United States Patent [19]

Bennett

[11] **3,882,815**

[45] **May 13, 1975**

[54] **WATERCRAFT**

[75] Inventor: **David Bennett**, Meipham, England

[73] Assignee: **North Hants Engineering Company Limited**

[22] Filed: **July 18, 1973**

[21] Appl. No.: **380,234**

[30] **Foreign Application Priority Data**

July 26, 1972 United Kingdom 34890/72
Oct. 11, 1972 United Kingdom 46942/72

[52] **U.S. Cl.** ..... **115/70**; 137/43; 244/135 R; 280/5 R

[51] **Int. Cl.** **B63b 35/00**

[58] **Field of Search** ..... 115/70; 244/135 R; 137/255, 43; 280/5 R; 123/136; 222/376, 377

[56] **References Cited**

UNITED STATES PATENTS

2,245,198	6/1941	Hunter et al.	244/135 R
3,165,087	1/1965	Stevens et al.	115/70
3,270,707	9/1966	Rozanski	115/70
3,608,512	9/1971	Thompson	115/70
3,623,447	11/1971	Jacobson	115/70

FOREIGN PATENTS OR APPLICATIONS

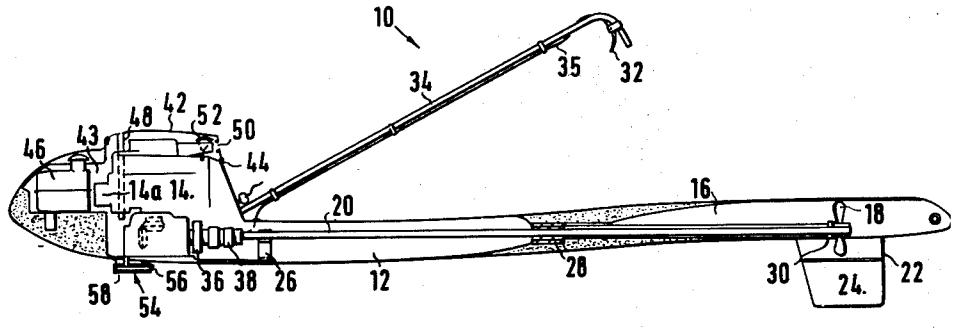
573,288	11/1945	United Kingdom	244/135 R

Primary Examiner—Albert J. Makay
Assistant Examiner—Donald W. Underwood
Attorney, Agent, or Firm—Larson, Taylor and Hinds

[57] **ABSTRACT**

A watercraft of the "surf-board" type including an engine driving a propellor, a handle connected to the hull of the craft by elongate tension means to enable the craft user to grasp the handle whilst standing on the hull and means enabling the engine to run for at least a limited period of time following inversion of the craft.

