

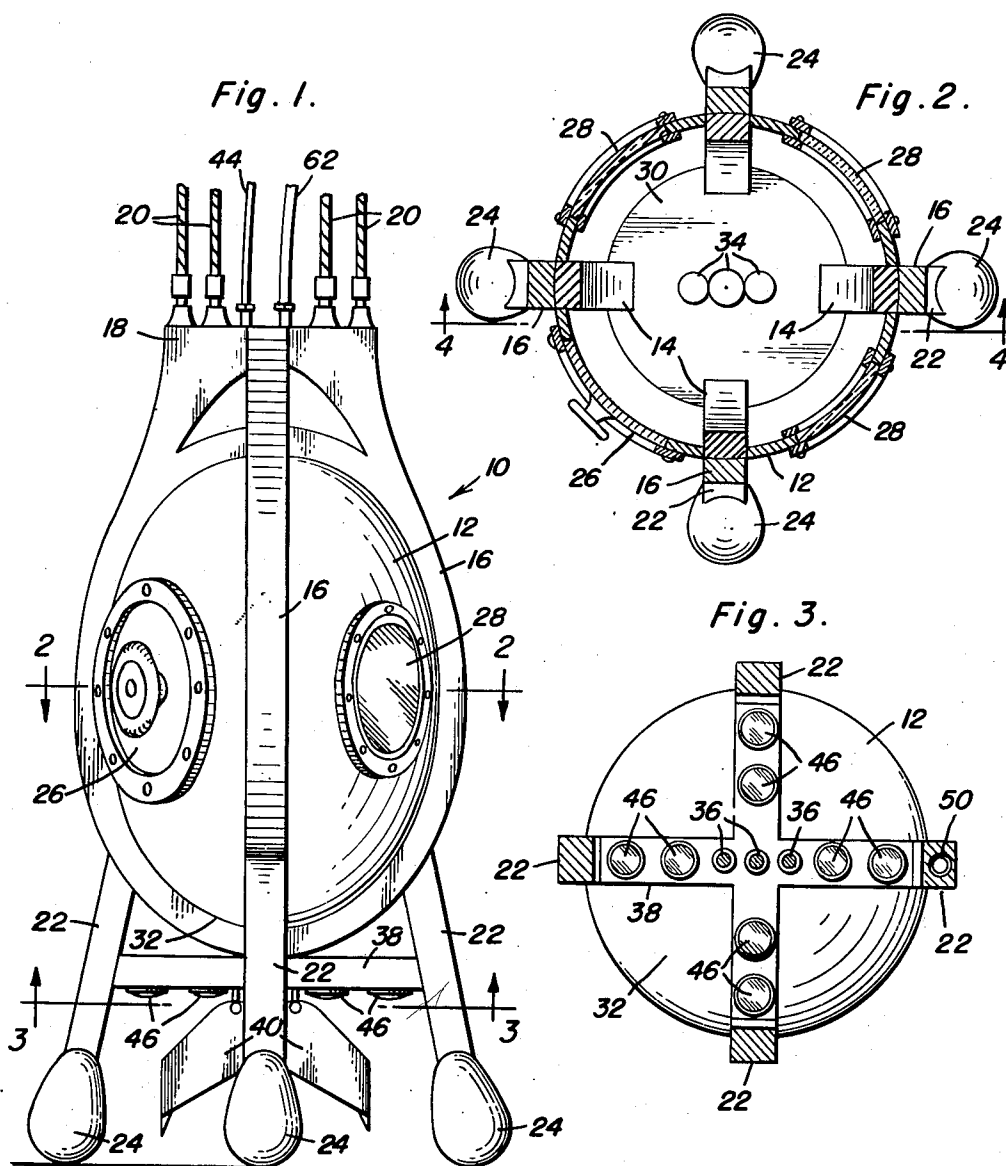
Feb. 12, 1952

W. WIGGINS, JR
DIVING APPARATUS

2,585,712

Filed May 23, 1949

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

Fig. 4.

