United States Patent

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[54] **SELF-PROPELLED SURFBOARD**
20 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **115/70**
[51] **Int. Cl.** **B63b 35/72;**
B63h 15/00
[50] **Field of Search** 115/6.1, 70

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ABSTRACT: This invention relates to a self-propelled surfboard which includes a hollow cavity within which is located a power generating source and which includes further drive means in the form of a single propeller connected to the power source by means of a drive shaft which passes from within the cavity to a rearward position intermediate the cavity and the rearmost end of the board.

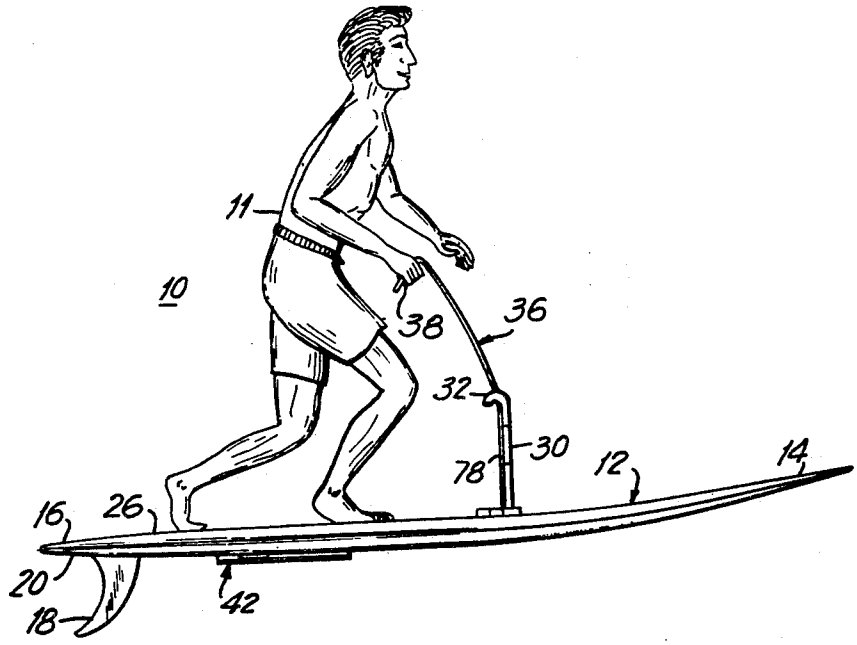
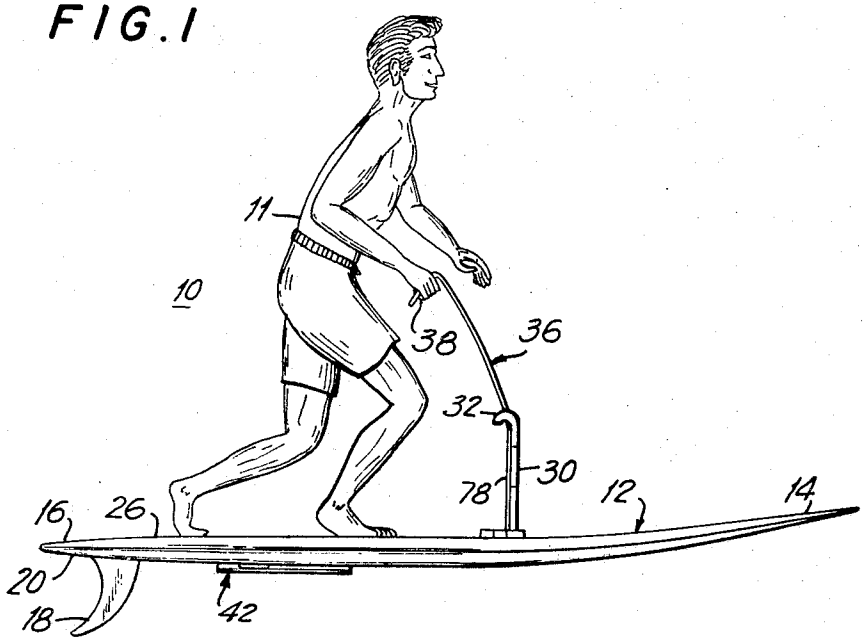


