H. B. GOODHART.

WATER MOTOR.

APPLICATION FILED MAR. 12, 1912.

1,047,203.

Patented Dec. 17, 1912.

2 SHEETS—SHEET 1.

Fig.1.

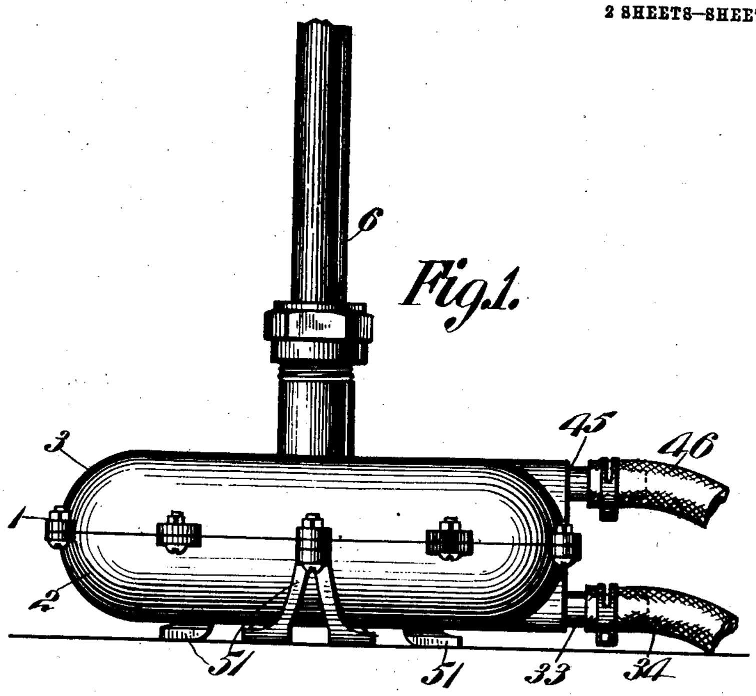
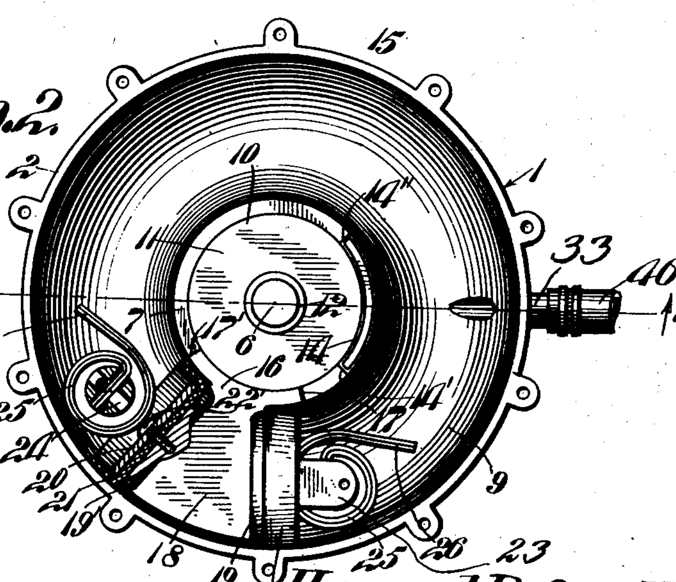


Fig.2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

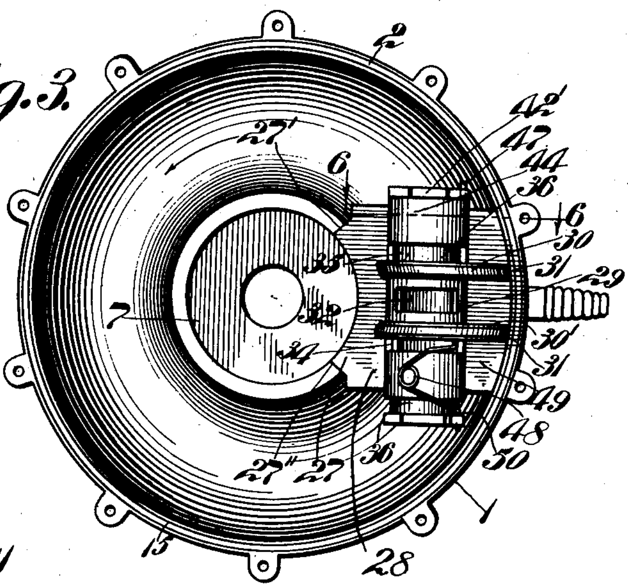
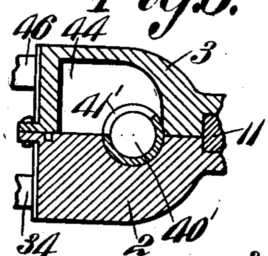


Fig. 6.



