

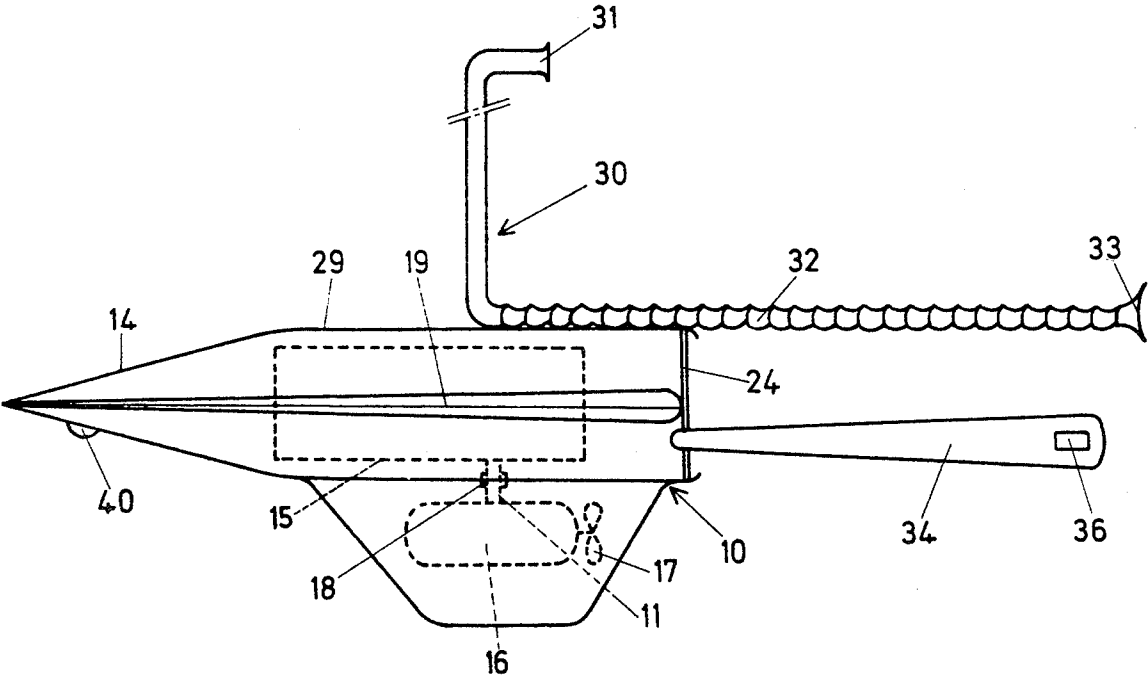
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[33] **France**
[31] **148,619**