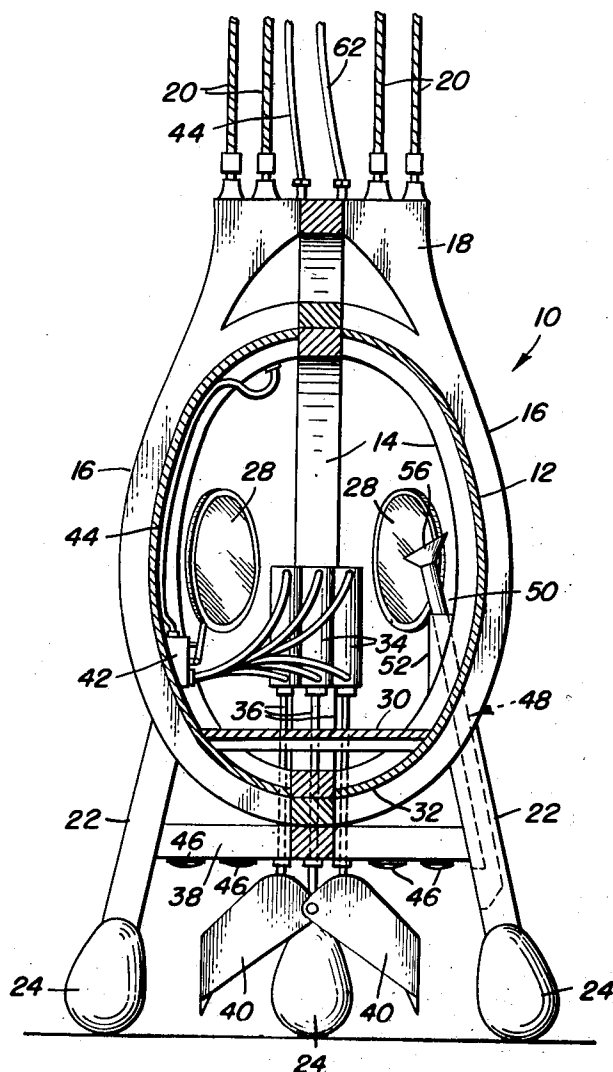
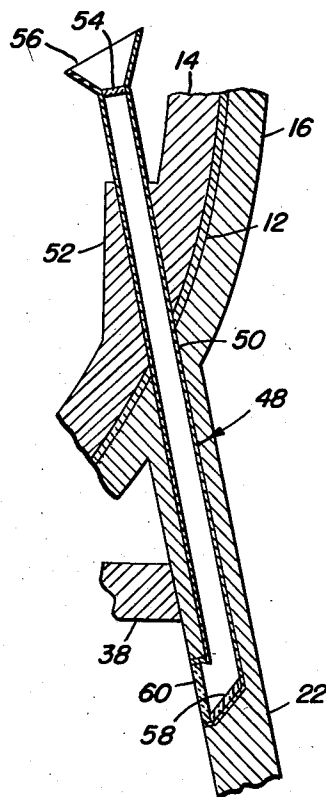


Fig. 5.



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DIVING APPARATUS

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1 Claim. (Cl. 61—69)

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This invention relates to new and useful improvements and structural refinements in diving apparatus, and in particular the invention concerns itself with devices of this type which are specifically designed for submersion in an ocean, or a similar body of water, for the purpose of salvaging valuable material from the ocean bed.

The object of the invention is carried out by the provision of a submersible vessel equipped under its bottom with a material handling device, such as for example, a clam bucket or grab, an important feature of the invention involving the provision of electric lamps under the vessel for illuminating the material handling device and the region wherein it operates, together with what may be referred to as an inverted periscope for indirectly viewing, from the interior of the vessel, the material handling device and its operation, as illuminated by said lamps.

Some of the advantages of the invention reside in its simplicity of construction, in its dependable and efficient operation, and in its adaptability for use in various different fields of environment.

With the above more important objects and features in view and such other objects and features as may become apparent as this specification proceeds, the invention consists essentially in the construction and arrangement of parts as shown in the accompanying drawings, in which:

Figure 1 is a side elevational view of the invention;

Figure 2 is a cross-sectional view, taken substantially in the plane of the line 2—2 in Figure 1;

Figure 3 is a cross-sectional view, taken substantially in the plane of the line 3—3 of Figure 1;

Figure 4 is a vertical cross-sectional view, taken substantially in the plane of the line 4—4 in Figure 2; and

Figure 5 is a fragmentary cross-sectional detail illustrating the arrangement of the periscope used in the invention.

Like characters of reference are employed to designate like parts in the specification and throughout the several views.

