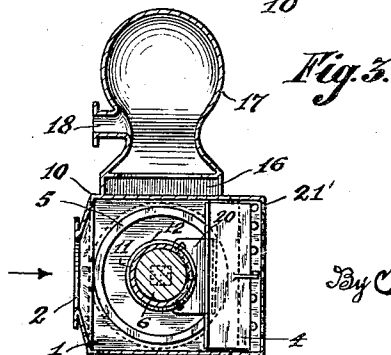
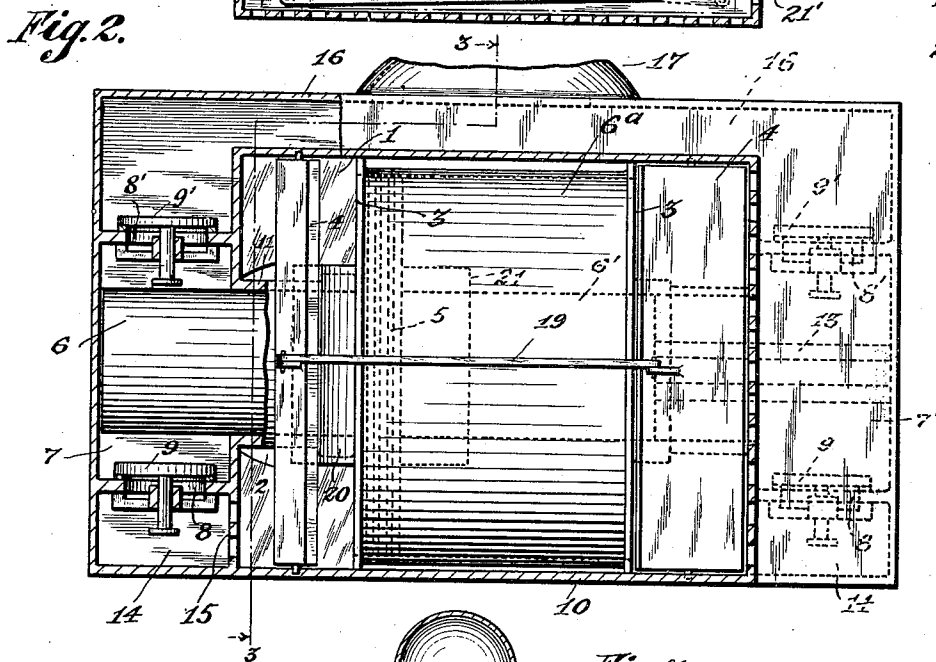
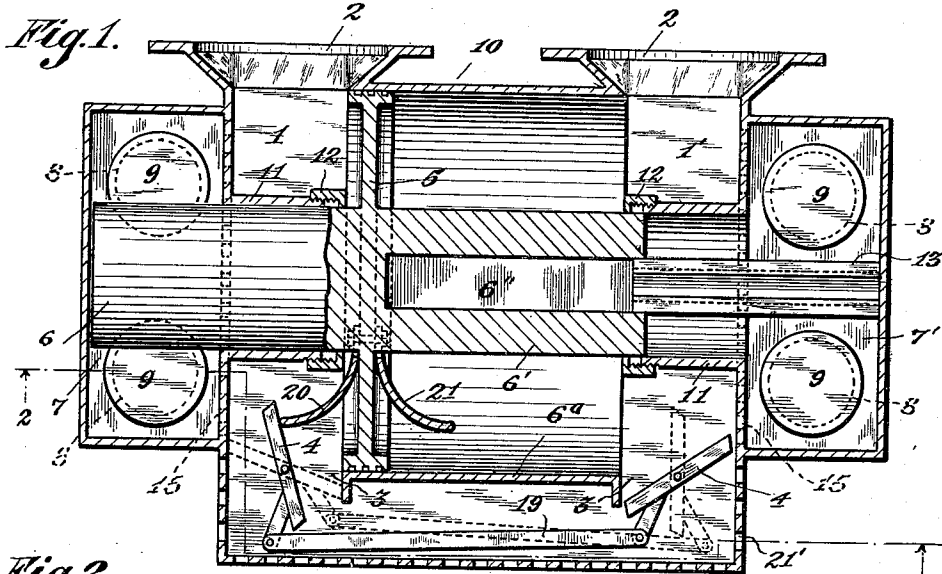


O. P. ROHR.
 COMBINED HYDRAULIC MOTOR AND PUMP.
 APPLICATION FILED NOV. 29, 1911.

1,057,777.

Patented Apr. 1, 1913.



Witnesses

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COMBINED HYDRAULIC MOTOR AND PUMP.

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Specification of Letters Patent.

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Application filed November 29, 1911. Serial No. 663,134.