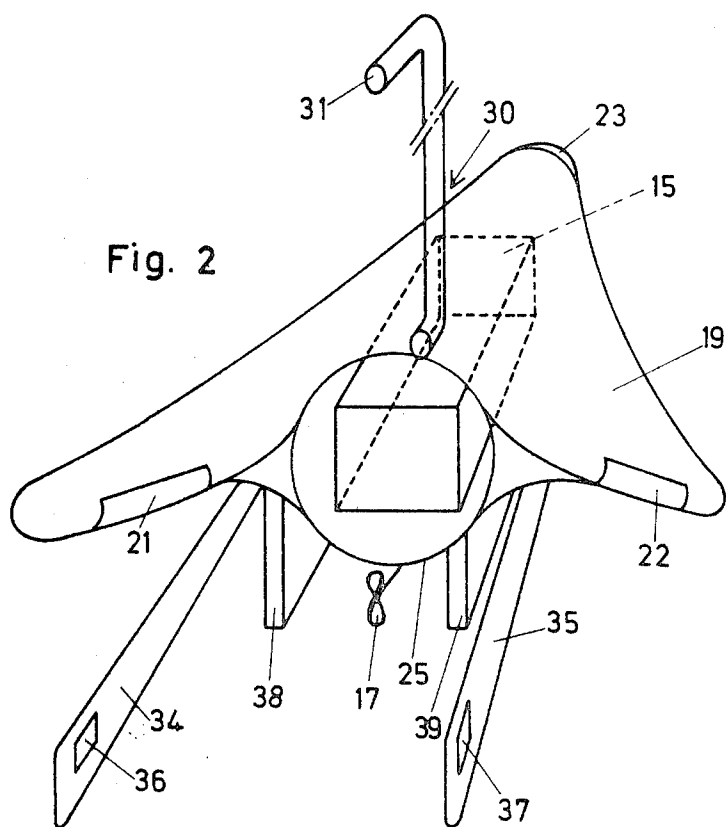
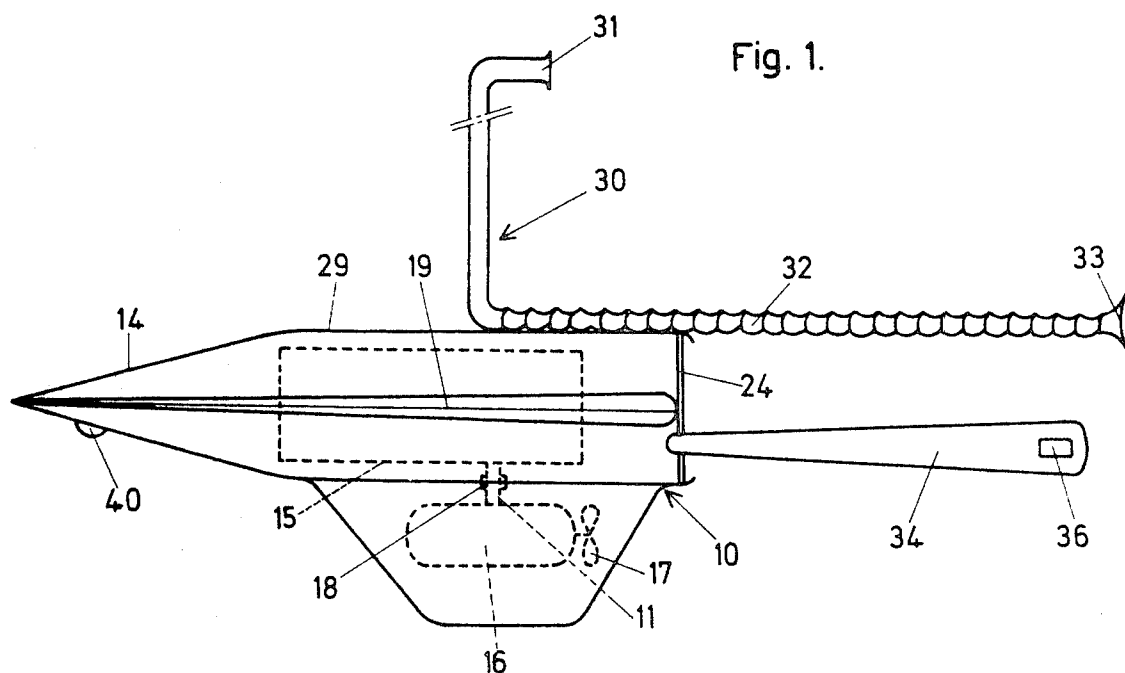
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[54] **SELF-PROPELLED SUBMARINED DEVICE**
7 Claims, 9 Drawing Figs.

[52] U.S. Cl..... **115/6.1,**
114/16
[51] Int. Cl..... **B63h 21/26**
[50] Field of Search..... **114/16 A,**
16; 115/70, 6.1

ABSTRACT: A device for submarine exploration of the self-propelled type. It comprises a hollow body housing a battery means for feeding one or more electric motors with arms or shafts being provided at the rear part of the body. The arms or shafts can be gripped by a diver drawn along by traction.





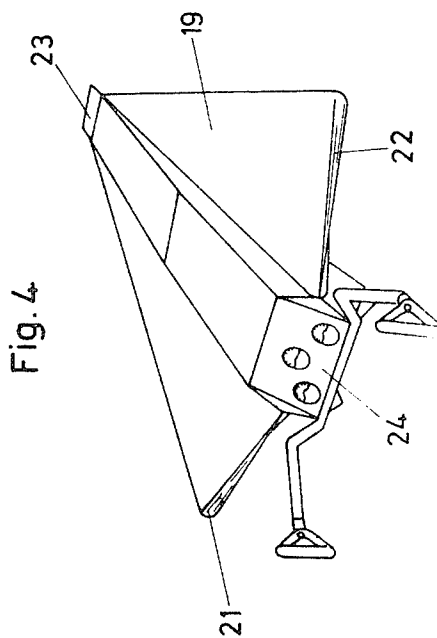
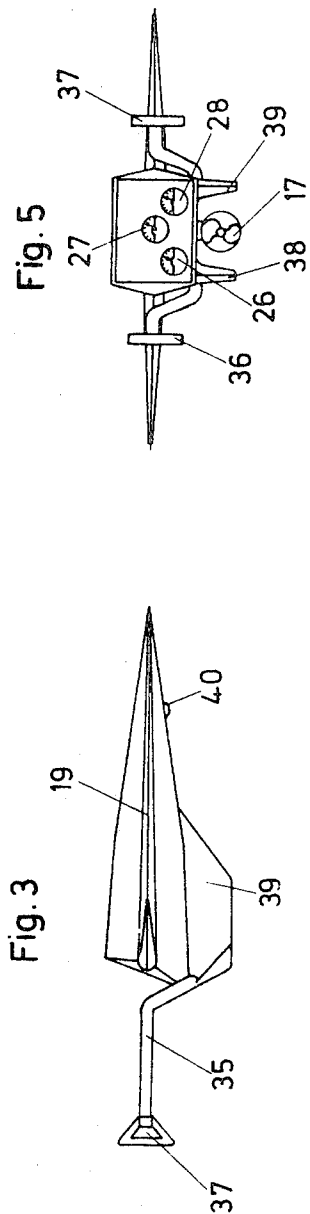


