Nov. 6, 1962 J. C. MOORE 3,062,172

MOTOR-DRIVEN WATER SKI TOWING DEVICE

Filed Feb. 20, 1961 2 Sheets-Sheet 1

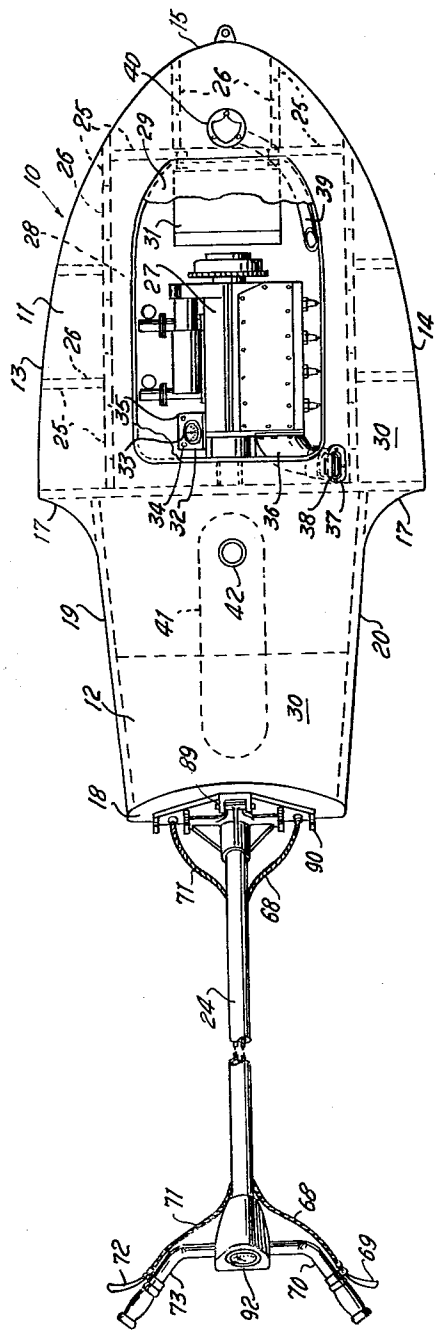


Fig. 1

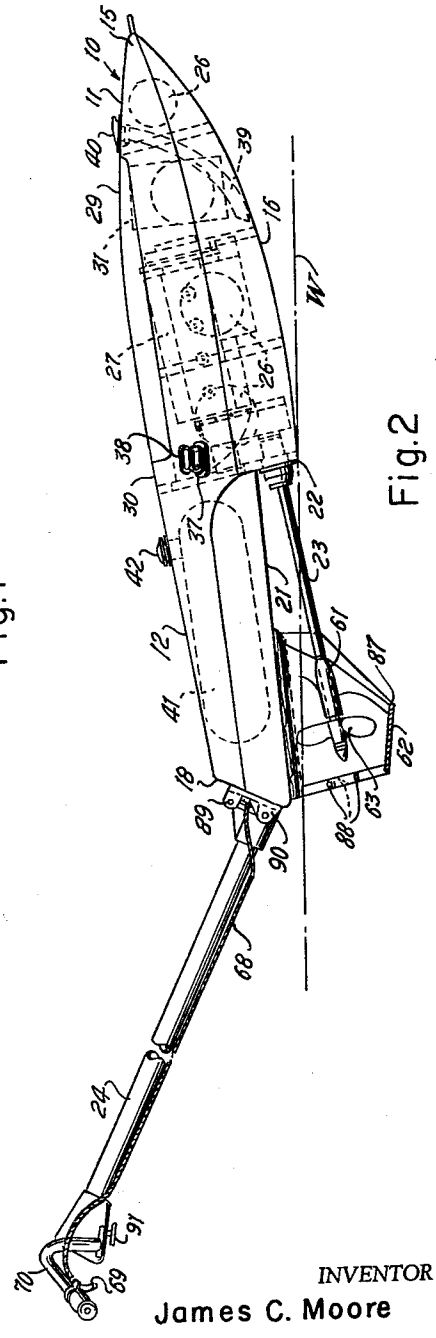


Fig. 2

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MOTOR-DRIVEN WATER SKI TOWING DEVICE

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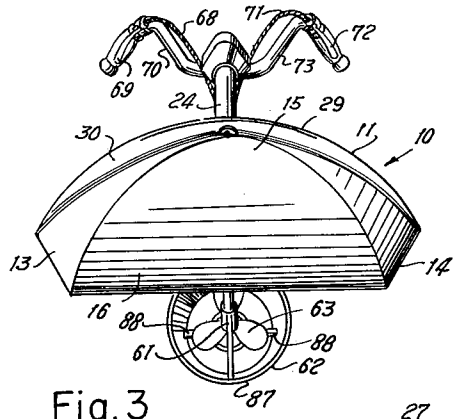


