April 24, 1945. E. J. McFARLAND 2,374,445

COMBINED PUMP AND ROTARY ENGINE

Filed June 3, 1942 2 Sheets-Sheet 1

Fig. 1.

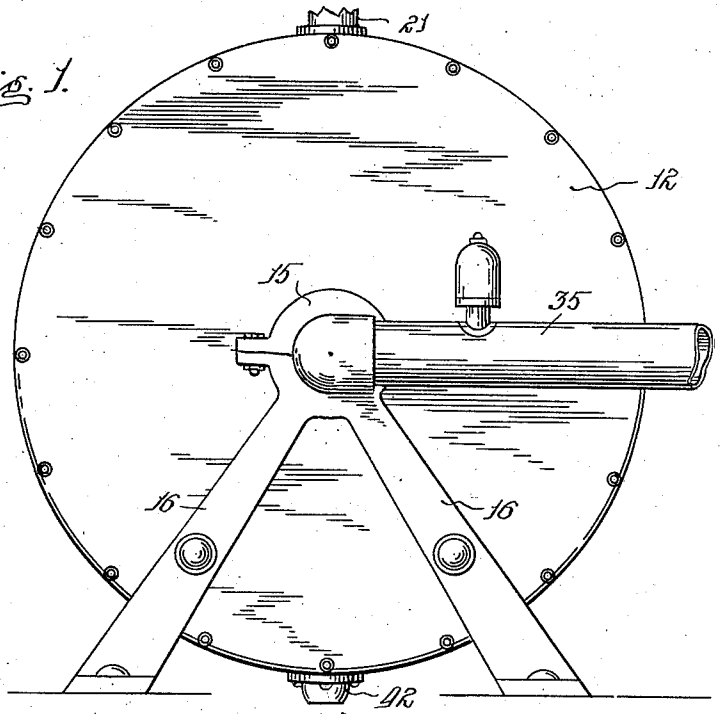
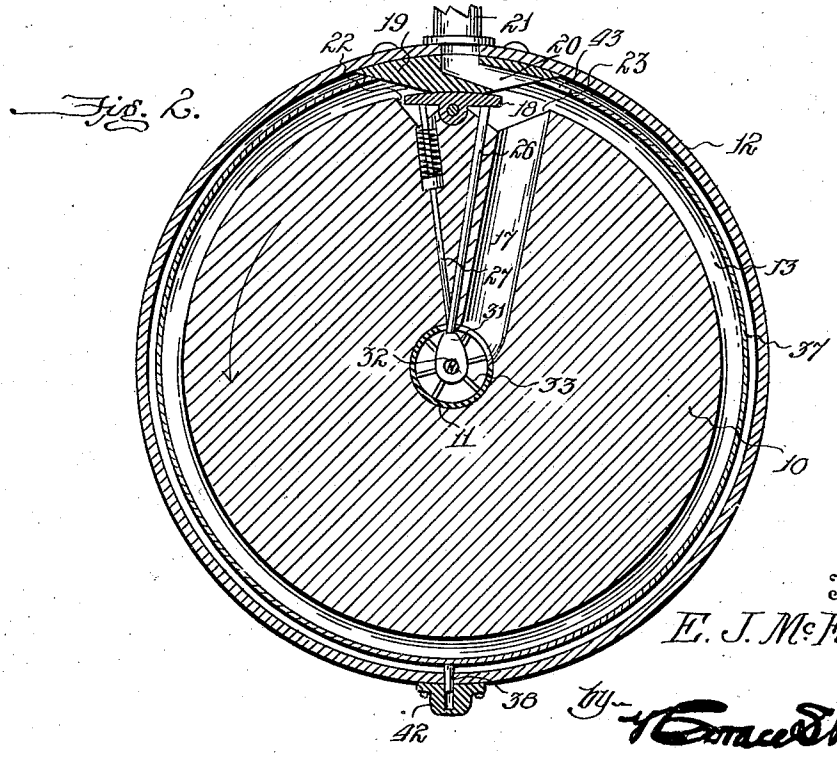


Fig. 2.



