May 21, 1957 A. L. NIELSEN 2,792,786

PUMP AND PROPULSION UNIT

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FIG. 1

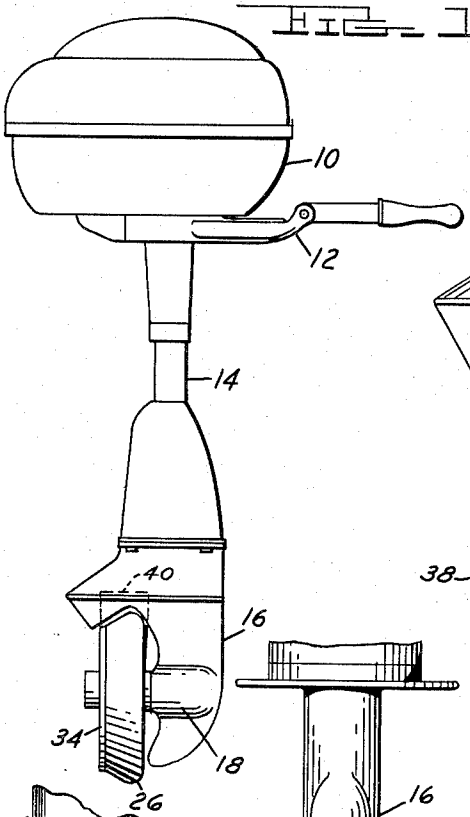
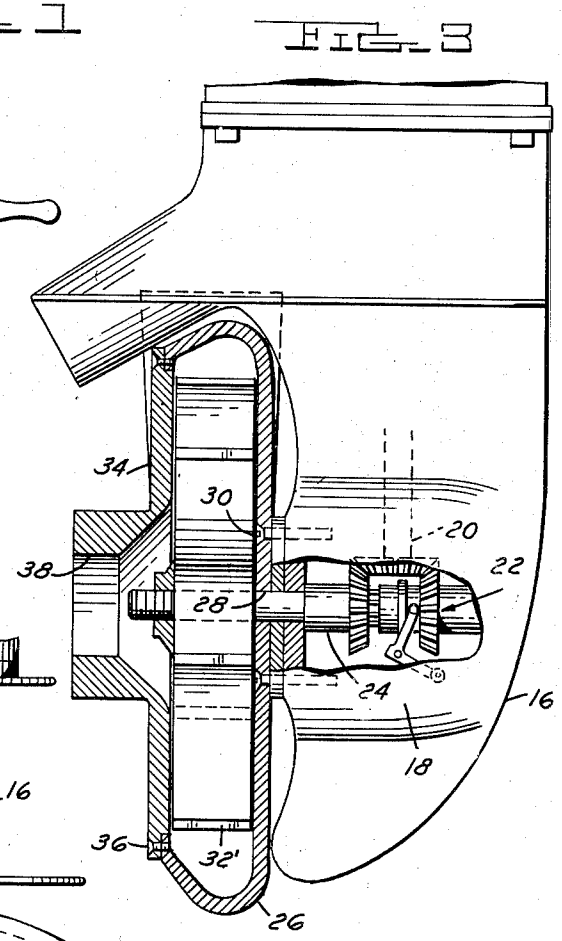


