

Sept. 17, 1929.

T. B. FUNK

1,728,486

COMBINED INTERNAL COMBUSTION ENGINE FAN AND WATER CIRCULATION PUMP

Filed June 29, 1925

2 Sheets-Sheet 1

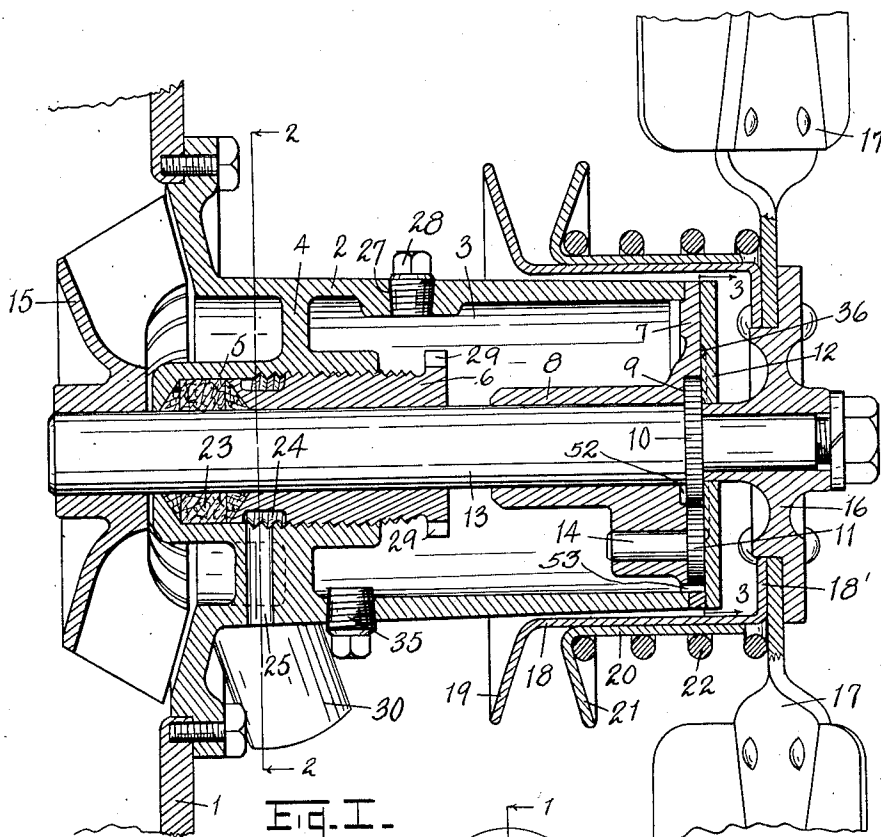


FIG. I.

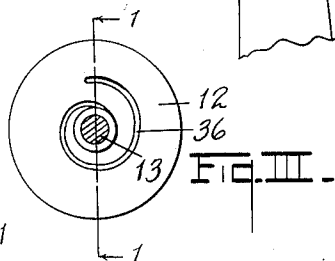


FIG. III.

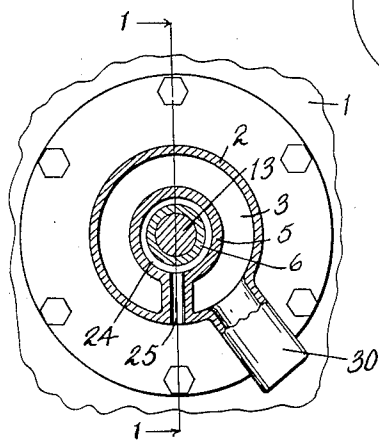


FIG. II.

