

No. 620,204.

Patented Feb. 28, 1899.

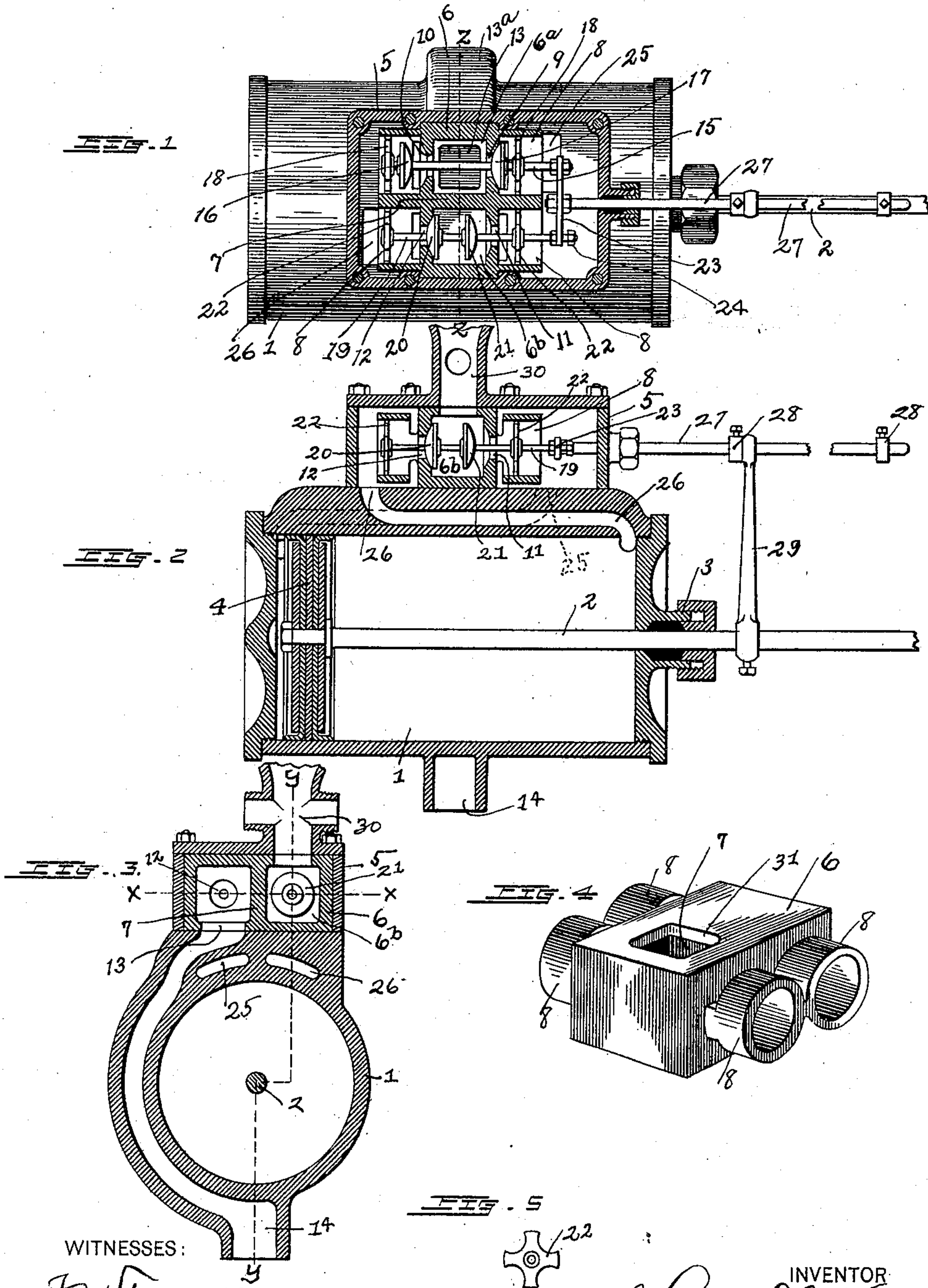
C. L. WILKINS.

MOTOR.