FIG. 3



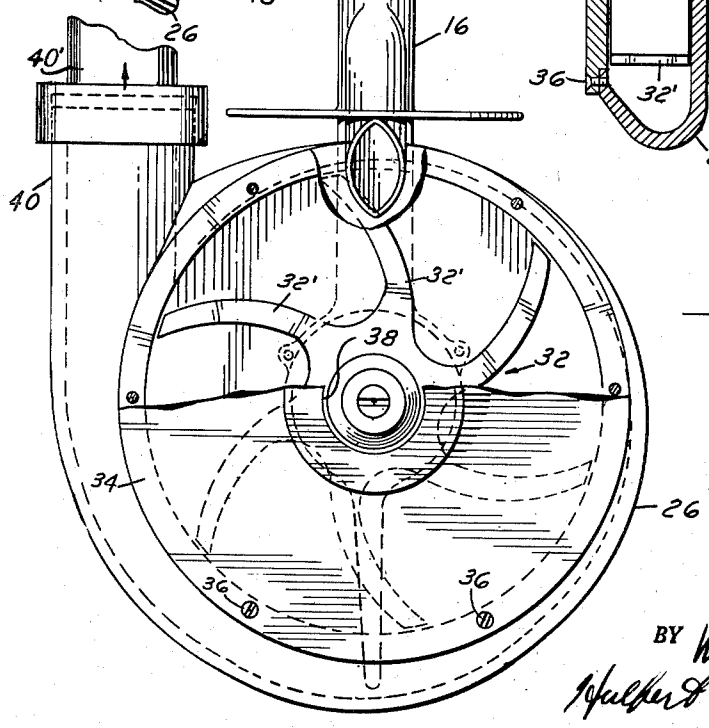


FIG. 2

INVENTOR.
AXEL L. NIELSEN
BY Whittemore, Hulbert & Belknap
ATTORNEYS

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PUMP AND PROPULSION UNIT

Filed Oct. 27, 1952 2 Sheets-Sheet 2

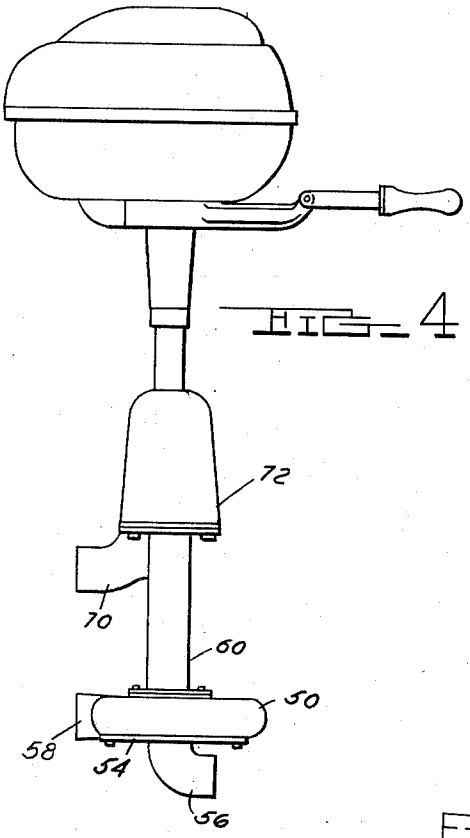


FIG. 4

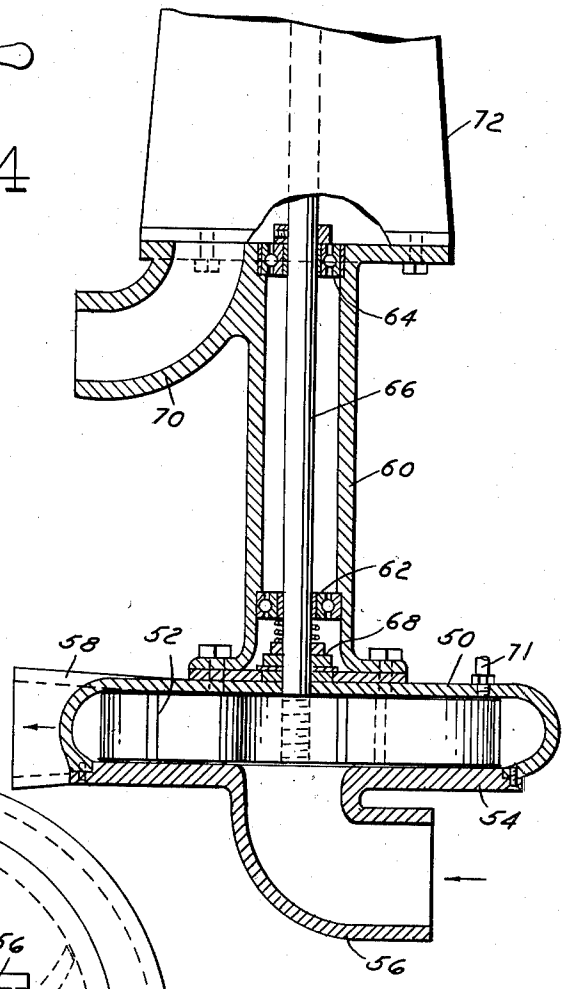


FIG. 6

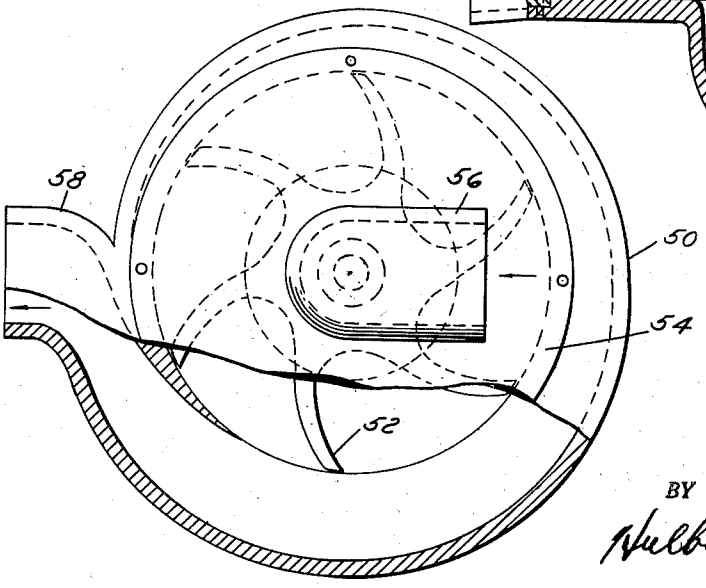


FIG. 5

INVENTOR.
AXELL NIELSEN
BY Whittemore Hulbert & Belknap
ATTORNEYS

United States Patent Office 2,792,786
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2,792,786

PUMP AND PROPULSION UNIT

Axel L. Nielsen, Hazel Park, Mich.

Application October 27, 1952, Serial No. 317,017

4 Claims. (Cl. 103—87)

The present invention relates to an attachment for outboard motors comprising a centrifugal pump adapted to be carried by the usual outboard motor structure and to be driven by the motor thereof.

It is an object of the present invention to provide a pump attachment for an outboard motor comprising a centrifugal pump casing adapted to be secured directly to the gear box of the outboard motor, and an impeller in the casing adapted to be secured directly to the propeller shaft in lieu of the propeller.

It is a further object of the present invention to provide a centrifugal pump attachment for an outboard motor in which the centrifugal pump operates with the axis of its impeller vertical, and in which the attachment comprises a centrifugal pump casing having an impeller therein, a shaft secured to the impeller, a shaft housing extending from the pump casing and attachable to the shaft housing of the outboard motor, the shaft of the impeller being splined for quick attachment to a motor driven splined part of the outboard motor.

It is a further object of the present invention to provide a centrifugal pump of the character described in which the outlet of the pump is directed rearwardly whereby the pump may be employed in propelling the boat forwardly.

