United States Patent [19]

Muraki et al.

[11] **3,722,444**

[45] **Mar. 27, 1973**

[54] **STRUCTURE OF UNDER-WATER VEHICLE**

[75] Inventors: **Kiichi Muraki,** Hirakata; **Tadashi Yoda,** Neyagawa, both of Japan

[73] Assignee: **Kabushiki Kaisha Komatsu Seisakusho,** Tokyo, Japan

[22] Filed: **Apr. 20, 1971**

[21] Appl. No.: **135,702**

[30] **Foreign Application Priority Data**

Apr. 20, 1970 Japan 45/33029

[52] **U.S. Cl.** .....**114/16 R,** 61/69 R

[51] **Int. Cl.**.....**B63c 7/00**

[58] **Field of Search**.....114/16 R, 16 E, 52; 61/69 R

[56] **References Cited**

UNITED STATES PATENTS

1,523,660	1/1925	Reno	61/69 R
3,593,533	7/1971	Washington	61/69 R
1,364,143	1/1921	Reno	114/52

Primary Examiner—Milton Buchler
Assistant Examiner—Stuart M. Goldstein
Attorney—James E. Armstrong and Ronald S. Cornell

[57] **ABSTRACT**

The present invention relates to an under-water vehicle structure comprising connecting, through sealing material, open end fringe of the upper box whose lower side is opened to the open end fringe of the lower box whose upper side is opened, said lower box being fixed on the right and left main beams supported on the track-frames.

