

United States Patent [19]

[11] **3,800,734**

Whang

[45] **Apr. 2, 1974**

[54] **WATER PROPULSION DEVICE**
 [76] Inventor: **Lee Yun Whang**, Executive Hotel
 237 Madison Ave., New York, N.Y.
 10016
 [22] Filed: **June 20, 1972**
 [21] Appl. No.: **264,487**

2,751,876 6/1956 Ogilvie..... 115/22
 3,027,576 4/1962 Fines..... 9/310 D

FOREIGN PATENTS OR APPLICATIONS

860,054 1/1971 Canada..... 115/31
 819,382 9/1959 Great Britain..... 115/31
 348,678 5/1937 Italy..... 9/310 D

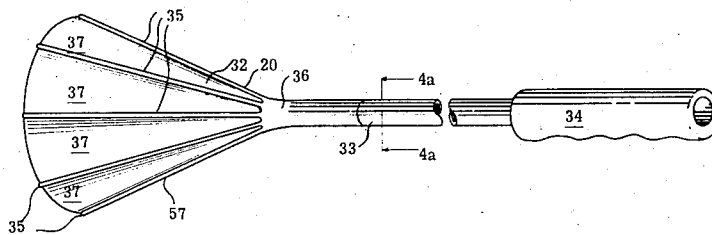
[52] U.S. Cl..... **115/31, 9/310 D**
 [51] Int. Cl..... **B63h 16/04**
 [58] Field of Search..... 115/31, 28 R, 22 R, 21,
 115/22.1-26.3, 32, 22; 9/310 R, 310 D

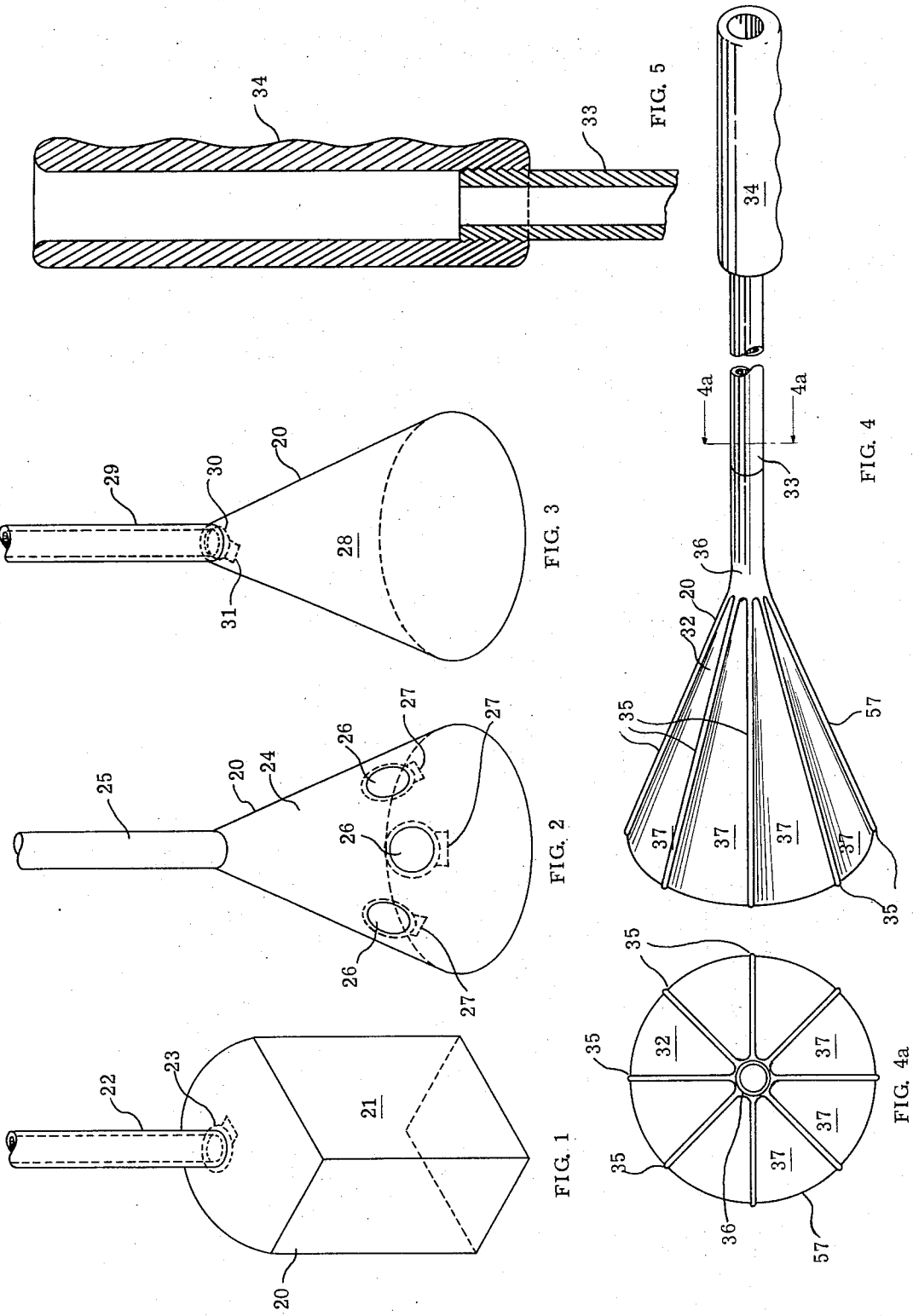
Primary Examiner—Milton Buchler
Assistant Examiner—Paul E. Sauberer
Attorney, Agent, or Firm—Auslander & Thomas

