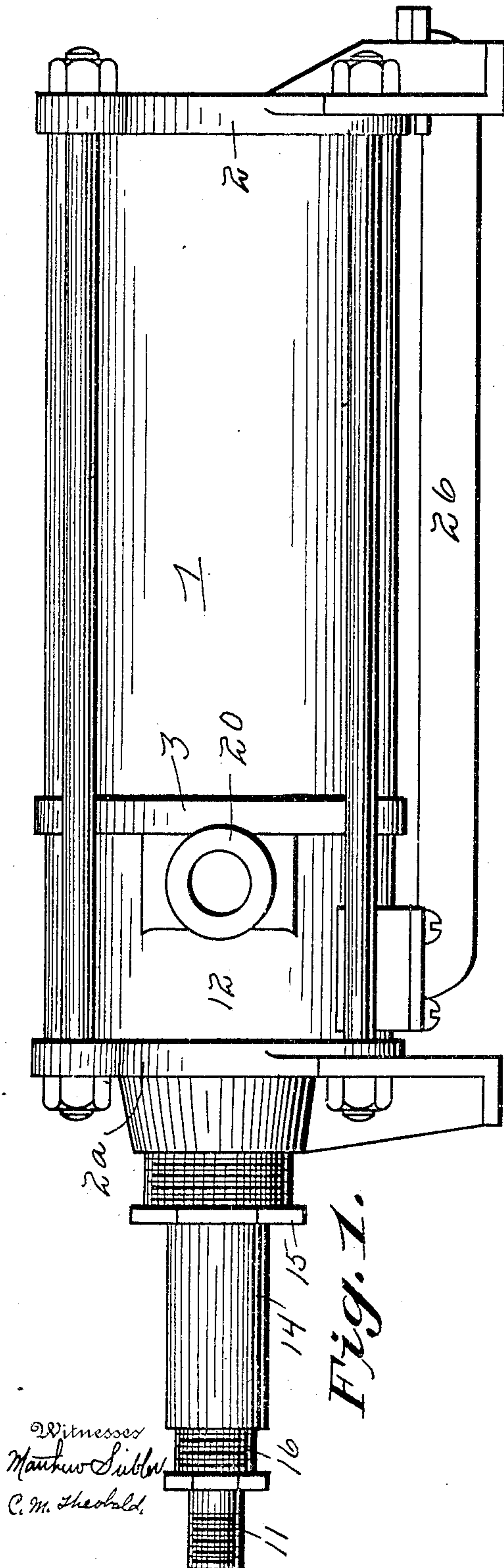
No. 871,852.

PATENTED NOV. 26, 1907.

B. ZIEHLER.
WATER MOTOR.

APPLICATION FILED DEC. 8, 1906.

2 SHEETS—SHEET 1.



No. 871,852.

PATENTED NOV. 26, 1907.

B. ZIEHLER.
WATER MOTOR.

APPLICATION FILED DEC. 8, 1906.