FIG. 1



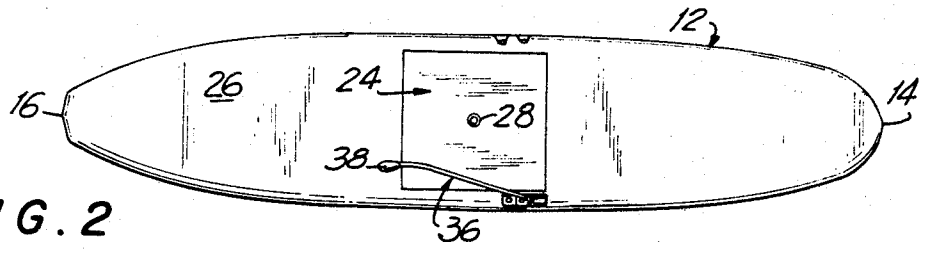


FIG. 2

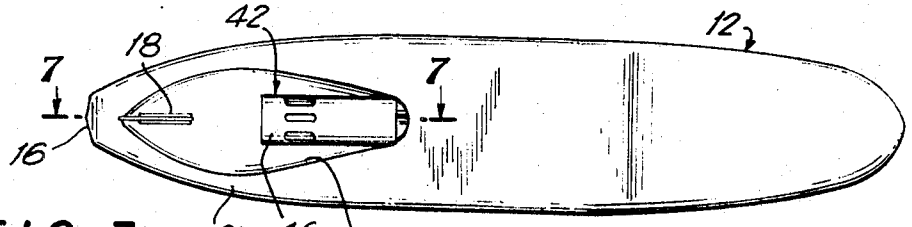


FIG. 3

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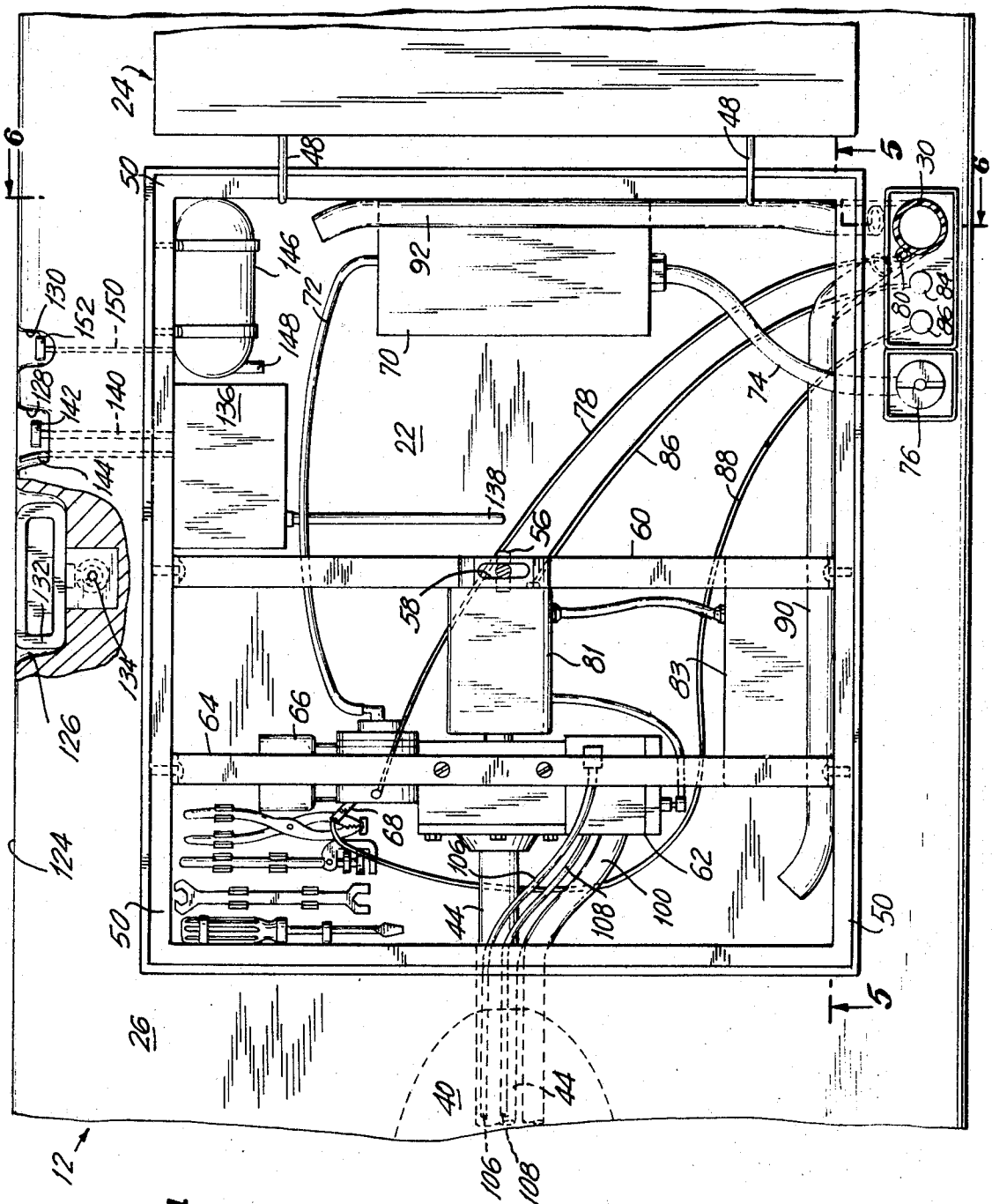

