Aug. 19, 1958 H. L. N. LAND 2,847,962

SALVAGE APPARATUS

Filed April 9, 1954 3 Sheets-Sheet 1

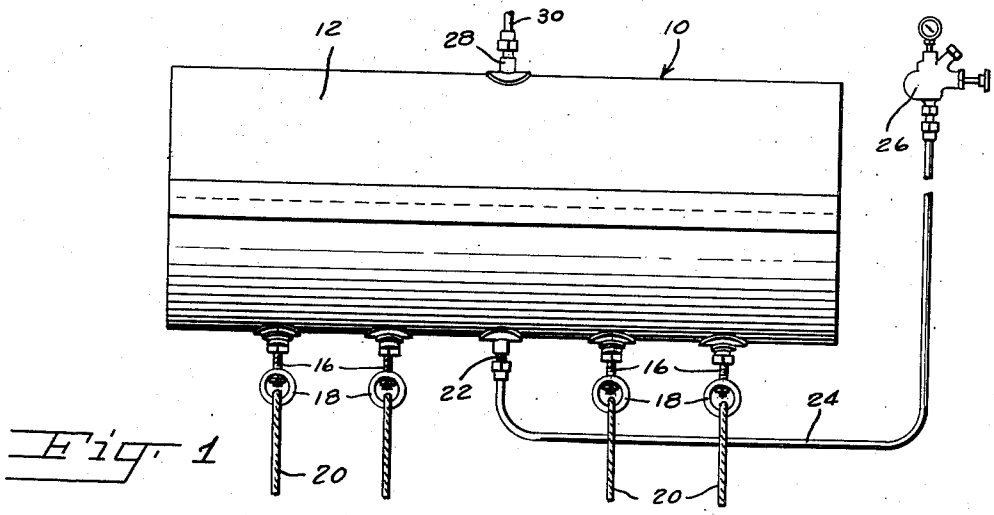


Fig. 1

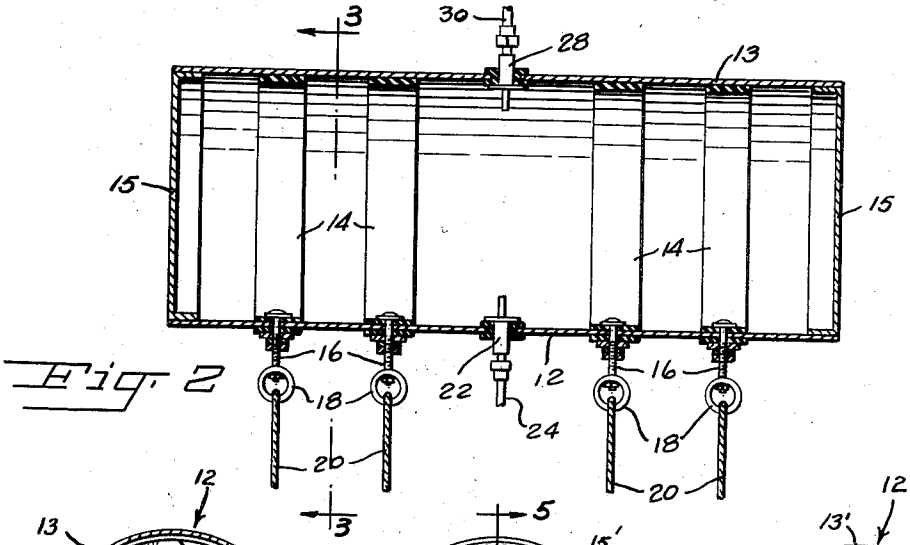


Fig. 2

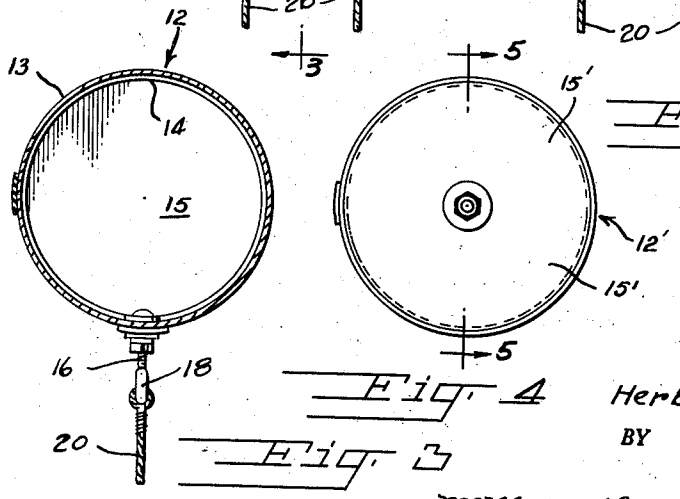


Fig. 4

Fig. 3

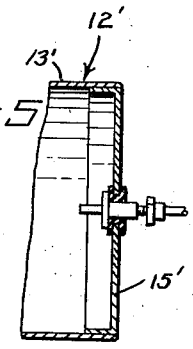


Fig. 5

INVENTOR.
Herbert L. N. Land
BY

McMorrow, Berman & Davidson
ATTORNEYS

Aug. 19, 1958 H. L. N. LAND 2,847,962

SALVAGE APPARATUS

Filed April 9, 1954 3 Sheets-Sheet 2

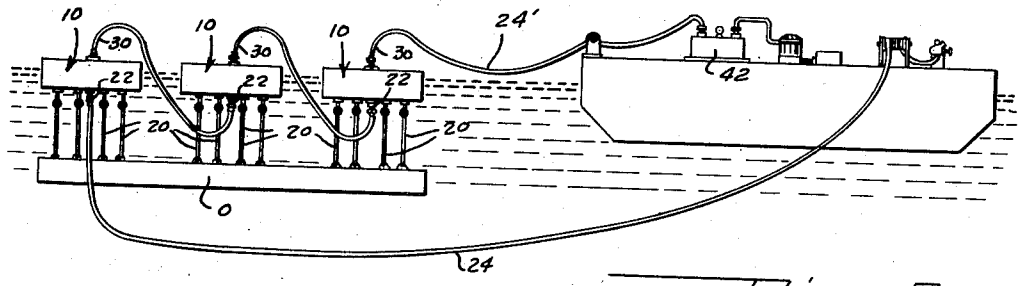


Fig. 6

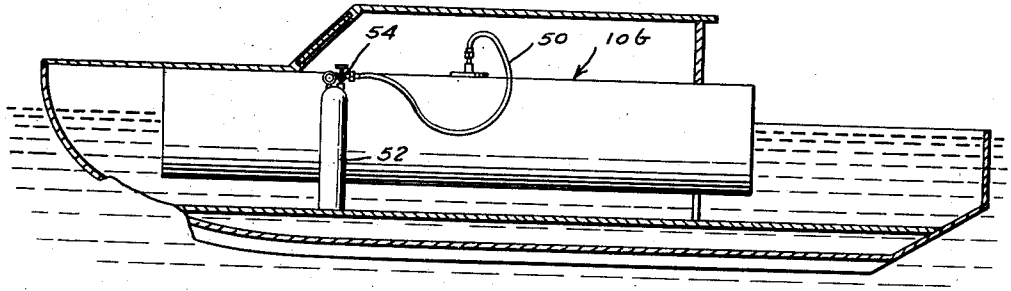


Fig. 7

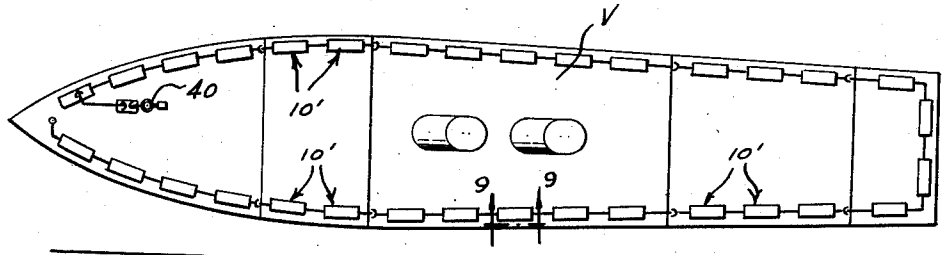


Fig. 8

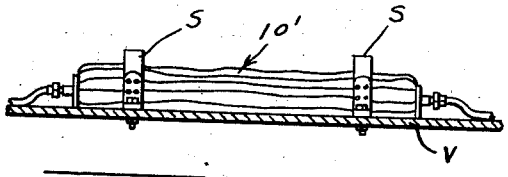


Fig. 10

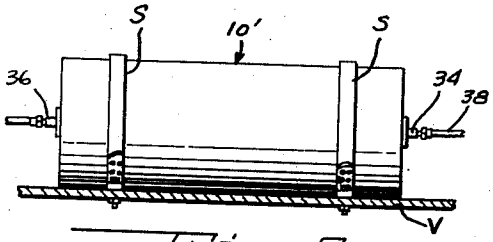


Fig. 9

INVENTOR.
Herbert L. N. Land

BY

McMorrow, Berman & Davidson
ATTORNEYS

Aug. 19, 1958 H. L. N. LAND 2,847,962

SALVAGE APPARATUS

Filed April 9, 1954 3 Sheets-Sheet 3

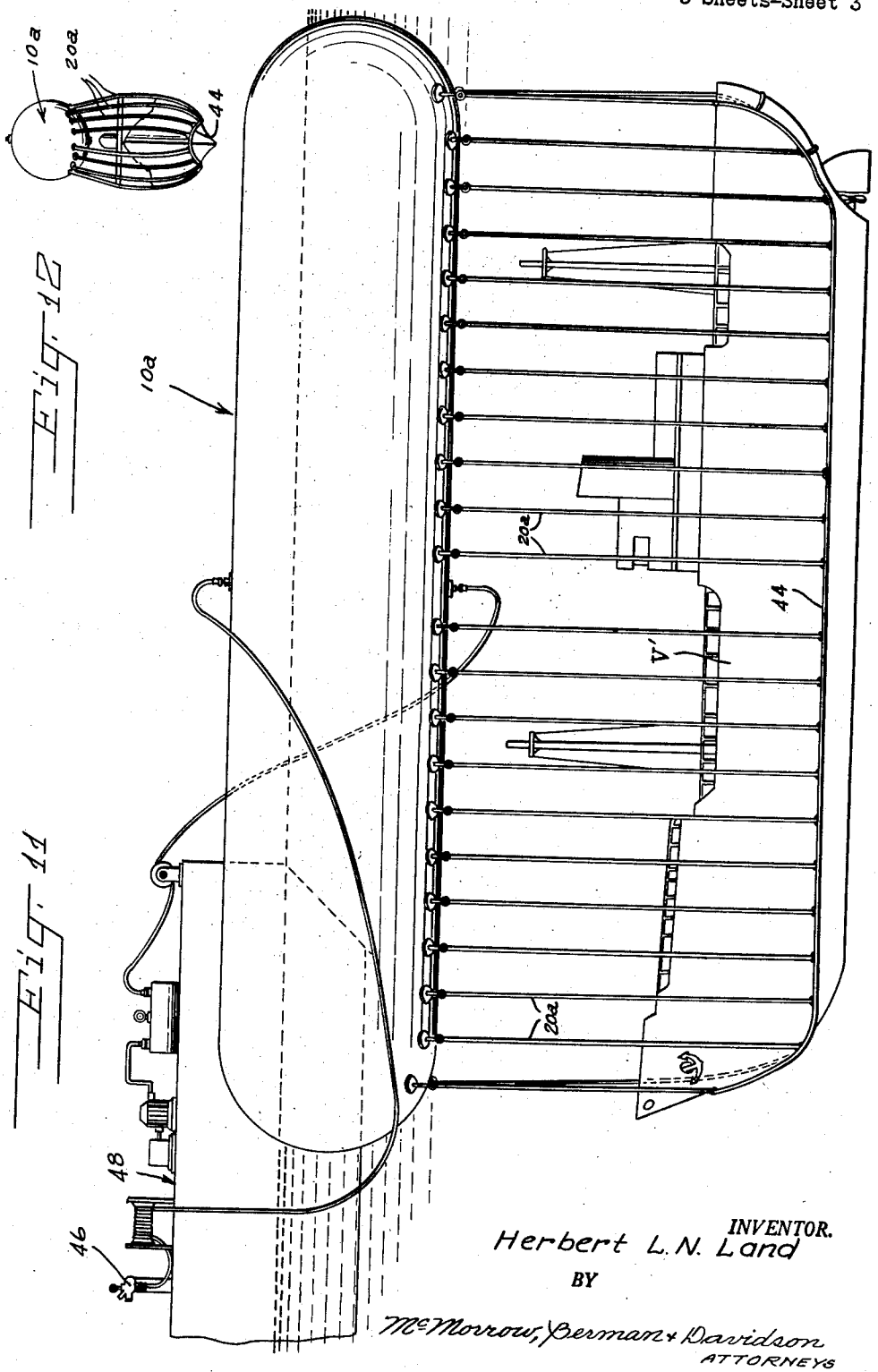


Fig. 12

Fig. 11

INVENTOR.
Herbert L. N. Land
BY
McMorrow, Berman & Davidson
ATTORNEYS

United States Patent Office 2,847,962
Patented Aug. 19, 1958

2,847,962

SALVAGE APPARATUS

Herbert L. N. Land, Camden, N. J., assignor of one-third to David G. Freedman, Haddon Heights, N. J.