2 SHEETS—SHEET 2.

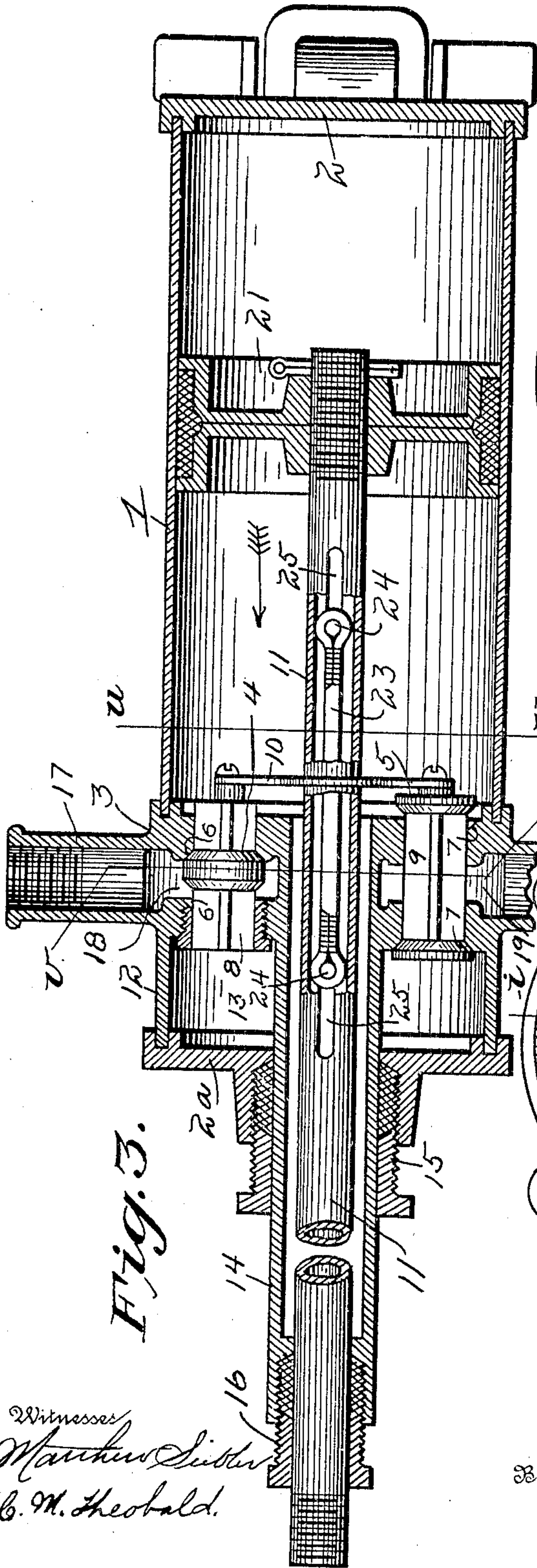


Fig. 3.

Witnesses
Matthew L. Lister
C. M. Theobald.