3 Claims, 5 Drawing Figures

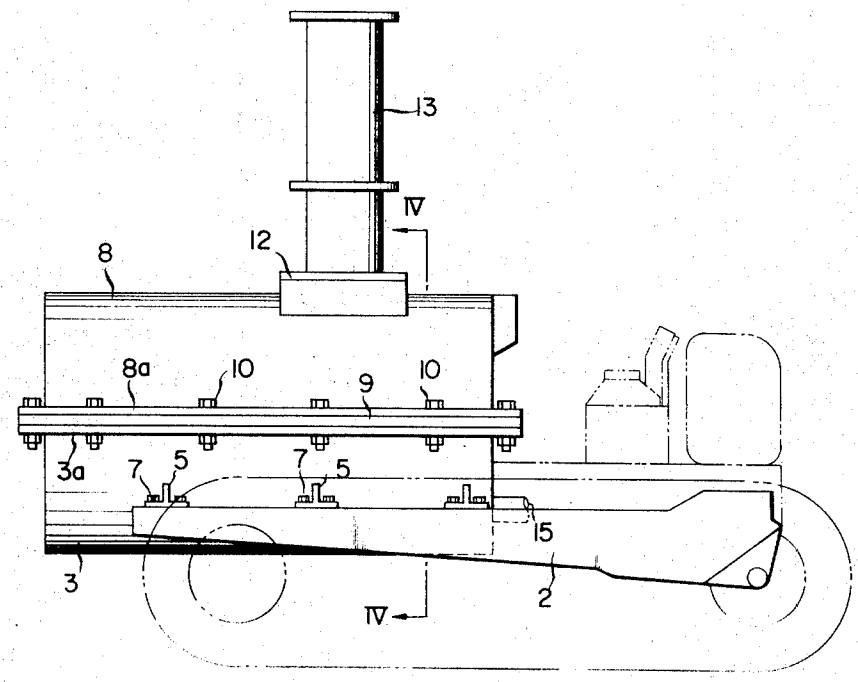


FIG. 1

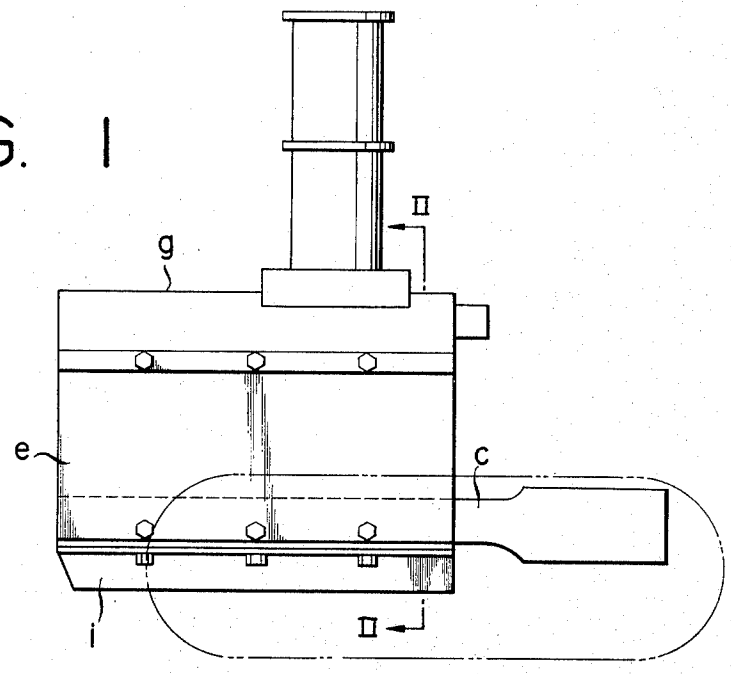


FIG. 2

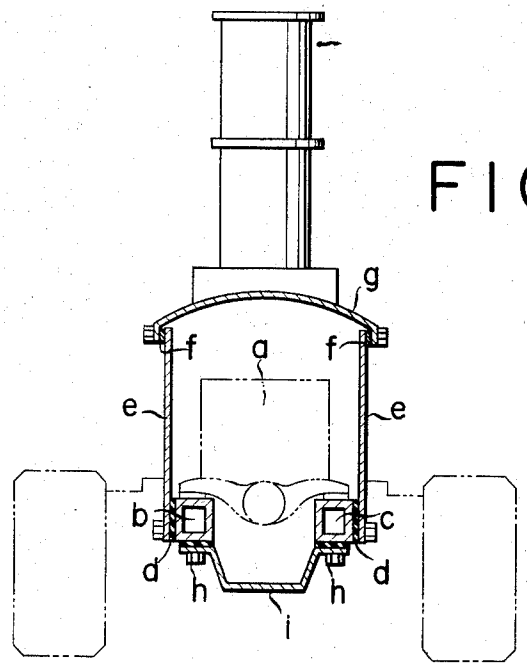


FIG. 3

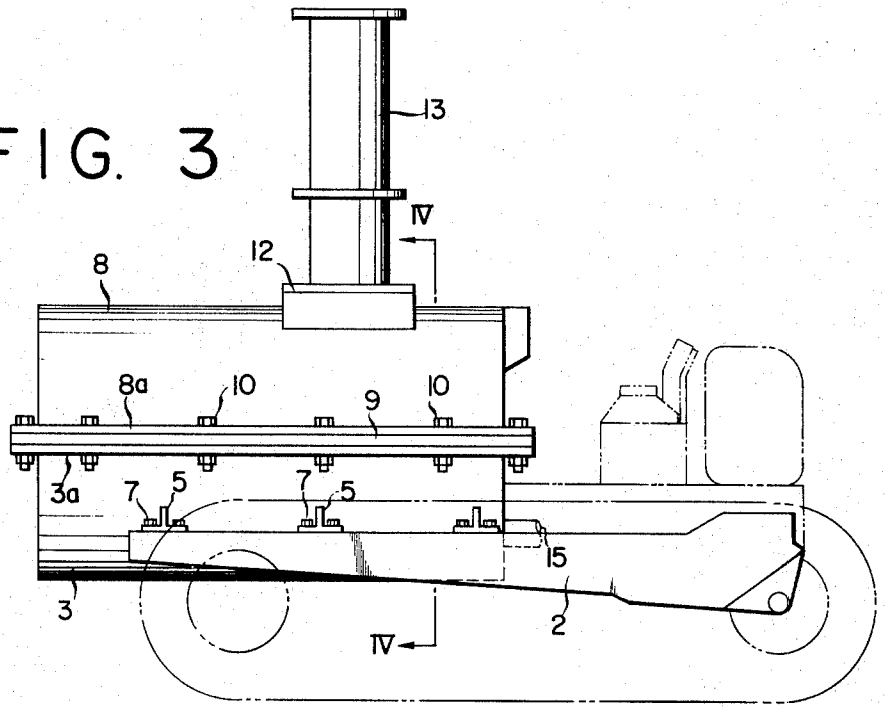

13
IV
12
8
8a
10
9
10
3a
7
5
7
5
15
3
IV
2

FIG. 4

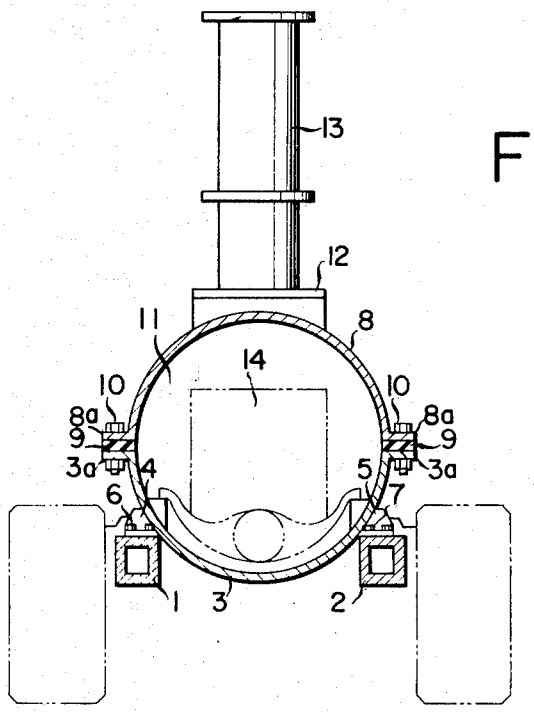
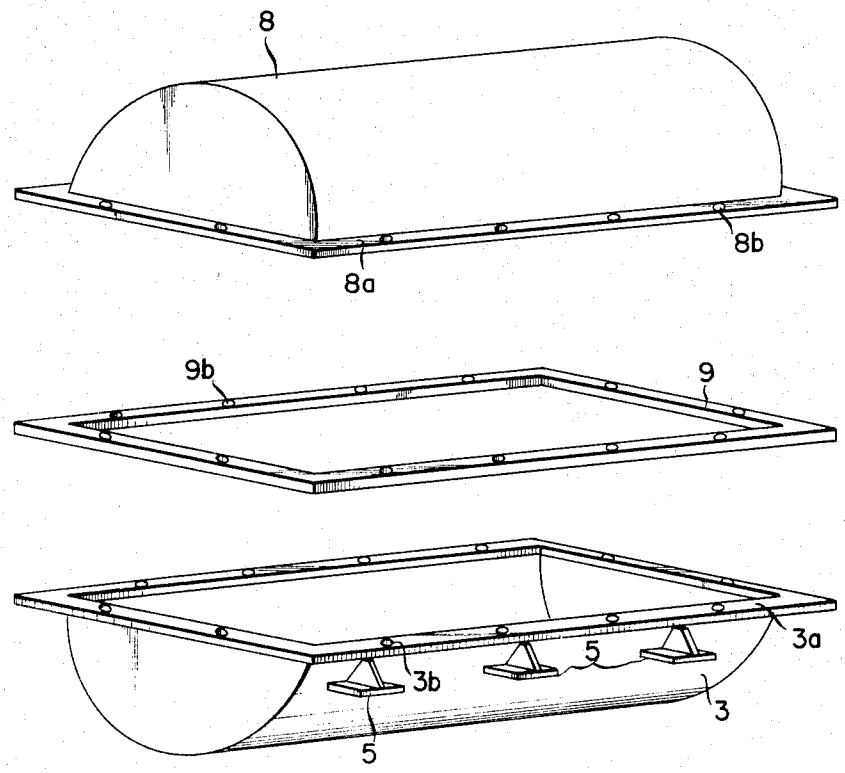

13
12
11
8
14
10
10
8a
8a
9
9
3a
3a
4
5
6
7
1
3
2

FIG. 5



STRUCTURE OF UNDER-WATER VEHICLE

SUMMARY OF THE INVENTION

The present invention relates to an under-water vehicle structure such as under-water bulldozer, and in particular, the present invention relates to the structure of the engine room.

The under-water vehicles that have recently been developed for completely under-water operations on a sea bottom or river bottom, and the newly developed under-water vehicles that are now actually in operation, and the conventional under-water vehicles have all been developed from the conventional vehicles for shore operation.

Namely, in the conventional under-water vehicle, the body has such a structure that as shown in FIG. 1 and FIG. 2. The side boards *e,e* are attached through the sealing materials *d, d* onto the outer side portions of the main beams *b,c* for mounting the engine *a*, the ceiling board *g* is provided on the upper portions of the side boards *e,e* through the sealing materials *f,f*, and in addition, the under-cover *i* is provided on the lower surface of the main beams *b,c* through the sealing materials *h,h*.

However, in the structure of the conventional under-water vehicle, a great number of sealing materials *d,d,f,f,h,h* as described above, must be used, and at the same time, the sealing materials for angular portions are required, and therefore the structure of the conventional under-water vehicle is complicated, and the sealability thereof is poor, and the water proofing effect thereof is not reliable, and this is considered to be a drawback of the structure of the conventional under-water vehicle.