1 Claim, 2 Drawing Figures



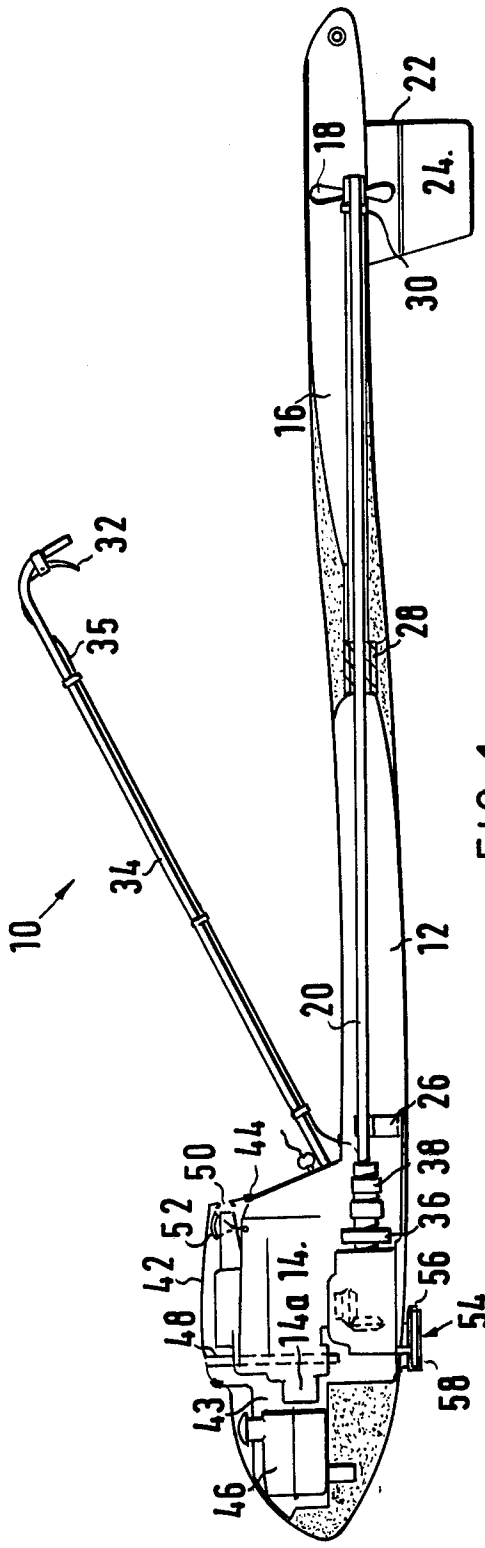

10
12
14
14a
16
18
20
22
24
26
28
30
32
34
35
36
38
40
42
43
44
46
48
50
52
54
56
58

FIG. 1

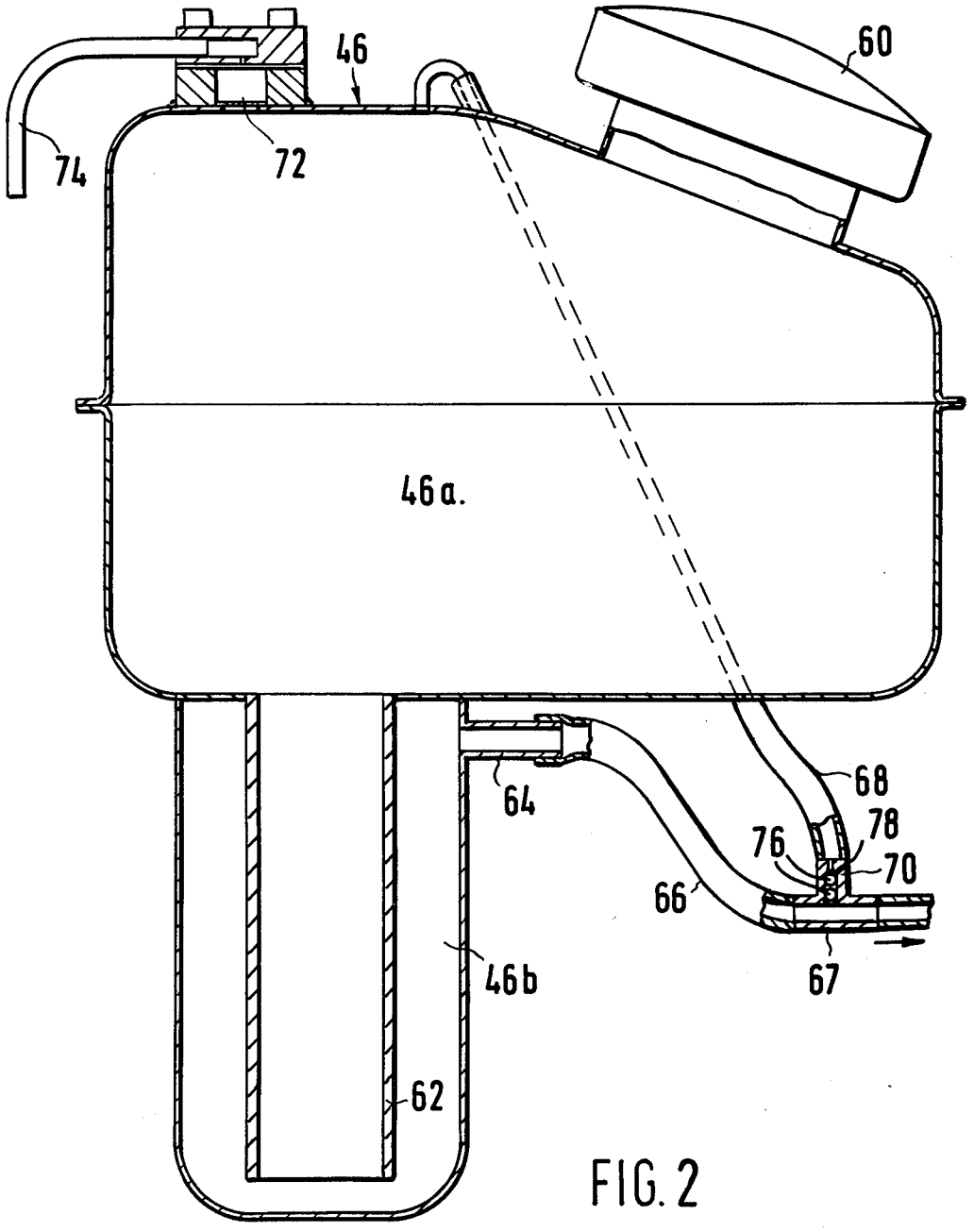


FIG. 2

WATERCRAFT

This invention relates to a craft which enables the user to experience what is generally known as "surf-riding" in the absence of those sweeping waves known as "surf".

