No. 827,477. PATENTED JULY 31, 1906.

J. G. F. TITO.

MEANS FOR RAISING SUNKEN VESSELS.

APPLICATION FILED JUNE 12, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

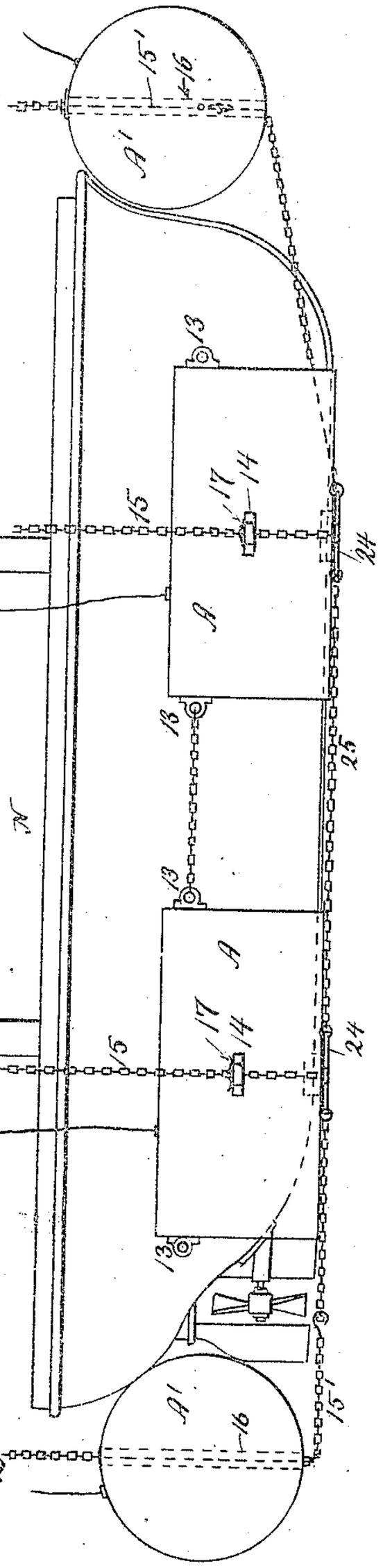
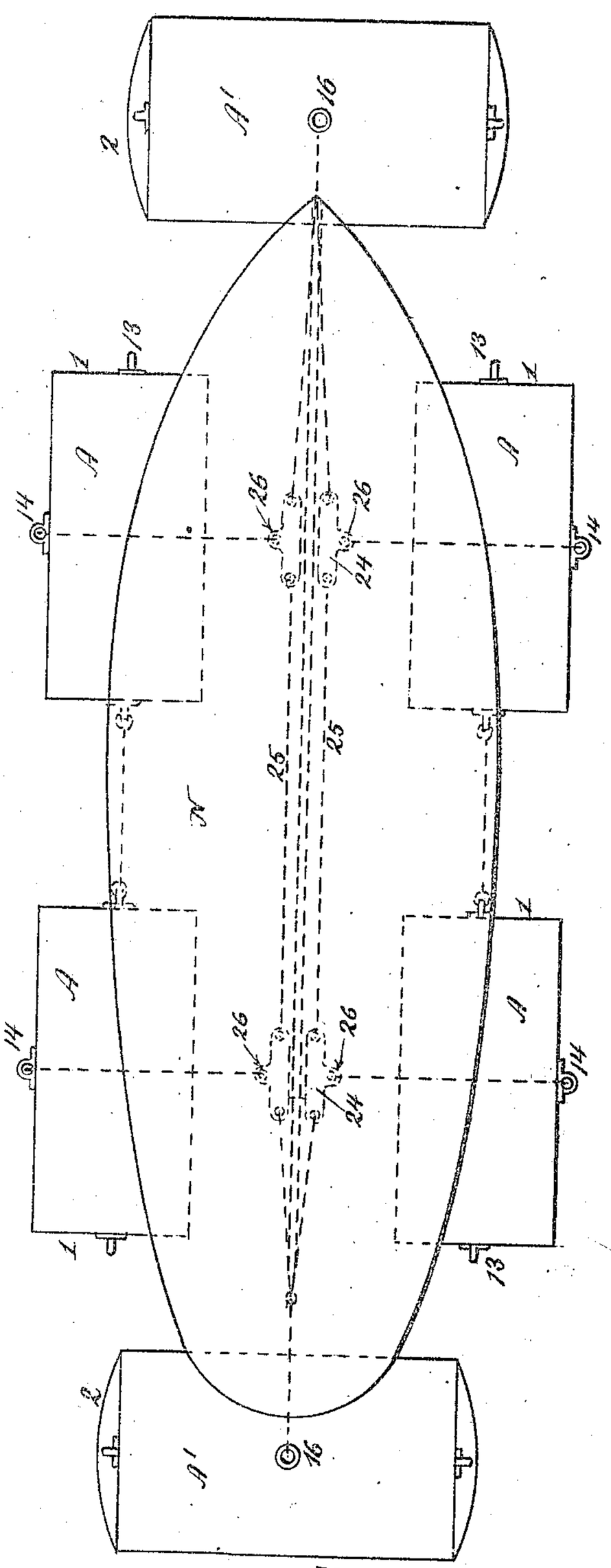


