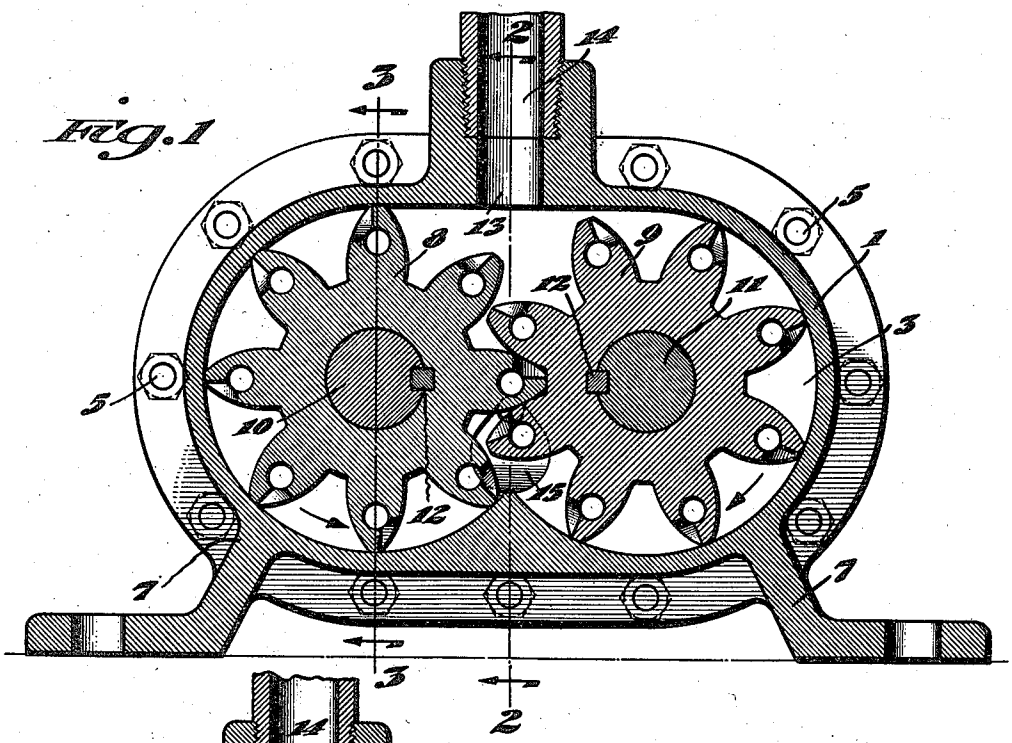
Sept. 17, 1929. C. G. BUTLER 1,728,529

FLUID ROTOR

Filed April 28, 1928

Fig. 1



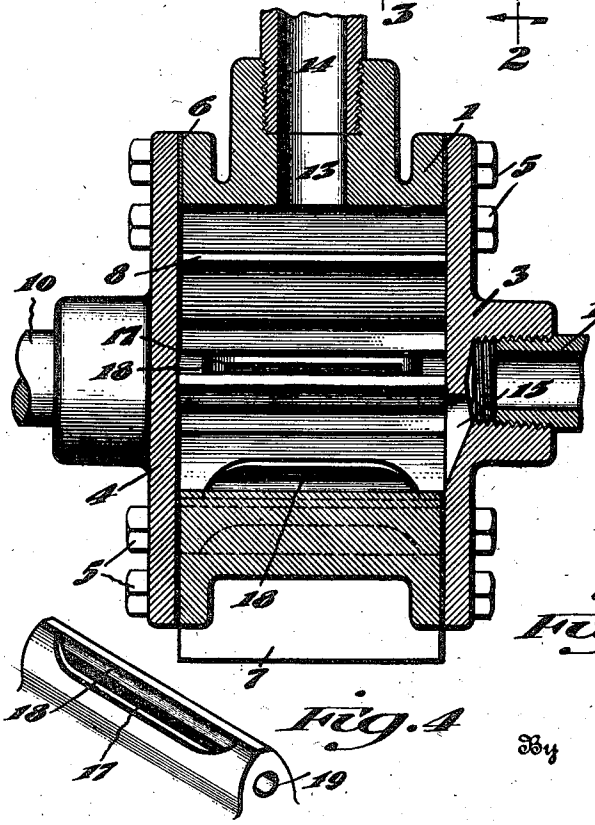


Fig. 3

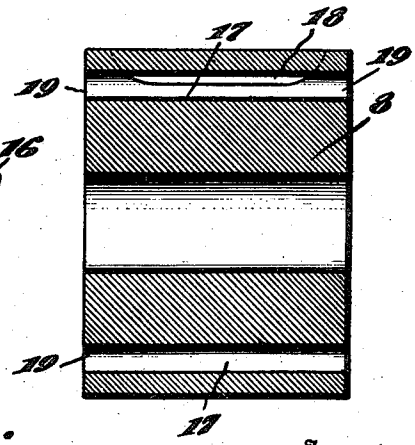


Fig. 2

Fig. 4

Inventor

Clyde G. Butler

By Wood & Wood Attorneys

Patented Sept. 17, 1929 1,728,529

UNITED STATES PATENT OFFICE

CLYDE G. BUTLER, OF CINCINNATI, OHIO, ASSIGNOR TO THE CINCINNATI BALL CRANK COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO

FLUID ROTOR

Application filed April 28, 1928. Serial No. 273,729.

This invention relates to rotary pumps of a type adapted to discharge fluid and particularly a liquid under pressure.

The object of the invention is to provide a rotary pump adapted to deliver a relatively large volume of liquid at a comparatively high pressure with a minimum amount of power in relation to said volume and pressure.