(Application filed Sept. 13, 1897.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

J. H. Fravel
A. L. Phelps

INVENTOR
Charles L. Wilkins
BY
C. C. Shepherd
ATTORNEY

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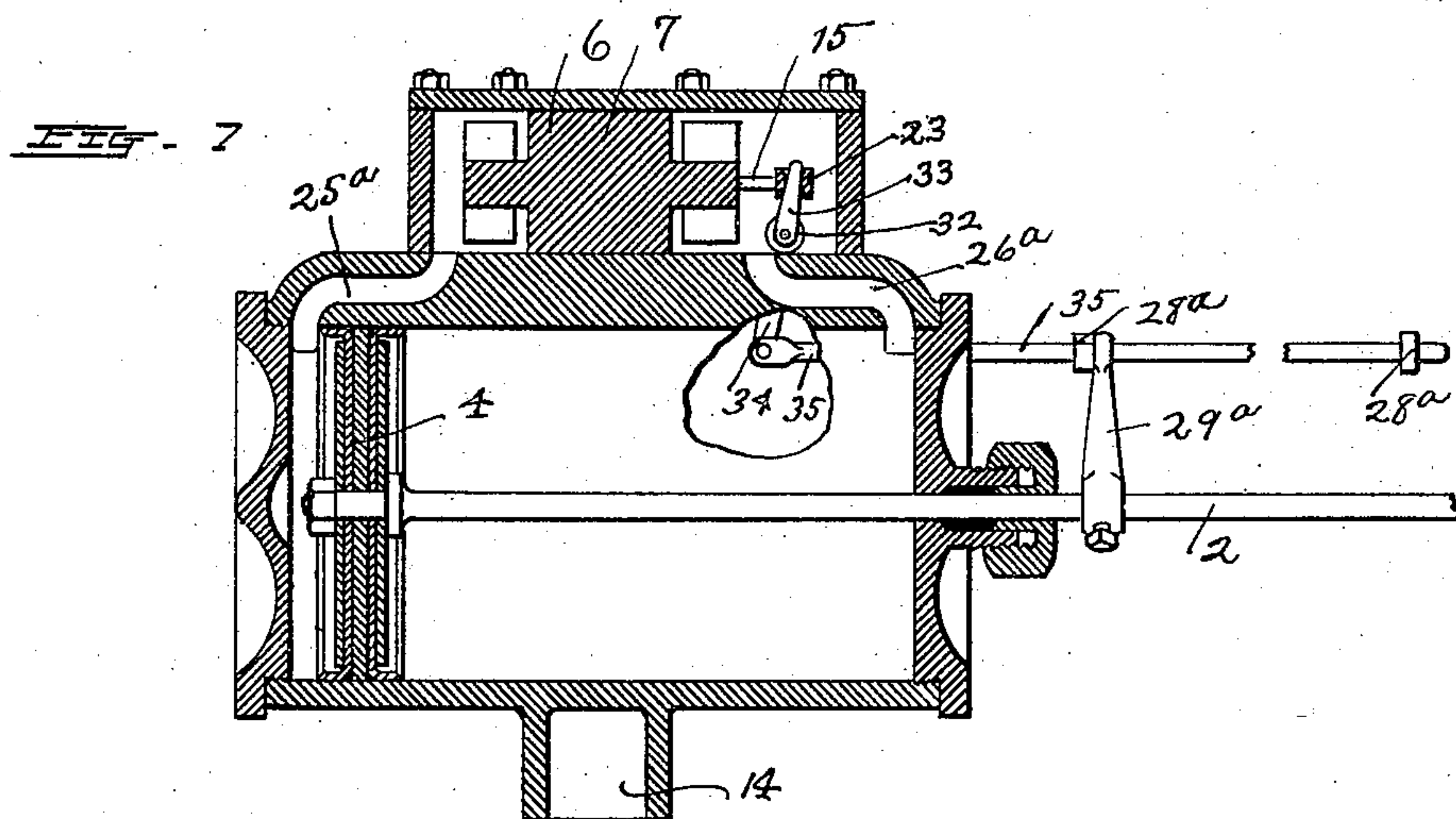