Fig. 3

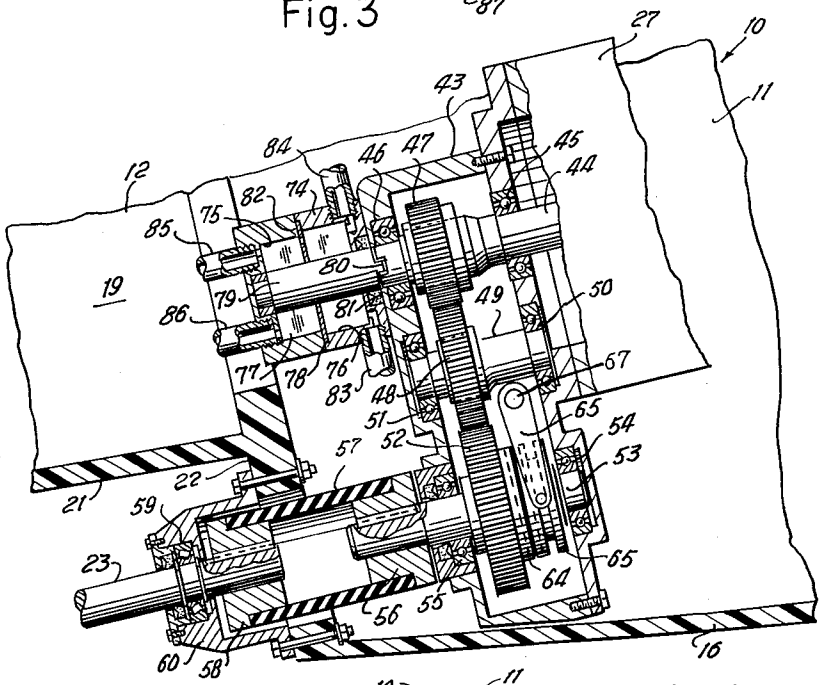


Fig. 4

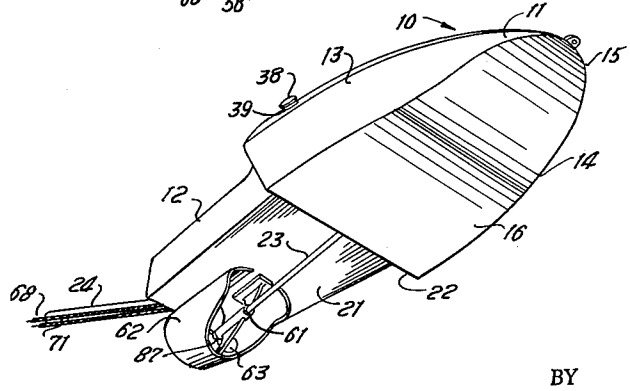


Fig. 5

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MOTOR-DRIVEN WATER SKI TOWING DEVICE

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1 Claim. (Cl. 115—6.1)

This invention relates to ski towing devices for use in aquatic sports, and it has particular reference to a buoyant, streamlined, motor driven tractor device for towing skis, or other aquatic devices, such as aquaplanes, and the like, and the principal object of the invention resides in the provision of a tractor device having a sealed hull, and driven by an internal combustion motor arranged within the hull, and having an elongated handle rigidly connected to the hull whereby the device is adapted to be controlled by a skier.

Another object of the invention is that of providing a tractor device of the character described in which the bottom of the hull is substantially flat across its forward portion, with a recessed rear portion to facilitate arranging the propeller shaft through the bottom, and to reduce drag.

A still further object of the invention resides in the provision of a water tractor device in which the forward or nose portion of the hull is curved upwardly to enable the device to plane and pass more easily over waves, and obstacles in its path, and in which the forward sides of the hull are angled to provide a soft chine effect, allowing for a top of maximum width while minimizing the bottom width.

Another object of the invention is that of providing a water tractor having a hull having a unique design, especially adapted to easy control and safe operation at high speeds, having a shielded propeller for the protection of a skier being towed by the device, and protecting the propeller from floating debris, and other obstacles in the water.

Broadly, the invention contemplates the provision of an aquatic tractor which is of light construction, yet durable, and possessing novel control features adapting the same to stable streamlined operation with a minimum of frictional drag and cavitation, due to its tendency to ride higher in the water and at increased inclination at the rear.

