Jan. 27, 1925. 1,524,320

V. C. SPARKS

WATER PUMP FOR GAS ENGINES

Original Filed Sept. 30, 1922

Fig. 2

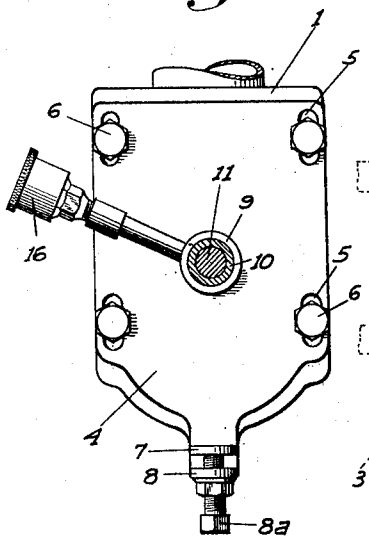


Fig. 1

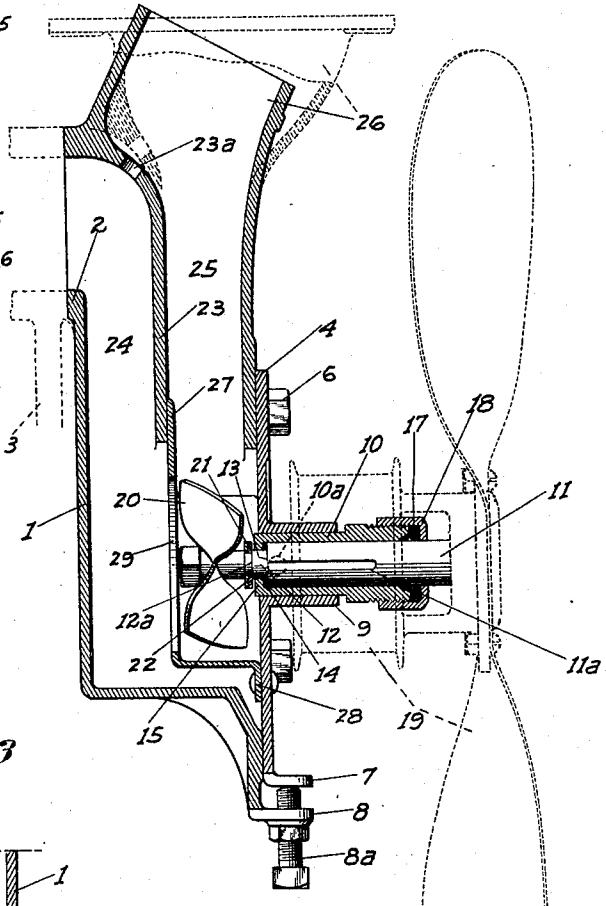
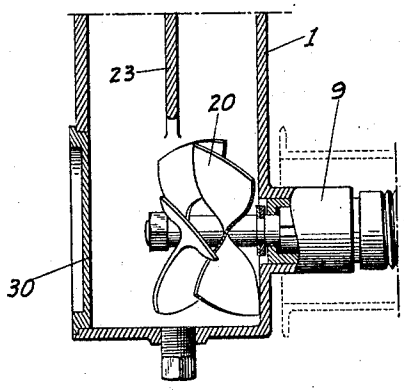


Fig. 3



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UNITED STATES PATENT OFFICE.

VERNON C. SPARKS, OF OAKLAND, CALIFORNIA, ASSIGNOR TO S. & G. MANUFACTURING COMPANY, OF STOCKTON, CALIFORNIA.

WATER PUMP FOR GAS ENGINES.

Original application filed September 30, 1922, Serial No. 591,643. Divided and this application filed November 5, 1923. Serial No. 672,310.

To all whom it may concern:

Be it known that I, VERNON C. SPARKS, a citizen of the United States, residing at Oakland, county of Alameda, State of California, have invented certain new and useful Improvements in Water Pumps for Gas Engines; and I 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 water circulation pumps for the cooling systems of automobile gas engines of a well-known type, and this application is particularly a division of my application, Serial No. 591,643, filed September 30th, 1922, and a continuation of application, Serial No. 570,558, filed June 24th, 1922.

The principal object of the present invention is to provide a pump structure arranged to be attached to the cylinder block of the engine in place of the usual water-outlet elbow or pipe, and so constructed that the pump shaft will occupy the same location, in a vertical and transverse plane, as that occupied by the original fan-shaft, thus enabling the latter to be done away with, and permitting the pump shaft to also serve as a means for supporting the fan, and allowing for the driving of said shaft by a single belt of the same length and size as that originally used.

