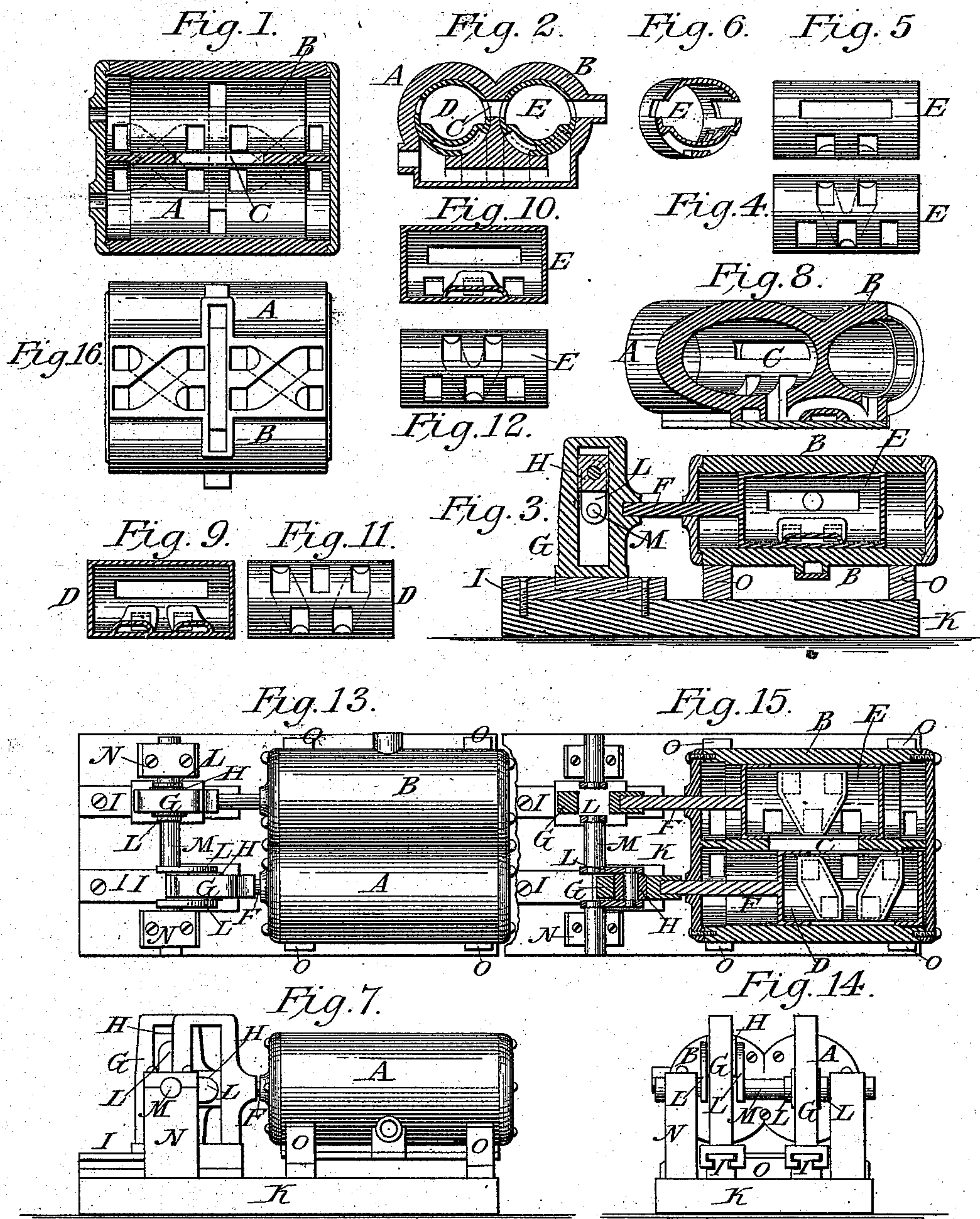


J. HARRIS.
Hydraulic Motor.

No. 105,450.

Patented July 19, 1870.



Witnesses:
S. N. Piper.
J. R. Snow.

Inventor:
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by his attorney,
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UNITED STATES PATENT OFFICE.

JAMES HARRIS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN HYDRAULIC MOTORS.

Specification forming part of Letters Patent No. 105,450, dated July 19, 1870.

To all whom it may concern:

Be it known that I, JAMES HARRIS, of Boston, of the county of Suffolk and State of Massachusetts, have invented a new and useful Hydraulic Motor; and I do hereby declare the same to be fully described as follows, reference being had to the accompanying drawings, making part of this my specification.