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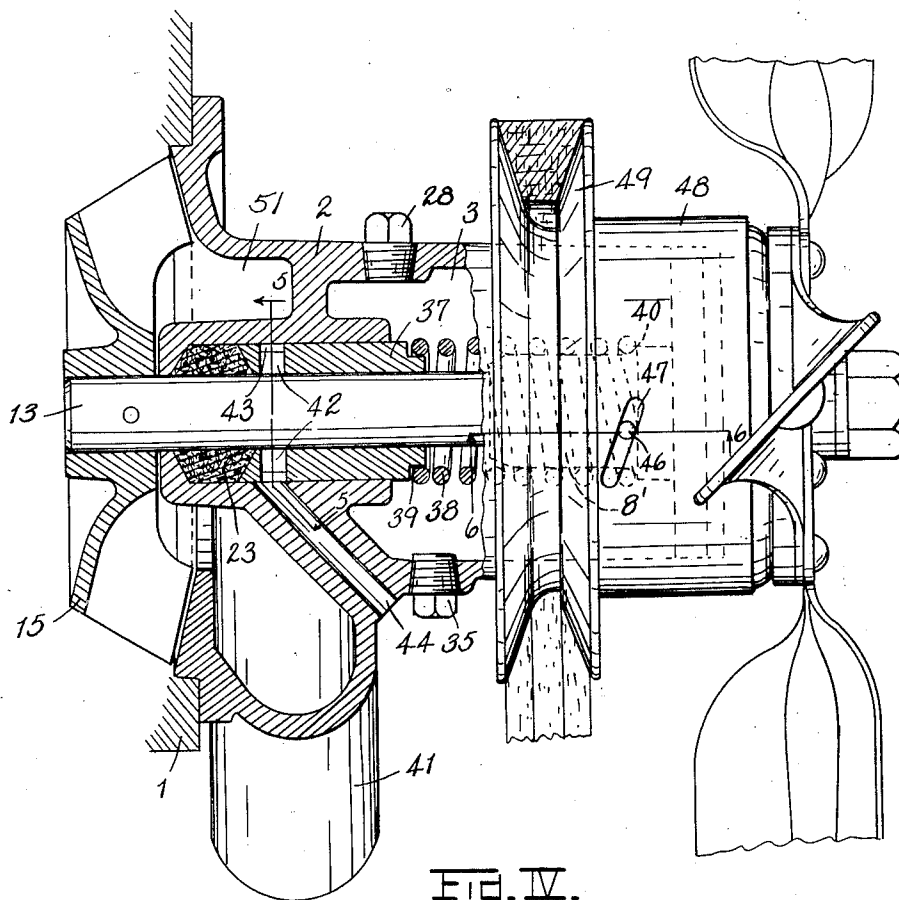


FIG. IV.

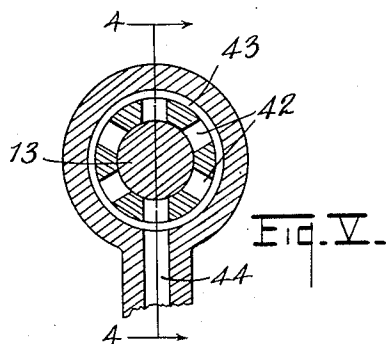


FIG. V.

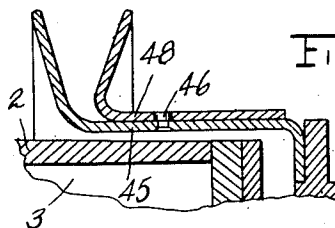


FIG. VI.

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UNITED STATES PATENT OFFICE

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COMBINED INTERNAL-COMBUSTION ENGINE FAN AND WATER CIRCULATION PUMP

Application filed June 29, 1925. Serial No. 40,319.

The main objects of this invention are:

First, to provide an improved combined internal combustion engine cooling fan and water circulation pump which may be assembled and handled as a unit, and installed as a unit.

Second, to provide an improved structure having these advantages which also has a force feed lubricating means.

Third, to provide a unitary structure of the class described in which the water is effectively prevented from mixing with the lubricant.

Fourth, to provide an improved pulley structure for units of the class described.

Objects pertaining to details and economies of my invention will definitely appear from the detailed description to follow.

The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing forming a part of this application, in which:

Fig. I is a fragmentary view mainly in longitudinal section of a structure embodying the features of my invention, the same being shown in operative relation to the water jacket of an internal combustion engine and the circulating connection being omitted. The section is taken on line 1—1 of Figs. II and III.

Fig. II is a detail cross section on a line corresponding to line 2—2 of Fig. I.

Fig. III is a detail cross section on a line corresponding to line 3—3 of Fig. I.

Fig. IV is a fragmentary view partially in longitudinal section on a line corresponding to line 4—4 of Fig. V of a modified embodiment of my invention.

Fig. V is a fragmentary transverse section on a line corresponding to line 5—5 of Fig. IV.

Fig. VI is a fragmentary longitudinal section on a line corresponding to line 6—6 of Fig. IV.