To all whom it may concern:

Be it known that I, OTTO P. ROHR, a subject of the King of Norway, and a resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Combined Hydraulic Motors and Pumps, of which the following is a specification.

My invention has particular reference to an improved construction of the above type operated through pressure generated incident to the arresting of the momentum of a body of flowing water, and has for a fundamental object to provide mechanism of this character which is comparatively simple in construction and capable of operation in an efficient manner.

A further object resides in the provision of valve mechanism controlled in a novel manner for closing the discharge ports of the drive passages.

Other objects will be set forth as my description progresses and those features of construction, arrangements and combinations of parts on which I desire protection, succinctly defined in my annexed claims.

Referring to the accompanying drawing wherein like numerals of reference indicate like parts throughout the several views: Figure 1 is a horizontal section of my apparatus. Fig. 2 is a fragmentary vertical longitudinal section thereof taken on line 2—2 of Fig. 1, and Fig. 3 is a transverse section, on reduced scale, taken on line 3—3 of Fig. 2.

Referring to the drawing by numerals of reference, 1, 1' indicate spaced drive passages for the water, the same being conveniently provided in a suitable casing 10 and having intake and discharge ports 2 and 3 respectively, the latter of which are controlled by valves 4.

Reference numeral 5 indicates a prime mover or piston mounted for reciprocatory movement in a cylinder or chamber 6^a extending between and having its end portions opening into the adjacent drive passages, as clearly shown in Fig. 1. Fixed to piston 5 are plungers or rams 6, 6' operating in pump chambers 7, 7' respectively, which latter are provided with inlet and outlet ports 8, 8' normally closed by suitable upwardly opening valves 9, 9' respectively in a manner similar to that disclosed in my application Serial No. 671,375, filed January 15, 1912. Plungers or rams 6, 6' are con-

veniently guided in hollow extensions 11 of chambers 7, 7' which latter can be provided with packing held in position, as by glands 12, and plunger 6' is further guided in its movement by a fixed guide 13, of the adjacent pump-chamber, which is freely received in a suitable bore 6'' of the plunger. Communication is had between pump chamber 7, 7' and the adjacent drive passages 1, 1' through passages 14 which lie at the outer sides of said drive passages, in opposing relation to cylinder 6^a, and being protected against ingress of foreign substances, by the foraminous walls 15. Outlet ports 8' of chambers 7, 7' open into pasageways 16 leading to an air chamber 17, having the usual discharge opening 18.

Valves 4 which, as now considered, are arranged vertically and provided on their upper and lower end portions with centrally disposed studs journaled in casing 10, are connected for simultaneous movement by a link 19 in such a manner that with one valve in closed position the other will be open or in other words, lie parallel with the flow of water in the drive passage so as to be held thereby against accidental closing movement. The side edges of valves 4 are adapted to seat on the vertical straight edge portions of the end flanges of cylinder 6^a, and the adjacent walls of casing 10.

Reference numerals 20, 21 indicate deflectors which are movable with piston 5 for effecting the operation of valves 4, the same, as now considered, comprising curved plates fixed to piston 5 and each lying on a respective side thereof for movement into the adjacent drive passages.

Assuming that drive passages 1, 1', are connected with a suitable source to receive flowing water, with the parts arranged as shown in Fig. 1, the operation is as follows: Piston 5, being at the end of its stroke, has just moved deflector 20 against the adjacent valve 4, to start the same on its closing movement. This movement is completed by the current, the water at such time being deflected by deflector 20 so that the preponderance of pressure thereof will fall on the outwardly moving side of the valve. The force generated by the sudden check in the momentum of the water causes a portion of the latter to flow through ports 8 into pump chamber 7, and a portion may pass to air chamber 17, this obviously depending on the pressure in the latter. On the next cor-

responding stroke of piston 5, plunger 6 acts on the water in chamber 7 to discharge a portion of the same. Water flows into chamber 7 as plunger 6 is withdrawn, or during the rearward stroke of piston 5, during which movement deflector 21 is moved into drive passage 1' and against its valve 4 to close the latter, and thereby simultaneously open the other valve 4 so that piston 5 can start on its return stroke. The closing of this last mentioned valve 4 causes the water from drive passage 1' to pass into pump chamber 7' in a manner identical with that referred to in connection with pump chamber 7.

Reference numeral 21' indicates a perforated protecting wall extending around the discharge end of the apparatus.

Having thus described my invention what I claim as new, and desire to secure by Letters Patent of the United States of America, is:

1. In an apparatus of the character described, spaced drive passages, valves for said passages, a reciprocatory piston, a cylinder for said piston having each end portion connected with a respective drive passage in advance of the valve thereof, an air chamber having a valved connection with one of said drive passages, and means actuated by and during movement of said piston for closing said valves alternately.

