June 19, 1923. 1,459,160

F. B. NIMS ET AL

WATER CIRCULATOR FOR GAS ENGINES

Filed Nov. 5, 1921

Fig. 1

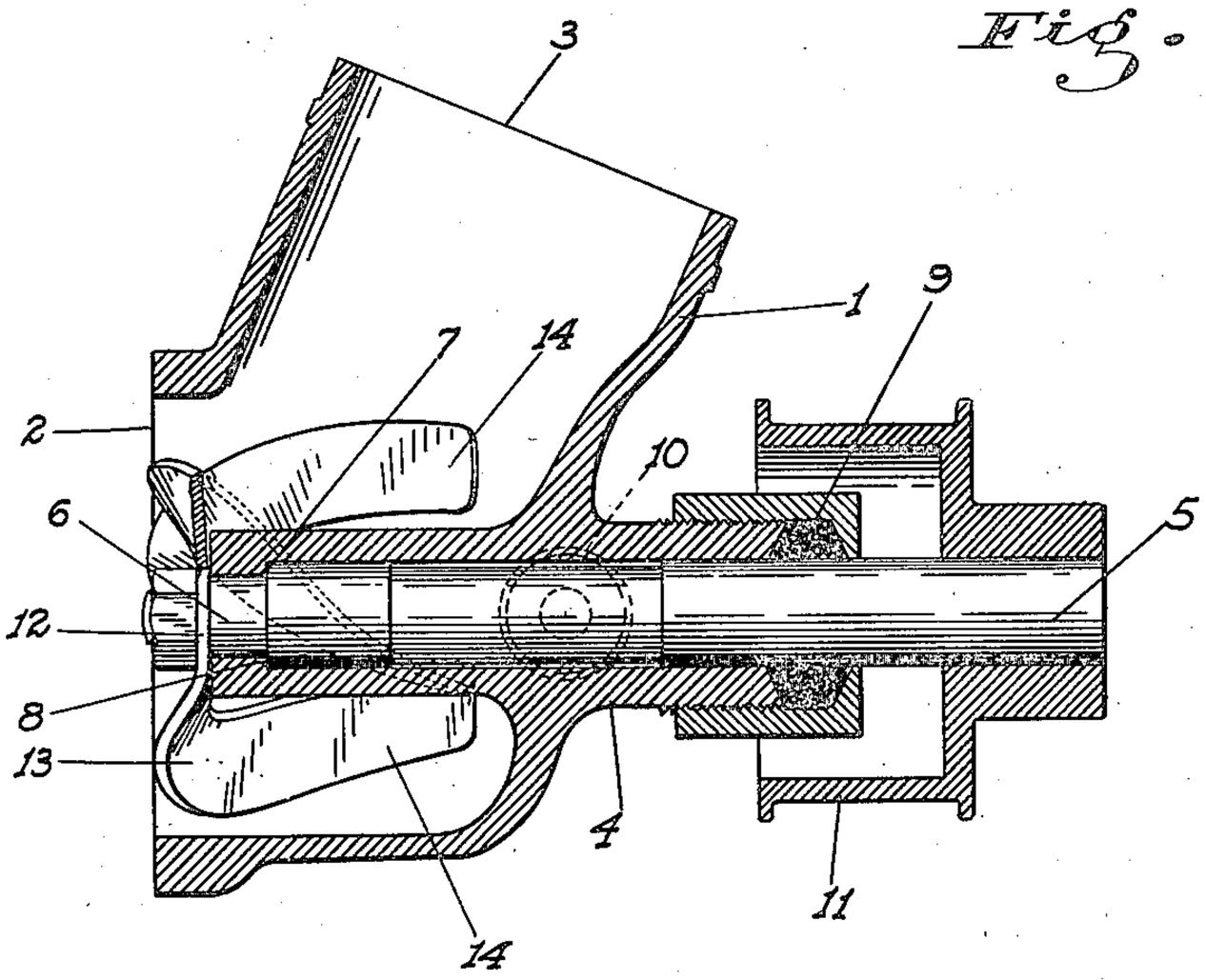


Fig. 2

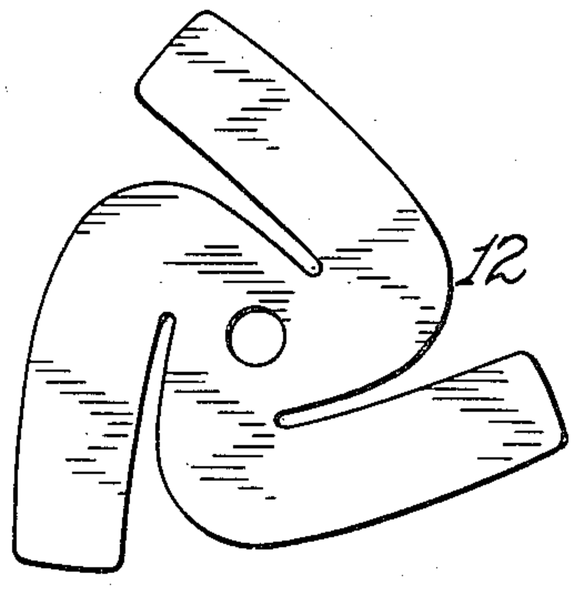
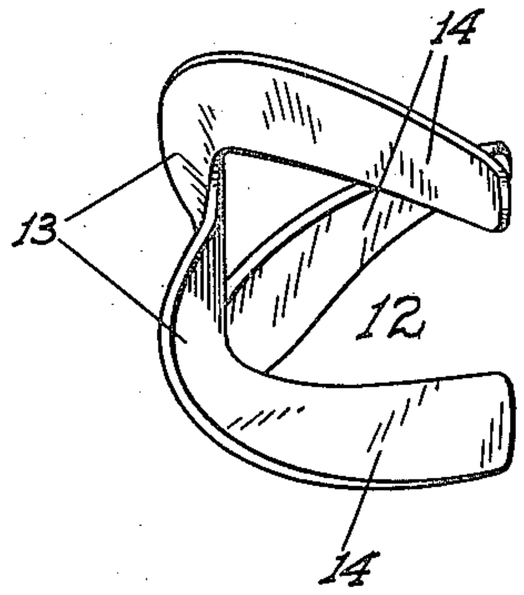


Fig. 3



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UNITED STATES PATENT OFFICE.

FRANK B. NIMS AND VOIGT J. NIMS, OF STOCKTON, CALIFORNIA.

WATER CIRCULATOR FOR GAS ENGINES.

Application filed November 5, 1921. Serial No. 513,178.

To all whom it may concern:

Be it known that we, FRANK B. NIMS and VOIGT J. NIMS, citizens of the United States, residing at Stockton, county of San Joaquin, State of California, have invented certain new and useful Improvements in Water Circulators for Gas Engines; and we do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in that class of device or attachment adapted to be interposed in the water circulating piping of Ford cars and tractors, and which are designed to provide a more positive and forceful circulation of the cooling water than is possible with the standard equipment provided.

The principal object of our invention is to improve upon the design and construction of this type of circulator over those now made, so that a great volume of water may be passed through the circulating system in a given time, with a very small expenditure of power necessary to do this.

A further object is to construct and design our circulator so that while it is light and inexpensive to construct, it is substantial and should give good service for a long time.

A further object of the invention is to so arrange the impeller and impeller shaft construction as to utilize the end thrust and weight of the water against the impeller to provide a continuous and positive automatic water seal between the pump casing and the shaft bearing, the efficiency and advantages of which will be brought out later in the specification.

These objects we accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a sectional elevation of our circulator.

Fig. 2 is a plan view of an impeller blank, as stamped and before being pressed to shape.

Fig. 3 is a detached view of the completed impeller.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes a casing member or fitting substantially the same size and general shape as that provided as standard equipment on Ford cars which is interposed between the cylinder water-outlet and the radiator, our casing being used in place of the ordinary one above mentioned.