The pump being a rigid member, the pump shaft, which is also the fan shaft, is free from the excessive vibration and consequent rapid wear, both of the shaft and belt, now commonly had with the light and somewhat resilient fan-bracket usually employed.

Another object is to provide for the necessary vertical adjustment of the pump shaft, on which the driving pulley is mounted, without detaching the pump or disturbing the efficiency of operation thereof in any manner.

As a third object, I have provided an improved form of leak-proof bearing means for the shaft, to prevent leakage of water from the pump and around the shaft with the operation of the pump.

I have also provided for the ready removal or insertion of the pump runner without removing the pump.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I 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 my improved pump structure.

Fig. 2 is a front view of the same.

Fig. 3 is a fragmentary section of the lower portion of a pump of modified form.

Referring now more particularly to the characters of reference on the drawings, and particularly at present to Figs. 1 and 2, the numeral 1 denotes a body member or casing having a flange 2 whereby it may be secured to the cylinder block 3 of an engine of a well known type in place of the usual elbow water-outlet fitting.

The front face of the casing is open for a certain portion of its extent, such opening being closed by a cover-plate 4 which is vertically adjustable on the casing by reason of vertical slots 5 in said plate through which the fastening bolts 6 project into the casing-walls. At the lower end of the plate is a horizontal lip or lug 7, under which is a similar lip 8 formed with the casing, in which latter lip is mounted a set screw 8^a which bears against the lip 7. In this manner, by first loosening the bolts 6, vertical adjustment of the cover, for the purpose hereinafter seen, may be regulated to a nicety.

Formed with the cover 4 on the front face and at the lower end thereof is a boss 9, in which is press-fitted a bearing bushing 10 for the combined pump and fan shaft 11, said shaft having a reduced portion 12 at its inner end thereby forming a shoulder 13 which seats a fiber washer 14, the latter being between said shoulder and a reduced or shoulder portion 15 on the bushing 10. Oil or grease for lubrication purposes is fed to the bushing around the shaft from a

cup 16 through a hole 10ª leading to said bushing and thence along a groove 11ª cut in the face of the shaft 11, said lubricant being prevented from escape from the outer end of the bushing by means of a packing gland 17, adjustable by a cap 18 turnable by hand.

The outer end of the shaft is adapted to have mounted thereon a pulley and fan unit indicated at 19, which may be of the ordinary type, or as featured in my above mentioned copending application, Serial No. 591,643.

On the inner end of the shaft is an impeller 20, preferably of the screw blade type.

Between the impeller and the adjacent end of the bushing 10 is another fiber washer 21 seating against a shoulder 12ª on the portion 12 of the shaft, and backed by a metal washer 22, these washers being clamped against the said shoulder with the clamping of the impeller on the shaft, and the shoulders being far enough apart so that a very slight end-play of the shaft is permitted.

The shouldered features of the shaft and the arrangement of fiber bushings employed prevent leakage of the water around the shaft, irrespective of the direction of the pull or thrust on the shaft, since if the pull on the impeller in one direction is greater than the pull on the fan in the opposite direction, the shaft will be drawn toward the rear and the washer 14 will be squeezed tightly between the shaft and bushing shoulders, providing a seal which the water cannot pass. If the pull on the shaft is reversed in direction the washer 21 will bear tightly against the bushing, likewise forming a watertight seal. These washers being members separate from the shaft and bushing may be readily replaced in the event of wear.

In the casing 1 between the front and rear walls, is a vertical partition 23, extending from above the outlet of the cylinder block to a point somewhat above the upper edge of the blades of the impeller and slightly to the rear thereof.

A water intake chamber 24, between the rear wall of the casing and the partition 23, is thus formed, providing for the passage of the water from the block 3 to the impeller. The water is then delivered by the impeller to the discharge chamber 25 formed on the forward side of the partition, the upper end of which chamber terminates in an outlet member 26 of suitable size, form, and location, depending on whether the pump is to be installed on a so-called passenger automobile, or on a tractor of the same make, said member being connectible to the radiator of the corresponding type of vehicle.

Positioned adjacent the forward face of the casing partition 23 is a vertical plate 27, extending below the impeller and thence to a rigid connection with the cover plate 4, as shown at 28. The plate 27 has a circular orifice 29 concentric with the impeller and about the same diameter as the latter, said plate 27 clearing the interior of the casing on all sides so as to enable it freedom of vertical movement with the movement of the cover.