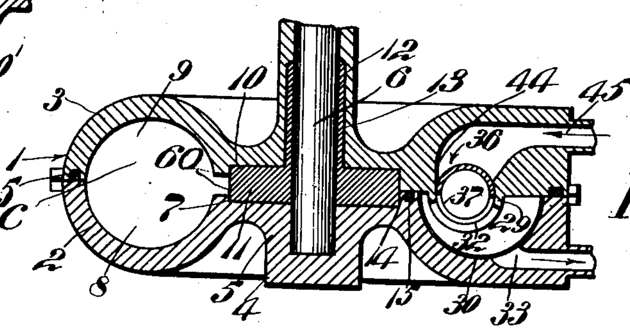
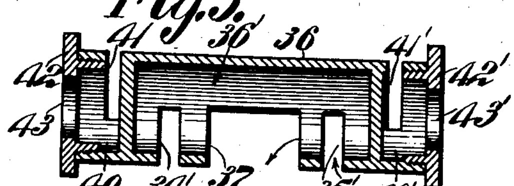


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

HOWARD BEIDLER GOODHART, OF MACUNGIE, PENNSYLVANIA, ASSIGNOR OF ONE-THIRD TO GEORGE J. BOGERT, OF EMAUS, PENNSYLVANIA, AND ONE-THIRD TO ROY R. READINGER AND ONE-THIRD TO HORACE F. NEUMEYER, BOTH OF MACUNGIE, PENNSYLVANIA.

WATER-MOTOR.

1,047,203. Specification of Letters Patent. Patented Dec. 17, 1912.

Application filed March 12, 1912. Serial No. 683,230.

To all whom it may concern:

Be it known that I, HOWARD B. GOODHART, a citizen of the United States, residing at Macungie, in the county of Lehigh and State of Pennsylvania, have invented a new and useful Water-Motor, of which the following is a specification.

The present invention relates to improvements in water motors, the primary object of the invention being the provision of a simple form of motor in which the piston is disposed in an annular chamber and is so combined with a valve to actuate the same that a continuous flow of water entering the casing will impart an oscillatory movement to the piston and shaft.

A further object of the present invention is the provision of a water motor, the main casing of which is composed of two identically shaped members forming an annular motor or piston chamber provided with superposed inlet and outlet conduits whereby a continuous stream of water is conducted to the chamber and thereaway from so as to act upon a piston disposed for oscillation within the chamber to impart an oscillatory movement to said piston and its shaft, a peculiar form of valve mechanism being provided and controlled by the piston during its oscillation or more properly speaking at the end of the stroke of each oscillation to conduct the water in the proper direction to impart the desired oscillatory movement to the piston and shaft, this special form of motor being especially desirable for use in connection with washing machines, vacuum cleaners and in any form of mechanism where a reciprocatory or oscillatory movement is desired.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings—Figure 1 is a side elevation of the complete motor the shaft thereof being foreshortened. Fig. 2 is a top plan view of the lower member of the casing showing the rotor or piston therein, one of the plungers of the same being shown in section. Fig. 3 is a plan view of the interior of the upper member of the casing showing the position of the valve normally actuated by its spring, the arrow indicating the direction of travel of the piston while the valve is in such position. Fig. 4 is a section taken on line 4—4 of Fig. 2 through the entire casing. Fig. 5 is a detail longitudinal sectional view of the valve *per se*. Fig. 6 is a section taken on line 6—6 of Fig. 3.

Referring to the drawings, the numeral 1 designates the motor casing which is composed of the lower member 2 and the upper member 3, both of which are provided with the channeled portions 8 and 9 which constitute when the device is assembled as in Fig. 4, an annular piston or rotor chamber C.

The lower member 2 is provided with the concentric boss 4, having the concentrically disposed socket 5 for the reception of the lower end of the piston or rotor shaft 6, the said member 2 being further provided with the concentric socket or receptacle7 which with the oppositely disposed receptacle 10 of the member 3 provides a compartment for the disk 11 provided with the sleeve 12 which is keyed to the shaft 6, and thereby provides an end thrust device or holder for the shaft 6, and at the same time provides a medium for carrying the rotor or piston as will later appear. A segmental projection 14 is provided upon the member 2 and carries a packing strip 15 to provide a water tight connection at such point with the upper member 3.