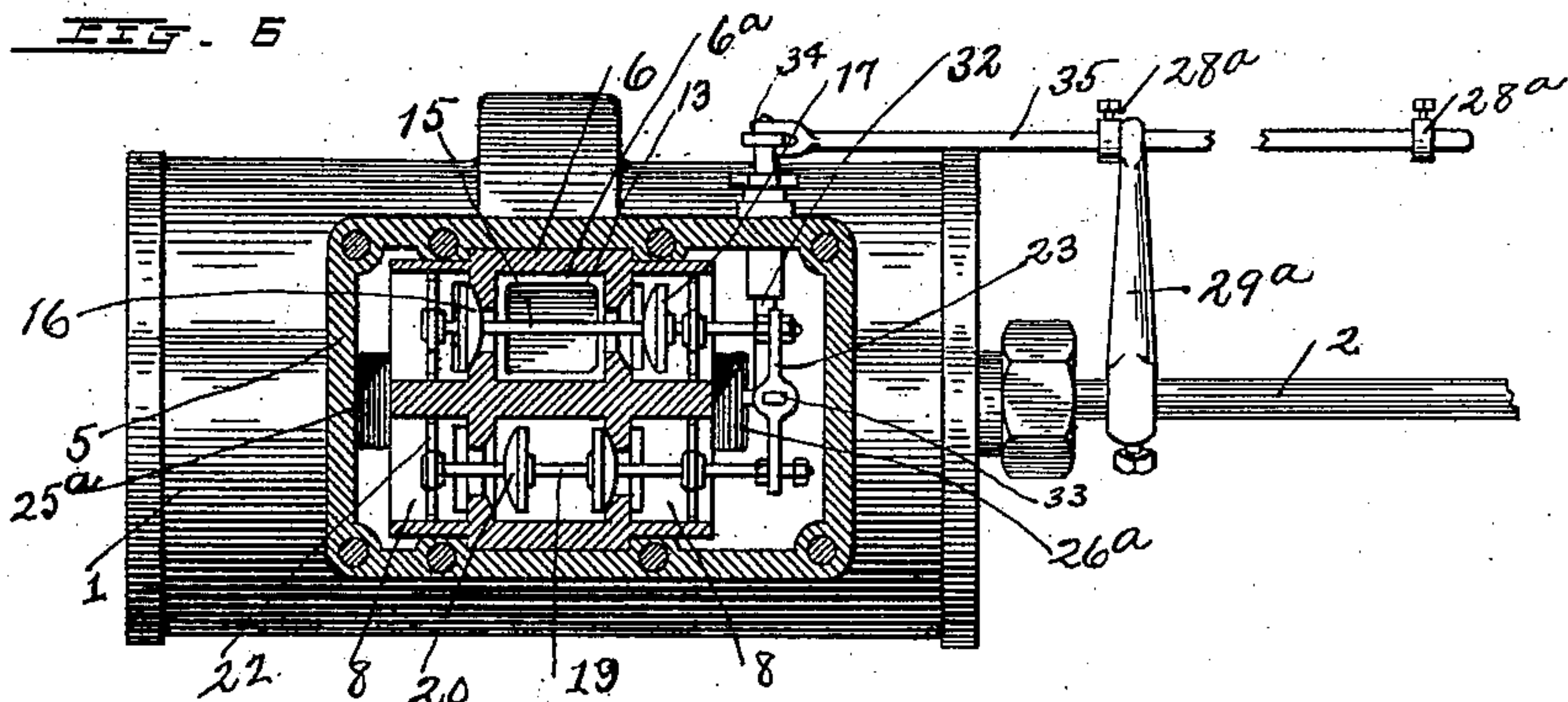
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BY
C. C. Shepherd
ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES L. WILKINS, OF COLUMBUS, OHIO.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 620,204, dated February 28, 1899.