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Filed June 3, 1942 2 Sheets-Sheet 2

Fig. 3.

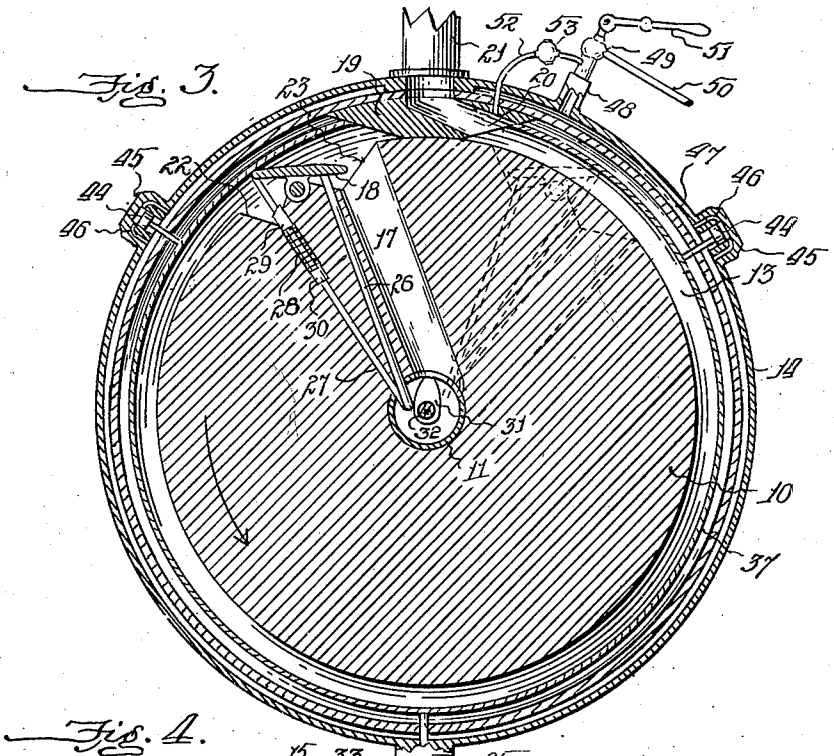


Fig. 4.

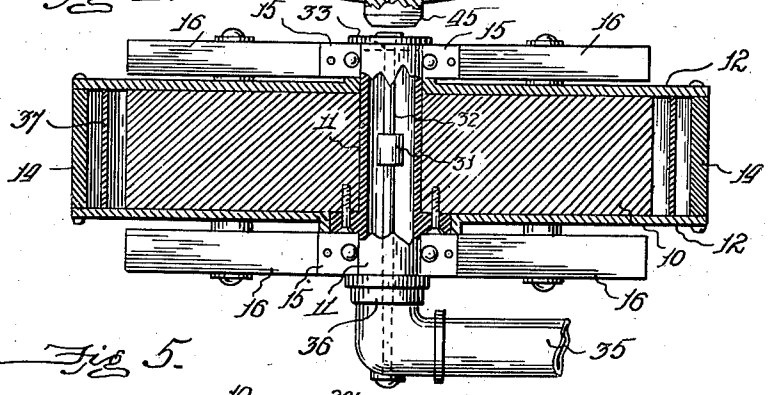


Fig. 5.

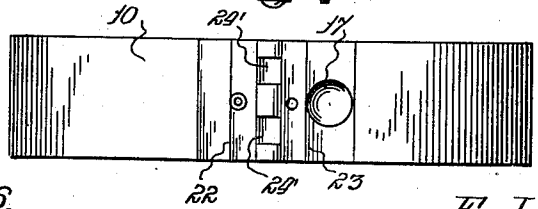
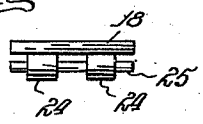


Fig. 6.



