

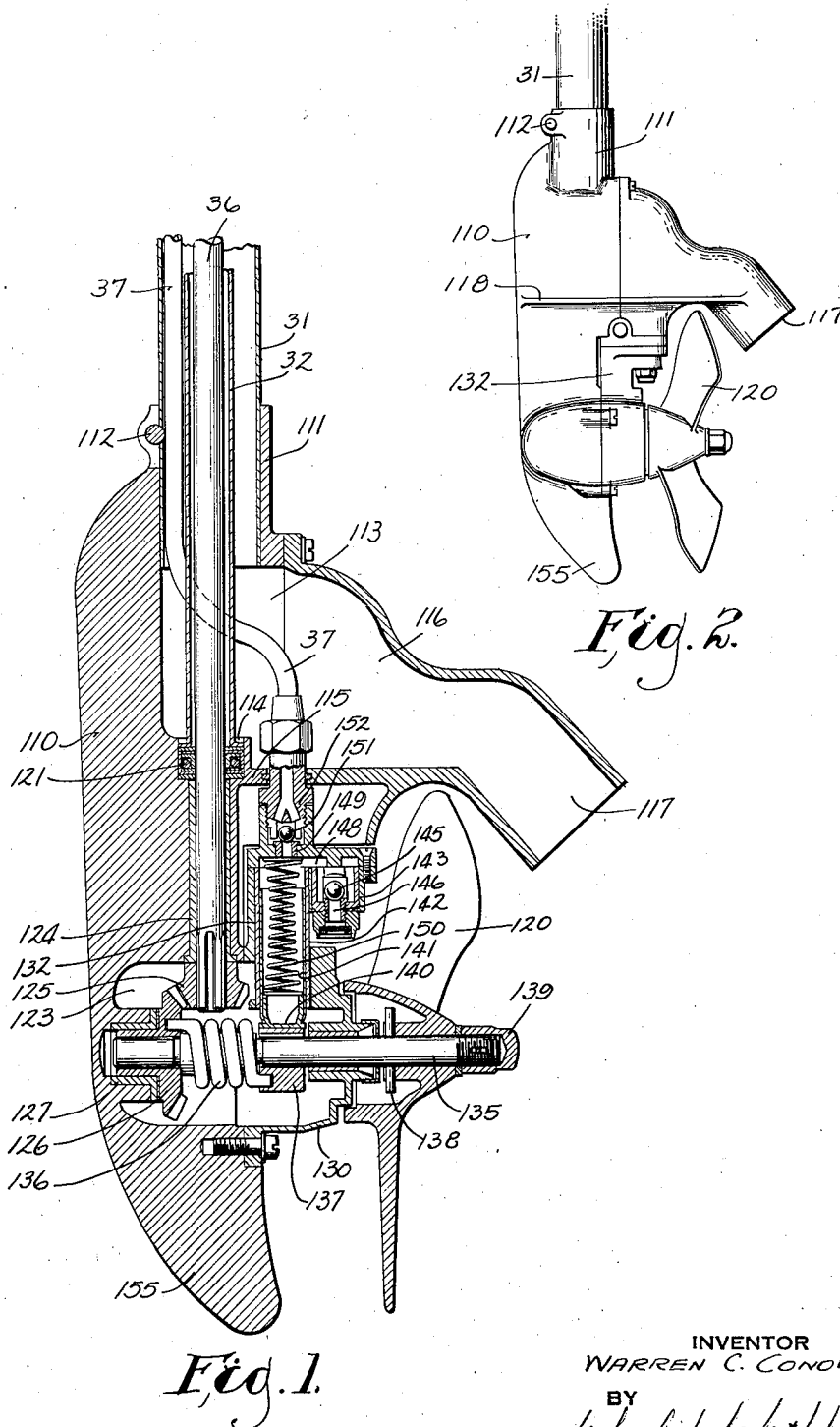
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WATER PUMP

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## WATER PUMP

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6 Claims. (Cl. 115—17)

This invention relates to improvements in outboard motor water pumps. The present application is a division of my copending application Serial No. 212,078, entitled Outboard motors, filed June 6, 1938, now Patent No. 2,224,900.

The primary object of my invention is to provide an improved outboard motor water pump together with a novel organization of water passages which are associated therewith.

Further objects of my invention are to provide a novel organization of lower unit elements including the motor drive shaft, the propeller shaft, and the driving connection therebetween, whereby to simplify the construction thereof with a resultant reduction in the cost of manufacture thereof.

Other objects of my invention will become apparent to those skilled in the art upon an examination of the drawing and the following specification and appended claims.

In the drawing:

Fig. 1 is a fore and aft section of an outboard motor lower unit having my inventive features incorporated therein.

Fig. 2 is a side elevation of the lower unit shown in Fig. 1.

Like parts are identified by the same reference characters throughout the several views.

The lower unit casting 110 is provided at its top with a split sleeve clamp 111 tightened by means of bolt 112 on the outer shaft housing sleeve 31 which terminates at the exhaust chamber 113 formed in the casting 110. At the bottom of the exhaust chamber is a socket 114 and a partition wall 115 directing the exhaust gases rearwardly into the discharge pipe 116 which is bolted at the rear of casting 110 and constitutes a rearward extension thereof, the anti-cavitation plate 118 being continuous across the outside of both castings. The discharge mouth 117 for the exhaust gases is located below plate 118 and at the rear of the path of the propeller 120.