In the drawing the sectional views are taken looking in the direction of the little arrows at the ends of the section lines and similar numerals of reference indicate similar parts in all of the views.

Referring to the drawing, 1 represents the water jacket of an internal combustion engine. My improved fan and circulating pump unit comprises a cylindrical member 2 chambered at 3 to provide a lubricant receptacle. At its inner end the body member has a transverse partition 4 carrying the packing gland casing 5 which in the embodiment illustrated in Fig. I is internally threaded to receive the packing gland 6.

The head closing the outer end of the body comprises an inner head member 7 having the inwardly projecting bearing 8 thereon. This inner head member is recessed on its outer face at 9 to receive the gears 10 and 11 constituting a gear pump. The outer end plate 12 constitutes the outer member of the casing. A passage 52 is provided leading from the nip or meeting point of the gears to the spindle. An inlet passage 53 is provided at the bottom of the gear 11.

The gear 10 is mounted on the spindle 13 supported in the bearing 8 while the gear 11 is mounted on a stub shaft 14 carried by the inner head member. The inner end of the spindle 13 projects through the packing gland and the impeller 15 is mounted thereon. The outer end of the spindle 13 projects to receive the hub 16 on which the fan blades 17 are mounted and also the pulley.

This pulley in the embodiment illustrated comprises a main pulley member 18 which has a flange 18' at its outer end secured to the hub 16 and an inclined pulley flange 19 at its inner end, the pulley member being arranged to embrace the outer end of the body 2. The supplementary pulley member 20 is sleeved upon the main pulley member and has a flange 21 in opposed relation to the flange 19. A coiled spring 22 yieldingly supports the pulley member 20 so that any wear on the belt is automatically taken up and the belt is automatically tensioned owing to the V-shape of the pulley, fan belts now commonly in use in this relation being designed for pulleys having V-shaped rims.

The lubricant circulating pump is similar to that of my Patent No. 1,378,587, dated May 17, 1921.

To render the packing more effective and

to prevent water reaching the lubricant chamber through the packing 23 the gland 6 is provided with a drain passage 24 communicating with the drain opening 25. The gland 6 may be adjusted through the openings 27 by means of a suitable tool, the gland having notches 29 in its periphery to facilitate that. The opening 27 is provided with a closure plug 28. The coupling nipple 30 is provided to receive the circulating pipe, this nipple opening to the inner side of the partition 4 so that water is brought into proper relation to the impeller.

The outer head plate 12 has a spiral groove 36 therein disposed in a reverse relation to the direction of rotation of the pump gear 10 to assist in retaining the lubricant. The plug 35 is provided for draining the lubricant chamber.

In the modification shown in Figs. IV, V and VI the packing gland 37 is automatically adjusted by means of the coiled spring 38 which engages the shoulder 39 on the gland and a shoulder 40 on the bearing 8'. The lubricant pump in this embodiment is the same as that described and, therefore, the details are not further illustrated.

The inlet connection 41 corresponds to the inlet connection 30, being disposed in a general tangential relation to the chamber 51 at the inner side of the impeller. The packing gland has a series of radial openings 42 opening to an annular groove 43 which communicates with the drain passage 44.

The main pulley member 45 is in this embodiment provided with a pin 46 engaging the slot 47 in the adjustable pulley member 48 so that the pull of the belt on the pulley member 48 tends to carry the flange 49 toward the flange 50, thus performing the function, broadly considered, of the spring 22.

I have illustrated my improvements in an embodiment which I have found highly satisfactory. I have not attempted to illustrate or describe other modifications and adaptations which I contemplate as I believe this disclosure will enable those skilled in the art to embody or adapt the same as desired.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The combination with an internal combustion engine provided with a water jacket, one wall of which has an opening therein, of a body member adapted as a lubricant chamber having an attaching flange at its inner end secured to said water jacket wall to close said opening therein, the body member having a transverse partition wall provided with a packing gland casing, a head member provided with a bearing, a driven spindle disposed in said bearing to project through said packing gland casing and said head member, a water impeller on the inner end of said spindle, said body member having a water

circulating connection opening at the inner side of said partition of said body member in operative relation to said impeller, a packing for said spindle comprising a packing gland arranged within said lubricant chamber and having a drain passage therein, said body member having a discharge opening for said drain passage, and a lubricant pump of the gear type operatively associated with said bearing and lubricant chamber, one gear of which is carried by said spindle.

