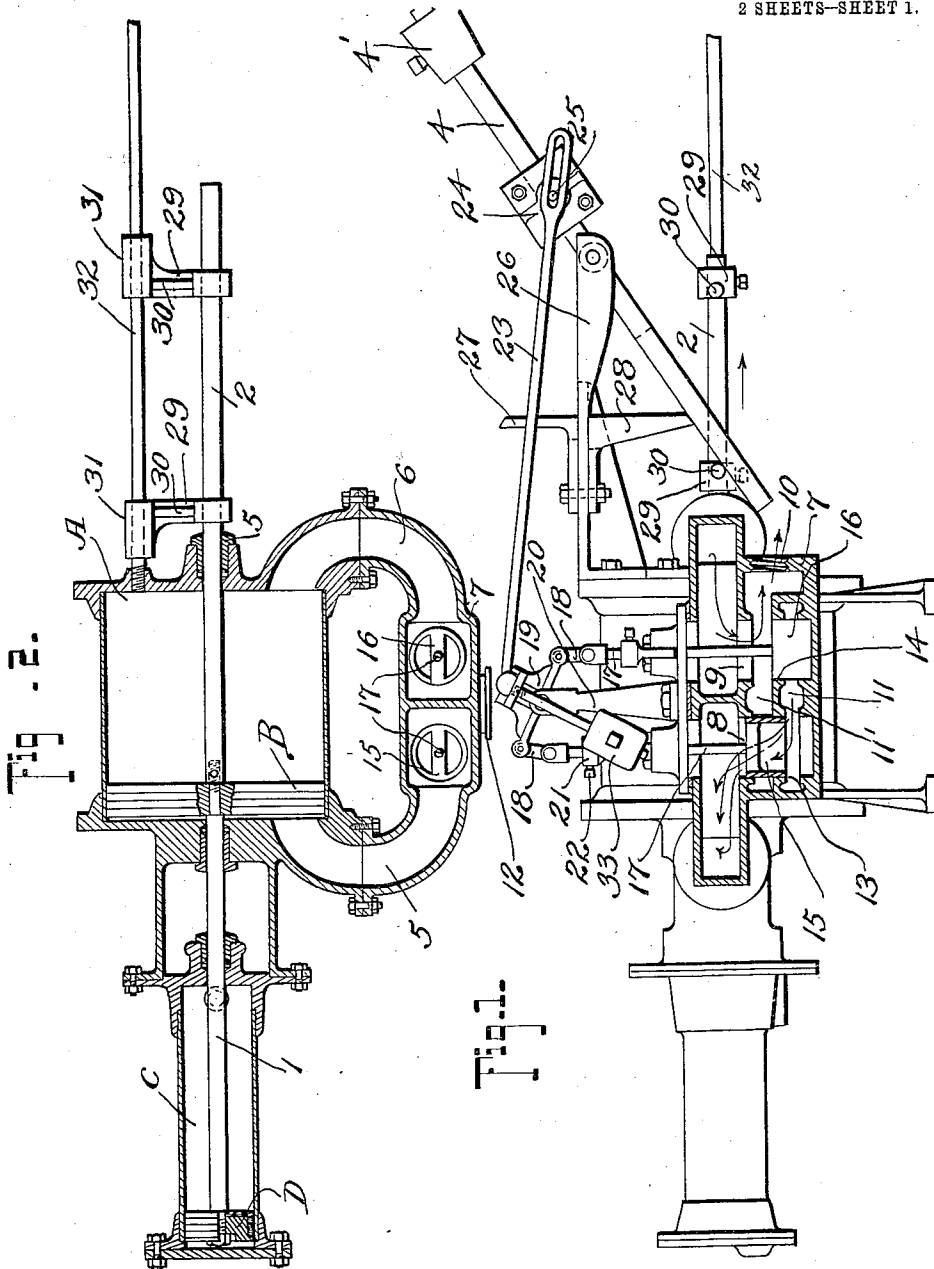


L. A. LAURSEN.
HYDRAULIC MOTOR.
APPLICATION FILED AUG. 26, 1911.

1,051,601.