It is a further object of the present invention to provide apparatus of the character described including a centrifugal pump having a forwardly directed intake and a rearwardly directed outlet, the outlet preferably being disposed radially of the pump impeller.

It is a further object of the present invention to provide an outboard motor in combination with a pump in which sealing means are provided preventing entry of water into bearings provided for the support of drive means connecting the impeller to the motor.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a side elevation of an outboard motor provided with the improved centrifugal pump attachment.

Figure 2 is an enlarged rear view of the lower portion of the structure with parts broken away.

Figure 4 is a side elevation of a second embodiment of the present invention.

Figure 3 is an enlarged side elevation of the lower portion of the structure with parts broken away.

Figure 5 is an enlarged rear elevational view of the lower portion of the structure shown in Figure 4, with parts broken away.

Figure 6 is an enlarged side elevational view of the lower portion of the structure shown in Figure 4, with parts broken away.

Referring now to the drawings, in Figure 1 there is illustrated an outboard motor comprising a motor housing **10**, a tiller **12**, a shaft housing **14**, and a lower casting **16** which includes a gear box portion **18**. In its use

as an outboard motor for the propulsion of boats, there is provided a drive shaft **20** connected through suitable gearing indicated generally at **22** to a propeller shaft **24**, the propeller shaft extending rearwardly from the gear box **18**. In its normal use a propeller is keyed by a shear pin to the propeller shaft **24**.