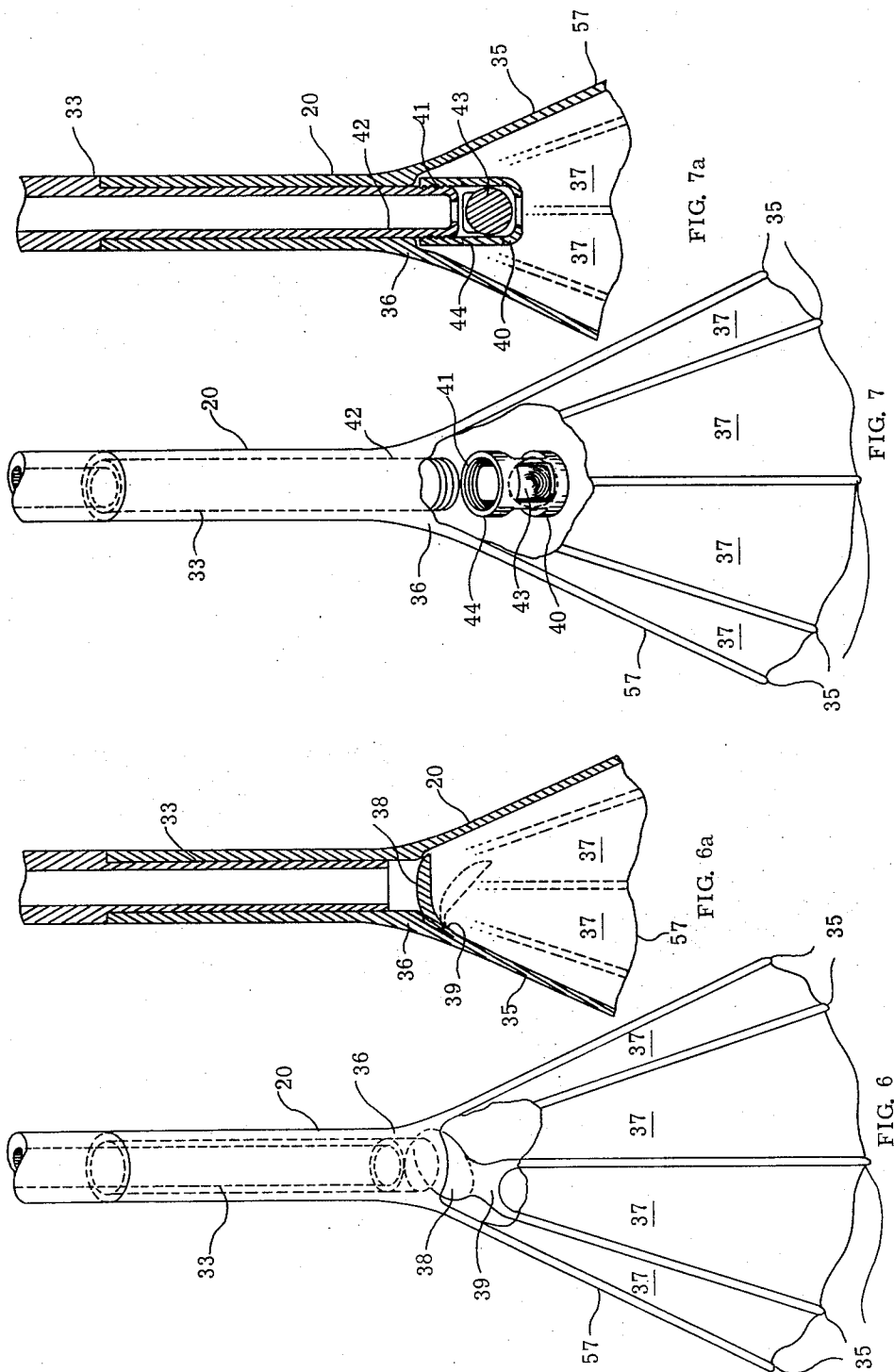
[56] **References Cited**
UNITED STATES PATENTS
 85,789 1/1869 Carpenter..... 115/31