In carrying out my present invention I have combined with a water-meter or hydraulic apparatus, substantially as described and represented in Letters Patent No. 88,475, dated March 30, 1869, and granted to me, a pair of piston-rods, a double-cranked shaft, two slide-yokes, and guides therefor, whereby I am enabled to adapt the said hydraulic apparatus shown in such patent for use as a motor or means of obtaining from the reciprocating rectilinear movements of its two pistons a rotary motion of a shaft.

In some respects my hydraulic motor is like a common double-cylinder steam-engine, although differing from it in others, for the pistons in my motor serve not only the purposes of pistons, but as valves to the cylinders, and in order to preserve each from turning around while in motion so as to vary its proper position with respect to the parts of the cylinder, I have dispensed with the groove and stud for such purpose, as represented in my said patent, and I have supported the piston-yokes on and so applied them to guide-rails as to cause such yokes and guide-rails, with the piston-rods, to maintain the pistons from revolving, the yokes also performing other duties—viz., that of operating with and actuating the cranks of the shaft.

By the additions I have made to the water-meter, as described in the aforementioned patent, the pistons, while the machine is in operation, are both in movement at one and the same time and in opposite directions, whereas without such additions one would be at rest while the other might be in motion, and in order that the machine may operate to good advantage its parts should generally be somewhat wider in proportion to the size of the pistons than is represented in the drawings of such patent.

My present hydraulic motor is calculated for moving the bellows of an organ or musical in-

strument, or putting in operation a house or hotel elevator, or doing other work where there is only an occasional necessity for the exertion of much power.

Of the said drawings, Figure 1 is a horizontal section of the two cylinders without their pistons. Fig. 2 is a transverse section of such cylinders with their pistons. Fig. 3 is a longitudinal section taken through one of the pistons, its rod, and yoke. Fig. 4 is an under-side view, and Fig. 5 a side elevation, of one of the valve-pistons. Fig. 6 is an oblique section of such valve-piston, the plane of section being taken through one of its oblique water-passages. Fig. 7 is a side elevation of the motor. Fig. 8 is an oblique section of the case or cylinders, taken through one of the oblique passages leading from one piston-cylinder to or about to the end of the other. Fig. 9 is a longitudinal section of the piston D. Fig. 10 is a similar section of the piston E, while Fig. 11 is an under-side view of the piston D, and Fig. 12 a similar view of the piston E, as hereinafter explained. Fig. 13 is a top view; Fig. 14, a front end elevation, and Fig. 15 a horizontal section, of the motor. Fig. 16 is a bottom view of the two connected cylinders with their bottom-part plate removed so as to show the ports or passages of such cylinders.

As hereinbefore mentioned, the essential characteristics of the pistons and cylinders are the same as those described and represented in the said patent. Therefore it will not be necessary for me to enter into a further description of them, except it be to state that A and B denote the two cylinders, arranged side by side, each being provided with a piston, as shown at D and E, made to open laterally into both cylinders, which open at their junctions into each other, as shown at C. Each piston has a rod, F, extended from it through one head of its cylinder, and having fixed to its outer end a rectangular frame or yoke, G, which at bottom rests upon and spans a straight guide-rail, I, arranged on the bed-plate K in manner as represented. Within each of the two yokes G there is a vertical slider or box, H, which encompasses or receives the wrist of one of two bell-cranks, L L, which span the yokes and project at a right angle to each other from a shaft, M, supported in bearings applied to two stand-

ards, N N, erected on the bed-plate. Such bed-plate serves also to support, by means of other standards, O O, the double cylinder or cylinders A B.

When water under pressure is let into the induction-pipe of the motor and supposed to act on the pistons, there will be produced reciprocating rectilinear movements of the two, one being moved in one and the other in the opposite direction at one and the same time, whereby, by means of the piston-rods, the yokes, the cranks, and the guide-rails, the cranked shaft will be put in continuous revolution.

By the employment of the yokes and guide-rails, with the shaft-crank and piston-rods, I am enabled to dispense with long connecting-rods, and thereby reduce the whole engine into less length or compass; and, besides, I am en-

abled to maintain the valve-pistons in their correct relations with their cylinders or to prevent the pistons from turning around in the cylinders so as to affect the proper disposition of the operative ports or passages of the cylinders and pistons.

I claim as my invention—

The hydraulic motor, constructed as described—viz., as composed of the yokes, the guides, the piston-rods, the double-cranked shaft, and the patented meter, as described, or hereinbefore mentioned and represented, all the said parts being arranged and to operate together as explained.

JAMES HARRIS.

Witnesses:

R. H. EDDY,
J. R. SNOW.