Fig. 2.



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Inventor:
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2 SHEETS—SHEET 2.

Fig. 3.

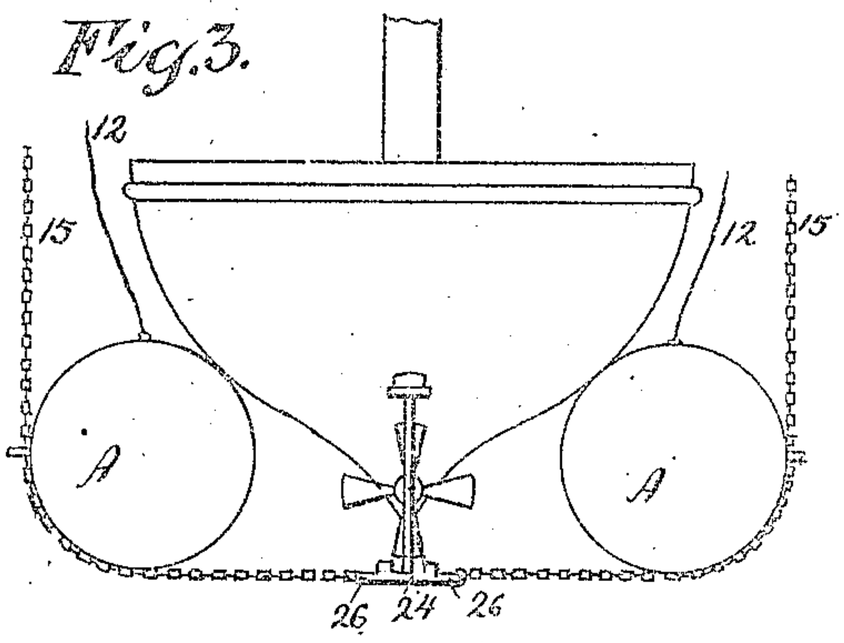

Fig. 4.