FIG. 4

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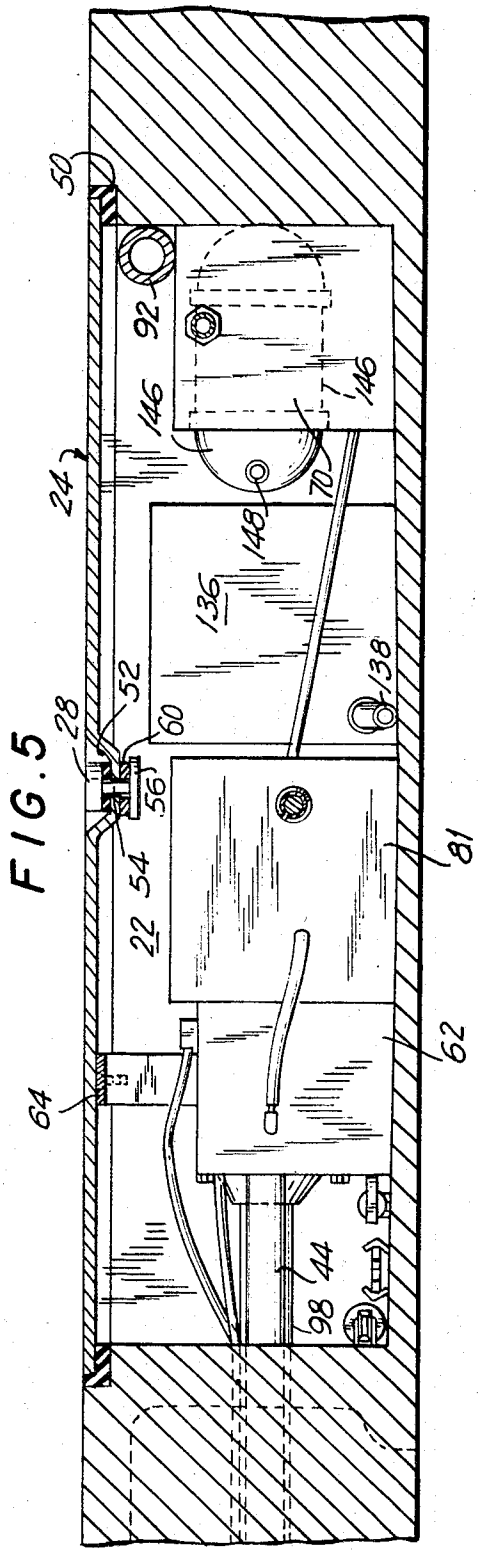