According to the invention, there is provided a watercraft comprising an elongate hull, an engine mounted on the hull, the cross-section of the hull rearwardly of the engine having a width substantially greater than its depth to provide a craft user with an appreciable upper surface area on which to lay, sit or stand, a propellor shaft extending rearwardly of the engine and located in a housing provided by the hull, a propeller fixedly connected to the rear end of the propellor shaft, handle means connected to the hull by elongate tension means to enable the craft user to grasp the handle means whilst standing on said upper surface area, and means enabling the engine to remain running for at least a limited period of time following inversion of the attitude of the craft.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings, in which:

FIG. 1 is a longitudinal section through a craft according to the invention, and

FIG. 2 is a section through the fuel tank of the craft and showing diagrammatically the fuel supply and vent ducting.

Referring to the drawings, the craft **10** consists of a hull **12** at the front of which is mounted an aircooled engine **14** disposed so that when counterbalanced by the weight of the human rider, the composite is heavily weighted at the rear such that the "board" assumes a "nose up" attitude. The cross-section of the hull rearwardly of the engine has a width substantially greater than its depth (in the manner of a surf board) to provide the rider with an appreciable upper surface area on which to lay, sit or stand. Along the centre line of the hull, and extending towards the rear, a tunnel **16** is formed in the hull which provides a housing for a propeller **18** driven via prop shaft **20** from the front mounted engine. In the region of the propeller a shaped fairing **22** is fitted so that it forms an enveloping tubular shroud in conjunction with an adjacent portion of the tunnel to fully protect and shroud the propeller. Extending outwards and downwards from the fairing **22** on either side of the centre line of the hull are two fins **24** which give lateral stability to the craft; the fins may be omitted if desired.

The prop shaft is rotatably supported in front, centre and rear bearings **26, 28** and **30** respectively.

Control of the engine power is effected by means of a hand-operated throttle including a lever **32** which is associated with a shaped handle to be grasped by the rider's hand. This handle is attached to the hull by a rigid tension member **34** capable of being moved in a vertical plane; alternatively, member **34** may be replaced by a tension wire attached to the deck immediately behind of the engine. Control of the throttle is provided by a flexible linear transmission member such as a Bowden or similar control cable **35** connected to lever **32.** A centrifugal clutch **36** is fitted between the output of the engine and a flexible coupling **38** connecting the clutch to the prop shaft **20** so that power cannot be transmitted to the prop shaft unless the engine speed is increased to a predetermined value by depressing lever **32.** The craft is of such dimension that an average adult may ride upon it in the sitting or standing position, and provided that enough weight is placed upon the rear end of the hull, also in a prone section.

Directional control for the craft is achieved by movement of the rider's body weight such as to cause an excessive dipping of one rear corner into the water, so providing sufficient additional drag on the appropriate side as to cause a deviation from the previous heading.

The hull is made from plastics moulding filled with foamed polyurethane and has sufficient buoyancy to be able to remain afloat even though all unfilled spaces in the hull and engine compartment should become flooded.

The engine **14** is housed in a compartment **43** having a detachable cover **42** sealed at **44** to the remainder of the hull and is preferably a single or multi-cylinder engine operating on a two stroke cycle. Fuel may be petroleum or petroil mixture, or liquid petroleum gas stored in a vented tank **46.**

Air for cooling and carburettion purposes enters the engine compartment through an elongate downwardly extending duct **48** forming part of cover **42**; the length of the duct is chosen so that if the craft has inadvertently capsized and is floating upside-down, water can enter part-way up the duct without actually entering the compartment. Cooling air is drawn by engine fan **14***a* over the engine and is directed to an outlet **50** in the rear of cover **42.** Associated with outlet **50** is a gravity operated counterweighted valve **52** which normally is positioned away from outlet **50** to permit exhaust cooling air to pass therethrough to atmosphere but which when the craft is floating upside down is biased to a position in which it closes outlet **50** to seal the compartment and prevent water from entering therein. Tests have shown that with the compartment sealed and the engine in its "idling" state, the air trapped in the sealed engine compartment will permit the engine to run for some eight minutes which should be sufficient to enable the craft user to bring the craft to its correct attitude from an upside down position.

Engine exhaust gases are led downwardly to a silencer **54** spaced from the bottom surface of the hull so as to be water cooled in use and having a rearwardly directed outlet **56**; the silencer is composed of two facing rectangular plates, the lower one of which is provided with small holes **58** at its forward edge to permit water to drain therefrom when the craft is taken from the water.