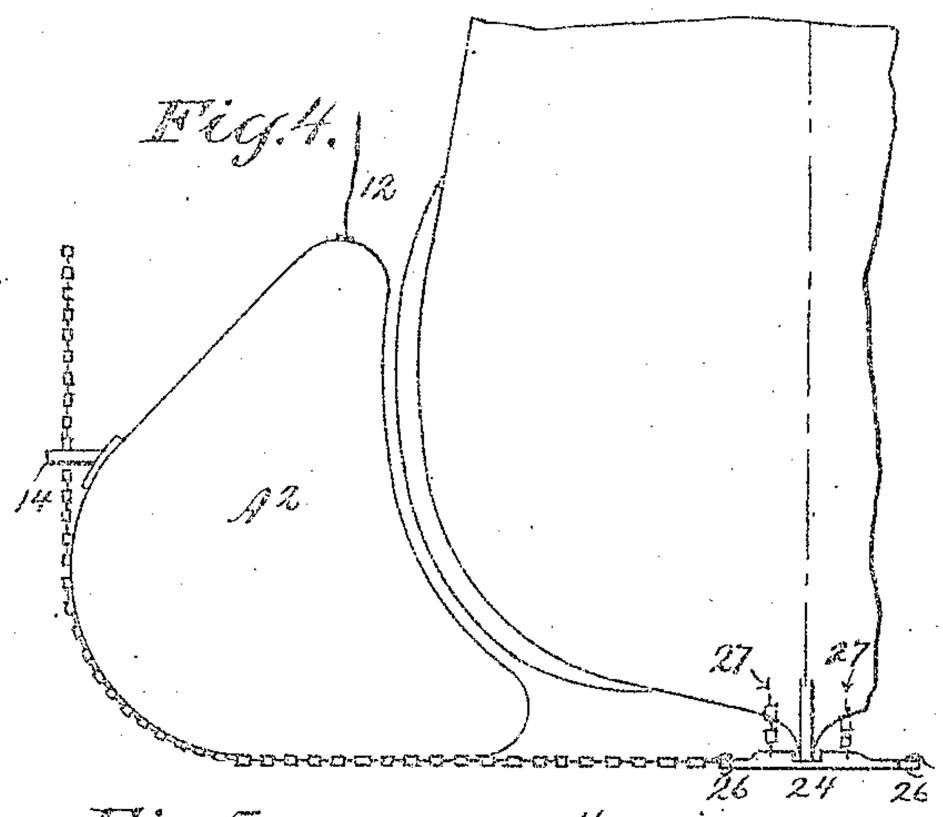

Fig. 6.