By reason of the adjustability of the cover, the tightness of the belt may be regulated to suit. The efficiency of operation of the impeller will not be impaired however, no matter what position it may assume in the casing, owing to the plate 27 and its central orifice with which the impeller maintains a fixed relation, moving up and down with the latter.

In Fig. 3, the cover plate is omitted, and the shaft mounted in the casing itself, which is a one-piece casting. In this type, to enable the impeller to be inserted or removed, an opening in the back of the casing of sufficient size to receive the impeller therethrough is provided, said opening being normally closed by a flat plug 30 driven into place.

Adjacent the upper end of the wall 23 is a vent 23ª so as to relieve and allow the escape of any steam which might accumulate, the pocket formed immediately under said wall, especially when the engine is stopped.

From the foregoing description it will be readily seen that I 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 my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. In a pump, a body, a bearing-sleeve projecting therein, the bore of said sleeve being reduced adjacent its inner end, thereby forming a shoulder, a shaft journaled in said sleeve and having different diameters to fit the normal and reduced portions thereof, thereby also having a shoulder and a removable washer about the shaft and seating between the shoulders, the inner end of the shaft projecting beyond the sleeve and being adapted to have an impeller mounted thereon.

2. In a pump, a body, a bearing-sleeve projecting therein, the bore of said sleeve being reduced adjacent its inner end, a shaft journaled in said sleeve and fitting the normal and reduced portions thereof and pro-

jecting beyond the latter, a removable washer about the reduced portion of the shaft between the reduced portion of the sleeve and the normal portion of the shaft, a removable washer on the shaft beyond the sleeve and adapted to bear thereagainst, and an impeller mounted on the shaft beyond the last named washer and holding the latter against removal.

3. In a pump, a body, a bearing-sleeve projecting therein, the bore of said sleeve being reduced adjacent its inner end, a shaft journaled in said sleeve and fitting the normal and reduced portions thereof, and projecting beyond the latter, a removable washer about the reduced portion of the shaft between the reduced portion of the sleeve and the normal portion of the shaft, another reduced portion on the shaft immediately beyond the sleeve, a removable washer on said last named reduced portion seating against the shoulder formed by said reduced portion, and an impeller on the shaft beyond the last named washer and holding the latter against said shoulder.

4. In combination, a casing provided with intake and outlet passages, an impeller in the casing interposed between the intake and outlet, a driven shaft on which the impeller is mounted, a vertically adjustable plate on the casing, the latter being open under the plate, and bearing means for the shaft carried by the plate.

5. A pump comprising a casing having intake and outlet openings, an impeller in the casing interposed between said openings, a vertically adjustable plate on the casing, the latter being open thereunder, a shaft for the impeller journaled in the plate, and another plate mounted in connection with and substantially parallel to the cover plate but positioned inwardly of the impeller, said other plate having an orifice concentric with the impeller.

6. A pump comprising a casing having intake and outlet openings, an impeller in the casing interposed between said openings, a vertically adjustable plate on the casing, the latter being open thereunder, a shaft for the impeller journaled in the plate, and another plate mounted in connection with and substantially parallel to the cover plate but positioned inwardly of the impeller, said other plate having an orifice concentric with the impeller, a wall in the casing separating the intake and outlet openings and extending substantially parallel to and adjacent said last named plate and terminating short of the orifice therein.

7. A water circulating element for connection with the outlet of the water jacket of the motor of a power plant having a revolving air fan whose axis is a predetermined distance below the outlet, such element including an elongated casing adapted to extend upwardly from below the axis of the fan and having an outlet, and an intake to aline with the jacket outlet, an impeller in the casing whose axis coincides with that of the fan, and a shaft for said impeller journaled in and projecting outwardly a certain distance whereby to enable the fan to be mounted on said shaft while maintaining the fan in its original vertical position.

8. A water circulating element for connection with the outlet of the water jacket of the motor of a power plant having a revolving air fan whose axis is a predetermined distance below the outlet, such element including an elongated casing adapted to extend upwardly from below the axis of the fan and having an outlet, and an intake to aline with the jacket outlet, an impeller in the casing whose axis coincides with that of the fan, a shaft for said impeller journaled in and projecting outwardly a certain distance whereby to enable the fan to be mounted on said shaft while maintaining the fan in its original vertical position, and a pulley on the shaft whereby the impeller and fan may be driven from the engine by a single belt.

In testimony whereof I affix my signature.

VERNON C. SPARKS.