In accordance with the present invention the usual propeller is removed from the propeller shaft **24** and the pump structure substituted. The pump structure comprises a casing **26** of a centrifugal pump, the casing having an opening **28** therein through which the rearwardly extending portion of the propeller shaft **24** extends. The casing **26** is adapted to be secured to the casting **16** by screws **30**. Keyed or otherwise secured to the propeller shaft **24** is an impeller **32**. The rear side of the casing **26** is open and is adapted to be closed by a plate **34** screwed or otherwise secured thereto, as indicated at **36**, the plate **34** having an inlet opening **38** located axially of the casing so as to permit water to flow into the eye of the pump. The centrifugal pump casing **26** is shaped to provide an outlet **40** which as illustrated in Figure 2, may be directed upwardly. Preferably, the outlet **40** will be suitably shaped for coupling to a hose **40'** or the like, but this coupling may be of any conventional type.

Impeller **32** is provided with mildly curved, generally radial blades **32'** of solid cross section, the liquid pumped being handled exclusively between successive blades and the casing surfaces to which the blade side edges are exposed. Thus the possibility of clogging or partial clogging by coarse objects in the liquid, or by accumulation of finer particles in restricted zones, is minimized.

It will be appreciated that the substitution of the casing and impeller for the usual propeller does not in any way interfere with the normal running of the outboard motor within the motor housing **10**, this motor being cooled in the usual fashion by water drawn in through the usual inlet.

Referring now to Figures 4–6 there is illustrated a second embodiment of the present invention. In this case the pump attachment comprises a centrifugal pump casing **50** having therein an impeller **52**. In this case the centrifugal pump is adapted to operate with its axis vertical and the lower side of the pump casing **50** is open and is adapted to be closed by a plate **54** having a downwardly and forwardly curved inlet portion **56** opening into the eye of the pump. As best seen in Figure 5, the pump casing **50** is shaped to provide an outlet **58** which in operation is located to extend rearwardly and opposite to the inlet opening **56**. Preferably, the outlet **58** is curved so that it is directed radially outwardly from the axis of the impeller.

With the parts arranged as just described, the centrifugal pump constitutes a propelling mechanism by means of which it is possible to propel the boat at very low speeds without danger of stalling the motor.

Rigidly secured to the pump casing **50** is a tubular housing **60** having shaft bearings **62** and **64** therein adapted to support a shaft member **66**, the lower end of which extends through suitable sealing means indicated generally at **68**, into the interior of the tubular housing **60**, and is there secured in driving relation to the impeller **52**. The tubular housing **60** includes an exhaust portion **70**. In this case, cooling of the motor may conveniently be accomplished by using the pump, and for this purpose a tube **71** may be connected thereto for leading cooling water to the motor.

Outboard motors in general includes a vertical drive shaft intermediate the motor and the gear box which is splined at its upper end to a correspondingly splined motor drive element and which is splined at its lower end for connection with a splined gear in the gear box. In the

present case the shaft 66 is adapted to replace the usual vertical drive shaft of the outboard motor and for this purpose its upper end, which extends beyond the tubular housing 60, is splined so that it may slip into engagement with the splined motor driven element when the tubular housing 60 is bolted or otherwise secured in place against the lower end of a shaft housing member 72 which is a part of the usual outboard motor.

Thus, in both cases the centrifugal pump may be connected for actuation by the motor of an outboard motor by the simple process for removing a portion of the outboard motor propulsive mechanism and substituting the centrifugal pump therefor.

It has been found that centrifugal pumps designed to be associated with outboard motors have a surprisingly large capacity and develop surprisingly great pressure. The new combination of outboard motor with a centrifugal pump unit substituted for the propeller thereof, or for the propeller and a part of the transmission mechanism thereof, is highly useful. Thus, for example, in resort areas the outboard motor can be used to pump water for irrigation or other purposes. In many cases, resorts or other property contiguous to water suitable for boating, are nevertheless subject to water shortages. By employing the centrifugal pump in combination with the outboard motor, it is a simple matter to irrigate such property by the always available supply of water.

Preferably, the impeller is designed with substantial clearances within the casing so that the pump may be employed for pumping water which may include sand or small particles of gravel without injury to the pump.

The pump attachment for the outboard motor may be adapted for connection to a water system and will be available to supply water in case of fire at resorts where the supply of water under pressure is not ordinarily available.