The inner casing 32 constituting the shaft housing extends clear across the exhaust chamber 113 and seats in the socket 114 where packing is provided at 121 to prevent the exhaust gases and water from penetrating along the drive shaft 36 into the gear chamber 123. The drive shaft has a bearing in a bushing 124 immediately above the gear chamber. At its end it carries the drive pinion 125 which meshes with a driven gear 126 bearing in a bushing 127 provided directly in the lower unit casting 110.

Bolted to the aft surface of the lower unit casting 110 is a casting 130 which provides a clo-

sure for the rear side of the gear chamber and also provides a pump casing 132. The propeller shaft 135 has its forward bearing within the driven gear 126 and its rearward bearing in a bushing provided in casting 130 constituting the gear casing closure. Motion is transmitted from the driven gear 126 to the propeller shaft through a torsion spring 136 having one end entering the gear and the other end anchored in the pump cam 137 which is keyed to the shaft. The torsion spring 136 is wound about the portion of the shaft intervening between the gear and the cam and provides a resiliently flexible driving connection calculated to absorb some of the shock to which the propeller may be subject. A shear pin 138 passing through the shaft is engaged in a notch in the hub of propeller 120, the hub being housed to the pin by the nut 139 screwed to the end of the shaft.

The pump comprises a cam follower 140 which is provided with an extension bearing sleeve 141 to constitute a displacement piston operating within a cylinder which includes the bushing 142. Adjacent the cylinder the casting 132 receives a cage 143 for a check valve 145 and a hardened seat 146 screwed into the cage and replaceable as required.

The water inlet provided by the cage communicates through the cylinder head 148 with the cylinder bushing 142 and with the replaceable tubular outlet valve seat member 149. On each displacement stroke of the piston against the compression of spring 150, water is forced through the outlet valve 151 and fitting 152 into the water supply pipe 37 which extends upwardly through the shaft housing between the inner and outer tubes thereof in the manner already described. Because of the presence of the inner tube no vibration can bring the supply pipe 37 into frictional contact with the rotating drive shaft 36.

I claim:

1. In an outboard motor, the combination with a lower unit gear housing, of drive and propeller shafts therein, intermeshing gears mounted on the respective shafts, one of said gears being rotatable upon the propeller shaft, a pump cam mounted on the propeller shaft, and a torsion spring encircling the propeller shaft and having its ends connected respectively with the pump cam and the last mentioned gear to constitute a yielding driving connection from the last mentioned gear to said cam and shaft, said cam being provided with means fixing it to said shaft to transmit rotation thereto.

2. In an outboard motor lower unit, the combination with a housing provided with a rearwardly opening gear chamber, of a closure secured to said housing at the rear thereof to close said chamber and having a cavity constituting an extension of said chamber, a propeller shaft having a bearing in said housing and said closure and extending through said closure and provided with a propeller externally thereof, a pump mechanism unitarily mounted in said closure for application and removal therewith, and means on said shaft within said chamber extension for operating said pump mechanism.

3. In an outboard motor lower unit, the combination with a housing provided with a gear chamber opening on one end, of a closure applied to said housing and having a cavity constituting an extension of said chamber, a displacement pump mounted in said closure for unitary application and removal with said closure, a propeller shaft having one end supported in said housing and its other end supported in said closure, and a cam carried by said shaft within said cavity in operative actuating connection with said pump, said pump being located in the plane of said cam on a radius of said shaft.

4. In an outboard motor lower unit, the combination with a housing provided with a gear chamber opening rearwardly, of a closure applied to said housing and having a cavity constituting a rearward extension of said chamber, a displacement pump mounted in said closure, a propeller shaft having its forward end supported in said housing and its rearward end supported in said closure, and a cam carried by said shaft within said cavity in operative actuating connection with said pump, driving and driven gears for said shaft in said chamber, the driven gear being free of the shaft and substantially concentric therewith, and a spring constituting a driving connection from the driven gear to the cam, said cam being fixed to said shaft for the actuation thereof.

5. In an outboard lower unit, the combination

with a housing having an exhaust chamber and a gear chamber, both opening rearwardly, of a bearing between said chambers, a drive shaft in said bearing, a driving pinion carried by the drive shaft, a driven gear provided with a mounting in the gear chamber, a propeller shaft extending rearwardly from said gear, a closure for the gear chamber within which said propeller shaft is mounted, a pump cam mounted on the propeller shaft and provided with means securing it to the shaft for rotation therewith, a spring providing a yieldable driving connection from the driven gear to the cam, a displacement pump comprising a cylinder formed in said closure and a piston reciprocable therein and bearing on said cam, a supply pipe leading from said cylinder through said exhaust chamber, and a discharge pipe connected with said housing about said exhaust chamber to receive exhaust from said chamber for under water discharge and to enclose said supply pipe.

6. In an outboard motor lower unit, the combination with a drive shaft jouralling housing provided in the upper portion thereof with an exhaust gas passage adjacent the drive shaft and extending axially thereof and having an upper rear wall aperture and a lower and rearwardly opening gear chamber, of a rearwardly projecting tubular exhaust housing attached to the shaft housing for communication with the aperture and a water pump housing attached to said shaft housing below the exhaust housing and adapted to provide both a rear closure for said gear chamber and supporting means for a water pump which is actuated from within the gear chamber, the lower portion of said exhaust housing and the upper portion of said water pump housing being adapted to provide a downwardly projecting cavity in which is housed the upper portion of the pump and an associated check valve, and a tubular water conduit leading from the valve, through the lower wall of the exhaust housing, and into the drive shaft housing.

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