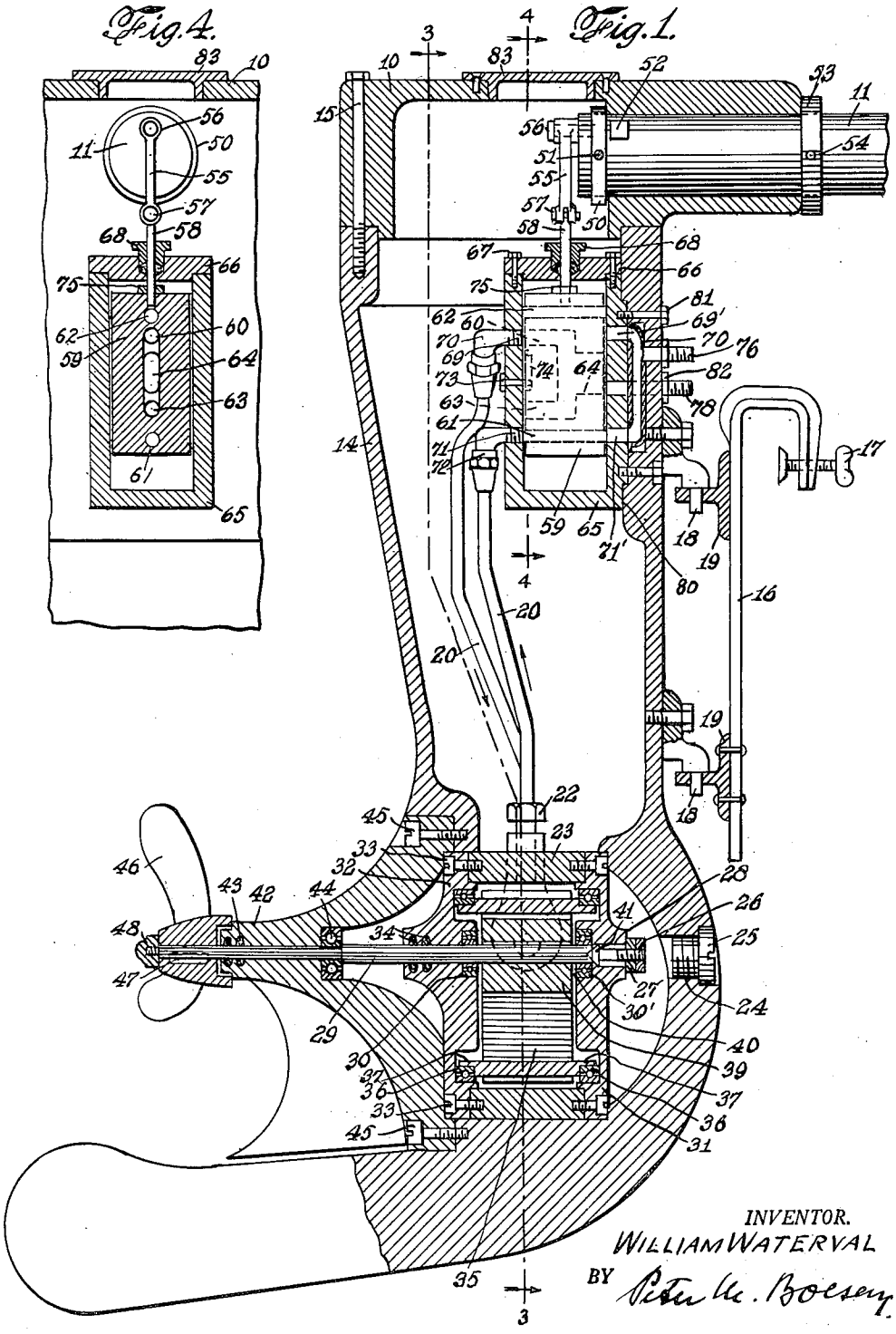
Oct. 16, 1956 W. WATERVAL 2,766,715

TURBINE DRIVEN STEERABLE, REVERSIBLE, OUTBOARD MOTOR

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Fig. 2.