The petrol tank **46** includes a main reservoir **46***a* having a non-vented filler cap **60,** and an auxiliary reservoir **46***b* disposed below the main reservoir and in communication therewith via a tube **62** depending downwardly therefrom. Reservoir **46***b* has an outlet **64** connected by fuel feed tubing **66** to the engine carburettor to supply fuel thereto under gravity. Located in the tubing is a three-way connector **67** enabling the fuel feed tubing **66** to communicate with the main reservoir above the fuel level via bleed tubing **68** and a one-way gravity operated valve **70.**

The top of the fuel tank also incorporates a diaphragm operated bleed valve **72** to enable vent air to enter the top of the tank via U-tube **74** in communication with the inlet of the valve **72.**

With the craft in its correct attitude and the engine running, fuel will be fed under gravity through tubing **66** to the carburettor and vent air will be drawn into the

top of the tank through valve **72**; valve **70** will be open allowing fuel to rise in tubing **68** up to the level in the main reservoir.

With the craft upside down and the engine running, fuel will still be fed under gravity through tubing **66** to the carburettor since fuel is retained by tube **62** in the auxiliary tank which is now located above the level of the carburettor; vent air can still be drawn through valve **72** and valve **70** will be closed. When the craft is returned to its correct attitude any air that might find its way from the auxiliary reservoir to tubing **66** will be bled via tubing **68** to the top of the main reservoir and therefore will be prevented from reaching the carburettor where it might stall the engine. The function of the U-tube **74** is to catch any fuel which may pass through valve **72** and thereby prevent it from spilling into the engine compartment. Valve **70** employs two balls **76** one only engaging valve seat **78**, the other ball being operable to damp out any pressure surges in the petrol.

In an alternative arrangement (not shown), duct **48** and outlet **50** are dispensed with and are replaced by two gravity operated valves in the upper surface of the engine compartment and two gravity operated valves in the lower surface of the engine compartment. When the craft is correctly afloat, the lower valves will be closed to prevent water entering the engine compartment and the upper valves will be open, one acting as an inlet and the other as an exhaust for cooling and carburettion air. When the craft is floating upside down, the so-called "upper" valves are closed and the so-called "lower" valves are open to enable the engine to run continuously in its inverted attitude. Since in the inverted attitude of the craft the engine need only be in its slow-running or "idling" state the cross-sectional area of the inlet valve in the lower lower surface of the engine compartment can advantageously be smaller than that of the upper inlet valve whereby the engine speed can be prevented from being inadvertently increased by the throttle lever **32** whilst the craft is inverted thereby preventing the propeller from being driven in that attitude.

In a further embodiment (not shown), the above mentioned inlet and outlet valves are omitted and replaced by air inlet and exhaust rectangular section ducts respectively located forwardly and rearwardly of the engine compartment, each duct admitting to both the upper and lower surfaces of the craft and being in communication with the engine compartment via a respective one of two pipes located partway along the length of the ducts. In the correct attitude of the craft, water can enter the lower end of each duct but does not reach the level of the pipes, and air can enter and leave the engine compartment through the upper portions of the ducts and the pipes. Should the craft be inverted, water again enters the lower ends of the slot but does not reach the level of the pipes. For the reasons mentioned above, the cross-sectional area of the lower end of the inlet duct is made smaller than the area of its upper end.

I claim:

1. A watercraft comprising an elongate hull, an engine mounted in the forward part of the hull, the cross-section of the hull rearwardly of the engine having a width substantially greater than its depth to provide a craft user with an appreciable upper surface area on which to lay, sit or stand, a propeller shaft extending rearwardly of the engine and located in a housing provided by the hull, a propellor fixedly connected to the rear end of the propellor shaft, handle means connected to the hull by elongate tension means to enable the craft user to grasp the handle means while standing on said upper surface area, means enabling the engine to remain running for at least a limited period of time following inversion of the attitude of the craft, a fuel supply means having a main reservoir for supplying fuel under gravity to the engine carburettor when the hull is correctly afloat, and an auxiliary reservoir disposed below the main reservoir and in communication therewith via a tube depending downwardly therefrom, the tube being operable to retain fuel in the auxiliary tank when the hull is upside down to enable fuel to be fed under gravity from the auxiliary fuel tank to the carburettor, the main reservoir having a fuel filling opening, a non-vented cap for closing said opening, a bleed valve for venting the main reservoir, and wherein a bleed tube connects the top of the main reservoir with a fuel feed tubing connecting the carburettor to the auxiliary reservoir, and wherein a one-way valve is incorporated into the bleed tube to permit air to bleed from the feed tubing to the main reservoir when the attitude of the craft is corrected from an inverted position.

* * * * *