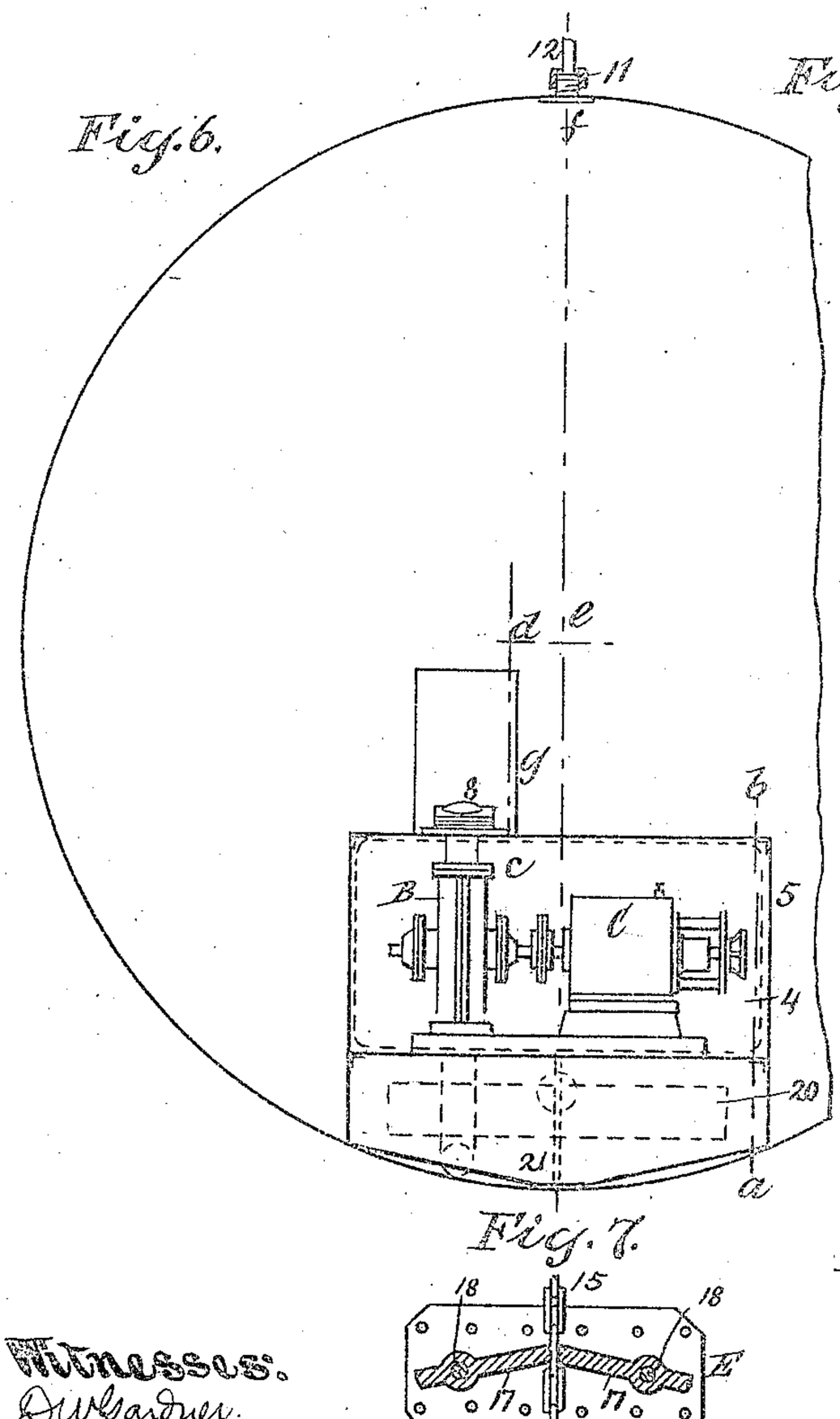

Fig. 5.