Further objects and advantages will be more fully set forth in a description of the accompanying drawings, forming a part of this specification, in which:

Figure 1 is a central section taken longitudinally of the pump.

Figure 2 is a sectional view taken on line 2—2, Figure 1.

Figure 3 is a sectional view taken on lines 3—3, Figure 1, showing a gear of the pump in section.

Figure 4 is a perspective view of a tooth of a gear detailing the formation thereof.

The pump of this invention comprises a closure, the constituting members of which are a casing 1 and two closure plates or members 3 and 4 secured to the casing by means of bolts 5, gasket members 6 being disposed between the casing and the closure plates.

The casing is also provided with legs 7, by means of which the casing is secured to its support (not shown).

Inside of the casing are disposed spur gears 8 and 9 in intermeshing relationship, these gears being secured to shafts 10 and 11 by means of keys 12—12.

These shafts are journalled in the closure plates 3, 4, and at least one of these shafts 10 extends to the outside so that the intermeshed gears can be rotated by power applied to said shaft. The inside of the casing is contoured to provide two cylindrical surfaces generated about centers coinciding with the centers of the shafts on which the gears are mounted so that the teeth of the spur gears contact the casing wall on the sides of the gears opposite to that of the gear intermesh.

On one side of the line between the gear centers this cylindrical configuration is carried toward the zone of gear intermesh to a point just short of that at which interference with said intermesh would take place. On the opposite side of the casing this cylindrical contouring extends a lesser amount about the periphery of the gear, the casing at this point being substantially a plain surface. An intake port 13 is disposed from this surface of the casing, the port having the nozzle of an intake pipe 14 screwed into its outer end.

The outlet port 15 of the closure thus provided is formed in one end plate in the proximity of the zone of gear intermesh and preferably between the line joining the centers of the gear shafts and the termination of the cylindrical portion of the casing which extends toward the zone of intermesh. The outlet port is provided with a nozzle 16 screwed into its outer end.

The gear teeth are provided with passageways or recesses 17 extending through them. These passageways are open to the casing adjacent to the crown of the tooth as at 18 and also endwise of the gears as at 19. The gears are rotated as indicated by the arrows on Figure 1 so that the teeth travel about the cylindrical casing wall and pass the outlet port just before going into full intermesh. The outlet port is larger on the inside of the plate than on the outside of the plate and flares inwardly to provide a greater cross section on the inside and a maximum diameter a bit to one side of the line between the gear centers. The flared portion of the port is disposed so as to register or communicate with the incoming tooth spaces prior to the encroachment of opposing teeth on these spaces.

The result is as follows: The fluid or liquid being pumped enters the casing through the inlet port which delivers it into the path of the revolving gear teeth which pick it up, entrap it in the spaces between them, and carry it along the wall of the casing to the zone of intermesh. Prior to the actual entrance of each tooth into the space between the teeth of the opposing gear, the trapped fluid or liquid is being discharged through the flared portion of the port. As each tooth enters the pocket between the two teeth of the opposing gear it forces the liquid or fluid

from said pocket through its own recess and out of said recess endwise and thus through the outlet port.

It will be apparent, of course, to those skilled in the art, that this device can be used as a fluid or liquid pressure motor instead of as a pump simply by reversing the direction of liquid flow. In other words, if liquid is forced into this device under pressure through the port 15 in the closure plate said pressure rotates the gears in the direction opposite to that disclosed in Figure 1 and escapes around the sides of the gears, being carried between the teeth and finally passed out through the port in the casing. It is to be noted also that in this operation the fluid or liquid between the teeth tends to lubricate the cylindrical wall or cushion the gear against it so that the same is not worn so much by the contact of the gear teeth with it.

Whether this device is used as a pump or a motor the recesses may be disposed at various points optionally about the periphery of the gears. But it is considered preferable for many uses to place such recesses adjacent to the crowns of the gear teeth with the peripheral openings on the side of the gear tooth in the direction of the gear rotation when used as a pump.

Having described my invention, I claim:

1. A rotary pump comprising a closure, a pair of intermeshing gears mounted within said closure, means for driving said gears, an intake port for said rotor for disposing fluid in the path of gear rotation, the teeth of said gears contacting the closure walls from the point of intake to the zone of intermesh, forming sealed travelling pockets between the teeth, a discharge port formed in the closure side wall laterally of the zone of intermesh, said port formed to communicate with the loaded pockets between the teeth prior to and at the time of complete opposing teeth encroachment on these pockets, and discharge openings formed through said teeth extending from the crowns thereof to the ends.

2. A rotary pump, comprising, a closure, a pair of intermeshing gears mounted within said closure, means for rotating said gears, said closure having an intake port at the unmeshing side of the gears and a discharge port extending from the zone of gear intermesh, the teeth of said gears having passageways therein extending from the crown of each tooth to the end thereof, said endwise openings successively aligning with the discharge port for discharging fluid trapped between the intermeshing teeth, and said discharge port flared toward the inside of the closure and toward the zone of the incoming teeth to provide a primary discharge passageway for the incoming spaces between the teeth prior to teeth intermesh.

3. A rotary pump, comprising, a closure, a pair of intermeshing gears mounted within said closure, means for rotating said gears, said closure having an intake port for introducing fluid into the zone of gear unmesh and a discharge port extending from the zone of gear intermesh, said discharge port having a small outlet portion and a flared mouth extending into the zone of the incoming spaces between the teeth.

In witness whereof, I hereunto subscribe my name.

CLYDE G. BUTLER.