While the foregoing objects are paramount, other and lesser objects will become manifest as the description proceeds, taken in connection with the appended drawings wherein:

FIGURE 1 is a plan view of the invention showing the broad forward portion and narrow rear portion of the hull, the handle and control devices, and showing the motor cover broken away to illustrate the motor.

FIGURE 2 is a side elevational view of the invention showing the stepped bottom surface, the propeller and propeller housing, and showing the motor and other parts in dotted lines.

FIGURE 3 is a front elevational view of the invention, showing the upwardly curved bottom, the angular sides, and showing the propeller and propeller housing.

FIGURE 4 is a fragmentary sectional view of the invention illustrating the driven gears, the flexible coupling on the propeller shaft, the clutch and water pumps, and

FIGURE 5 is a perspective bottom view of the hull, showing the offset bottom, the propeller and propeller housing.

The invention is designed to provide an aqua-tractor which is capable of towing a person on skis at relatively high speeds with safety, having a convenient and dependable system of controls by which the device is easily maneuvered, and sufficiently buoyant to remain afloat, even when upset, without flooding the motor compartment, but automatically stopping the motor.

The invention primarily comprises a hull 10 which is

preferably formed of plastic, or other light material, and has forward and aft portions 11 and 12. The forward portion 11 has curved sides 13 and 14 and a rounded nose 15, defining a semi-ellipsoid, and the bottom 16 is curved gradually upwardly to the nose 15, the transverse surface being planar, thus presenting a minimum of resistance as the tractor moves over the surface of the water.

The rear or aft portion 12 of the hull 10 is narrower than the forward portion 11, as shown particularly in FIGURE 1, defining an offset 17 on each side, and is tapered rearwardly to the stern 18 which is angled downwardly and outwardly, as shown in FIGURES 1 and 2. The sides 13 and 14 of the forward portion 11 of the hull 10 are angular, inclining inwardly toward the bottom 16, as shown in FIGURE 3, for further streamlining the structure and enhancing its maneuverability in the water. The sides 19 and 20 of the rear or aft portion 12 are also angularly inclined toward the bottom 21 of this portion of the hull 10, as shown in FIGURES 2 and 5.

The bottoms 16 and 21, respectively, of the forward and aft portions of the hull 10 are in different planes, as apparent in FIGURES 2, 4 and 5, an offset 22 being formed transversely of the hull 10 at a right angle thereto. The offset provides for the extension of the propeller shaft 23 rearwardly beneath the bottom 21 of the aft portion 12 of the hull 10 and, due to the narrower dimension of the aft portion 12, facilitates the movement of the tractor in starting, as by pushing down on the handle 24 which is adjustably attached to the stern 18, in the manner shown in FIGURE 2. The handle 24 will be presently described in greater detail.

The forward portion 11 of the hull 10 is hollow and is formed with a plurality of internal partitions 25 to strengthen the same, as shown in dotted lines in FIGURES 1 and 2. The partitions are arranged to define a a plurality of small cells to enhance the buoyancy of the tractor, and each cell has an opening 26 in the longitudinal partitions 25 to lighten the hull 10, as shown in dotted lines in FIGURES 1 and 2. Such arrangement, however, is optional and may assume a variety of forms, as desired.

An internal combustion motor 27 is supported in its compartment 28 in the forward portion 11 of the hull 10, and is enclosed by a hatch cover 29 in the top 30 of the hull 10, as shown in FIGURE 1, and in dotted lines in FIGURE 2. The motor 27 is preferably of the four cylinder type although other types of motors may be employed. A battery 31 is arranged in the motor compartment, and forwardly of the motor 27, providing for an electrical system for starting the motor or for suitable illumination for lamps carried by the tractor. Attached to the motor 27 on a panel 32 are an ampmeter 33, a starter button 3 and ignition switch 35.

The motor exhaust pipe 36 has its outlet 37 in one side of the top 30 and is provided with a flapper type of closure 38 hinged thereto and capable of closing the exhaust 36 to prevent flooding when the tractor is upset in the water, or against spray. An air supply tube 39 is arranged forwardly of the motor compartment to admit air thereto. The tube 39 is open to the top 30 of the hull 10 and is covered by a hood 40 to resist any water running into the motor compartment either from a spray or when the tractor is upset. The fuel tank 41 is arranged in the hollow aft portion 12 of the hull 10 and has a filled opening covered by a cap 42 on the top 30, as shown in FIGURES 1 and 2.

Attached to the rear of the motor 27 is a housing 43 which encloses the transmission gears, as shown in FIGURE 4. The main shaft 44 of the motor 27 is journalled in non-friction bearings 45 and 46 and has a gear 47 thereon which is meshed with a reduction gear 48 on a

stub shaft 49 journalled at each end in bearings 50 and 51. The gear 48 is meshed with a gear 52 on a stub shaft 53 mounted in bearings 54 and 55.