This fitting is more or less of the form of an elbow, having a circular and horizontally disposed intake opening 2 at its lower end and a substantially vertical outlet 3 at its upper end.

Formed with the casing and extending horizontally and axially of the intake 2, is a sleeve or bearing member 4, projecting into the casing to a point not far from the intake face of the same, and outwardly of the casing at its opposite side for a certain distance, so as to form a relatively long bearing for a shaft 5. The inner end of this shaft is of smaller diameter than the remainder as shown at 6 so as to form a shoulder 7 which bears against a similar shoulder 8 in the bore of the sleeve 4.

A packing box 9 is provided at the outer end of the sleeve, the shaft 5 projecting therebeyond, while a grease cup as indicated at 10 is fitted to communicate with the bore of the sleeve intermediate the shoulder 8 and packing member 9, the shaft being spaced from the bore for a certain distance to form a grease chamber.

On the outer end of the shaft a pulley 11 is removably fixed, being arranged to be belt-driven in connection with the air fan of the engine.

On the inner end of the shaft, beyond the sleeve, is fixed an impeller 12, preferably formed from a flat piece of sheet metal as shown in Fig. 2, and which when pressed to shape is formed with blade portions 13 having any suitable pitch and width and disposed relative to the plane of the shaft as are the blades of an ordinary screw propeller.

Formed with these main blade portions and bent to project over that portion of the sleeve which projects into the casing for the greater part of the length of such portion are relatively long wing members 14, whose

inner edges preferably lie close to the outer surface of the sleeve and are equidistant therefrom throughout their extent, and are therefore practically set at right angles to the blade portions 13.

These wings also have a suitable pitch with respect to the plane of the shaft and are preferably curved somewhat from one end to the other, the pitch being set in a direction opposite to that of rotation of the shaft 5, and the curvature being so distributed or arranged as to assist in the upward movement of the water and add to the inward pull on the shaft during the upstrokes of the wings, and to offer the least resistance to the water on the down strokes of the wings.