Patented Jan. 28, 1913.

2 SHEETS—SHEET 1.



WITNESSES:
Charles H. Wagner.
E. Larson

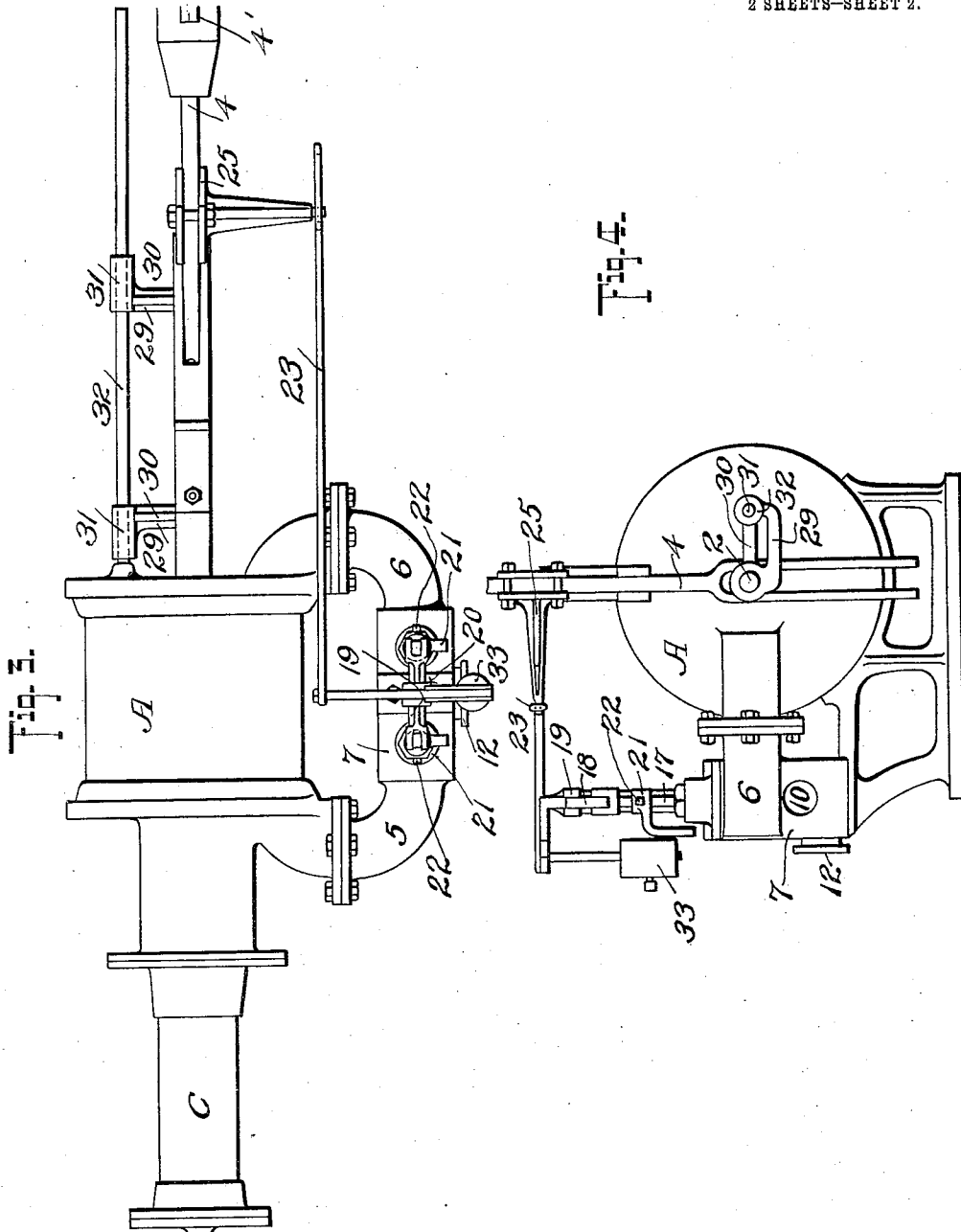
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UNITED STATES PATENT OFFICE.