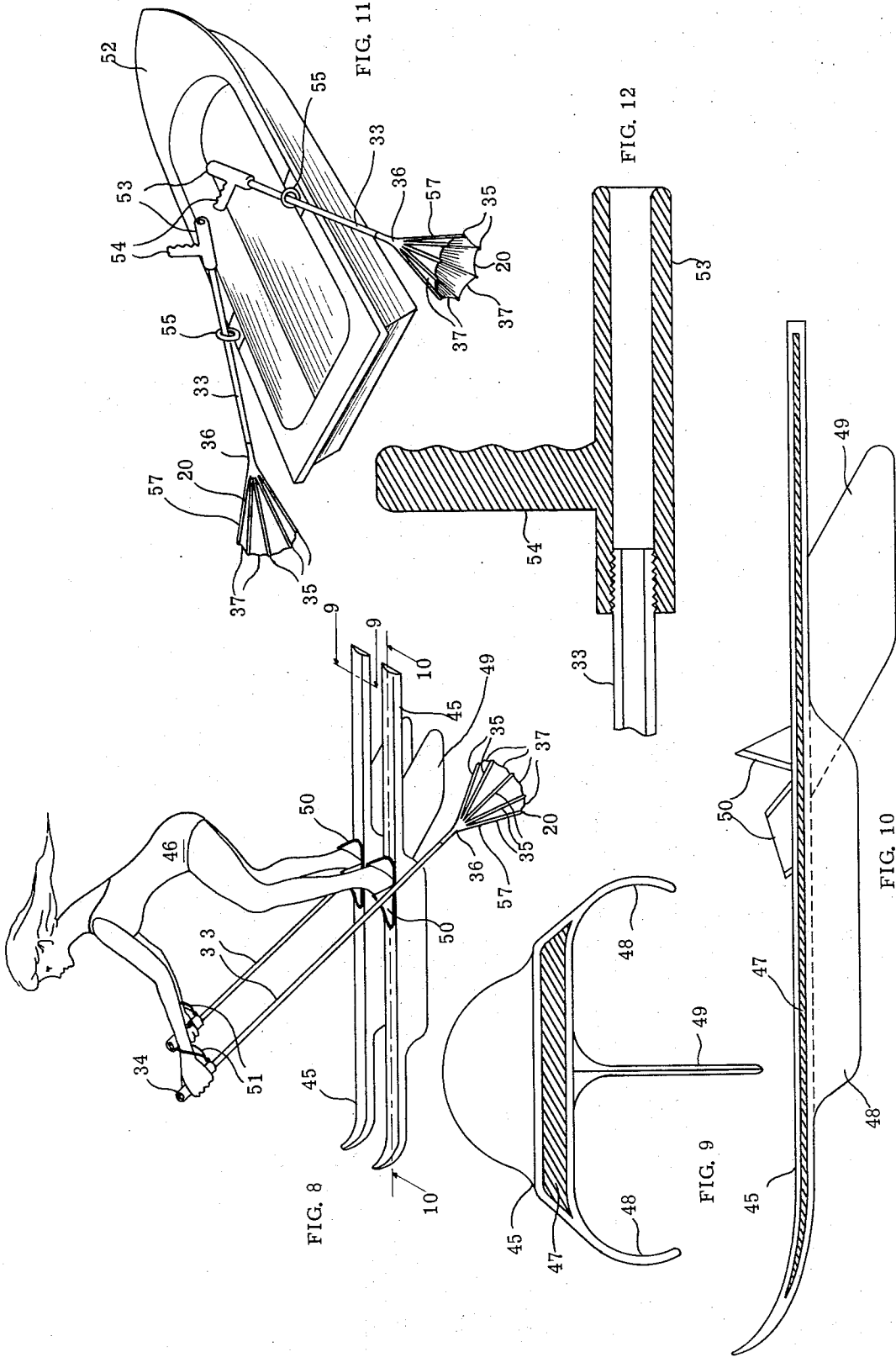
[57] **ABSTRACT**
 A compression head with an inner valve is adapted for improved water propulsion.