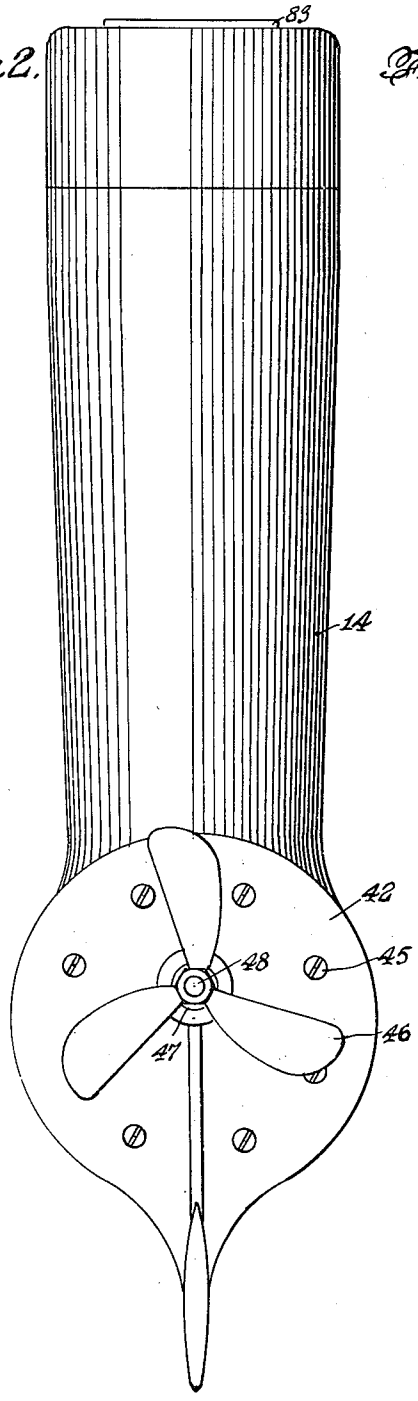
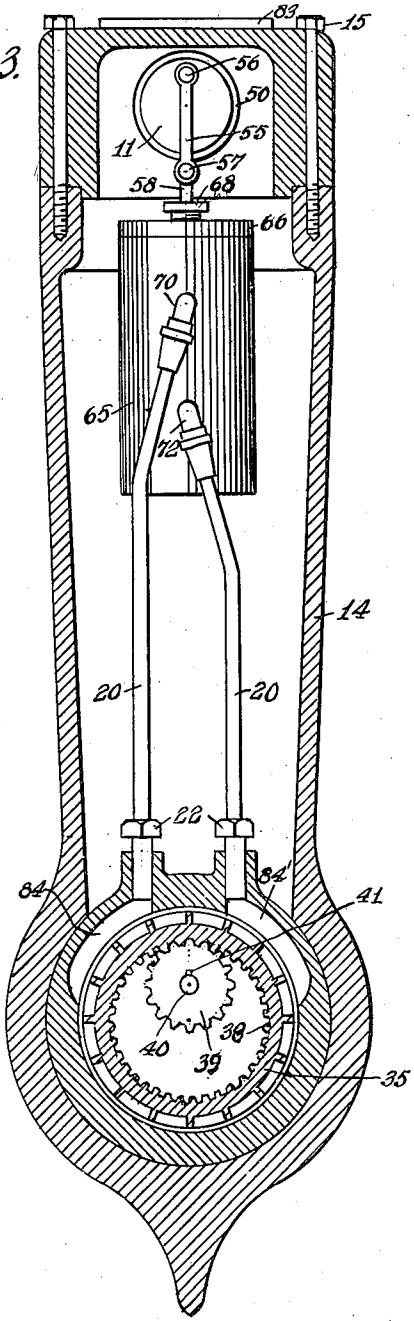


Fig. 3.



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United States Patent Office 2,766,715 Patented Oct. 16, 1956

2,766,715

TURBINE DRIVEN STEERABLE, REVERSIBLE, OUTBOARD MOTOR

William Waterval, Brooklyn, N. Y.

Application July 31, 1952, Serial No. 301,841

1 Claim. (Cl. 115—18)

This invention has for its object to provide a power rudder, and the invention in this connection relates to a direct reversible compound high speed hydraulic turbine for boats.

Thus, among the objects of my invention is to provide a hydraulic propelled turbine consisting of an internal gear for driving a pinion gear that can be used with various sizes, as to speed and power required.

This power unit can be used at the boat stern with a single or double propellers, namely one forward of the housing, and one on the aft part of the housing.

On a twin propelling unit, the propellers are to be arranged on a 45-degree turn in order to get better balance, to avoid unnecessary vibration, and to avoid a continuous pull and load on the power unit.

With twin propellers the advantage is obtained that two similarly sized propellers may be used instead of one large one, so as to make the depending structure shorter for travelling in shallow water, without sacrificing any driving power.

Thus one of the objects of the invention is to provide a powerful pulling and backing hydraulic turbine in which the vibration is reduced to a minimum.

A further object is to provide a hydraulic turbine, which is compact, light of weight, portable, easy to carry, and provided with a folding tiller handle, and which at the same time is adaptable for use with any type of power unit to which a pump may be connected.

The power unit consists of a propelling unit and rudder, which are easy to dismantle, and in which the turbine housing bucket pinion gear may be made of metal, plastic, or any other suitable material.

The invention is adapted to be operated with a three-way valve system for reverse and ahead motion.

There are no intricate mechanical connections, but only a high pressure hose used between the pump and the propulsion turbine.

Incidentally, this engine can be used for a bilge pump at the same time.

The propeller guards, which act as a steering rudder, are arranged under one or both propellers.

The hereinbefore mentioned propeller unit has no reverse gear, or clutch, but, by eliminating all commonly used structures, reduces this invention to a minimum of costs to make.