FIG. 5

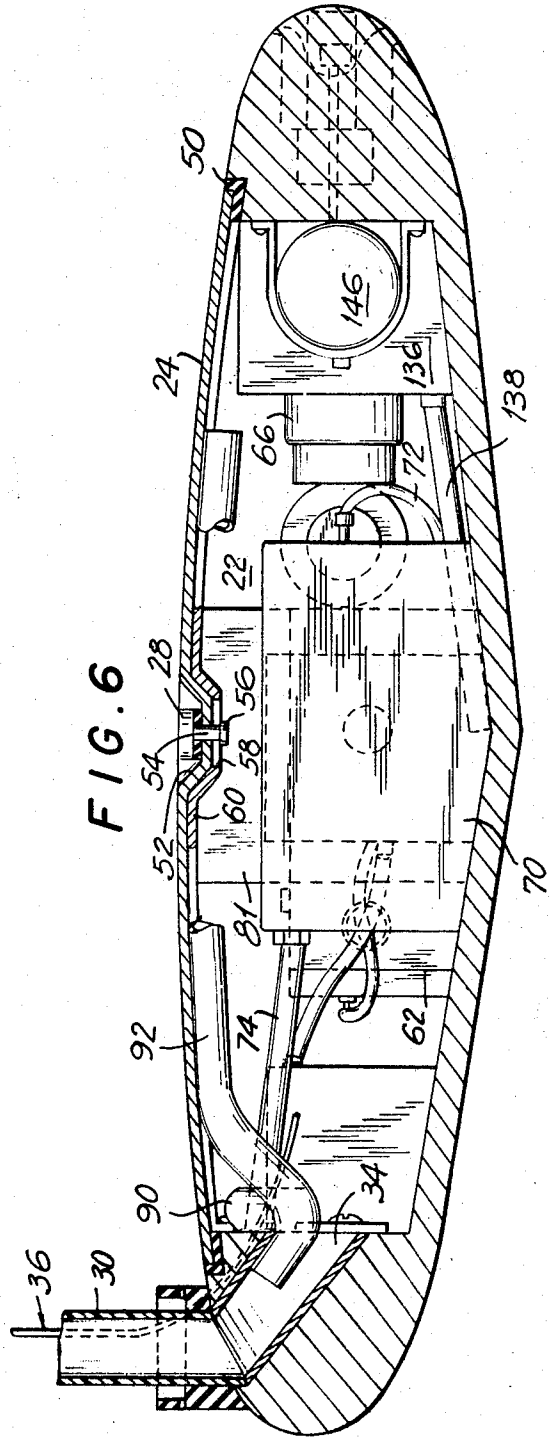

FIG. 6

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FIG. 7

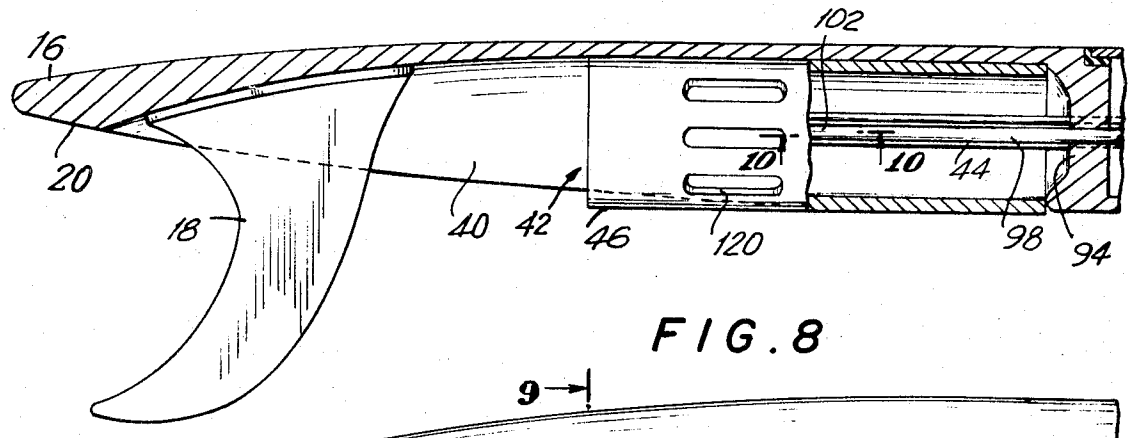
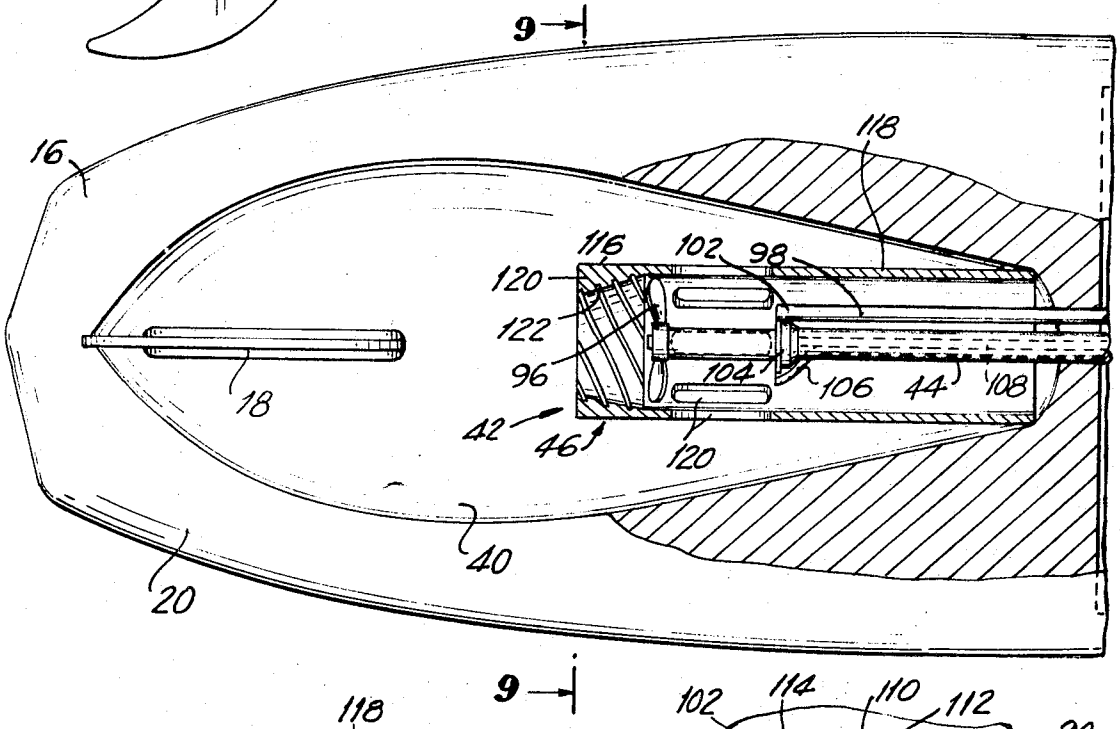


FIG. 8



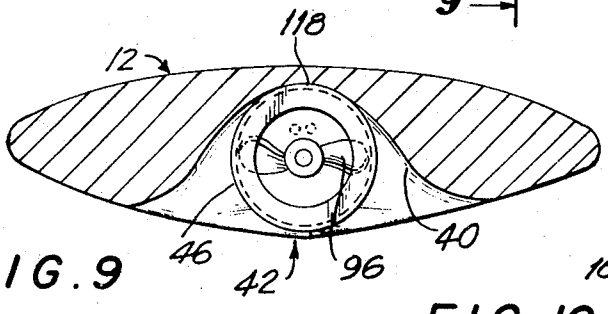


FIG. 9

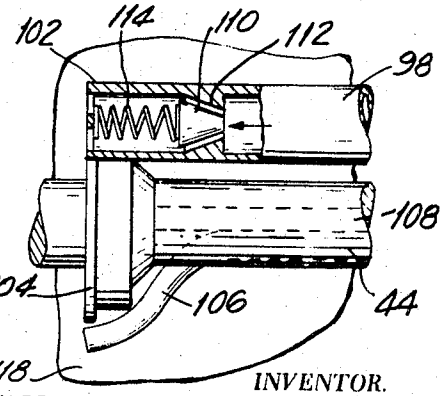


FIG. 10

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SELF-PROPELLED SURFBOARD

BACKGROUND OF THE INVENTION

This invention relates to surfboards and more particularly relates to a self-propelled surfboard.