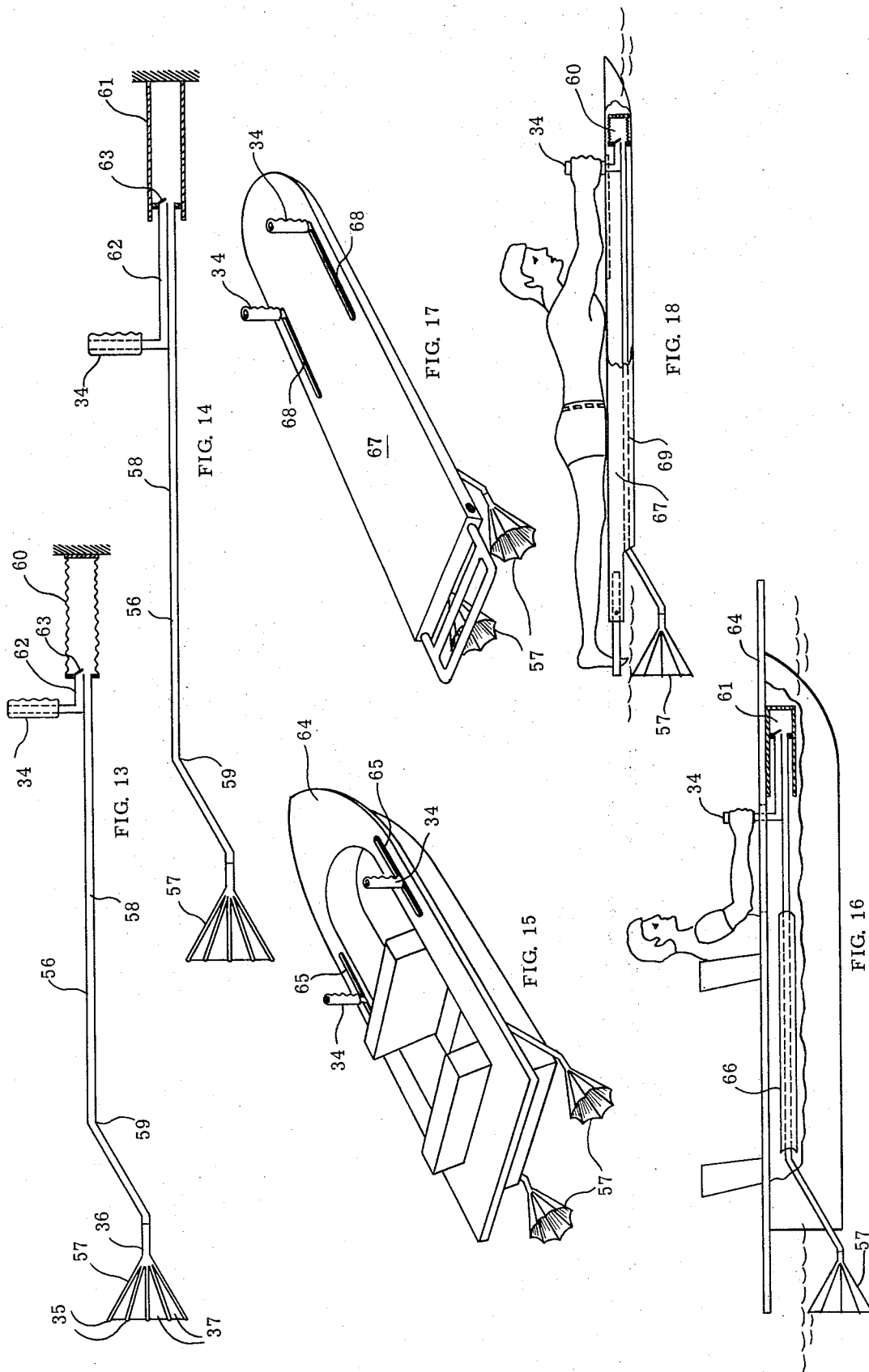
4 Claims, 29 Drawing Figures

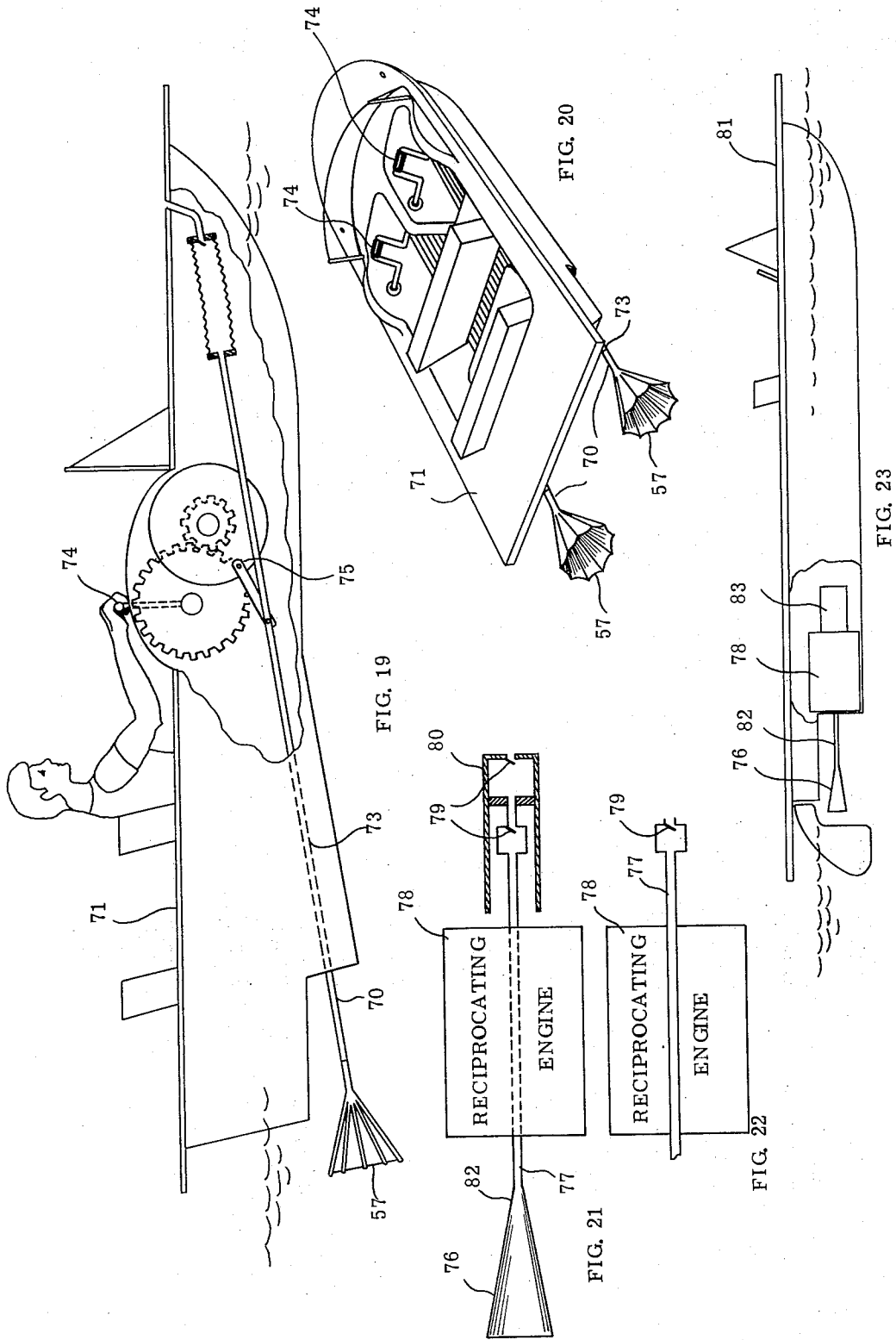












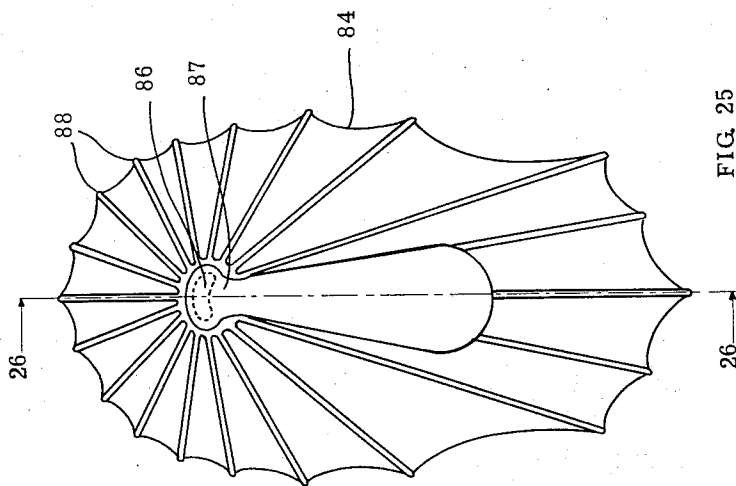


FIG. 25

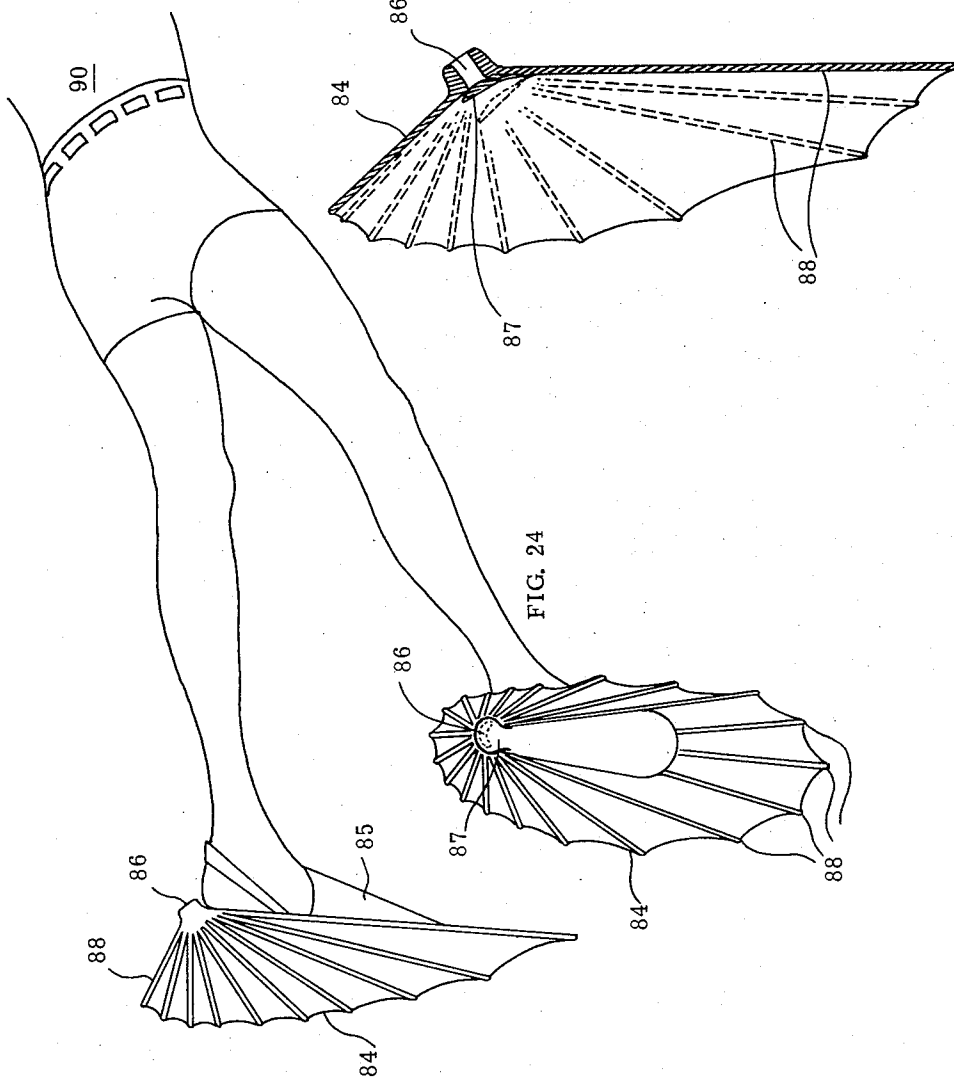


FIG. 24

FIG. 26

WATER PROPULSION DEVICE

The present invention relates to a new water propulsion device.

In the past, oars, screws and jets have, among other things, served to propel people and vehicles through the water. While many of the propulsion means of the past still have utility, the propulsion device of the present invention has flexibility of application, effectiveness and efficiency. In some applications, there is an efficiency over present modes of use and in other applications there are new uses not heretofore applied.

The basic principle is that of a plunger which has heretofore been used in applications with water. In U. S. Pat. No. 3,313,265, the plunger of FIG. 12 is purely a plunger and used as a steadying device.

In expanded use of the water propulsion device of the present invention, it may be used as a propulsion means in a boat. U. S. Pat. No. 1,028,093 suggests a supported umbrella type propulsion device not having the ease of movement of the water propulsion device of the present invention.

Even U. S. Pat. No. 817,810 for a forward facing rowing oar for a row boat does not suggest the practical advantages of the water propulsion device of the present invention, even though it can substantially achieve the same end result.