Application April 9, 1954, Serial No. 422,063

2 Claims. (Cl. 114—54)

This invention relates to improvements in apparatus for raising sunken vessels and other objects.

The primary object of the invention is to provide more efficient and more easily transported apparatus of this kind, which is more easily applied to or installed in sunken vessels, and is more easily operated for raising sunken vessels.

Another object of the invention is to provide raising means on a vessel to be used when the vessel has been damaged and is partly submerged, whereby the vessel can be raised to or maintained floating at water level, the raising means involving collapsible inflatable pontoons of small bulk when inflated and occuping minimum space when installed on the vessel.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, for purposes of illustration only, a specific form of the invention is set forth in detail.

In the drawings:

Figure 1 is a side view of a collapsible pontoon embodying the features of this invention showing the pontoon inflated;

Figure 2 is a longitudinal sectional view through the pontoon illustrated in Figure 1;

Figure 3 is a transverse sectional view taken substantially on the line 3—3 of Figure 2;

Figure 4 is an end view of a modified form of pontoon;

Figure 5 is a fragmentary sectional view taken substantially on the line 5—5 of Figure 4;

Figure 6 is a schematic side view illustrating apparatus in accordance with the present invention connected to raise a sunken vessel;

Figure 7 is a longitudinal sectional view through a boat showing an inflatable pontoon therein in inflated condition for maintaining the boat afloat despite a hole in the bottom of the boat;

Figure 8 is a plan view of a vessel showing pontoons of the form of Figures 4 and 5 distributed therearound in accordance with the present invention;

Figure 9 is a sectional view taken substantially on the line 9—9 of Figure 8, showing one of the pontoons on an enlarged scale;

Figure 10 is a view similar to Figure 9, showing the pontoon deflated;

Figure 11 is a schematic side view of a modified form of salvage apparatus including a harness connected to a sunken vessel and a raising pontoon; and

Figure 12 is an end view of Figure 11 on a greatly reduced scale.

Referring to the drawings in detail, and first to Figures 1 to 3 thereof, apparatus therein shown comprises a collapsible pontoon **10** comprising a hollow cylinder **12** of flexible impervious material having longitudinally spaced internal annular reinforcing bands **14** of flexible material on its side wall **13**. Secured through the bands **14** and the side wall **13** are shanks **16** having swivel eyes **18** on their lower ends to which vessel raising cables **20** are

adapted to be attached. Secured through the bottom of the side wall **13** at a point intermediate the ends of the cylinder **12** is a valve stem **22** of the type having therein a check valve (not shown) which prevents escape of fluid from the interior of the cylinder **12** but enables fluid, such as air, to be introduced into the cylinder by a suitable fluid supply pipe **24** which is connected in any conventional manner to a control valve **26** carried by a source of fluid pressure (not shown). If desired, a similar valve **28** which operates in a reverse direction from the valve **22** can be secured through the top of the side wall **13** of the cylinder **12** diametrically opposite the valve **22**, to which is connected a pipe **30** leading to the next adjacent pontoon so that a group of ponttons can be connected in series and inflated from a common source **26**.