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Patented Apr. 24, 1945

2,374,445

UNITED STATES PATENT OFFICE

2,374,445

COMBINED PUMP AND ROTARY ENGINE

Edwin J. McFarland, Vulcan, Alberta, Canada

Application June 3, 1942, Serial No. 445,603

5 Claims. (Cl. 103—140)

My invention relates to pumps and/or rotary engines of that general type which include a casing providing an expansible chamber surrounding a rotary piston having a movable abutment or vane in the periphery cooperating with a stationary abutment in the expansible chamber, and in which the fluid is either drawn through or forced into a passageway in the piston leading to the expansible chamber and discharged through an outlet at one side of the stationary abutment by the operation of the vane working in the chamber.

The main object of my invention is to provide an engine of this general character which may be employed either as a rotary pump for drawing water or other fluid through the passageway in the piston and discharging it through the outlet in the abutment—operating after the manner of a rotary engine by introducing fluid under pressure into the passageway to operate against the vane for turning the piston to develop motive power for running machinery of any kind.

My invention also contemplates the employment of plunger rods which may assist in operating the vane carried by the rotary piston, in connection with a split ring or band forming a yielding partition in the expansion chamber to vary the size thereof according to the pressure of the fluid acting on the vane, as well as guide the vane past the abutment when the opposite end portions of the ring or partition band are contracted by the expansion of the major portion thereof under the influence of fluid pressure in pumping or developing power.

With these principal objects in view my invention consists in the construction and arrangement of parts, as hereinafter fully described and specifically pointed out in the claims.

In the drawings:

Fig. 1 is a side elevation of a combined pump and rotary engine in accordance with my invention.

Fig. 2 is a vertical sectional view through the center of the rotatable piston and casing in which it operates.

Fig. 3 is a similar view, showing a modification and the position of the oscillating vane in the operation of pumping—in full lines—and its position—in dotted lines—when operating as a rotary engine.

Fig. 4 is a transverse sectional view through the center of the rotatable piston and casing.

Fig. 5 is a detail view of the rotary piston, and

Fig. 6 is a detail side elevation of the movable abutment or vane which may be mounted in the periphery of the rotary piston.

In carrying out my invention a solid piston or rotor 10—fixed to a hollow shaft 11—is enclosed in a circular casing between side plates 12, 12 thereof, and in order to provide the expansible chamber or annular recess 13 around the periphery of the piston the latter is of slightly less diameter than the diameter of the casing; while the rim 14 of the casing—which forms the outer wall of the annular recess—is bolted between the side plates, and the hollow shaft is extended at its ends and supported in bearings 15, 15 at the upper ends of diverging legs 16, 16 forming the supporting frame of the engine.

The fluid for either the pumping or driving operations enters the annular recess or expansion chamber from the hollow shaft by way of a passage 17 extending radially through the solid piston, and associated with the piston there is a movable abutment or oscillating vane 18 pivoted in recesses in the periphery of the piston to operate in the expansible chamber and cooperate with a stationary abutment 19 secured to the rim of the stationary casing and presenting oppositely inclined surfaces over which the vane passes. The operating fluid, such as oil, which enters the expansion chamber through the aforementioned passageway in the piston is discharged through an opening 20 in the stationary abutment at one side thereof into a pipe 21 for carrying it off.

By reference to Fig. 5 it will be noted that the oscillating vane is pivoted between V-shape recesses 22 and 23 extending across the periphery of the piston, and that said vane is provided with pivot-ears 24 seated in recesses 24' in the piston to form corresponding ears through which the pintle 25 passes. It will be noted, also, that the passageway 17 opens into the recess 23 through the wall thereof opposite to that to the upper end of which the vane is pivoted.

The operation of the movable abutment or vane in addition to being influenced by the fluid pressure and centrifugal force is actuated by plunger rods 26 and 27 working in openings therefor in the piston, the rod 26 being thicker than its companion rod for more effective operation by centrifugal force, and to offset the greater weight of rod 26 a light spring 28 is used in connection with rod 27, said spring being interposed between collars 29 and 30 fixed to the rod and piston respectively. These plunger-rods are normally operated for causing the movable abutment or vane to pass over the stationary