With the above and other objects in view, this invention consists of the novel features of construction, combination and arrangement of parts, hereinafter fully described, claimed and illustrated in the accompanying drawing forming part of this application, and in which similar characters of reference indicate corresponding parts in all views, and in which:

Figure 1 is a side elevational view of my invention, partly in section.

Figure 2 is a rear elevation, showing the propeller.

Figure 3 is a vertical section on the line 3—3 of Figure 1; while

Figure 4 is a vertical section on the line 4—4 of Figure 1.

Referring more particularly to the drawings, the numeral **10** indicates a cover with a tiller arm **11** inserted in the cover to act as a control handle for the operation of the control valve.

The cover **10** is fastened to a housing **14** by means of bolts **15**. A hanger bracket for engaging the stern of a boat (not shown) is indicated at **16**; said hanger bracket is secured to the stern board of said boat by a lock screw **17**.

The hanger bracket is attached to the housing by hinge pins **18** adapted to receive padeyes **19** secured to said bracket, whereby said housing may be used as a rudder in addition to a propelling unit.

In said housing is arranged pressure tubings **20**.

The said pressure tubings **20** are connected to a hydraulic turbine **23** as at **22**.

A pinion gear **39** and a propeller shaft **29** are regulated by a set screw **26** for clearance.

A thrust riding button **28** is loosely arranged in the space between the set screw **26** and the end of the propeller shaft **29**, which latter is journaled in ball bearings **30, 30'**.

The front turbine cover is indicated at **31**, and the after turbine cover at **32**; said covers are secured to the housing by screws **33**. Pressure seals **34** are mounted in the after turbine cover.

The turbine bucket **35** is mounted on ball bearings **36** and has ball bearing landings **37** to carry the turbine bucket, and seals **34** and an interior gear drive **38** to actuate the propeller drive shaft pinion **39**. The opening **40** in pinion **39** for the propeller drive shaft **29** has a key way **41**.

The turbine securing cap, the propeller steadying bearing and part of the rudder fin are indicated at **42**; said cap has seals **43**, and ball bearings **44**; screws **45** secure the cap to the housing **14**.

The propeller **46** is mounted on the shaft **29** by means of a key **47** and secured by nut **48** to said shaft, the propeller hub overlapping the bearing cap **42**.

In the control valve, as shown and which forms an integral part of my said invention, the control handle has a stop collar **50**, secured by a set screw **51**; a stop pin **52** is arranged on the handle to regulate and control the head and stern motion.

The valve connecting rod **55** has a crank pin **56**. Said rod **55** has a cross-headlinkage **57** for connecting the rod to the valve rod **58**.

The valve rod **58** is threadedly secured to the plunger **59** and held in position by a lock nut **75**.

The said plunger **59** is adapted to move up and down to change the openings for the in and outlet of the fluid. Said plunger is formed with bores **60** and **63** for the inlet of fluid when moved in one direction, and with outlets **61** and **62** when moved in the opposite direction the numeral **62** indicates an outlet, which, however, is closed, or acts as a seal, when the outlet **61** is open.

A valve housing **65** has a cover **66** secured to the latter by screws **67**.

The center of the cover has a packing box **68** surrounding the valve rod.

The said housing is formed with an outlet port **69** having fitting **70** and with an inlet port **71** having fittings **72**.

A set-screw **73** is inserted through the aft-side of the housing and made to engage a recess **74** in the plunger to keep the latter from turning.

The outlet ports on the front sides **69'** and **71'** are provided with an outlet pipe **76**.

The valve housing **65** has a pressure inlet port **78**.

The housing is secured by bolts **81** to the outboard motor housing.

The inlet **78** and outlet **76** are provided on the outside with watertight lock nuts **82**. The motor cover is provided with a handhold **83**.

It is obvious that changes may be made in the form, construction and arrangement of the several parts, as shown, within the scope of the appended claim, without departing from the spirit of the invention, and I do not, therefore, wish to limit myself to the exact construction shown and described herein.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

A boat propulsion device comprising a housing, a propeller, a turbine, a valve and bracket means adapted to be attached to a boat; said housing being pivotally mounted on vertical pivots on said bracket, a cover secured to the top of said housing, a guard forming a rudder surface extending rearwardly from the lower end of said housing, a tiller journalled on a horizontal axis in said cover, a fluid pressure turbine having a bucket with interior gear mounted in the lower end of said housing, a propeller shaft journalled in said housing, said propeller attached to said shaft, a pinion keyed to said shaft and meshing with said interior gear, a valve housing having fluid inlets and outlets supported in said housing adjacent the tiller, pressure tubing connected to said valve housing and said turbine, a valve plunger adapted to move up and down in said valve housing

and having bores therethrough positioned for alignment with the inlets and outlets in said valve housing and a linkage connected to said plunger and the said tiller whereby rotation of the tiller on its horizontal axis will move the plunger up and down in the valve housing to direct the fluid to and from the turbine, said tiller when moved in a horizontal plane moving the combined housing, propeller and guard for steering purposes.

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