In accordance with the present invention, the above mentioned drawback can be removed, and the object of this invention is to provide a simple under-water vehicle structure with excellent sealability, having less sealing portions.

Another object of the present invention is to provide such an of under-water vehicle structure that has great pressure resistant strength.

The structure of the under-water vehicle of the present invention is characterized in that the open end fringe of the upper box whose lower portion is open is connected to the open end fringe of the lower box which is attached to the right and left main beams supported by the track frames, the upper portion of said box being opened, through sealing materials.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 and FIG. 2 show the body of a conventional under-water vehicle; FIG. 1 is a diagram showing the side view thereof, and FIG. 2 is a diagram showing the cross sectional view across II—II line of FIG. 1.

FIG. 3 through FIG. 5 are the diagrams showing an embodiment of the present invention; FIG. 3 is a diagram showing the side view of the embodiment of the present invention; FIG. 4 is a diagram showing the cross sectional view across IV—IV line of FIG. 3; FIG. 5 is a diagram showing a perspective view of the engine room structure.

DETAILED DESCRIPTION OF THE INVENTION

An embodiment of the present invention is explained in accordance with FIG. 3 through FIG. 5.

1,2 are the right and left main beams supported by track frames (not shown).

3 is the lower box whose lateral cross sectional view is of half cylindrical form, the upper portion thereof being opened, and on the outer right and left sides of the lower box **3**, a plural number of brackets **4,5** are fixed, and said brackets **4,5** are bound with the binders **6,7** such as bolts on the upper surface of said main beams **1,2**.

On the upper end fringe of said lower box **3**, the flange **3***a* is projected out.

8 is the upper box whose lateral cross sectional view is of half cylindrical form, the lower portion thereof being opened, and the flange **8***a* projected out is formed on the lower end fringe of said upper box **8**.

The holes **3***b*, **8***b* for bolts are provided on the respective flanges **3***a*, **8***a*.

9 is a sealing material such as rubber, and the hole **9***b* for bolt is provided on said sealing material as in the case of said flanges **3***a*, **8***a*.

Therefore, the flange **8***a* of the upper box **8** is placed on the flange **3***a* of said lower box **3** through said sealing material **9**, and the binders **10** such as bolts are inserted through said holes **3***b*, **9***b*, **8***b* to bind the two boxes **3,8** to form the engine room **11**.

The attachment base **12** is formed on said upper box **8** and the air removing duct **13** is provided on said base **12**.

The output shaft **15** of the engine **14** is projected water tightly and rotatably from the rear surface of said lower box **3** towards the rear side thereof.

The present invention has such a structure that, as described above, the upper box whose lower portion is opened is connected, through sealing material, to the lower box whose upper portion is opened, which is attached to the main beams through brackets by means of binders to form the body, and therefore the sealed portion is reduced to the effect that excellent sealability can be attained, and the structure becomes simple.

In addition, the engine room is formed with the upper box and lower box, and therefore the engine room is independent and thus the assemblage or disassemblage and repairing of the engine can be carried out easily, and the operability can be remarkably improved.

On the other hand, the lateral cross sections of upper box and lower box are shaped into half cylindrical form and therefore when the two boxes are connected, cylindrical enclosure can be formed, and thus the pressure resistant strength can be increased.

Other variations of the foregoing embodiments of the invention will be apparent to those skilled in the art.

What we claim is:

1. An underwater vehicle structure comprising right and left main beams supported on track frames and a lower box which is attached to said main beams, the upper portion of said lower box being opened, an upper box whose lower portion is open, said upper and lower boxes in contacting engagement along the opening peripheries with sealing material therebetween, and binding members connecting the opening peripheries, wherein the lateral cross sections of the upper and lower boxes is semi-cylindrical in form, with flange members projecting perpendicularly out from that portion of each box which defines the opening, and the

longitudinal axis of the cylinder formed by the combination of boxes is essentially parallel to the surface upon which the device operates, and wherein an attachment means is formed on said upper box, an air removing means extends up from said attachment means and a shaft projects from the rear surface of the lower box.

2. An underwater vehicle structure according to claim 1 wherein fastening elements extend from the lower box surface fixing said box to the main beams.

3. An underwater vehicle structure according to claim 1 wherein the upper and lower boxes are fastened together with fastening means extending through predesigned holes in the flange portions and sealing material, and said sealing material is rubber.

* * * * *