Fig. 6

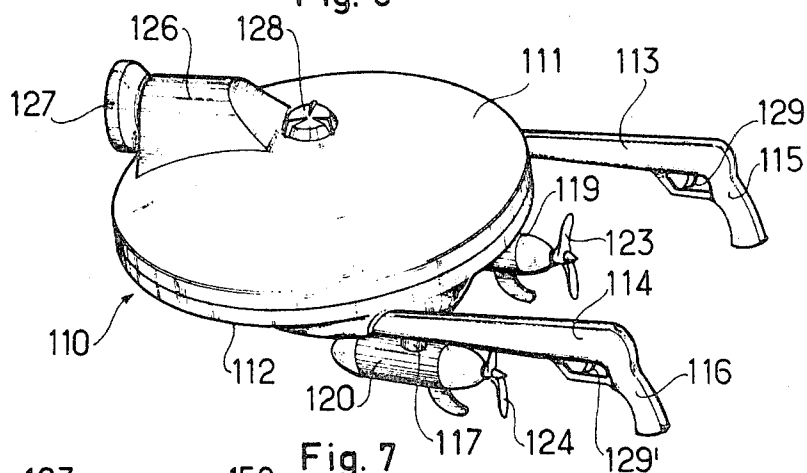


Fig. 7

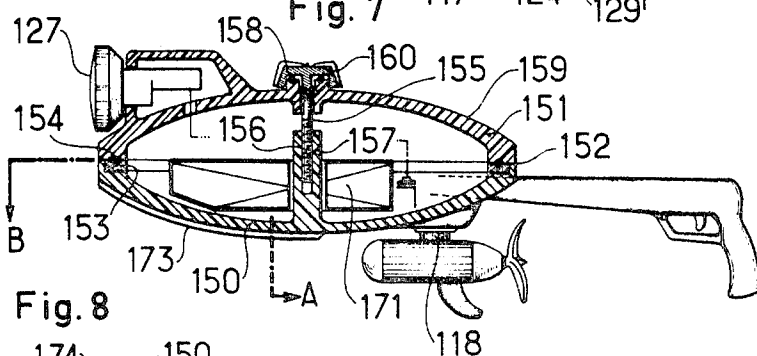


Fig. 8

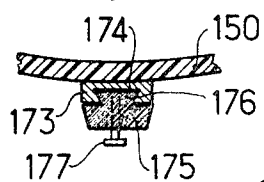
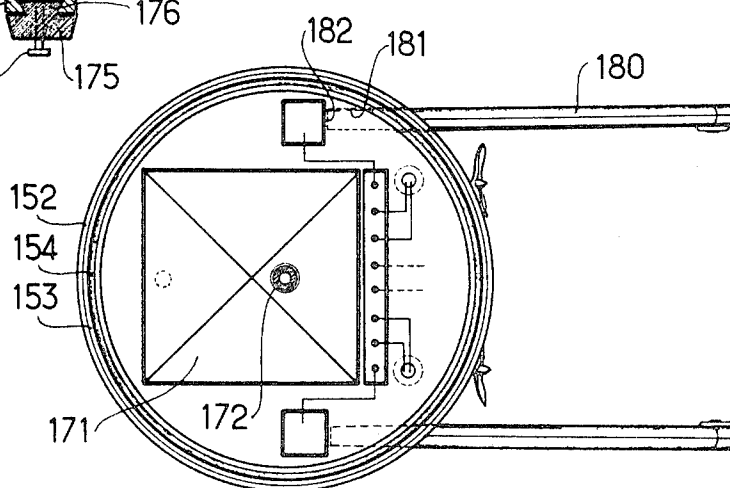


Fig. 9



SELF-PROPELLED SUBMARINED DEVICE

Individual devices adapted for submarine exploration at various depths have already been proposed. When they are self-propelled, these known devices are frequently heavy and bulky and high in cost so that they are substantially used only for technical and scientific research. In addition their maneuverability is limited.