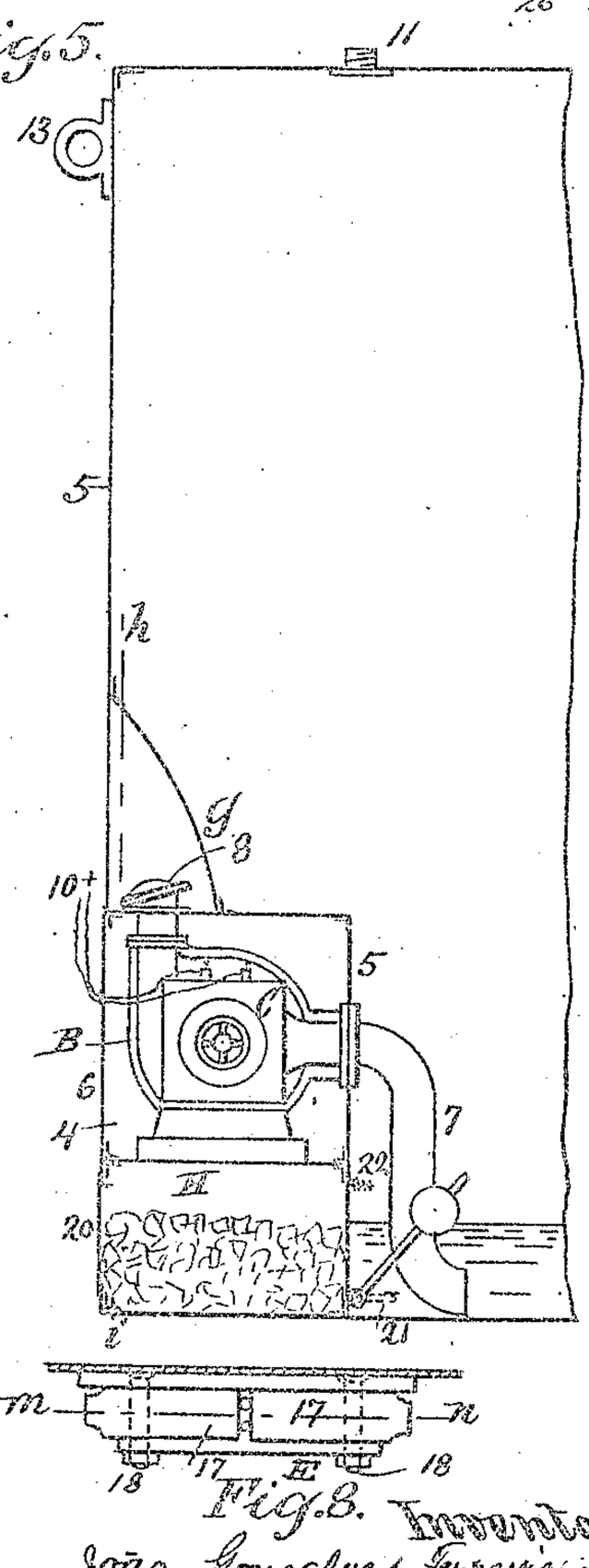

Fig. 7.

Fig. 8.

Witnesses.
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UNITED STATES PATENT OFFICE.

JOÃO GONÇALVES FERREIRA TITO, OF RIO DE JANEIRO, BRAZIL.

MEANS FOR RAISING SUNKEN VESSELS.

No. 827,477. Specification of Letters Patent. Patented July 31, 1906.

Application filed June 12, 1906. Serial No. 264,976.

To all whom it may concern:

Be it known that I, JOÃO GONÇALVES FERREIRA TITO, dentist, a citizen of the Republic of Brazil, residing at 31 Rua General Camara, Rio de Janeiro, Brazil, have invented certain new and useful Improvements in Means for Raising Sunken Vessels, &c., of which the following is a specification.

My invention relates to submarine apparatus used to raise submerged vessels or other objects.

It is designed to afford simple but effective means which may be quickly and conveniently applied to the object to be raised in such manner that the several parts are held firmly against slip or displacement.

The invention consists in the combination with suitable caisson-buoys, each provided with adequate means of exhausting water therefrom, of keel or supporting plates to which the harness cables or chains are attached, and toggle guide-clutches upon the caisson-buoys for the lateral support of the suspender-chains, which allow the caisson-buoys to slide downward upon said suspender-chains, but automatically grip the same when any back or upward pressure is exerted by the caisson-buoys, substantially as hereinafter described and claimed specifically.

In the accompanying drawings, Figure 1 represents a side elevation of a ship under water with my appliances applied thereto. Fig. 2 is a plan of the same; Fig. 3, an end view; Fig. 4, a view showing a modified form of float or caisson-buoy; Fig. 5, a vertical section of one end of a caisson-buoy on plane of line *f*, Fig. 6; Fig. 6, an end elevation of one end of a caisson-buoy, partly in section, upon plane of line *h i*, Fig. 5. Fig. 7 is a section upon plane of line *m n*, Fig. 8. Fig. 8 is a top view of one of the toggle guide-clutches.

The caisson-buoys A A' A^2 may be of any desired shape and capacity, but are preferably of cylindrical form with either flat (1) or convex (2) ends, and are provided with means for discharging water from their interiors. Various well-known expedients may be resorted to for this purpose—as, for example, a reservoir in which a gaseous fluid has been stored under high pressure, which when released ejects water from the body of the caisson-buoy. I prefer to use, however, for this purpose a centrifugal pump B, Figs. 5 and 6, in conjunction with a dynamo C for operating the same. The pump and dynamo may be arranged in a water-tight compartment 5, having an opening 4, closed by a removable door 6.