2. The combination with an internal combustion engine provided with a water jacket, one wall of which has an opening therein, of a body member adapted as a lubricant chamber having an attaching flange at its inner end secured to said water jacket wall to close said opening therein, the body member having a transverse partition wall provided with a packing gland casing, a head member provided with a bearing, a driven spindle disposed in said bearing to project through said packing gland casing and said head member, a water impeller on the inner end of said spindle, said body member having a water circulating connection opening at the inner side of said partition of said body member in operative relation to said impeller, and a packing for said spindle comprising a packing gland arranged within said lubricant chamber and having a drain passage therein, said body member having a discharge opening for said drain passage.

3. The combination with an internal combustion engine provided with a water jacket, one wall of which has an opening therein, of a body member adapted as a lubricant chamber having an attaching flange at its inner end secured to said water jacket wall to close said opening therein, the body member having a transverse partition wall provided with a packing gland casing, a head member provided with a bearing, a driven spindle disposed in said bearing to project through said packing gland casing and said head member, a water impeller on the inner end of said spindle, said body member having a water circulating connection opening at the inner side of said partition of said body member in operative relation to said impeller, and a packing for said spindle comprising a packing gland arranged within said lubricant chamber.

4. In a combined water circulation pump and fan structure, the combination of a body member adapted as a lubricant chamber and having a transverse partition provided with a packing gland casing, a head member provided with a bearing, a driven spindle disposed in said bearing to project through said packing gland casing and said head member, a water impeller on the inner end of said spindle, a packing for said spindle comprising a packing gland having a drain passage therein, said body member having a discharge

opening for said passage, and a lubricant pump of the gear type operatively associated with said bearing and the lubricant chamber, one gear of which is carried by said spindle.

5 5. In a combined water circulation pump and fan structure, the combination of a body member adapted as a lubricant chamber and having a transverse partition provided with a packing gland casing, a head member provided with a bearing, a driven spindle disposed in said bearing to project through said packing gland casing and said head member, a water impeller on the inner end of said spindle, a packing for said spindle comprising a packing gland having a drain passage therein, said body member having a discharge opening for said passage, and a compressing spring for said packing gland arranged within said chamber.

20 6. In a combined water circulation pump and fan structure, the combination of a body member adapted as a lubricant chamber and having a transverse partition provided with a packing gland casing, a head member provided with a bearing, a driven spindle disposed in said bearing to project through said packing gland casing and said head member, a water impeller on the inner end of said spindle, and a packing for said spindle comprising a packing gland having a drain passage therein, said body member having a discharge opening for said passage.

35 7. In a combined water circulating pump and fan structure, the combination of a body member adapted as a lubricant chamber and having a packing gland casing at its inner end and a bearing at its outer end, a spindle disposed in said bearing to project at each end of the body member, a packing for said spindle arranged within said chamber and having a drain passage therein, said body member having a discharge opening for said drain passage, and a compressing spring for said packing gland arranged within said chamber.

50 8. The combination with an internal combustion engine provided with a water jacket, one wall of which has an opening therein, of a body member mounted on said water jacket to close said opening therein and adapted as a lubricant chamber and having a packing gland casing at its inner end and a bearing at its outer end, a spindle disposed in said bearing to project at each end of the body member, and a packing for said spindle arranged within said chamber and having a drain passage therein, said body member having a discharge opening for said drain passage.

60 9. The combination with an internal combustion engine provided with a water jacket, one wall of which has an opening therein, of a body member mounted on said water jacket to close said opening therein and

adapted as a lubricant chamber and having a packing gland casing at its inner end and a bearing at its outer end, a spindle disposed in said bearing to project at each end of said body member, a packing for said spindle comprising a packing gland arranged within said lubricant chamber, and a compressing spring for said packing arranged within said lubricant chamber.

75 10. The combination with an internal combustion engine provided with a water jacket, one wall of which has an opening therein, of a body member mounted on said water jacket to close said opening therein and adapted as a lubricant chamber and having a packing gland casing at its inner end and a bearing at its outer end, a spindle disposed in said bearing to project at each end of said body member, and a packing for said spindle comprising a packing gland arranged within said lubricant chamber.

In witness whereof I have hereunto set my hand.

TRUMAN B. FUNK.

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