In operation, with the rotation of the shaft 5, the blades 13 of the impeller draw the water horizontally thereto from the water jacket of the engine. This water is then thrown against the wings 14, which positively directs and throws it upwardly toward the outlet 3 thus eliminating any of the driving power being wasted by merely throwing the water against the inner front wall of the casing and causing it to bank up and only move upwardly by reason of more incoming water being forced thereagainst.

Our impeller therefore reduces friction by eliminating this banking-up tendency.

In our type of impeller the end thrust of the shaft is toward the impeller or intake end of the shaft and is made positive and continuous, by reason; first, of the screw propeller formation of the face of the impeller and second, by reason of the fact that the pitch of the wings 14 relative to the shaft is in a direction opposite to the direction of rotation thereof. Thus as the propeller face pulls the water into the casing, and the wings press against it to push or force it upward, the pressure and the weight of the water against the wings pitched in the manner above stated, pulls the shaft towards the inner end of the casing and holds the shoulder 7 tight against the shoulder 8 in a positive and continuous manner. Even when the shaft comes to a stop the weight of the water against the face and wings of the impeller hold the two shoulders together. Thus an automatic water seal is effected at the junction of the shoulders 7 and 8 and with continuous running of the pump a very close ground joint is formed by their contacting faces.

In practice we have found that not a drop of water passes this sealing joint whether the pump is running or idle. This water seal is an absolute necessity in a pump of this character since if any of the water could pass from the casing into the shaft bearing, the chemical and iron elements in the water form a grinding paste which cuts out the shaft bearing in a few hours of running and allows the pump to leak, which renders it useless. Packing glands and the like employed in pumps of this character are too expensive and difficult to install and also cut out very quickly while our ground joint, as indicated, forms an automatic water seal, the efficiency of which increases with constant running of the pump.

The particular means of lubricating the shaft retains the advantages of two widely spaced bearing points for the shaft without the necessity of providing an unduly great extent of bearing surface, and insures a lining of grease about the greater portion of the shaft, which cannot fail to penetrate between the actual bearing surfaces.

The particular style of circulator-casing here shown and described is suited for Ford cars, but by enlarging and altering the shape of the casing somewhat, the device may be used with equally good results on Fordson tractors.

From the foregoing description it will be readily seen that we have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described our invention, what we claim as new and useful and desire to secure by Letters Patent is:

1. A water circulating pump including a casing, a bearing sleeve within the casing, a shaft turnable in the sleeve, contacting shoulders on the shaft and sleeve, and means whereby with the operation of the pump the shoulders will be held in positive and continuous frictional contact to form a ground joint to seal the water against passing from the casing into the bearing sleeve.

2. The combination with an elbow pump casing, of a bearing sleeve extending into one of the bends of the elbow, a shaft projecting through the bearing sleeve and into the casing, the bearing sleeve and shaft having shoulders adapted to engage each other in frictional contact with the longitudinal thrust of the shaft toward the elbow, and means for positively and continuously thrusting the shaft in that direction whereby the two shoulders will form a seal against the passage of water from the casing into the bearing sleeve.

3. The combination with an elbow pump casing, of a bearing sleeve formed in the casing, a shaft turnable in the sleeve, shoulders on the sleeve and shaft adapted to frictionally contact with the thrust of the shaft

toward the casing, and an impeller on the inner end of the shaft of such shape that the weight and pressure of the water thereagainst will positively and continuously thrust the shaft in the direction indicated to hold the shoulders in frictional contact, whereby a seal will be maintained against the passage of water from the casing into the bearing sleeve.

4. An elbow pump casing, a bearing sleeve projecting through one bend of the elbow to a point immediately adjacent the open end of said bend, a shaft extending through the sleeve, an impeller on the shaft, and wings on the impeller bent to extend longitudinally along the outside of the sleeve and having a pitch set in a direction opposite to the direction of rotation of the shaft.

5. A pump casing having a bearing sleeve, a shaft turnable in the sleeve, an impeller on the inner end of the shaft, and wings on the impeller bent backward from the end of the shaft and having a pitch set in a direction opposite to the direction of rotation of the shaft, the sleeve and shaft having shoulders held in frictional contact by the thrust of the shaft to form a seal against the passage of water from the casing into the sleeve.

6. An elbow pump casing, a bearing sleeve projecting through one bend of the elbow to a point immediately adjacent the open end of said bend, a shaft extending through the sleeve, and an impeller on the shaft, the impeller for that portion thereof immediately surrounding the shaft being shaped to draw the water theretoward, and beyond said portion being shaped to force the water received from the first portion directly toward the other opening of the other bend.

7. An elbow pump casing, a bearing sleeve projecting through one bend of the elbow to a point immediately adjacent the open end of said bend, a shaft extending through the sleeve, and an impeller on the shaft, the impeller for that portion thereof, immediately surrounding the shaft being shaped to draw the water theretoward, and beyond said portion being bent to form wings extending over the sleeve substantially from one end to the other thereof, said wings having a pitch relative to the plane of the shaft set in a direction opposite to that of the rotation thereof.

In testimony whereof we affix our signatures

FRANK B. NIMS.
VOIGT J. NIMS.