Referring now to the accompanying drawings in detail, the invention consists of a diving apparatus designated generally by the reference character 10, the same embodying in its construction a submersible vessel 12 which is preferably of an elliptical cross-sectional configuration so that it is better adapted to withstand external pressure of water when submerged, to which end the vessel may also be provided with

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a set of inner and outer longitudinal reinforcing ribs 14, 16, respectively, as is best shown in Figures 2 and 4.

The outer reinforcing beams or ribs 16 are extended upwardly so as to provide a cross-shaped suspension member 18 above the vessel 12, this member affording a connection for a plurality of derrick cables 20 by which the entire apparatus may be lowered and raised.

A plurality of legs 22 are secured to the outer ribs 16 and extend downwardly and outwardly therefrom, being provided at their lower ends with ballasted feet 24 which function to retain the entire vessel in a stable position on the ocean bed.

It may be explained at this point that the body of the vessel 12 may be provided with a port hole cover or entrance door 26 and with a plurality of lateral observation windows 28, and a floor 30 may be provided in the vessel above the bottom 32, as shown in Figure 4.

A set of pneumatic cylinders 34 are suitably mounted within the vessel 12 and are provided with reciprocable control rods 36 which extend downwardly through the floor 30 and through the bottom 32 of the vessel and also through an X-shaped cross member 38 which rigidly connects together the legs 20 below the vessel, as will be clearly apparent.

The lower ends of the control rods 36 carry a suitable material handling device, such as for example a clam bucket 40, this being disposed below the cross member 38 and being adapted to be opened and closed by the rods 36. The air cylinders 34 are controlled through the medium of a suitable valve 42 disposed within the vessel 12 and connected by an air line 44 to a compressor (not shown) on the surface.

A plurality of electric lamps 46 are mounted on the under side of the cross member 38 for the purpose of illuminating the bucket 40 and the immediately adjacent area wherein the bucket operates, and the essence of novelty of the invention resides in the provision of means for indirectly observing the bucket 40 and its operation, as illuminated by these lamps.

These means consist of what may be referred to as an inverted periscope designated generally by the reference character 48, the same consisting of a straight sighting tube 50 which extends downwardly from the interior of the vessel 12 through a portion of one of the legs 22, the intermediate portion of the tube 50 extending also through a reinforcing block 52 provided on one of the interior ribs 14.

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The upper end of the tube 50 is equipped with a lens 54 and with a light ray concentrating funnel 56, while the lower end portion of the tube accommodates an inclined mirror or reflector 58. A suitable window or lens 60 is provided on the inner surface of the leg 22 wherein the tube 50 is mounted, the window 60 being disposed below the cross member 38 and immediately adjacent the reflector 58 (see Figure 5), the latter being positioned at such an angle relative to the longitudinal axis of the tube 50 that by simply looking down the tube into the mirror 58, the bucket 40 and the general area wherein it operates may be observed indirectly from a lateral direction. In this manner, the operation of the bucket may be carefully observed without interference from the cross member 38 and from the bucket itself, such as would be involved if the operation of the bucket were observed directly through an opening or window in the bottom 32 of the vessel.

By way of additional explanation, it may be stated that the instant apparatus is intended to be raised to a height of a few feet above the ocean bed when suitable material has been gathered in the bucket 40 so that such material may be deposited into a convenient receptacle (not shown), lowered to the ocean bed with the vessel, thus eliminating the necessity of the entire vessel being hoisted to the surface with each load.

An electric cable 62 is connected to the apparatus for delivering current to the lamps 46 and it will be noted that by being enclosed in one of the legs 22, the periscope assembly 48 is effectively protected against possible damage.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted

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to without departing from the spirit and scope of the invention as claimed.

Having described the invention, what is claimed as new is:

5 In a diving apparatus, the combination of a submersible vessel, a set of downwardly projecting legs provided on said vessel, a cross-member connecting together said legs in a plane spaced upwardly from the lower ends thereof, said cross-member being disposed below the bottom of the vessel, a set of slidable control rods extending downwardly from the interior of said vessel through said cross-member, a material handling device supported and manipulated by said control rods and disposed between said legs below the cross-member, a plurality of downwardly directed lamps mounted in the underside of the cross-member for illuminating said device, and an inverted periscope having its upper end disposed in said vessel and extending downwardly through one of said legs to a point in substantial horizontal alignment with the material handling device, the lower end of said periscope terminating at the inner surface of the associated leg whereby said device may be viewed indirectly and laterally from the interior of said vessel.

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