From the earliest days of surfing, the necessity of hand paddling a surfboard out to where waves are forming, has always prompted the desire for a motorized surfboard. Similarly, in locales which are not favored with breaking waves, the desire for a motorized surfboard has been just as intense. Thus, throughout the years there have been many attempts to construct a self-propelled surfboard.

The earliest attempts at this venture comprised nothing more than attaching a common outboard motor to the rear of the board with the rider being provided with a complex network of pulleys and cables to control the motor's operation and direction of thrust. In addition to the problems associated with weight distribution and bulkiness, a major problem inherent in such early attempts was one of safety. A rider thrown off of such a surfboard would almost certainly come dangerously close to, if not into contact with either the propeller blade or other exposed portions of the engine which even after a short period of time operate at excessively high temperatures.

The next development in this field, was the suggestion that the internal combustion engine, should be housed internally of the surfboard in a hollow compartment located centrally thereof. However, for safety reasons, the propeller blade was still located as far to the rear of the surfboard as possible to prevent the possibility of the rider accidentally being injured by the blade. Although this scheme avoided many of the dangers inherent in the earlier outboard type surfboards, there are still serious drawbacks which prevented the idea of a motorized or self-propelled surfboard from becoming popularly accepted.

Thus, with the engine located centrally of the board (necessary for proper balance) and the propeller blade located as far to the rear as possible, a substantially long drive shaft is necessary to interconnect these two components. Not only are these drive shafts long, but they must be relatively heavy to structurally withstand the torque generated by the engine. Therefore, a substantial portion of the engine output is utilized simply for the purpose of rotating the relatively heavy drive shaft such that substantially less than the total output of the engine is available for driving the propeller blades. The end result of this problem has been either to work with an acceptably small engine but sacrifice the desired speed, or alternatively to work with an unacceptable large motor which is too expensive to be commercially feasible and furthermore enlarges the entire surfboard construction to a point of undesirable size.

SUMMARY:

In contradistinction, the instant invention eliminates all of the above noted problems so as to provide a relatively small, inexpensive and high-powered self-propelled surfboard which despite all of these highly desirable characteristics is yet absolutely safe. These objects have been achieved in the self-propelled surfboard of the instant invention, by housing the power source, preferably an internal combustion engine, within a cavity located centrally of the front and rear ends of the board. Thus, it will be appreciated that those components of the system which operate at elevated temperatures namely the engine block and associated hardware, will be completely isolated from the rider while at the same time quickly and easily accessible as desired, and, the board itself will be properly balanced.

Furthermore to eliminate the relatively long and heavy drive shaft associated with the prior art, the instant invention locates the driving propeller closely behind the internally stored engine at a point intermediate the hollow cavity and the rear of the surfboard. The real relatively short drive shaft permits the major portion of the output power of the engine to become usable energy for the propeller blade with the result being that a smaller less expensive engine can be used to achieve the same operating speed possible in the prior art, or alternatively the same size engine can be used to generate higher speeds.

The paramount problem associated with locating the propeller blade immediately behind the internal combustion engine (as opposed to locating the blade at the rear of the surfboard as has been done in the prior art) is, of course, the problem of safety. Thus it can be appreciated that with the propeller blade located relatively close to the center of the board, swimmers or other surfers who might be hanging on the side of the board could easily be injured. No doubt, it was the safety problem which discouraged designers from ever considering placing the propeller blade anywhere but at the extreme rear of the board. However, the instant invention overcomes this danger by locating the propeller blade in a severely recessed area provided in the undersurface of the body of the surfboard. In this manner, the propeller blade actually resides within the confines of the cross-sectional perimeter of the body of the board such that the likelihood of coming into contact with the propeller blade is substantially reduced. Furthermore, and as an added safety feature, the propeller blade is housed within a shield which virtually eliminates any possibility whatsoever that a swimmer could accidentally come into contact with the propeller.

As a particular advantageous feature of the instant invention, the aforementioned shield, takes the form of an elongated tube, with that portion of the tube located to the rear of the propeller blade being provided with a frustoconically tapered interior surface such that water forced therethrough tunnels into a restricted jet stream which develops added thrust and consequently higher speed.

As a further particularly advantageous feature of the instant invention the same hollow interior cavity which houses the engine of the self-propelled surfboard, also houses various other components which taken together make the instant invention easy to operate and safe over extended periods of use. Thus where an internal combustion engine is being utilized as a power source, and it is desirable to use an electric starter system in conjunction therewith, the internal cavity can also house an electric starter and battery therefor. Similarly, the fuel tank and conduits associated therewith may be safely supported therein. Also, a hand operated pump for draining the cavity in the event water seeps therein and/or a hand operated fire extinguisher may be provided within the housing to quickly disperse foam in the event of fire. As a further feature each of these various components although being safely housed within the aforementioned cavity, may be easily operated from the exterior of the surfboard.

Accordingly it is an object of the instant invention to provide a self-propelled surfboard which includes an elongated body member having an internal cavity within which is safely housed a power source and further including a driving propeller connected to the output of the power source with such propeller being located on the undersurface of the body member intermediate the cavity and the rear of the elongated body.