In the modified form of the invention illustrated in Figures 4, 5 and 8 to 10, the pontoons designated generally **10′** are constructed substantially identically with those above described except for the fact that the valves **34** and **36** thereof are secured through the opposite end walls **15′** of the cylinder **12′**. These pontoons **10′** are secured by straps S embracing the cylinder, to the deck of a vessel V at selected locations and are connected in series through pipes **38** with a suitable source **40** of fluid under pressure which is lighter than the water. It will thus be seen that by establishing a flow of fluid from the source **40** through the pipes **38**, the pontoons **10′** can be inflated to supply buoyancy to the vessel V.

In employing the pontoons **10**, of Figures 1 through 3, inclusive, the lower ends of the cables **20** are connected to a sunken object O and to the endmost position of a series or group a fluid supply line **24** is connected which is connected to a source **42** of fluid under pressure, so as to inflate the pontoons and raise the object O.

The apparatus illustrated in Figures 11 and 12, comprises an elongated cylindrical pontoon designated generally **10*a*** from which salvaging cables **20*a*** depend, the pontoon **10*a*** being disposed over a sunken vessel V′ and the lower ends of the cables being coupled to a harness **44** which cradles the hull of the sunken vessel V′ so that when the pontoon **10*a*** is inflated from a source of fluid pressure **46** carried by a tender **48**, the buoyancy of the pontoon **10*a*** will raise the sunken vessel V′ so that it may be towed to a salvage station.

In stances where protection is desired for small boats, a collapsible pontoon designated generally **10*b*** is stowed in a convenient place in the boat in a collapsed condition with a hose **50** coupled to the inlet valve of the pontoon **10*b***, the hose **50** being in turn connected to a suitable source **52** of fluid under pressure which when expanded is lighter than water. In order to float the small boat in which the pontoon **10*b*** is located, when the boat is in danger of sinking, it is necessary only to open the valve **54** to establish communication between the source **52** and the pipe **50** to supply fluid pressure to the interior of the pontoon **10*b***. In the preferred form of the invention the fluid employed for inflating the pontoons is preferably compressed carbon dioxide which upon its release from its containing vessel expands to inflate the pontoon to which it is connected.

From the foregoing, it will be obvious that by providing flexible collapsible pontoons, they may be carried in collapsed condition into the interior of a sunken vessel through hatchways or the like and distributed at selected points throughout the hull and then coupled to a source of fluid under pressure, and thereby inflated to give buoyancy to the vessel. Obviously, where the pontoons are permanently fixed to the vessel, as illustrated in Figures 9 and 10, they will, in collapsed condition, take up very little space on the vessel.

While in the foregoing there has been shown and de-

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

What is claimed is:

1. Apparatus for raising a sunken vessel, comprising an elongated collapsible cylinder of flexible material having a side wall and opposite ends, said side wall having a top portion and a bottom portion, inflating and deflating valve means secured to and entering the cylinder, shanks spaced along the bottom portion of the cylinder side wall and secured to and depending from said bottom portion, said shanks having lower ends having eyes thereon to which salvage chains are adapted to be connected.

2. Apparatus according to claim 1, wherein stretchable

bands surround the cylinder and are secured to the cylinder side wall at the points of connection of the shanks of the side wall, the shanks being secured to the bands.

References Cited in the file of this patent

UNITED STATES PATENTS

350,184	Benninger	Oct. 5, 1886
387,933	Travis	Aug. 14, 1888
531,485	Turner	Dec. 25, 1894
1,293,900	Pendergast	Feb. 11, 1919
1,337,250	Meguerditchian	Apr. 20, 1920
1,740,231	Ellsberg	Dec. 17, 1929
2,391,326	McKinley	Dec. 18, 1945
2,508,800	Rinne	May 23, 1950
2,679,224	Sturtevant	May 25, 1954