2. In apparatus of the character described, spaced drive passages, valves for said passages, means connecting said valves for movement of one to its open position simultaneously with the moving of the other to its closed position, a reciprocatory piston, a cylinder for said piston having each end portion connected with a respective drive passage in advance of the valve thereof, an air chamber having a valved connection with one of said drive passages, and means actuated by and during movement of said piston for opening and closing said valves.

3. In apparatus of the character described, spaced drive passages, valves for said passages, means connecting said valves for movement of one to its open position simultaneously with the moving of the other to its closed position, a reciprocatory piston, a cylinder for said piston having each end portion connected with a respective drive passage in advance of the valve thereof, an air chamber having valved connections with said drive passages, and means actuated by and during movement of said piston for opening and closing said valves.

4. In apparatus of the character described, spaced drive passages, pivoted valves for said passages, means connecting said valves for movement of one to its open position simultaneously with the moving of the other to its closed position, a reciprocatory piston, a cylinder for said piston hav-

ing each end portion connected with a respective drive passage in advance of the valve thereof, an air chamber having a valved connection with one of said drive passages, and curved deflector members for operating said valves, said members being connected for movement with said piston and lying on opposite sides thereof for projection each into a respective drive passage to thereby deflect the flowing water against one side of the adjacent valve.

5. An apparatus of the character described provided with spaced drive passages provided with intake and discharge openings for the passage of fluid, pivoted valves for the discharge openings of said drive passages, means connecting said valves for simultaneous movement of one to its closed position and the other to its open position, a pump chamber connected to receive fluid from one of said drive passages, a valve controlling the communication between said pump chamber and said last named drive passage, a piston chamber extending between and opening into said drive passages, a piston in said last named chamber, a ram operating in said pump chamber and connected with said piston, and means for closing said valves alternately comprising deflectors for the water connected for movement into said drive passages by and during movement of said piston, for the purpose specified.

6. In apparatus of the character described, spaced drive passages, valves for said passages, a reciprocatory piston, a cylinder for said piston having each end portion connected with a respective drive passage in advance of the valve thereof, a pump chamber connected with one of said drive passages in advance of the valve thereof, a plunger in said pump chamber connected with said piston for operation thereby, and means actuated by and during movement of said piston for closing said valves alternately.

7. An apparatus of the character described provided with spaced drive passages provided with intake and discharge openings for the passage of fluid, valves for the discharge openings of said drive passages, means connecting said valves for simultaneous movement of one to its closed position and the other to its open position, a pump chamber connected to receive fluid from one of said drive passages, a valve controlling the communication between said pump chamber and said last named drive passage, a piston chamber extending between and opening into said drive passages in advance of the valves thereof, a piston in said last named chamber, a ram operating in said pump chamber and connected with said piston, and means operated by movement of said piston for operating said valves to close said drive passages alternately.

8. An apparatus of the character described provided with spaced drive passages provided with intake and discharge openings for the passage of fluid, valves for the discharge openings of said drive passages, means connecting said valves for simultaneous movement of one to its closed position and the other to its open position, a pump chamber connected to receive fluid from one of said drive passages, a valve controlling the communication between said pump chamber and said last named drive passage, a piston chamber extending between and opening into said drive passages in advance of the valves thereof, a piston in said last named chamber, a ram operating in said pump chamber and connected with said piston, and means movable with said piston for operating said valves to alternately close said drive passages.

9. In apparatus of the character described, a drive passage, a valve for said drive passage, a chamber extending at an angle to said drive passage and communicating therewith in advance of said valve, a driving means mounted in said chamber for movement toward and from said passage and operated in one direction by fluid therein, and means for deflecting water against said valve to thereby operate the same, said last named means being supported for advance movement by said driving means.

10. In apparatus of the character described, a drive passage, a valve for said drive passage, a chamber extending at an angle to said drive passage and communicating therewith in advance of said valve, a driving means mounted in said chamber for

movement toward and from said passage and operated in one direction by fluid therein, a pump chamber having valved connection with said drive passage, a plunger in said pump chamber connected with said driving means for operation thereby, and means operated by and during movement of said driving means for operating said valve in one direction.

11. In apparatus of the character described, spaced drive passages, valves for said drive passages, means connecting said valves for simultaneous movement of one to its closed position and the other to its open position, a piston, a cylinder for said piston having each end portion communicating with a respective drive passage in advance of the valve thereof, and means operated by and during movement of said piston for operating said valves.

12. In apparatus of the character described, spaced drive passages, valves for said drive passages, means connecting said valves for simultaneous movement of one to its closed position and the other to its open position, a piston, a cylinder for said piston having each end portion communicating with a respective drive passage in advance of the valve thereof, and means for deflecting water against said valves to thereby close the same supported for advance movement by said piston.

Signed at Seattle, Washington this 16th day of November 1911.

OTTO P. ROHR.

Witnesses:

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