Another object of the instant invention is to provide such a self-propelled surfboard wherein the body member thereof includes a recessed area on the undersurface thereof within which resides the driving propeller whereby the likelihood of accidental engagement with the propeller is materially reduced.

Still another object of the instant invention is to provide such a self-propelled surfboard wherein the propeller drive thereof is enclosed in a shield to positively prevent accidental contact therewith.

Another object of the instant invention is to provide such a self-propelled surfboard wherein the aforementioned shield is so configured as to establish a restricted jet stream which aids in the development of forward thrust.

Yet another object of the instant invention is to provide such a self-propelled surfboard wherein the aforementioned cavity houses a plurality of components useful in safe, relatively carefree operation over extended periods of use.

Another object of the instant invention is to provide such a self-propelled surfboard the internal cavity of which houses all components associated with the operation of an internal combustion engine including a fuel tank which can be filled from the exterior of the surfboard; a hand pump operable from the exterior of the surfboard for draining the internal cavity thereof; and a fire extinguisher operable from the exterior of the surfboard for quickly dispersing foam in the interior cavity thereof.

Yet another object of the instant invention is to provide a self-propelled surfboard including an air ventilation system for maintaining the interior cavity thereof in communicating relationship with the exterior of the surfboard which ventilation system additionally prevents the entry of water therein.

These and other objects of the instant invention may be had by referring to the following specification and drawings.

DESCRIPTION OF THE DRAWINGS:

FIG. 1 is a side view of the self-propelled surfboard of the instant invention being used by a rider;

FIG. 2 is a plan view of the self-propelled surfboard of FIG. 1;

FIG. 3 is a plan view of the self-propelled surfboard of FIG. 1 viewed from the undersurface thereof;

FIG. 4 is an enlarged plan view of a portion of the self-propelled surfboard of FIG. 1, partly in section, and also revealing the interior of a hollow cavity thereof;

FIG. 5 is a view taken along the lines 5–5 of FIG. 4;

FIG. 6 is a view taken along the lines 6–6 of FIG. 4;

FIG. 7 is an enlarged view of the self-propelled surfboard of the instant invention taken along the lines 7–7 of FIG. 3, partially in elevation;

FIG. 8 is an enlarged view, partly in section, of a portion of FIG. 3;

FIG. 9 is a rear view of the self-propelled surfboard of the instant invention taken along the lines 9–9 of FIG. 8; and

FIG. 10 is a detailed view, partly in section, taken along the lines 10–10 of FIG. 7.

Turning to FIGS. 1—3, there is shown the self-propelled surfboard 10 of the instant invention being ridden by a surfer 11. The surfboard 10 includes an elongated generally planer body member 12 the forward end or bow 14 of which is slightly inclined to facilitate its passage through water. The rear end or stern 16 includes a rudder or fin 18 depending from its undersurface 20 thereof which as well known in the art, aids in stabilizing the surfboard 10. Although the fin 18 is illustrated as being rigidly secured to the body member 12, it is to be understood that if desired, the fin may be rotatably secured on the undersurface 20 and appropriate cables, controlled by the rider 11, may be used to make the board 10 steerable by the rudder.

As noted previously, the surfboard 10 of the instant invention is self-propelled and to that end includes a power source, preferably an internal combustion engine, housed within an internal cavity 22 (see FIG. 4) located centrally of the body member 12. A cover 24 provided on the upper surface 26 of the body member 12, sealingly closes the cavity 22 but is easily removable therefrom by turning a knob 28, to be described in greater detail. An air ventilation system is provided for the internal cavity 22 by means of rigid upstanding hollow tube 30 one end of which 32 is inverted back toward the upper surface 26 of the body 10 to prevent the excess of water therein while the opposite end 34 passes through the upper surface 26 and into the cavity 22 (see FIG. 6).

To control the internal combustion engine located within the cavity 22 there is provided manually operable control means 36, one end 38 of which preferably includes a squeezable type of accelerator knob while the opposite end passes into the cavity to vary the amount of fuel supplied to the engine, in a manner to be further described.

Intermediate the cavity 22 and the rear end 16, the under surface 20 of the body member 12 is provided with a deeply scalloped recessed area 40 within which is located the drive means 42 for propelling the surfboard 10. Although not shown in FIG. 3, the drive means preferably includes at least one propeller which is connected by a drive shaft 44 to the output of the engine secured within the cavity 22. As best seen in FIG. 9, by providing the deeply recessed area 40, the entire drive system 42 can be safely stored within the cross-sectional perimeter of the body member 12 such that the likelihood of a swimmer accidentally engaging the propeller blade thereof is substantially reduced. Furthermore and in accordance with the instant invention, to virtually eliminate the possibility of accidental engagement, the propeller blade is housed within a tubular shield 46, to be explained in greater detail hereinafter.

Turning to FIG. 4, there is shown an enlarged view of the central portion of the upper surface 26 of the body 12 with the cover 24 flung open by means of hinge members 48 such that the interior cavity 22 is revealed. Also seen in FIG. 4 is a gasketlike seal 50 which surrounds the cavity 22 to prevent the entrance of water therein when the cover 24 is closed. For opening the cover 24, the knob 28 is housed within a recessed portion 52 of the cover (FIGS. 5 and 6) and is provided with a depending stem 54 to which is secured an elongated plate 56. As suggested in FIG. 4, rotation of the knob 28 by 90° will align the plate 56 with an elongated slot 58 provided in a strut 60 which traverses the cavity 22 whereby the cover 24 may then be easily lifted and swung to the position of FIG. 4.