A sleeve 56 is keyed to the outer end of the stub shaft 53 which has a tubular flexible coupling 57 thereon connected at its opposite end to a similar sleeve 58 keyed to the inner end of the propeller shaft 23 which is supported in a thrust bearing 59 in a stuffing box 60, attached to the offset wall 22, and extends rearwardly along the bottom 21 of the aft portion of the hull 10 to be supported near its outer end in a bearing support 61 in a conical shroud 62 which surrounds the propeller 63.

The gear 52 is mounted for free rotation on the shaft 53 and has a clutch face 64 on its inner side engageable by a friction type clutch member 65 which is slidably keyed to the inner portion of the shaft 53 and is operable thereon with respect to the clutch face 64 by a fork 66 on a shaft 67 to which is connected a lever (not shown) by which the fork shaft 67 is oscillated by a cable 68 arranged along the handle 24 and operated by a lever 69 on one of the handle bars 70, as shown in FIGURES 1, 2 and 3.

By the arrangement just described the motor 27 can be started without turning the propeller 63 since the clutch can be disengaged, thus insuring the safety of the operator. It is desirable that the motor 27 cannot be started without removing the hatch cover 29 to minimize the possibility of an explosion through the accumulation of gas fumes, and other hazards. Another cable 71 is arranged along the handle 24 for controlling the speed of the motor 27, and has a lever 72 attached to the handle bar 73. The cable 71 is connected to the carburetor control lever in the usual manner.

Attached to the gear housing 43 is a pump housing 74 having separate compartments 75 and 76, each having a pump rotor operating therein designated, respectively 77 and 78, and on a common stub shaft 79, one end of which has a driven connection 80 with the outer end of the main shaft 44 of the motor 27. A suitable packing 81 is provided about the shaft 79 to seal the compartment 76 which is separated from the compartment 75 by a partition 82.

The compartment 76 has inlet and outlet ducts 83 and 84 for the circulation of water through the cooling system (not shown) of the motor 27. Water is pumped by the rotor 78 from outside the hull 10 through the inlet conduit 83 and the motor cooling system to be discharged exteriorly of the hull 10. The opposite rotor 77 operates to pump out the compartment in the aft portion 12 which might leak thereinto, or the motor compartment in the forward portion 11. Inlet and outlet conduits 85 and 86 are connected into the compartment 77 of the pump housing 74.

The conical shroud 62 embracing the propeller 63 is attached to the rear of the bottom 21 of the aft portion 12 of the hull 10 and is flared forwardly, having its forward annular rim 87 inclined downwardly and rearwardly, as best illustrated in FIGURE 2, for freer action in the water.

The shroud 62 serves to scoop the water, protect the propeller 63 against obstructions, and to protect the operator from injury by the propeller. The shroud 62 also aids in eliminating cavitation at high speeds.

The shroud 62 has a series of integral radial vanes 88 in its smaller rear open end, and these are set at angles which oppose the angular incidence of the blades of the propeller 63 and function to counteract the torque of the propeller. Another obvious function of the shroud 62 is that of holding down the rear portion of the tractor to cause it to "plane" at high speeds, as indicated in FIGURE 2 in which the broken line W designates the water line.

The handle 24 is hinged at 89 to a bracket 90 attached to the rear inclined wall 18 of the hull 10, and is capable of being folded over the top of the latter for compactness in transportation and storage. The handle 24 may also be adjusted angularly and longitudinally, and locked in the desired positions by a knob 91 on the underside of the handle bar assembly. A speedometer 92 may be arranged in the handle bar assembly, if desired, as shown in FIGURE 1.

The mechanical features and structural design of the invention, as herein described, are obviously capable of certain changes and modifications, by persons skilled in the art, without departing from the spirit and intent of the invention or the scope of the appended claim.

What is claimed is:

In a water tractor for towing water skis, and the like, having a buoyant hull having forward and aft portions, and having an offset in the bottom of said hull intermediate its ends whereby the undersurface of said aft portion is in a plane above that of said forward section, the improvements comprising, in combination, a hull having offsets on each side thereof adjacent to the offset in the bottom thereof whereby the said aft portion is narrower and shallower than said forward portion, a motor in said forward portion having a propeller shaft driven thereby, the said shaft extending through said offset in the bottom of said hull and rearwardly thereof beneath the bottom of said aft portion, a propeller on said shaft, a shroud attached to the bottom of said aft portion, and rearwardly thereof embracing said propeller and said shaft, and a handle for controlling said hull in motion.

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