The present submarine device according to the invention, on the other hand, permits the most varied maneuvers from the surface of the water down to a depth of about 100 meters.

It is very safe to use.

It is easy to manufacture and consequently economical.

In the following description, given by way of example, reference is made to the accompanying drawings in which:

FIG. 1 is a side view of the device according to the invention;

FIG. 2 is a perspective view thereof;

FIG. 3 is a side view of another embodiment of the present invention;

FIG. 4 is a perspective view of the embodiment of Fig. 3;

FIG. 5 is a rear view of the embodiment of Fig. 3;

FIG. 6 is a perspective view of another embodiment of the present invention;

FIG. 7 is a longitudinal sectional view of the embodiment shown in Fig. 6;

FIG. 8 is a sectional view along A in Fig. 7;

FIG. 9 is a sectional view along B in Fig. 7.

The device according to the invention comprises a hollow body 10, preferably of a plastic material, such as those used for boat building, for example polyester reinforced with glass fiber, and according to the invention includes a body 10, the front 14 which is tapered to facilitate its penetration in water. An electrochemical power generator 15 is connected within the body 10 and, preferably includes a set of high-capacity electric accumulators. A hull houses an electric motor 16 which drives a propeller. Current is supplied from the generator 15 to the motor 16 in a tube 11 supporting the hull and passing through the body 10 in a sealed manner by means of a joint 18. The device has a wing 19 similarly made of plastic material, the trailing edge of which has trimming tabs, 21 and 22 respectively, while the front portion of the device includes a trimming tab 23. The body 10 is closed at the rear by a hinge-mounted pivoted scuttle 24, with a packing ring being interposed between the edge 25 of the aperture in the upper compartment and the scuttle. The latter carries indicating instruments, for example a voltmeter 26, which provides information regarding the state of the battery, a depth indicator 27, and a magnetic compass 28 (Figure 5).

A tube 30 is attached to the upper portion 29 of the body 10, the upper horizontally extending end of the tube having an air intake 31 and a lower horizontally extending end is extended towards the rear by an arm 32 ending in a mouthpiece 33. The tube 30 is preferably pivotally mounted in such a manner to be able to be retracted or telescoped along the body 10. Two arms or shafts 34 and 35 are mounted to the rear portion of the body 10 and end in handles 36 and 37. The shafts 34 and 35 are preferably hinge mounted in such a manner to be able to pass from the extended position as shown in FIGS. 2 and 3 into a folded position in which they are retracted below the wing. A searchlight 40 electrically connected to the generator 15 is mounted at the front of the body 10, at the lower portion thereof. Supports or keels 38 and 39 are provided one at each side of the body 10 depending from the bottom thereof, protecting the body as well as the propeller 17.

When the propeller is set in motion, driven by the motor 16 fed by the battery 15, the device tows the person who is grasping the handles 36 and 37. The towing speed is regulated by manipulating a switch which permits a slow speed and a high speed for example.

So long as the device remains at a shallow depth, together with the towed person, the person can breathe by placing his

mouth against the mouthpiece 33, the air carried through the air intake 31, the tube 30, and the branch 32. At greater depths a respirator is required or the person holds his breath. The person drawn along does not have to exert any physical effort so that the period of submersion while holding the breath can be prolonged and the distance covered can be considerably greater than that of a swimmer holding his breath. The present device therefore broadens possibilities for submarine exploration and research.

In the case of a ride at shallow depth, it is possible to pass below a boat by lowering the tube 30 along the body of the device.

The most varied maneuvers are possible, including acrobatic maneuvers, simply by steering the device in one direction or another by the handles 36 and 37, varying its speed, etc.

The independence of the device is significant, the battery 15 preferably being selected for its high electrical capacity with a relatively low weight.

The searchlight 40 permits the exploration of holes or caves.

Initially, the trimming tabs are adjusted to ensure satisfactory balancing of the device both with regard to rolling and pitching moments.

For beaching, the device rests on the keels 38 and 39.

For transport, the shafts 34 and 35 are folded back, thus permitting the device to be accommodated in the trunk of an automobile.

The sealed division between the body containing the electric generator and the hull or the like containing the motor ensures complete safety in the use of the device.