Located within the cavity 22 toward the rear thereof is the power source 62, preferably an internal combustion engine. The engine is secured to a second strut 64 which spans the cavity 22. The intake manifold of engine 62 (not shown) is connected to the outlet of a carburetor 66 having a throttle valve (not shown) to vary the mixture of air and fuel being supplied from tank 70 through a conduit 72. The tank 70 is located within the cavity 22 toward the forward wall thereof and includes a filling pipe 74 which passes through the upper surface 26 of the body member 12 where it is normally closed by a cap 76. Thus, when the cap 76 is removed, the tank 70 can be filled from the exterior of the cavity 22 without removing the cover 24 thereof. Similarly, the throttle valve is controllable by a length of cable 78 which passes up through the surface 26 at a point 80, and as best seen in FIG. 1, from there is guided by the rigid vent tube 30 into the squeeze bulb 38 such that the amount of pressure applied by the rider 11 will control the movement of the throttle valve which in turn controls the amount of fuel supplied to the engine. A manually operable choke 86 mounted externally of the cavity 22 is linked to a throttle valve lever 68 by a control cable 88 whereby the rider can choke the engine before starting.

As illustrated in FIG. 4, the motor 62 may be started by an electrical system including an electric motor 81 energized by a battery 83. A starter switch 84 is provided on the upper surface 26 with an appropriate cable 86 passing to the motor 81 and arranged such that power is supplied from the battery 83 to the motor 81 a upon actuation of the switch 84. It will be appreciated, that although the instant invention has been disclosed as utilizing an electric starting system, it is within the scope of the invention that a conventional rope operated recoil starter or a commonly available type of impulse starter could be easily substituted therefore, the only requirement being that the rope or crank associated with such system be led from the interior cavity 22 through the upper surface 26 to an exterior position whereby it will be easily accessible to the rider 11.

As noted previously, an air ventilation system including the rigid upstanding tube 30 of FIG. 1 is provided to maintain the cavity 22 in communicating relationship with the atmosphere above the surfboard. To aid in distributing the incoming air to preselected regions within the cavity 22, a pair of ducts 90 and 92 are provided, one end of each of which communicates with the inner end 34 of the rigid tube 30. (see FIG. 6).

Turning to the drive system a system and with specific reference to FIGS. 4—9, the drive shaft 44 passes from the engine 62 through a rearward wall 94 of the cavity 22 into the tubular shield 46 located in the recessed area 40 where at its opposite end is secured a propeller 96 which propels the surfboard. In substantially parallel alignment with the drive shaft 44 is provided an exhaust pipe 98 one end 100 of which communicates with the combustion chamber of the engine 62 while the opposite end 102 is supported by an annular plate 104 freely mounted about the drive shaft 44.

Preferably the internal combustion engine 62 is a water cooled type engine and as such would include a water inlet tube 106 and a water outlet tube 108. As best seen in FIG. 10, the tubes 106 and 108 are parallelly aligned with drive shaft 44 and are supported at their rear ends by the plate member 104. Additionally, exhaust tube 98 includes a one way valve system including a valve 110 which seats in a valve seat 112 under the bias of spring 114 to permit the passage of exhaust fumes in only one direction from the engine 62 and prevent water from entering therein.

From the above it will be seen that the entire drive shaft assembly, exhaust pipe and inlet and outlet water tubes are all neatly and compactly located and stored within the recessed area 40 which simultaneously houses the propeller 96 and the shield arrangement 46 to be described in greater detail below. This arrangement, in addition to facilitating manufacture, conveniently keeps these components well out of the reach of the swimmers in the immediate vicinity of the surfboard and thereby greatly increases safety.

As noted previously, the propeller 96 is safely enclosed by the shield 46 which takes the shape of an elongated tubular member 116 secured at its upper tangential surface 118 to the undersurface of the scalloped recessed area 40. Tube 116 includes a first section 118 forward of the propeller 96 which section 118 includes elongated apertures 120 therethrough to facilitate the intake of water when the blade 96 is rotating. The second or rear section 120 of the tube 116 includes a frustoconically tapered interior surface 122 which tends to funnel the rearwardly moving water into a jet stream which develops additional thrust for the surfboard by eliminating the lateral dispersion of water which would inevitably occur were it not for the jet effect. Thus it will be appreciated that the shield means 46 comprising the tubular element 116 performs a dual function in the sense that it eliminates any possibility of a swimmer accidentally engaging the blade 96 while at the same time creates a funnellike jet effect which adds thrust by eliminating lateral diffusion of the propelling water.

Returning to FIG. 4, a side surface 124 of the body member 12 is provided with a plurality of recesses 126, 128 and 130. Recess 126 houses a carrying handle 132 normally biased by a Neg'ator spring 134 toward the rest position shown in FIG. 4. When it is desired to carry the surfboard, one merely pulls out the handle 132 and carries the surfboard on edge.