According to the present invention, a cuplike device is provided on a support with means to engage a fluid or fluids in reciprocal motion, maximizing compression and minimizing friction, drag or suction in its reciprocation.

Although such novel feature or features believed to be characteristic of the invention are pointed out in the claims, the invention and the manner in which it may be carried out may be further understood by reference to the description following and the accompanying drawings.

FIG. 1 is a partial view of a substantially square version of the compression head and shaft of the water propulsion device of the present invention.

FIG. 2 is a partial view of a conical compression head and shaft of the water propulsion device of the present invention with valves on the head.

FIG. 3 is a partial view of a conical compression head and shaft with a valve in the hollow shaft of the water propulsion device of the present invention.

FIG. 4 is a broken away view of a reinforced head, shaft and handle of the water propulsion device of the present invention.

FIG. 4a is a view of FIG. 4 at lines 4a — 4a of FIG. 4.

FIG. 5 is a vertical section of the handle of FIG. 4.

FIG. 6 is a view of the head of FIG. 4 showing the shaft and valve.

FIG. 6a is a section of the head of FIG. 6 showing the valve closed.

FIG. 7 is a broken away head of FIG. 6 with an alternate valve exploded away.

FIG. 7a is a section of the head of FIG. 7 showing the valve in position.

FIG. 8 is a view of a pair of water propulsion devices of the present invention being used for propulsion on a pair of buoyant water skis.

FIG. 9 is a section of a water ski of FIG. 8 at lines 9 — 9.

FIG. 10 is a section of a water ski of FIG. 8 at lines 10 — 10.

FIG. 11 is a view of a pair of water propulsion devices of the present invention with a variant handle used for face forward propulsion of a row boat.

FIG. 12 is a partial section of the shaft and handle of the water propulsion devices of the present invention of FIG. 11.

FIG. 13 is a variant water propulsion device of the present invention operable with a bellows pump.

FIG. 14 is a variant water propulsion device of the present invention operable with a fixed pump.

FIG. 15 is a boat including a pump species of the water propulsion device of the present invention.

FIG. 16 is a section of FIG. 15 showing the water propulsion device of FIG. 14.

FIG. 17 is a surf board including a pump species of the water propulsion device of the present invention.

FIG. 18 is a side elevation cut away showing the water propulsion device of the present invention of FIG. 13.

