

No. 652,970.

Patented July 3, 1900.

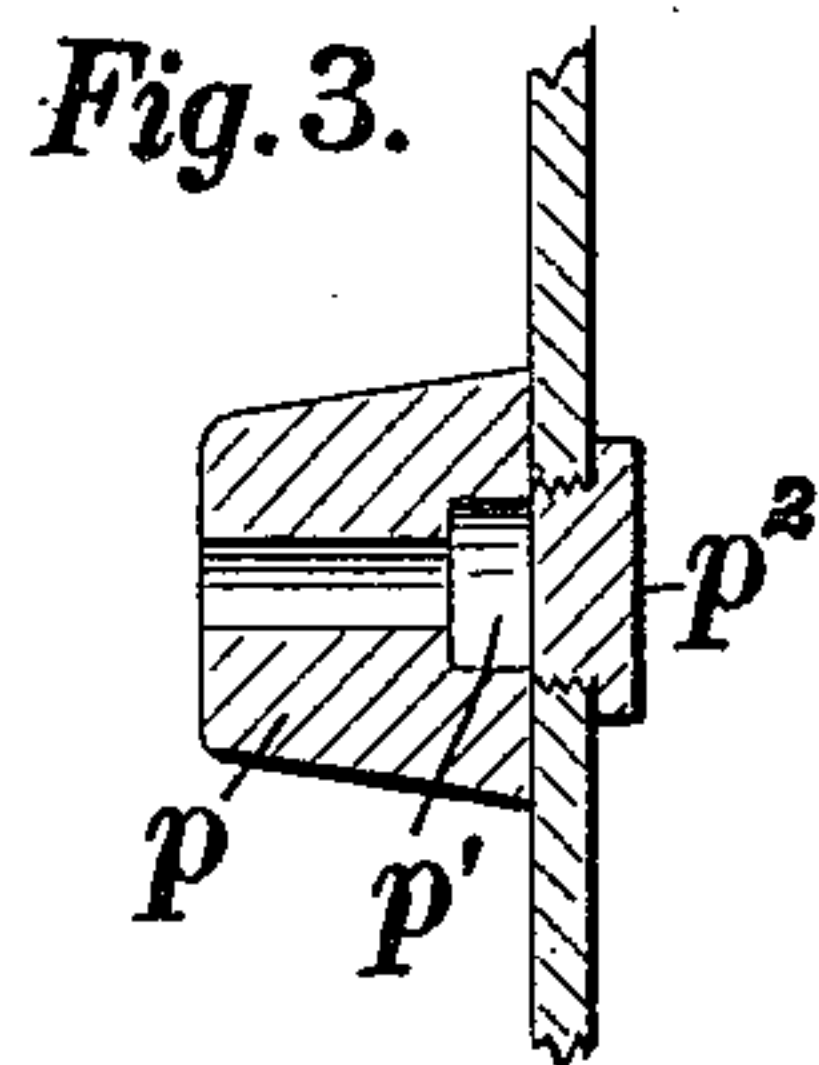