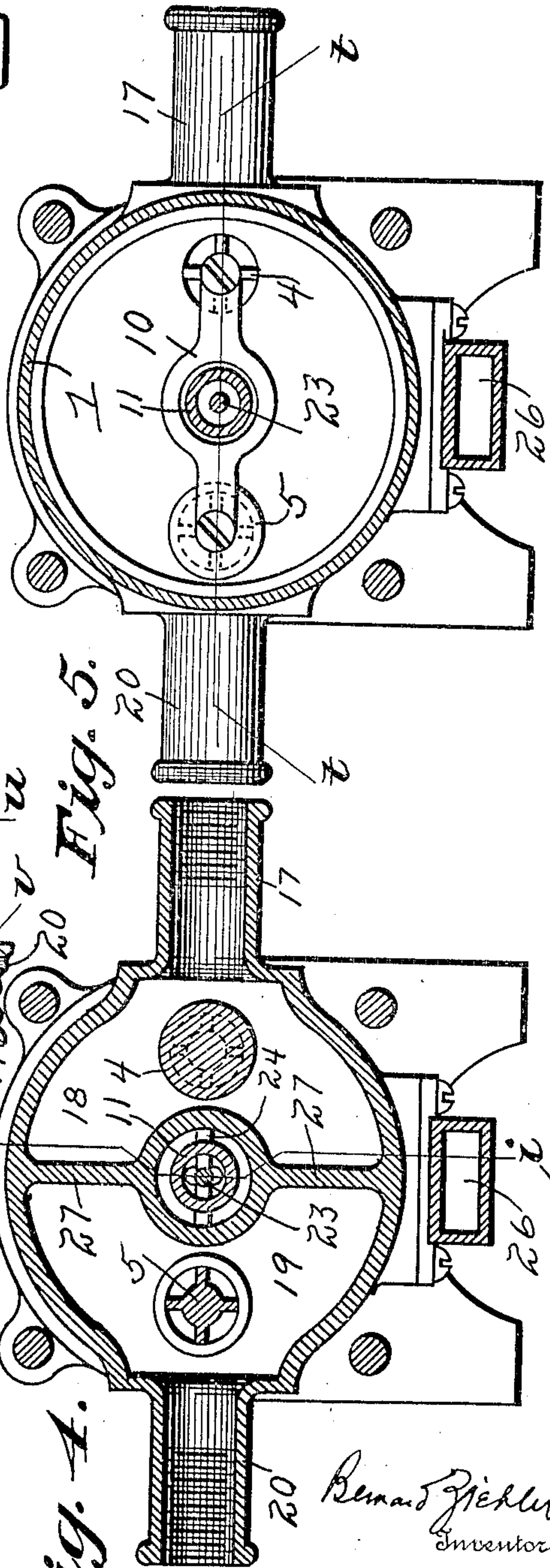


Fig. 4.

Fig. 5.

Bernard Ziehl
Inventor

R. J. M. Carty
Attorney

UNITED STATES PATENT OFFICE.

BERNARD ZIEHLER, OF DAYTON, OHIO.

WATER-MOTOR.

No. 871,852.

Specification of Letters Patent.

Patented Nov. 26, 1907

Application filed December 8, 1906. Serial No. 346,831.

To all whom it may concern:

Be it known that I, BERNARD ZIEHLER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Water-Motors; and I do declare the following to be a full, clear, and exact description of the invention, such as it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in water motors for furnishing power for domestic purposes and other purposes where comparatively light driving power is required.

The object of the invention is to provide a simple and highly efficient motor of the above type, as will be hereinafter described in the specification to follow and in connection with the drawings, and pointed out in the subjoined claims.

Preceding a detailed description of the invention, reference is made to the accompanying drawings, of which—

Figure 1, is a side elevation of the improved motor intact. Fig. 2, is a longitudinal mid-sectional elevation taken vertically through the motor. Fig. 3, is a longitudinal sectionalelevation taken horizontally through the motor. Fig. 4, is a section on the line $v-v$ of Fig. 3. Fig. 5, is a sectional view on the line $u-u$ of Fig. 3.

In a detail description of the invention, similar reference characters indicate corresponding parts.

The motor cylinder 1 is inclosed at one end by a head 2, and is connected at the other end to a casting 3 which provides chambers 18 and 19 for the inlet and exhaust valves 4 and 5 respectively; said valves are shown in Fig. 3, in a horizontal position in said casting. The inlet valve 4 seats against opposite interior seats 6—6 and the exhaust valves 5 seat alternately against exterior seats 7 in said casting. The stems 8 and 9 of these respective valves are connected by a yoke 10 which fits loosely around the piston rod 11. The casting 3 has a forward hollow extension 12 which is inclosed by a head 2^a and said extension may be considered a continuation of the cylinder 1 with the ends thereof inclosed by the heads 2 and 2^a. It will be observed that the casting 3 is sta-

tionary and lies adjacent to one end of the cylinder, with a chamber 13 at the left and inclosed by the head 2^a. Extending from the axis of the casting 3, is a tubular member 14 which is of sufficient interior diameter to permit of the piston rod 11 moving freely therein with no frictional contact. The head 2^a is provided with a stuffing box 15 which provides a suitable tight connection between the extension 14 and said head; and the extreme outer end of said extension 14 is provided with a stuffing box 16 which packs in a suitable manner, the piston rod passing therethrough. The liquid to drive the piston in opposite directions is introduced to the inlet chamber 18 through a pipe 17 which is connected to the supply pipe, and the water under pressure, after expending its force to drive the piston in reverse directions is exhausted through the chamber 19, and either of the exhaust valves 5 finding its way out from the motor through the waste nozzle or pipe 20.