FIG. 19 is a cut away boat using a water propulsion device with a bellows pump and crank reciprocating mechanism.

FIG. 20 is an isometric view of FIG. 19.

FIG. 21 is a water propulsion device of the present invention engaged with a reciprocating engine and having a pump.

FIG. 22 is a section of FIG. 21 operable with a valve only.

FIG. 23 is a partially cut away view of a boat with a water propulsion device of the present invention and reciprocity engine.

FIG. 24 is a view of the water propulsion device adapted for swimming fins.

FIG. 25 is a bottom view of one of the swimming fins of the water propulsion device of the present invention.

FIG. 26 is a section of FIG. 25 at lines 26 — 26.

Referring now to the figures in greater detail, where like reference numbers denote like parts in the various figures.

The water propulsion device 20, as shown in FIG. 1 has a compression head 21 mounted on a hollow shaft 22 with an inner valve 23 that closes under compression coming through the head 21 and may open when pressure passes through the shaft 22. As will hereinafter be set forth, the functioning of the parts shall be described in relation to their operations.

In FIG. 2 the compression head 24 is conical and mounted on a solid shaft 25. Inward of the compression head 24 are a series of flap valves 26 with hinges 27, permitting the valves 26 to open inward.

In FIG. 3, a simple conical compression head 28 is mounted on a hollow shaft 29. A valve 30 includes a hinge 31 which allows the valve 30 to open inward of the compression head 28.

Depending on the application of the water propulsion device 20, the compression heads 21, 24, 28 may be made flexible, pliable or rigid.

In FIGS. 4 — 7, the basic preferred embodiment is shown with a flexible compression head 32 mounted on a hollow shaft 33 with a hollow handle 34 at the end of the shaft 33.

The compression head 32 is provided with a plurality of radiating ribs 35, substantially radiating from the apex 36 of the compression head 32. Between the ribs

35 the gores 37 are flexible so that they may collapse on an upstroke.

The handle 34 is hollow so that there is no obstruction between the handle 34 and the shaft 33 other than a valve.

In FIGS. 6 and 6a the flap valve 38 is shown with a hinge 39 hinged to close over the hollow shaft 33.

In FIGS. 7 and 7a a ball valve 40 has threads 41 which mates with threads 42 on the end of the shaft 33 to hold the ball 43 in the cage 44 for opening and closing the shaft 33.

In FIGS. 8 - 10, the water propulsion device 20 of the present invention is shown used with self-sustaining buoyant water skis. The skis 45 are preferably buoyant enough to sustain the skier 46.

As can be seen, the skis 45 are laminated with a layer 47 of plastic foam to give buoyancy and lightness. The skis also have downwardly depending arms 48 to catch air for buoyancy and guide the skis 45 through the water and a keel 49 for stability. The skier's 46 feet are held in foot grip 50. It may be convenient to have wrist straps 51, preferably coming off the handle 34 of the water propulsion device 20.

The water propulsion device 20, when used with the row boat 52, preferably has its handle 53 modified to have a hand grip 54. The water propulsion device 20 is preferably held in pivotable rings 55.

Rowing then can be performed in a forward facing position, the water propulsion device 20 being gripped and moved backwards at the hand grips 54. In FIG. 12 the section of the handle 53 shows the clear opening between the shaft 33 and the handle 53.

The water propulsion device 56, as shown in FIGS. 13 and 14 uses a compression head 57 such as shown in FIGS. 4 - 11 with a hollow bent shaft 58. The bend 59 is designed to keep the compression head 57 under water at all times and free from the vehicle upon which it is being used.

In both FIGS. 13 and 14 the hollow shaft 58 is connected with a pump. In FIG. 13, the pump is a bellows pump 60. In FIG. 14 the pump is a fixed pump 61. In both instances, the handles 34 are mounted on a hollow shaft 62 in preferably welded or integrally attached to the outer portion of the hollow shaft 58. A flap valve 63 is adapted to close the shaft 62 under the pressure of forward movement. Thus, as can be seen in FIGS. 15 through 18, reciprocation of the compression head 57 will tend to expell air taken in through the handle 34 under pressure through the compression head 57.

In FIGS. 15 and 16 are shown a boat 64 employing a pair of water propulsion devices 56 as illustrated in combination with a fixed pump 61. Reciprocation of the water propulsion device 56 in the slots 65 slideably guided by channels 66 (only one shown) propels the boat forward on the back stroke of the water propulsion device 56 and forward from the expelled air from the pump 61 on the forward stroke. The bend 59 keeps the water propulsion device 56 normally beneath the surface of the water. Steering may be affected by selecting the movement of one or another of the water propulsion devices 56.

In FIGS. 17 and 18 the water propulsion device 56 of FIG. 13 is employed in conjunction with surfboard 67. The water propulsion devices 56 ride in slots 68 and are held in channels 69 (only one indicated). For the purpose of illustration, a pump 60 is employed to provide the extra propulsive force.