Application filed September 13, 1897. Serial No. 651,425. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. WILKINS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Motors, of which the following is a specification.

My invention relates to the improvement of motor-pumps for pumping-engines of that class which are adapted to be operated by the water-pressure of city supply-pipes; and the objects of my invention are to produce an improved engine or pumping apparatus of this class of superior construction and arrangement of parts, to provide improved means for supporting and operating the valve mechanism, to provide an improved valve-cage, and produce other improvements in details of construction and arrangement of parts, which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of my device, showing the upper portion thereof broken away on the line *x x* of Fig. 3. Fig. 2 is a central vertical section taken on two planes, as indicated by the dotted line *y y* of Fig. 3. Fig. 3 is a transverse section taken on dotted line *z z* of Fig. 1. Fig. 4 is a detail view in perspective of the valve cage or box. Fig. 5 is a detail view in elevation of one of the valve-rod guides. Fig. 6 is a similar view to that shown in Fig. 1, in which a modified manner of operating the valves and arranging the ports is shown; and Fig. 7 is a central vertical sectional view of said modification.

Similar numerals refer to similar parts throughout the several views.

In carrying out my invention I employ a main or power cylinder 1, which is provided with a central piston-rod 2, which extends through a suitable packing-box 3 in one of the end caps of said cylinder, this piston-rod extending outward and being adapted to operate a suitable form of pump which does not form a part of my present invention. The piston-rod 2 carries on its inner end a suitable piston-head 4, which fits and slides within the cylinder 1. Upon the upper side of the cylinder 1 I provide a valve-casing 5, which rises therefrom. Within this valve-casing I support, in the manner hereinafter

described, a valve cage or box 6, which is in the form of an oblong body having a central partition 7, which divides said body into the compartments 6^a and 6^b, and which is provided on each of its longer sides with two tubular guide projections 8, which communicate with the interior of the cage through the medium of valve-openings 9, 10, 11, and 12. Leading outward from the compartment 6^a is an exhaust-port 13, which is continued downward about the cylinder through a raised portion 13^a, or which may be formed within a double cylinder-casing and which terminates in an outlet 14 on the lower side of the cylinder. Extending centrally through the valve-openings 9 and 10 and into the tubular guide projections 8 is a valve-rod 15, the latter carrying thereon on the outer side of each of said valve-openings a suitable valve, said valves being indicated, respectively, at 16 and 17. These valves 16 and 17 are arranged at such distance apart as to result in one of said valves being supported in the open position when the other is in a closed position. On the outer side of each of the valves 16 and 17 is carried a guide-plate 18, the radial arms of which are adapted to fit and slide within the tubular extensions or projections 8.

19 represents a valve-rod which is parallel with the rod 15 and which extends centrally through the valve-openings 12 and 11, said valve-rod carrying within the compartment 6^b valves 20 and 21, which are of such distance apart as to result in one of said valves being retained in an open position when the other is in the closed position. Within the tubular projections 8 the valve-rod 19 carries guide-plates 22, which correspond with the plates 18. On the corresponding outer sides of the tubular projections 8 the valve-rods 15 and 19 are connected by a cross-bar 23. As indicated in Fig. 1 of the drawings, that end of the cross-bar 23 which is connected with the rod 15 is rigidly clamped thereon, while the end which is connected with the rod 19 is loosely secured thereon between two shoulders or nuts 24, both of which are not in contact with the bar 23 at the same time.

Leading outward from the bottom of the valve-casing 5 on one side of the valve-cage and adjacent to the tubular projection 8 of the compartment 6^a is a port 25, the latter ex-

tending downward into the top plate of the cylinder 1 and, as indicated in dotted lines in Fig. 2 of the drawings, leading into the outer end of said cylinder.

5 26 represents a port which leads outward from the bottom of the valve-casing and near the end thereof and opposite the cage-compartment 6^b, said port 26 extending downward and thence longitudinally through the top
10 plate of the cylinder 1 and entering the forward end of said cylinder, as shown more clearly in Fig. 2.

27 represents a valve driving-rod, the inner end of which is secured centrally to the valve-rod-connecting bar 23, said rod 27 extending
15 outward through one end of the casing 5 and a suitable packing-box formed therewith. This driving-rod 27 is provided with suitable separated adjustable stop collars or lugs 28.
20 With the piston-rod 2 on the outer side of the cylinder is adjustably connected an arm 29, the outer end of which has a sliding connection with the rod 27 of one of the stop-lugs 28.

With the upper side of the casing is formed
25 an upwardly-extending air-chamber, the neck of which is indicated at 30, and with this neck portion are adapted to be connected the water-pipes of a city supply system, said neck portion leading into the upper side of the
30 valve-compartment 6^b through an opening 31 in the upper side of the valve-cage.

In order to illustrate the operation of the above-described valve mechanism, I will assume that the valve 17 is closed against the
35 valve-seat which is formed about the opening 9, the valve 16 being in the open position shown in Fig. 1 of the drawings and the valves 21 and 20 being respectively opened and closed. The parts being in this position, the
40 piston-head 4 is, as indicated in Fig. 2, at the outer end of the cylinder 1. The water which is employed for operating the mechanism entering the compartment 6^b passes outward through the opening 11, thence downward
45 through the port 25, and into the outer end of the cylinder 1. The pressure thus imparted to the piston-head 4 drives the latter to the opposite end of the cylinder, and during this operation the water which was previously con-
50 tained in said cylinder 1 is forced out through the port 26, thence through the valve-opening 10, and out through the exhaust-opening 13. The movement of the piston-head above described toward the inner end of the cylinder
55 results finally in a contact of the arm 29 with the outer lug 28 of the rod 27, thus driving said rod outward and causing a reversal in the position of the valve-cage. The valve-opening 11 being thus closed and the valve-
60 opening 12 being opened, it is obvious that the incoming water will pass out through said valve-opening 12, thence downward through the port 26, and operate to reverse the movement of the piston-head. This operation
65 causes a contact of the arm 29 with the inner lug 28 of the rod 27, resulting in the valves returning to their first-described positions.