Another valuable use for the pump would be as a bilge pump. Thus for example, on boats sufficiently large to carry auxiliary small craft the outboard for the small craft may be used as an efficient bilge pump to discharge water from the bilge from the larger vessel.

The present pump structure in characterized by its extreme simplicity, the economy with which it may be produced, and the ease and facility with which it may be combined with the outboard motor. This last factor makes it possible to convert the outboard motor from its ordinary purpose to a pump in a minimum of time and of course, likewise permits reconverting the outboard to its usual function in a correspondingly small time and with a minimum of effort.

It will be noted that in the structure illustrated in Figure 1, the centrifugal pump is substituted essentially for the propeller of the outboard motor so that the usual seals which prevent entrance of water to the bearings, etc., remain effective when the outboard motor is converted to a pump.

The drawings and the foregoing specification constitute a description of the improved pump and propulsion unit in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. An attachment for an outboard motor of the type comprising a motor having a drive shaft extending downwardly through a shaft housing and into a gear box at the lower end of said housing, and a propeller shaft extending rearwardly through an opening in said gear box, said attachment comprising a centrifugal pump casing having coaxial shaft receiving and intake openings, a centrifugal impeller in said casing, said impeller having generally radial blades defining therebetween liquid accommodating pumping spaces which are laterally exposed to opposed surfaces of said casing, and means mounting said pump casing directly on said gear box in a zone surrounding said opening in the latter, with said impeller secured on said shaft and with said intake and shaft openings in axial alignment with said gear box opening, said mounting means including means to insure the locating of said casing on said gear box in said aligned relation of said openings.

2. An attachment for an outboard motor of the type comprising a motor having a drive shaft extending downwardly through a shaft housing and into a gear box at the lower end of said housing, and a propeller shaft extending rearwardly through an opening in said gear box, said attachment comprising a centrifugal pump casing having coaxial shaft receiving and intake openings, a centrifugal impeller in said casing, said impeller having generally radial blades defining therebetween liquid accommodating pumping spaces which are laterally exposed to opposed surfaces of said casing, and means mounting said pump casing directly on said gear box in a zone surrounding said opening in the latter, with said impeller secured on said shaft and with said intake and shaft openings in axial alignment with said gear box opening, said mounting including a plurality of screws extending through a wall of said pump casing and into said gear box in a piloted zone.

3. An attachment for an outboard motor of the type comprising a motor having a drive shaft extending downwardly through a shaft housing and into a gear box at the lower end of said housing, and a propeller shaft extending rearwardly through an opening in said gear box, said attachment comprising a centrifugal pump casing having coaxial shaft receiving and intake openings, a centrifugal impeller in said casing, said impeller having generally radial blades defining therebetween liquid accommodating pumping spaces which are laterally exposed to opposed surfaces of said casing, and means mounting said pump casing directly on said gear box in a zone surrounding said opening in the latter, with said impeller secured on said shaft and with said intake and shaft openings in axial alignment with said gear box opening.

4. An attachment for an outboard motor of the type comprising a motor having a drive shaft extending downwardly through a shaft housing and into a gear box at the lower end of said housing, and a propeller shaft extending rearwardly through an opening in said gear box, said attachment comprising a centrifugal pump casing having coaxial shaft receiving and intake openings, a centrifugal impeller in said casing, said impeller having generally radial blades defining therebetween liquid accommodating pumping spaces which are laterally exposed to opposed surfaces of said casing, and means mounting said pump casing directly on said gear box with said impeller secured on said shaft and with said intake and shaft openings in axial alignment with said gear box opening.

References Cited in the file of this patent

UNITED STATES PATENTS

21,825	Eaton	Oct. 19, 1858
141,039	Dow	July 22, 1873
1,141,556	Krogh	June 1, 1915
1,197,181	Buck	Sept. 5, 1916
1,454,180	Motte	May 8, 1923
1,528,449	Meyer	Mar. 3, 1925
1,663,253	Hillborn	Mar. 20, 1928
2,233,231	Vincent	Feb. 25, 1941
2,504,140	Mill	Apr. 18, 1950
2,610,602	Schenavar	Sept. 16, 1952
2,684,635	Winkelman et al.	July 27, 1954

FOREIGN PATENTS

106,524	Sweden	Feb. 9, 1943
631,037	France	Dec. 13, 1927
812,914	France	May 20, 1937