The water propulsion device 70 is on a boat 71 which includes a pump, in this case a bellows pump 72 in series with the shaft 73 and compression head 57. The shaft 73 is reciprocated by a crank 74 and a gear train 75.

In FIGS. 21 - 23 a rigid compression head 76, quite similar to the compression head 28 is mounted on a hollow shaft 77 and engaged in a reciprocating engine 78. The compression head 76's valve 79 is located at the end of the shaft 77 as a matter of convenience. The compression head 76 is operable with a pump 80 as illustrated in FIG. 21 as a fixed or rigid pump or operable without a pump as shown in FIG. 22.

In FIG. 23 a boat 81 with the compression head 76 and water propulsion device construction 82 with a reciprocating engine 78 and pump housing 83 is shown. The pump 80 and/or the valve 79 work as in the other embodiments of the present invention. It is preferable, though, for proper propulsion, that the compression head 76 be rigid.

In FIGS. 24 - 26 a compression head 84, substantially a compression head 57 truncated at an angle, is combined with foot grips 85 and opening 86 covered by a flap valve 87. Surrounding the foot grips 85 are ribs 88 joined to flexible gores 89.

As shown in FIGS. 24 and 26, a down kick by a swimmer 90 closes the valve 87 and an upward movement of the leg tends to open the valve 87.

In operation, various forms of propulsion through water by use of the compression heads as shown and described, is effected by the combination of the compression heads and the valves as shown and described.

The conventional plunger having a hollow head at the end of a pole as shown in FIG. 12 of U. S. Pat. No. 3,313,265 may provide a form of stability and balance in water propulsion but the withdrawal of such device is met with suction which may either prevent withdrawal or create drag. The umbrellalike propeller shown in FIG. 2 of U. S. Pat. No. 1,028,093 has an equivalent difficulty. Upon closing and withdrawing, it has full water drag.

In the present invention, the embodiments of the compression heads 21, 24, 28 have bodies capable of entrapping air and water, or water alone. In a down thrust with air and water entrapped, the air compresses somewhat as a spring and at the same time closes the respective valves 23, 26, 30 on the withdrawal of the thrust air and/or water, opening the valves 23, 26, 30, reducing the drag and easing movement.

The preferred embodiment is the compression head 57, which may be seen in FIGS. 8, 11, 13, 20, having ribs 35 between gores 37. Thus a thrust expands the compression head 57 and closes its valve 38. Thus, compression is obtained against water or water and air. Upon withdrawal, the compression head 57 collapses to reduce drag and water and/or air move freely through the shaft, facilitating movement.

In FIG. 8, the buoyant water skis are quickly propellable with the compression head 57, shaft 33 and handle 34 controlled by the valve 38.

In FIG. 11, the hand grip 54 of the boat 52 allows a strong grip for forward facing propulsion of the boat 52, maintaining all the advantages of compression and lack of drag.

Optionally, as shown in FIGS. 13 - 18, the shaft 58 may be bent to maintain the compression head 57

5

under water at all times. A further option in the implementation of propulsion is the addition of air via the pumps 60, 61, the air being pumped without the withdrawal of the compression head 57 out of the water.

In FIG. 19, a variant of the present invention is shown using a crank 74 and gear train 75 with an optional pump. The invention of FIG. 19 could optionally be pedaled.

The water propulsion device 82 as shown in FIGS. 21 - 23 is driven by a reciprocating engine 78. The compression head 76 is preferably rigid to withstand the speed and power of the engine 78. The valve 79 in this instance is at the end of the shaft 77. The pump 80 may optionally implement propulsion by feeding air to be compressed in the compression head 76 on the withdrawal strokes.

In FIGS. 24 - 26 the ribs 88 and gores 89 are formed to the shape of a compression head 84 which captures air and water as the swimmer 90 swims. The outer shape of the compression head 84 aids swimming, the compression of the air with its concomittant closure of the valve 87 provides spring and buoyancy to the kick. The upstroke of the kick is unimpeded by water or air since the flap valve 87 allows water and/or air to pass freely into the compression head 84.

The terms and expressions which are employed are

6

used as terms of description; it is recognized though that various modifications are possible.

Having thus described certain forms of the invention in some detail, what is claimed is:

1. A water propulsion device comprising a hollow open shaft, said shaft having a hollow collapsible compression head portion attached to one end of said shaft, at least one opening in said hollow compression head portion, said hollow head portion comprising flexible gores between stiff ribs, valve means, said valve means disposed between said hollow compression head portion and said hollow shaft to close said opening under pressure into said hollow compression head portion and at least one opening outward of said hollow compression head portion to said valve means to open said valve means into said hollow compression head portion under pressure from outside said hollow compression head portion.

2. The invention of claim 1 wherein said shaft includes a hand grip.

3. The invention of claim 1 wherein said valve means are flap valve means.

4. The invention of claim 1 wherein said valve means are ball and cage means.

* * * * *

30
35
40
45
50
55
60
65