In order to relieve the valves 17 and 21 from the substantially equal pressure of water which is contained in the corresponding end
70 of the valve-casing, and thereby preventing interference with the proper and free action of said valves, I have separated the retaining-nuts 24 in the manner heretofore described to admit of a slight movement of the bar 23
75 before the closing of the valve 21, thereby causing the valve 17 to open before the valve 21 is closed and relieving the water-pressure on the latter valve by admitting of its escape through the valve-opening 9.
80

Although the ports 25 and 26 (illustrated in Figs. 1, 2, and 3 of the drawings) are shown to cross each other, said ports extending from the ends of the valve-casing to opposite ends
85 of the cylinder, I may simplify this construction by arranging said ports as indicated at 25^a and 26^a in Figs. 6 and 7, thus providing for a direct water connection between the cylinder and valve-casing between the corresponding ends of the same. In this case, how-
90 ever, it is obvious that the movement of the valves must be reversed. In order to provide for this reversal and the proper operation of the device, I omit the connection of the rod 27 with the connecting-bar 23, provid-
95 ing a horizontal shaft 32, which extends outward through one side of the valve-casing and which has extending upwardly from its inner end an arm 33, which is jointedly connected with the central portion of said con-
100 necting-bar 23. On the outer end of the shaft 32 I provide a crank-arm 34, with which I connect an operating-rod 35, the latter being provided with adjustable lugs or cams 28^a, which correspond with the collars 28 in Fig. 1.
105 I also provide the main piston-rod 2 with an arm 29^a, which is adapted to work on said rod 35 between said collars. In the operation of this modified valve-operating mechanism the opening-and-closing movement of the
110 valve-rods is, as will readily be seen, imparted through the partial rotations imparted to the shaft 32 through the backward-and-forward movement of the rod 35.

It will be observed that in the construction
115 of my improved motor or engine the valves thereof are supported or suspended on the valve-rods and that their peripheries are at no time in contact with the inner surfaces of the tubular extensions 8 or compartment 6^b,
120 thus preventing the friction and wearing action on the valve peripheries and providing for the closing of the valve-openings by direct horizontal movements of the valves. It will also be observed that in supporting said
125 valves in proper horizontal positions I employ the guide-plates 18, of such form as to fit and slide within the tubular extensions 8 of the valve-cage and of such form as to admit of the free passage of the water there-
130 through. It will also be observed that the valve-cage herein described in conjunction with its tubular guide extensions 8 is of a desirable form and construction and that the

same may be formed separately and readily and accurately secured within the casing.

Although my improved engine is described as operated by water, it is obvious that the construction is such as to admit of other power being used and that the same might be adapted for the employment of steam or air power and utilized for other purposes than that of pumping water.

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

1. In an apparatus of the class described, a valve-case having inlet, exhaust and discharge chambers, oppositely-located ports in the inlet and exhaust chambers, communicating directly with the discharge-chambers, a double valve within the inlet-chamber between the ports thereof, a valve in each discharge-chamber opposite the port in the exhaust-chamber, and mechanically-operated means to impart positive initial movement simultaneously and in the same direction to all of the valves.

2. In an apparatus of the class described, a valve-case, discharge-chamber therein at or near its ends, interposed common inlet and exhaust chambers, ports communicating with the discharge-chambers, a reciprocable dou-

ble valve within the inlet-chamber, to control communication with the discharge-chambers, a valve movable in each discharge-chamber to control the exhaust therefrom, spindles on which the valves are mounted, and mechanically-operated means to positively reciprocate said spindles to operate the valves simultaneously.

3. In a motor, the combination with a cylinder, a valve-casing thereon, a valve-cage supported in said casing, said valve-cage having separated compartments and a guide extension for each of said compartments, oppositely-located valve-openings in each compartment, an inlet-opening in one of said compartments and an outlet-opening in the other, of connected valve-rods extending through said compartments, valves on said rods and guide-plates also carried on said rods, said guide-plates formed of open-work and fitting and sliding within said guide extensions and ports leading from opposite ends of said valve-casing to said cylinder, substantially as and for the purpose specified.

CHARLES L. WILKINS.

In presence of—

C. C. SHEPHERD,

EDWARD M. TAYLOR.