The piston 21 has a suitable peripheral packing ring to insure the desirable contact between it and the interior of the cylinder, and the piston rod 11 has inclosed within it an elongated member 23 in the form of an elastic bar of suitable tenacity. Suitably connected to the ends of this elastic bar so lying within the piston rod, are pins 24, the ends of which project through elongated slots 25 in opposite sides of said piston rod. The slots 25, it will be understood, are in the opposite walls of the piston rod, allowing the cross pins 24 to project through said piston rod on both sides. The lengths of the slots depend upon the length of the time it takes to throw the valve, and the amount of expansion or elongation that may be given the elastic tripping member 23. The limits of the slots 25 are apparent in Fig. 3, the trip pins 24 being stopped at the inner limits of said slots. In the opposite movements of the piston, these pins 24 engage the opposite sides of the yoke 10 and mechanically operate the inlet and the exhaust valves 4 and 5 to move them entirely from one seat to the other, giving said valves both their initial and completed movements.

As the piston is shown in Fig. 3, we will assume it to be moving to the left by water pressure in the extreme right hand end of the cylinder. When the pin 24 on the right engages the yoke 10, the effect will be to seat the inlet valve 4 upon its left seat and the

exhaust valve 5 upon its right seat and unseat it upon its left seat. When this is done, the water will be admitted to the cylinder on the right of the valve 4 and the water
5 will exhaust from the extreme right hand end of the cylinder through pipe 26 and the left exhaust valve 5, and vice versa.

The chamber 13 communicates with the extreme right hand end of the cylinder
10 through the pipe 26, and when the piston has moved to the right to the extent of its movement, the trip pin 24 to the left as seen in Fig. 3, will engage the other side of the yoke 10, and will cause the valves to seat as
15 shown in Fig. 3. At this time, the water is discharging from the chamber 13 to the right of the piston through the pipe 26, and the water is exhausting from the cylinder at the left of the piston through the right hand
20 exhaust valve 5 and the chamber 19. The inlet chamber 18 and the outlet chamber 19 are separated by a partition 27, and it will be understood that both of these chambers communicate with the chamber 13 and the
25 cylinder when permitted to do so by the positions of the valves. When both pins 24 are away from the yoke 10, the resilient bar 23 is contracted to its shortest length, but when one or the other of said pins engages
30 said yoke, the said resilient bar is expanded or elongated owing to the other pin being held by the innermost terminals of the slots 25. When the tension on said resilient bar ceases it contracts and in so doing, the valves are
35 moved completely from one seat to the other.

I claim:

1. In a water motor of the above type, a cylinder, a casting adjacent to one end thereof and providing a chamber at such end, inlet and exhaust valves within said casting and adapted to seat against oppositely-disposed interior and exterior seats therein, a yoke connecting said valves, a piston rod
45 passing through the casting, a resilient member inclosed within said piston rod with means thereon for tripping the valve-connecting yoke to reverse the positions of the valves in the contracting movement of said
50 resilient member.

2. In a water motor of the type specified, a cylinder, a casting attached to one end of said cylinder, and having two chambers, said casting having an extension providing
55 an auxiliary chamber, a communication between said auxiliary chamber and the other end of the cylinder, valves seating against interior oppositely-disposed seats, and exteriorly oppositely-disposed seats, both
60 chambers in said casting adapted to communicate with the cylinder on one side of said casting and with the auxiliary chamber on the other side of said casting, a yoke connecting said valves, a tubular piston rod
65 passing through said casting, a resilient rod

within said piston rod, pins secured to the ends of said resilient rod and extending through the sides of the piston rod at right angles to the valve-connecting yoke, and whereby the valves are tripped in opposite
70 directions to admit water to drive the piston in opposite directions and to exhaust the cylinder on either side of the piston.