LAURITS A. LAURSEN, OF HOLCOMBE, WISCONSIN.

HYDRAULIC MOTOR.

1,051,601.

Specification of Letters Patent.

Patented Jan. 28, 1913.

Application filed August 26, 1911. Serial No. 646,201.

To all whom it may concern:

Be it known that I, LAURITS A. LAURSEN, a citizen of the United States, residing at Holcombe, in the county of Chippewa and State of Wisconsin, have invented certain new and useful Improvements in Hydraulic Motors, of which the following is a specification.

The present invention embodies improvements in hydraulic motors of the same general type as described in my United States Letters Patent No. 995,263, issued to me June 13, 1911.

The present invention relates particularly to the valve mechanism controlling the admission and exhaust of a pressure medium to and from, respectively, a working cylinder in which operates a piston connected with suitable pumping means.

The invention involves the valve mechanism itself and the peculiar automatic means for operating said valve mechanism, all of which will appear more fully hereinafter.

For a full understanding of the present invention, reference is to be had to the following description and to the accompanying drawings, in which—

Figure 1 is a side elevation of a hydraulic pump embodying the essential features of the invention, the valve chest being shown in section; Fig. 2 is a horizontal sectional view; Fig. 3 is a top plan view; Fig. 4 is an end view looking toward the shifting lever.

Throughout the following detail description and on the several figures of the drawings, similar parts are referred to by like reference characters.

In the drawings, A denotes a working cylinder in which operates the working piston B, and C denotes a pumping cylinder in which is located the piston D. The above parts are arranged substantially as shown in my previous patent, the pistons B and D being connected by the rod 1 and the piston B having a piston rod 2 which extends through an end of the cylinder A at the stuffing-box 3, and carries suitable means for operating a shifting lever 4 by which the positions of the valves are controlled.

At its opposite ends, the cylinder A is in communication with the fluid passages 5 and 6, said fluid passages being in turn in communication with a valve chest 7, such communication being established by openings 8 and 9 which lead downwardly from the

outer ends of the passages 5 and 6 respectively. At one end, the valve chest 7 has an exhaust port 10, and in the chest 7 is an inlet chamber 11 having the fluid inlet port 12. The top of the chamber 11 has openings 13 and 14 in vertical alinement with the openings 8 and 9, respectively, and hollow or tubular valves 15 and 16 are arranged for movement in the valve chest, as will be more fully described. Each of the valves 15 and 16 has a valve stem 17 which passes through a suitable stuffing-box to its point of connection with a link 18 pivotally attached to one end of a rocker lever 19, the latter being pivoted between its ends to the vertical standard 20 suitably secured to a supporting part of the machine.

The valve stems 17 are preferably made in sections, the lowermost section having a socket 21 receiving the lower end of the upper section, the latter being firmly attached by a suitable set screw 22.

As above mentioned, the rocker lever 19 is pivoted between its ends and is connected with one end of a rod 23, the opposite end of said rod being connected with an arm 24 supported by an adjustable bracket 25 on the shifting lever 4. The bracket 25 is adapted to be adjusted longitudinally of the lever 4 and said lever 4 is pivoted to the horizontal arm 26, to which are attached the upper stop 27 and lower stop 28.

On the piston rod 2 are arranged spaced trip arms 29 which may be supplied with suitable rollers 30, the latter being adapted for direct contact with the lower end portion of the shifting lever 4 and said trip arms 29 being secured to the rod 2 by set screws or similar fastenings. The arms 29 may furthermore have bearings 31 receiving a guide rod 32 projecting from the adjacent end of the cylinder A. At its upper end, the lever 4 carries a heavy weight 4' and adjustably mounted on the rocker lever 19 is a counterbalance weight 33.