The disk 11 has formed integral therewith, the segmental projection 16 whose shoulders 17 and 17′ are disposed at the ends of the respective oscillations or strokes of the piston, to abut the corresponding shoulders 14′ and 14″ of the projection 14, thus limiting the movement or stroke of the piston and consequently the shaft 6 during the operation thereof. This projection 16 has formed integral therewith, the dovetail-shaped plate 18 which is disposed radially with relation to the shaft 6 and disk 11 and in line with the center line between the members 2 and 3, the same being provided with the integral circular disks 19 and 19′ respectively. Each of these disks carry the gasket holding member 20, the leather gaskets 21 which are held in place by means of

the screw 22, while each member 20 is provided with the integral lug 23 having the stud 24, to which is properly connected the doubled leaf spring 25 which is wound to form a single helix with its terminal 26 disposed away from its side of the piston, the purpose of which will presently appear.

The upper section or member 3 of the motor has a lug 27 formed integral therewith, the shoulders 27′ and 27″ of which are adapted to be above and in line with the shoulders 14′ and 14″ of the segmental projection 14 of the member 2 and thus provide a proper space as at 60 for the passage of the lug 16 during the oscillation of the piston or rotor. Formed integral with the projection 27 is a casing 28, which constitutes the valve support. The casing 28 is rigidly supported transversely of a portion of the channel 9 and has the tubular port carrying member or valve casing 29 rigidly supported thereby, as clearly shown in Fig. 3.

Formed integral with the casing 28 and projecting downwardly so as to form an inner compartment with the member 2 and a portion of the channel 8, are the two parallel disposed semi-annular rims 30 and 30′, respectively, each one of which is provided with a packing strip 31 disposed to engage the abutting wall of the member 2 and thereby prevent any leakage of said connection.

The tubular valve casing 29 is provided with the oppositely disposed exhaust ports 34 and 35 and with the centrally disposed main exhaust port 32 which is disposed to at all times conduct the water from either side of the piston from the piston chamber C into the chamber formed between the projections 30 and 30′ to the outlet conduit or port 33 and finally through the port or other suitable conduit 34.

The tubular valve 36 which is disposed for reciprocatory movement within the tubular valve casing 29, is formed to have the main exhaust chamber 36′ and the oppositely disposed chambers 40 and 40′, respectively. The port 37 disposed centrally of the chamber 36′ of the valve 36 is at all times in register with the port 32, while either one of the ports 34′ or 35′ are so positioned and formed as to be in register one at a time with its respective port 34 or 35 of the tubular valve casing 29. These ports 34 and 34′ and 35, 35′ constitute the outlet or exhaust ports from the ends of the chamber C through the valve and finally out of the eduction conduit 34.

The respective intake, more properly speaking, water conducting chambers 40 and 40′ are provided with the respective intake ports 41 and 41′ which are disposed to be placed one at a time in register with the introducing chamber 44 of the member 3, the port 45 leading the water from the hose connection or other conduit 46 into such chamber 44. Thus when the valve is in the position as shown in Fig. 3, the water will be conducted from the conduit 46 into the chamber 44 and through the port 41′ of the valve 36 into chamber 40′ through the concentric port 43′ in the end of the chamber 40′ and finally upon the pressure side of the piston, to move the piston in the direction of the arrow Fig. 3, while the valve being in the position as shown in Fig. 3, the water upon the non-pressure side of the piston will be forced through the ports 34 and 34′ into the chamber 36′ and finally through the ports 37 and 32 into and out of the exhaust port 33 and conduit 34. The chamber 40 of the valve 36 is provided with the intake port 41 and the concentrically disposed directing port 43, so that when the port 41 is in register with the chamber 44, the water will be directed in the opposite direction to that shown in Fig. 3, to impart an opposite movement to the piston and shaft 6.

Each of the respective chambers 40 and 40′ are sealed by the shouldered rings 42 and 42′, which also provides an abutting means for the terminals 26 of the respective springs 25 as will later appear.

In order to prevent the rotation of the tubular valve 36 within the support 29, a pin 47 is carried by the valve casing 29 and alines with an aperture in the shouldered ring 42′ of the valve, while in order to normally hold the valve 36 in the position as shown in Fig. 3, so that when water is conducted through the motor, the piston will have imparted thereto a movement to start in proper operation the valve, the spring 48 has its respective terminals 49 and 50 connected to the projection 30′ and the shouldered ring 42 of the valve.

In order to properly support the motor casing, preferably so that the chamber C is a horizontal position, although it is to be understood that the same may be operated in a vertical position, the supports 51 are connected as shown in Fig. 1 and provide a proper mounting for the motor.