The instant invention also contemplates the utilization of a hand pump 136 within the cavity 22 for draining seepage which may accumulate therein. The pump includes a draw pipe 138 on the interior of the cavity and an operating rod 140 which terminates in an operating knob 142 housed within the recess 128. Thus, should it be desirable to operate the pump 136, the operator simply reciprocates the rod 140 in an up and down stroke and the water from within the cavity 22 is expelled out the drain pipe 144 which terminates within the recess 128.

Also provided within the cavity 22 is an extinguisher 146 having an exit port 148 and an operating rod 150 to which is secured a knob 152 normally housed within the recess 130. As well known in the art the extinguisher is filled with foam under pressure such that when actuated by pulling on knob 152, the foam will disperse throughout the entire cavity 122.

Thus, there has been described an inboard type of self-propelled surfboard which locates an internal combustion engine within a hollow cavity located centrally on the front and rear ends of the board. In accordance with the invention the propeller blade connected to the output of the motor is housed intermediate the cavity and the rear of the board, thereby reducing the length of drive shaft necessary to connect these components. The propeller is located within a recess provided in the undersurface of the surfboard and furthermore is safely housed within a tubular shield which additionally function to develop a jet stream effect.

Although this invention has been described with respect to its preferred embodiments, it should be understood that many variations and modifications will now be obvious to those skilled in the art.

I claim:

1. A self-propelled surfboard comprising: an elongated body member on the upper surface of which a rider is intended to be supported, said body member including an internal cavity located intermediate its front and rear ends; power means positioned within said cavity for developing usable output power; drive means having at least one propeller located intermediate said cavity and said rear end of said body member in a recessed area in the undersurface of said body member connected to said power means for driving said body member through water, and shielding means disposed about said drive means comprising an elongated tube having apertures thereabout at one end so as to facilitate the intake of water into said tube.

2. The self-propelled surfboard of claim 1 wherein said tube includes a first section forward of said propeller and a second section rearward of said propeller, the interior of said second section being frustoconically tapered to effectuate a jet stream effect as water is forced therethrough by said propeller.

3. The self-propelled surfboard of claim 1 and further including stabilizing means secured to the undersurface of said body member in the path of said jet stream for stabilizing said body member.

4. The self-propelled surfboard of claim 1 wherein said drive means is connected to said power means by a drive shaft which freely passes from within said cavity to said recessed area.

5. The self-propelled surfboard of claim 4 wherein said power means comprises an internal combustion engine and further including an exhaust pipe connected at one end thereof to said engine, said pipe passing from within said cavity to said recessed area in substantially parallel alignment with said drive shaft.

6. The self-propelled surfboard of claim 5 and further including air ventilation means communicating at one end with the environment above the upper surface of said body member and at its other end with the interior of said cavity for cooling said cavity.

7. The self-propelled surfboard of claim 6 wherein said air ventilation means includes a rigid tube passing through said upper surface of said body member, said one end including means for preventing the accidental entrance of water into said tube.

8. The self-propelled surfboard of claim 7 wherein said last mentioned means comprises a portion of said one end of said tube directed down towards said upper surface of said body member.

9. The self-propelled surfboard of claim 8 and further including air distribution means positioned within said cavity and connected to said other end of said air ventilation means for distributing air to selected regions of said cavity.

10. The self-propelled surfboard of claim 9 wherein said internal combustion engine is water-cooled, and further including a water inlet tube passing from said recessed area into said engine and a water outlet tube passing from said engine to said recessed area, said inlet and outlet tubes being in substantially parallel alignment with said drive shaft.

11. The self-propelled surfboard of claim 10 and further including one way valve means positioned in said outlet tube for permitting the passage of water from said internal combustion engine in one direction only toward said recessed area.

12. The self-propelled surfboard of claim 11 and further including control means manually operable from the exterior of

said body member for selectively controlling the amount of output power developed by said power means.

13. The self-propelled surfboard of claim 12 wherein said drive means comprises an internal combustion engine startable from the exterior of said body member and further including a fuel tank positioned within said cavity for supplying fuel to said engine, said fuel tank being fillable from the exterior of said body member.

14. The self-propelled surfboard of claim 13 and further including a carburetor having a throttle valve for regulating the flow of fuel from said tank to said engine, said manually operable control means controlling the movement of said throttle valve.

15. The self-propelled surfboard of claim 14 and further including choke means operable from the exterior of said body member for choking said engine.

16. The self-propelled surfboard of claim 15 and further including electric motor means positioned within said cavity for electrically starting said motor.

17. The self-propelled surfboard of claim 16 and further including battery means positioned within said cavity for energizing said electric motor means; and starting switch means positioned on the exterior of said body member for selectively interconnecting said battery to said electric motor means for the energization thereof.

18. The self-propelled surfboard of claim 12 wherein sad said body member includes a first recess in a side surface thereof and further including handle means normally biased toward a rest position within said first recess, said handle means being extractable from said rest position to a surfboard carrying position.

19. The self-propelled surfboard of claim 12 and further including pump means located within said cavity, said pump means being manually operable from the exterior of said body member to eliminate water from the interior of said cavity.

20. The self-propelled surfboard of claim 12 and further including extinguisher means located within said cavity and operable from the exterior of said body member for dispersing a fire extinguishing fluid within said cavity.