3. In a water motor of the above type, a cylinder, a casting providing an inlet chamber and an exhaust chamber and connected to one end of the cylinder and providing a chamber at one end of the motor, an inlet valve within the inlet chamber and seating against oppositely-disposed interior seats
75 therein, an exhaust valve within the exhaust chamber and seating against exterior oppositely-disposed seats, said inlet and exhaust valves being connected by a yoke, a tubular piston rod, a resilient bar therein, pins projected from said resilient bar through slots in the piston rod and adapted to trip said yoke to reverse the positions of said resilient bar first expanding after the engagement of either pin, and then contracting to completely
80 reverse the valves.
85

4. In a water motor of the above type, a cylinder, a casting connected to an end thereof and having an extension providing an auxiliary chamber separated from the cylinder of the motor, said casting having an inlet and an outlet chamber, valves within said chambers to supply, alternately the cylinder and the auxiliary chamber, and to exhaust alternately the cylinder and the
90 auxiliary chamber, a yoke connecting said valves, a piston rod, an elongated resilient member carried in said piston rod parallel therewith and having a pin on each end thereof adapted to alternately engage the
95 opposite sides of the yoke to reverse the positions of the valves after said elongated resilient member is expanded and during its contracting movement

5. In a water motor of the above type, a cylinder, a casting at one end thereof providing an auxiliary chamber separated from the cylinder chamber, said casting having an inlet and an exhaust chamber, an inlet valve seating against interior oppositely-disposed
110 valve seats in said inlet chamber, an exhaust valve seating against exterior oppositely-disposed seats in said exhaust chamber, a yoke connecting said valves, a piston rod, an elastic bar within said piston rod, pins on the ends of said bar for engaging, alternately, the opposite sides of the valve-connecting yoke to reverse the positions of the valves alternately from the contracting effect of said elastic bar after it has been
115 elongated or expanded by the engagement of one or the other of the pins with the valve-connecting yoke.
120

6. In a water motor, a cylinder with an inclosing head at one end, a casting having in-
130

let and exhaust chambers at the other end, a piston within the cylinder, a piston rod extending through the casting, an extension on said casting in a plane with the cylinder and
 5 forming an auxiliary chamber, a pipe communication between said auxiliary chamber and the interior of the cylinder, valves mounted within the inlet and exhaust chambers in said casting, and means for tripping
 10 said valves to enable the piston to reverse.

7. In a water motor, a cylinder having an inclosing head, a casting at the other end of said cylinder having inlet and exhaust chambers, said casting having a peripheral extension and an axial extension, the peripheral
 15 extension being inclosed by a head which provides an auxiliary chamber in a plane with the cylinder, a piston within said cylinder, a piston rod extending through the
 20 axial extension of the casting, valves located in the inlet and exhaust chambers in the casting, and means carried by the piston rod for tripping said valves to enable the piston to reverse.

8. In a water motor, a cylinder having an inclosing head, a casting attached to the other end of said cylinder and having inlet and exhaust chambers, said casting having
 25 a peripheral extension in a plane with the cylinder, and an axial extension, a head inclosing the peripheral extension and providing an auxiliary chamber, a pipe forming a communication between said auxiliary cham-

ber and the interior of the cylinder, a piston within said cylinder, a piston rod projecting
 35 through the axial extension of the casting, a yoke connecting the valves on the cylinder side of the casting, and means for engaging said yoke to trip the valves and thereby enable the piston to reverse. 40

9. In a water motor, a cylinder having an inclosing head at one end, a casting at the other end of said cylinder having inlet and exhaust chambers, said casting having a peripheral extension in a plane with the motor
 45 cylinder, and an axial extension reaching beyond the peripheral extension and having a stuffing box in its outer end for the piston rod, a head fitting over said axial extension and engaging the peripheral extension and
 50 providing an auxiliary chamber, a pipe communicating with the motor cylinder and with the auxiliary chamber, inlet and exhaust valves mounted in the casting, a yoke connecting said valves, and a trip member car-
 55 ried upon the piston rod and whereby the valve-connecting yoke is engaged in the opposite movements of the piston rod to trip the valves.

In testimony whereof I affix my signature, 60
 in presence of two witnesses.

BERNARD ZIEHLER.

Witnesses:

R. J. McCARTY,
 C. M. THEOBALD.