The construction of the invention being as above described, the general operation of the valve mechanism is as follows: Assuming that the parts are in the positions shown in Fig. 1, the fluid pressure medium enters the inlet chamber 11 through the inlet 12 and passes from the inlet chamber upwardly through the hollow portion of the valve 15, and the passage 5, into the cylinder A. The pressure of the fluid being exerted against the piston B, the latter is forced toward the

outer end of the cylinder A from its position shown in Fig. 2. As the piston B moves outwardly in the aforesaid direction, the member 29 and its roller 30, by engagement
 5 with the lower end of the lever 4, tends to raise said lever into a vertical position, the arm 24 swinging on its pivot and permitting the lever 4 to swing beyond the dead-center, whereupon the lever 4 coöperates with the
 10 rocker lever 19 to move the latter into a position reversing the positions of the valves 15 and 16. During the above movement of the piston B, the fluid previously admitted into the cylinder A through the passage 6 ex-
 15 hausts through said passage and passes therefrom through the opening 9 in the exhaust chamber 11' of the valve chest 7 and out through the exhaust port 10. A pipe may, of course, be connected with the ex-
 20 haust port if desired, but is not shown. When the positions of the valves are reversed, the passage of the fluid from the inlet chamber 11 to the passage 5 is cut off by the valve 15, and said fluid then passes
 25 through the valve 16 and passage 6 to the opposite end of the cylinder A. The above operation is, of course, continued indefinitely, the automatic operation of the pump being insured by supplying water at the
 30 inlet 12 under a sufficient head to do the work required.

It will be understood, of course, that the pumping cylinder C will be connected by pipes or other connections, not shown, to re-
 35 ceive water and pump the latter to a suitable point of utilization.

Having thus described the invention, what is claimed as new is:

1. In a hydraulic motor, the combination
 40 of a working cylinder, a piston reciprocable therein, a pair of passages opening into the cylinder at opposite ends thereof to deliver a fluid pressure medium to opposite sides
 45 of the cylinder, an inlet chamber having an opening for the entrance of the fluid pressure medium, a superposed exhaust chamber provided with a suitable outlet opening, the
 50 top of the inlet chamber being formed with spaced openings establishing communication between the exhaust and inlet chambers, said exhaust chamber being provided with openings arranged in alinement with the openings at the top of the inlet chamber and

each communicating with one of said pas-
 55 sages, reciprocating valves controlling said passages, a rocker lever connected at its opposite ends to said valves, a counterbalance weight carried by said lever, a supporting bracket, a shifting lever pivoted between its
 60 ends to the outer portion of said bracket, stops projecting upwardly and downwardly from the bracket to engage the upper and lower end portions of the shifting lever re-
 65 spectively, according to the direction of its movement, a weight carried by the upper end of the shifting lever, an adjustable member supported by the shifting lever, a rod
 70 connected at one end to the rocker lever and loosely connected at its opposite end to said adjustable member, and means for actuating the shifting lever coacting at the lower end thereof.

2. In a hydraulic motor, the combination of a working cylinder, a piston reciprocable therein, a pair of passages opening into the
 75 cylinder at opposite ends thereof to deliver a fluid pressure medium to the opposite sides of the cylinder, an inlet chamber having an opening for the entrance of the fluid pressure medium, an adjacently disposed exhaust
 80 chamber provided with a suitable outlet opening, the top of the inlet chamber being formed with spaced openings establishing communication between the exhaust and inlet chambers, said exhaust chamber being
 85 provided with openings arranged in alinement with the openings at the top of the inlet chamber and each communicating with one of said passages, reciprocating valves controlling said passages, a lever connected
 90 to said valves, a shifting lever, stops adapted to engage the ends of the shifting lever, a weight carried by the upper end of the shifting lever, an adjustable member supported by the shifting lever, a member connected
 95 with said first named lever and having a loose connection with said adjustable member, and means for actuating said shifting lever.

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

LAURITS A. LAURSEN.

Witnesses:

E. A. CLEAVES,
 J. A. CLEAVES.