The modification illustrated in FIGS. 3 to 5 has the same general organization as the construction shown in FIGS. 1 and 2. It does not, however, have a breathing tube.

Referring to FIG. 6 the present device comprises a body 110 preferably in the form of a disc, with a convex upper face 111 and a lower face 112 which is also convex. The body is hollow and may be made of plastic materials.

Projecting from the body 110 are two parallel arms 113 and 114, preferably hollow, ending in handles 115 and 116, respectively, resembling pistol grips.

Depending from the body 110, at its lower face 112, are two small posts 117 and 118 carrying elongated hulls 119 and 120 respectively, in which are housed electric motors for the drive of propellers 123 and 124, respectively.

The electric motors are fed from a set of accumulators 125 housed inside the body 110. The upper face 111 includes a boss 126 to house a searchlight 127 supplied by the battery which boss is integrally formed therewith. A support 128 may be provided in the center of the upper face 111 to receive a cradle carrying a camera for example.

Triggers 129 and 129' cooperating with the grips 115 and 116, respectively, serve to control the feed of the electric motors and the searchlight.

For submarine exploration, a diver grasps the grips or handles 115 and 116 and, when the electric motors have been started, he is pulled by the device. The density of the device is approximately that of the water so that it is sufficient for the diver to exert a slight upward or downward action on the handles 115 and 116 to dive, or rise. A lateral action permits turning.

The discoid shape of the device permits the most varied and rapid maneuvers in various planes, simply by exerting stresses in the appropriate direction on the handles. Diving or surfacing at an acute angle is effected without any difficulty. It is even possible to turn upside down at the end of a rising sweep, the face of the device which is normally turned upwards then being turned downwards.

The flat form of the device renders changes of direction easy by rotation about a vertical axis (twisting movement).

The design of the device is such that it has a slightly positive buoyancy, that is its density or specific gravity is very slightly less than one.

The presence of two propellers spaced apart from the mean longitudinal plane reduces the backwash felt by the diver.

The body 110 is formed by the assembly of a lower half-dome 150 (see FIGS. 7 through 9) and an upper half-dome 151 of a plastic material, preferably of reinforced polyester. The upper edge 152 of the dome 150 has a metal insert 153 in which is housed a toroidal joint 154 to ensure the sealing of the connection to the upper dome 151.

For the axine assembly, a screw 155 passing through the dome 151 cooperates with a threaded recess 156 of a tube 157 rigidly connected to the dome 150. A packing ring 158 is provided between the upper face 159 of the dome 151 and the head 160 of the screw.

The box 171 containing the accumulator is provided with an aperture 172 for the passage of the tube 157.

A slideway or guide means 173 is provided substantially along a median plane or front half-meridian of the lower dome 150. By means of its dovetail section 174 it permits the sliding and immobilization of a ballasting weight 175 having an extension 176 of a shape matching the section 174. A screw 177 permits the immobilization of the weight 175.

For their mounting, the shafts 180 are assembled by being fitted into internal sleeves 181 provided in dome 150 and closed by end faces 182.

In the construction, the head 160 of the screw 155 is adapted to receive and position a cradle carrying the camera.

I claim:

1. A self-propelled submarine device comprising a hollow body, having two separate dome members connected together to form a disc-shaped body, at least one electric motor, at least one propeller means, said electric motor driving said propeller

means, electric-power means electrically connected to drive said electric motor, and at least two arms, said arms secured to said hollow disc-shaped body and being provided with respective handle means for easy gripping.

2. A self-propelled submarine device as claimed in claim 1 including at least two hulls, each of said hulls being mounted to a respective one of said arms and depending therefrom, at least two electric motors, each of said electric motors being housed in a respective hull, and at least two propeller means with each of said two propeller means being driven by a respective electric motor.

3. A self-propelled submarine device as claimed in claim 2 including guide means located along a median plane of said disc, a ballast, the position of said ballast being adjusted in said guide means.

4. A self-propelled submarine device as claimed in claim 1 wherein said hollow body is formed by an upper convex shaped dome and a lower convex shaped dome, an axial assembly means for securing said upper and lower domes together.

5. A self-propelled submarine device as claimed in claim 4 wherein a housing is provided for said electric-power means, said axial assembly means passing through said housing.

6. A self-propelled submarine device as claimed in claim 4 wherein a cradle means is formed at the top of said axial assembly means, said cradle supporting a camera or the like.

7. A self-propelled submarine device as claimed in claim 2 wherein each of said arms terminates in a pistol-type grip, each of said pistol-type grips cooperating with respective triggers for controlling respective electric motors.

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