From the foregoing description taken in connection with the drawings, it is evident that the operation of the present motor is readily understood, but briefly stated it is as follows: Presuming the parts to be in the position as shown in Fig. 3, and the water entering through the conduit 46 into the chamber 44, and the piston being nearer the end 42′ of the valve 36, the water will enter the port 41′ of the valve 36 and through the concentric port 43′ into the chamber C. This action will move the piston and shaft in the direction of the arrow Fig. 3, while the water upon the non-pressure side of the piston will be forced by the piston to pass through the ports 34 and 34′ of the casing 29 and valve 36 into the casing 36′ of the valve and finally exhaust through

the ports 37 and 32 and through the outlet conduit 34, of the lower member 2. As the piston approaches the valve side of the motor, the terminals 26 of the spring 25 nearest the end 42 of the valve 36, will engage said end 42 and move the valve in an opposite direction, thus reversing the flow of water so that the pressure will be placed upon the opposite side, that is so that the ports 41 of the valve 36 will be placed in communication with the casing or chamber 44 and thereby conduct the water through the concentric port 42 in the end of the valve to impart an opposite movement to the piston and shaft 6. The water from the non-pressure side of the said piston being forced through the ports 35 and 35′ of the casing 29 and valve 36 into the chamber 36′ of the valve and out of the ports 37 and 32 through the eduction conduit 34.

By reason of the spring 48, should the flow of water be turned off to stop the motor, the valve 36 will normally assume the position as shown in Fig. 3, so that pressure will be admitted to one side of the piston, and thereby impart the desired movement and start into operation the valve 36 so that a continuous reciprocatory movement is imparted to the valve 36 while the piston and shaft 6 are being oscillated.

What is claimed is:

1. A water motor, having a casing provided with an annular chamber having superposed inlet and outlet, a shaft disposed concentrically of the casing, a valve casing mounted in the chamber and having a central port in communication with the outlet and two exhaust ports in communication with the respective ends of the annular chamber, a reciprocatory valve mounted in said casing normally open at all times to the outlet port of the casing and having two exhaust ports disposed to aline one at a time with the exhaust ports of the casing, a piston mounted for oscillation within the annular chamber and connected to the piston, said valve being further provided with oppositely disposed pressure conducting ports in the ends thereof disposed to be alined one at a time and placed in communication with the inlet port of the chamber, and means carried by the piston upon opposite ends thereof to actuate the valve at the end of each stroke to control the flow of water to impart oscillatory movement to the piston.

2. A water motor, having a casing provided with an annular rotor chamber, having an inlet conduit and an outlet conduit, superposedly mounted and connected to the casing, a valve casing disposed transversely of one portion of the annular chamber and provided with projections to provide a centrally disposed chamber in communication with the outlet conduit, and with two oppositely disposed ports in communication with the respective ends of the annular chamber, a tubular valve disposed for reciprocation within the casing and provided with a central port to register at all times with the exhaust port of the casing and two exhaust ports disposed to register one at a time with the exhaust ports of the chamber, an outlet chamber in each end of the tubular valve each one of which is provided with a port disposed to register with the inlet conduit of the casing, a shaft disposed concentrically of the casing, and a radially disposed piston connected to the shaft and disposed for oscillation within the annular chamber.

3. A water motor, having a casing provided with an annular rotor chamber, having an inlet conduit and an outlet conduit superposedly mounted and connected to the casing, a valve casing disposed transversely of one portion of the annular chamber and provided with projections to provide a centrally disposed chamber in communication with the outlet conduit, and with two oppositely disposed ports in communication with the respective ends of the annular chamber, a tubular valve disposed for reciprocation within the casing and provided with a central port to register at all times with the exhaust port of the casing and two exhaust ports disposed to register one at a time with the exhaust ports of the chamber, an outlet chamber in each end of the tubular valve each one of which is provided with a port disposed to register one at a time with the inlet conduit of the casing, a shaft disposed concentrically of the casing, a radially disposed piston connected to the shaft and disposed for oscillation within the annular chamber, and means provided at the respective ends of said piston for imparting a reciprocatory movement to the valve to regulate the direction of water pressure to the annular chamber and the exhaust therefrom.

4. A water motor, having a casing provided with an annular rotor chamber, having an inlet conduit and an outlet conduit, superposedly disposed and connected to the casing, a valve casing disposed transversely of one portion of the annular chamber and provided with projections to provide a centrally disposed chamber in communication with the outlet conduit, and with two oppositely disposed ports in communication with the respective ends of the annular chamber, a tubular valve disposed for reciprocation within the casing and provided with a central port to register at all times with the exhaust ports of the chamber and two exhaust ports disposed to register one at a time with the exhaust ports of the casing, an outlet chamber in each end of the tubular valve each one of which is provided with a port disposed to register with the inlet

conduit of the casing, a shaft disposed concentrically of the casing, a radially disposed piston connected to the shaft and disposed for oscillation within the annular chamber, and means for normally holding the valve in position to direct the water at one side of the valve casing.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HOWARD BEIDLER GOODHART.

Witnesses:

ELIZABETH KNAUSS,

DAVID J. NAGLE.