7 is the suction-pipe for the pump, and 8 is the discharge-valve situated in a recess external to the caisson-buoy.

10 represents electric wires connecting the dynamo C with a suitable source of electricity.

In Figs. 5 and 6 a hollow coupling 11 is represented for the attachment of a flexible tube represented by the line 12, said tube being of sufficient strength to avoid collapse under the pressure of external water. Each caisson-buoy is thus provided with a coupling and tube for the purpose of admitting atmospheric air.

13 represents eyelets or staples upon the caisson-buoys by means of which they may be chained together, as indicated in Figs. 1 and 2.

14 represents automatic toggle guide-clutches attached to the sides of the caisson-buoys, said automatic clutches being shown in detail in Figs. 7 and 8 and being used for the purpose of engagement with the guide-chains 15, by which the caisson-buoys when immersed are conducted to their respective positions upon or with relation to the object to be raised, the lower ends of said guide-chains 15 being attached by means of eyelets 26 to the keel or supporting-plates 24. The keel or supporting plates 24 are coupled together by chains 25. From the keel-plates 24 the guide-chains 15 pass upward between the toggle-arms 17, Figs. 7 and 8, each of which is pivotally supported upon a fixed pin 18, projecting from a plate secured rigidly to the side of a caisson-buoy. The toggle-arms 17 are of such length and are so arranged that they are free to yield upward to admit of their passage over the guide-chain 15 during the descent of the caisson-buoy, but pinch and hold the chain firmly when the caisson-buoys strain upward, thereby utilizing the portions of guide-chains 15 below the automatic clutches 14 as lifting-chains.

H represents a water-tight compartment containing a supply of carburet of calcium, said compartment being provided with a door 20.

21 is a float-cock for regulating the admission of water from the interior of the caisson-buoy into the compartment H, and 22 is a valve for admitting into the interior of said caisson-buoy the gas produced by the con-

tact of the water with the carburet of calcium when the level of water in the caisson-buoy reaches the height predetermined for the generation of the gas. In this case the air-tube 12 is not needed.

The manner of using the apparatus is as follows: Supposing, for example, that a ship N is submerged and is to be raised. The caisson-buoys A′, filled with water, are first firmly secured to the prow and to the stern of the vessel by means of cables or chains, and then the water in these caisson-buoys A′ is exhausted by pumps or other means. The caisson-buoys A′ then operate to straighten out the ship and lessen the pressure of the same against the sea-bottom, thus permitting the placing of the keel-seats or supporting-plates 24, the latter when located being secured in position by means of the chains 15′ passing through the aperture 16, provided in the caisson-buoys A′. To the eyelets 26 of the keel-plates or supports are then secured the ends of the chains 15, and along these are caused to descend the caisson-buoys A, filled with water, to the sides of the ship near its keel, the automatic clutches 14 finally securing the caisson-buoys A in position with the lower portions of the chains 15 taut. The water contained in the buoys A is then exhausted in order that they may develop their full lifting capacity in conjunction with the buoys A′ to raise the vessel to the surface.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with caisson-buoys each provided with means for exhausting water therefrom, of automatic clutch-guides upon said caisson-buoys, guiding and lifting chains passing through said automatic clutch-guides, supporting-plates attached to the lower ends of said guiding and lifting chains and coupling-chains connecting adjoining supporting-plates, for the purpose described.

2. In apparatus of the character designated, the combination of the caisson-buoys A and A′, each provided with means for exhausting water therefrom, automatic clutch-guides 14 secured to the sides of the caissons A, guiding and lifting chains 15 passing through said automatic clutch-guides and attached at their lower ends to supporting-plates 24, coupling-chains 25 connecting said supporting-plates, and guiding and lifting chains 15′, attached to said supporting-plates 24 and passing through the caisson-buoys A′, substantially in the manner and for the purpose described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOÃO GONÇALVES FERREIRA TITO.

Witnesses:

JULES GERAUD,

E. ALEXANDRE.