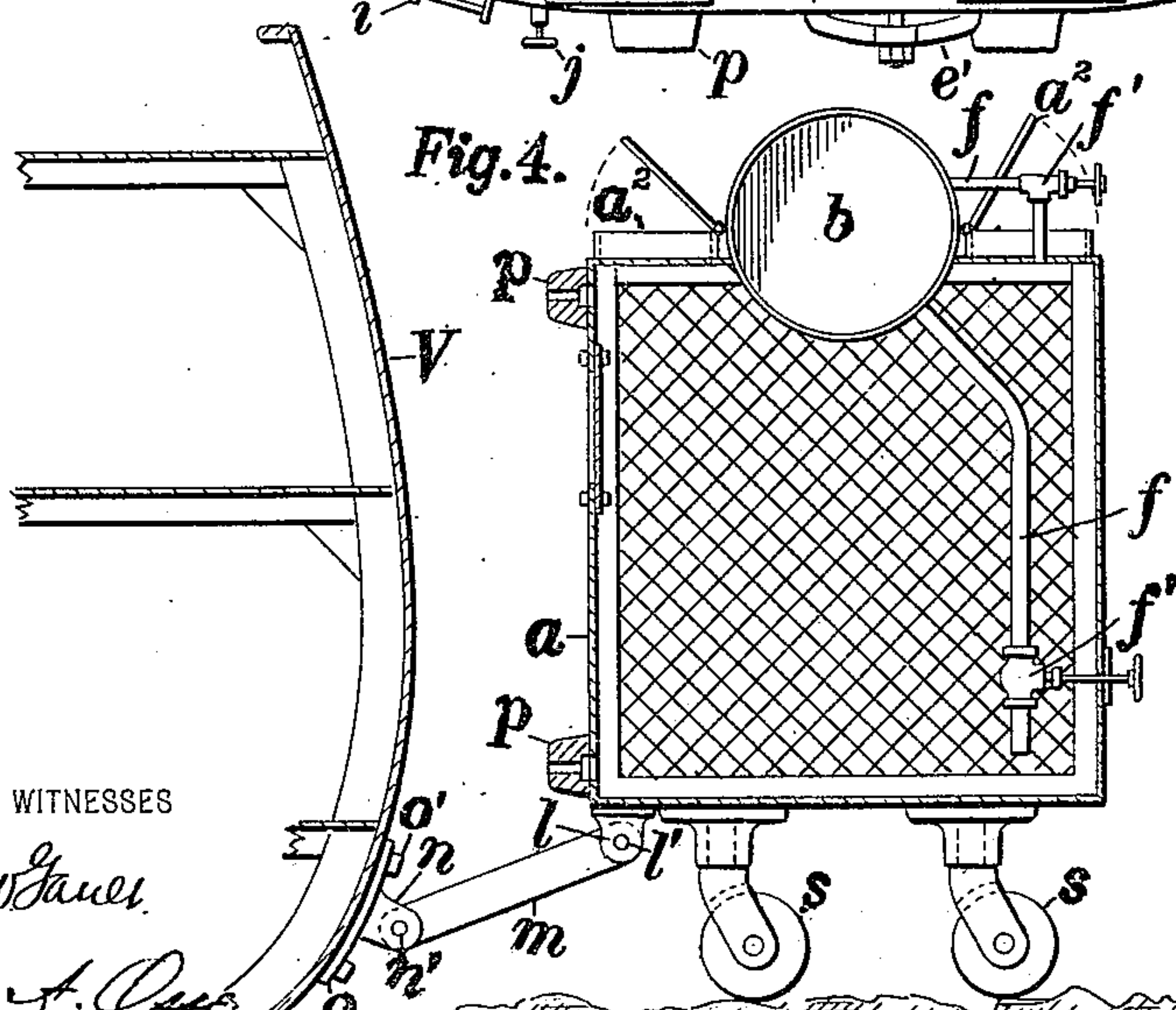
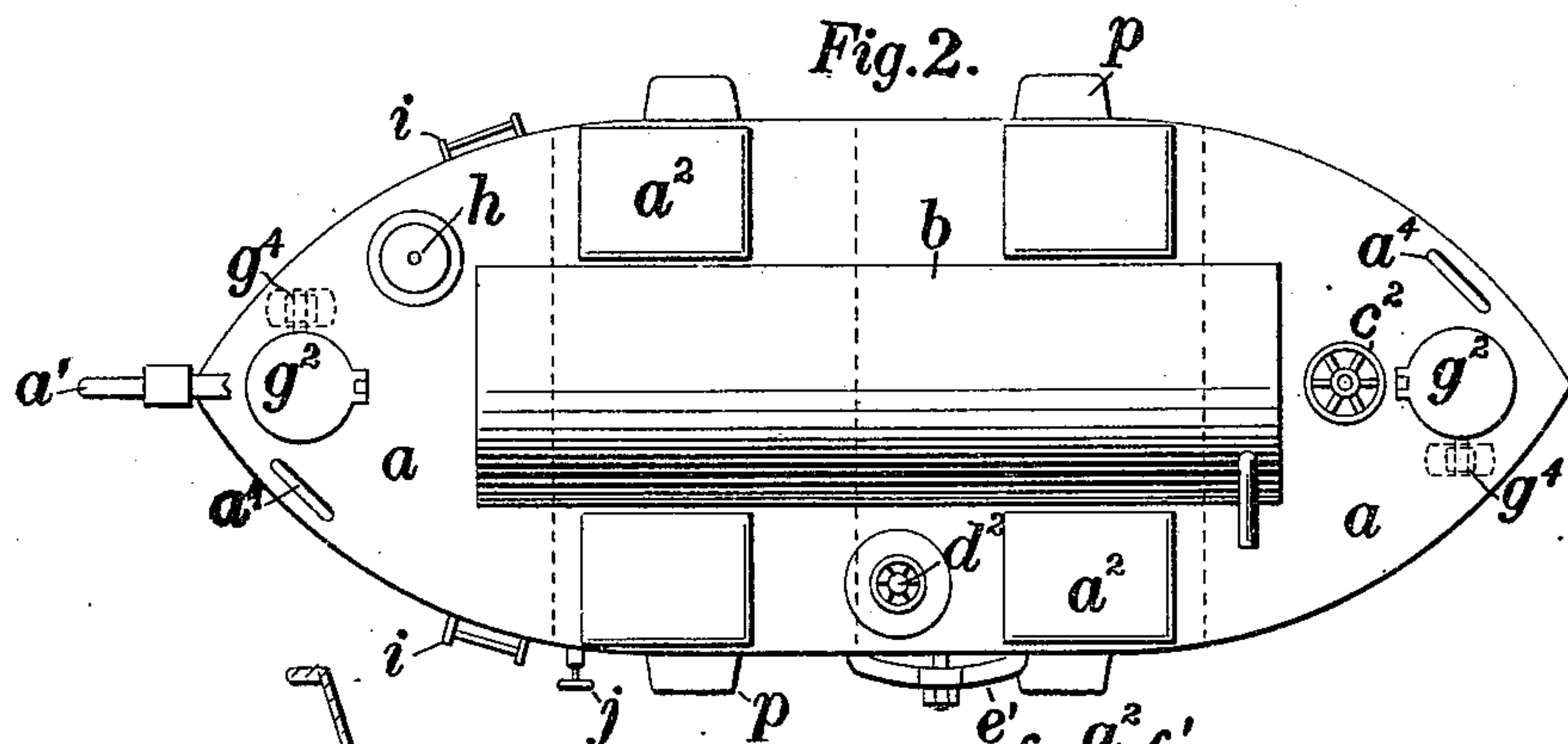
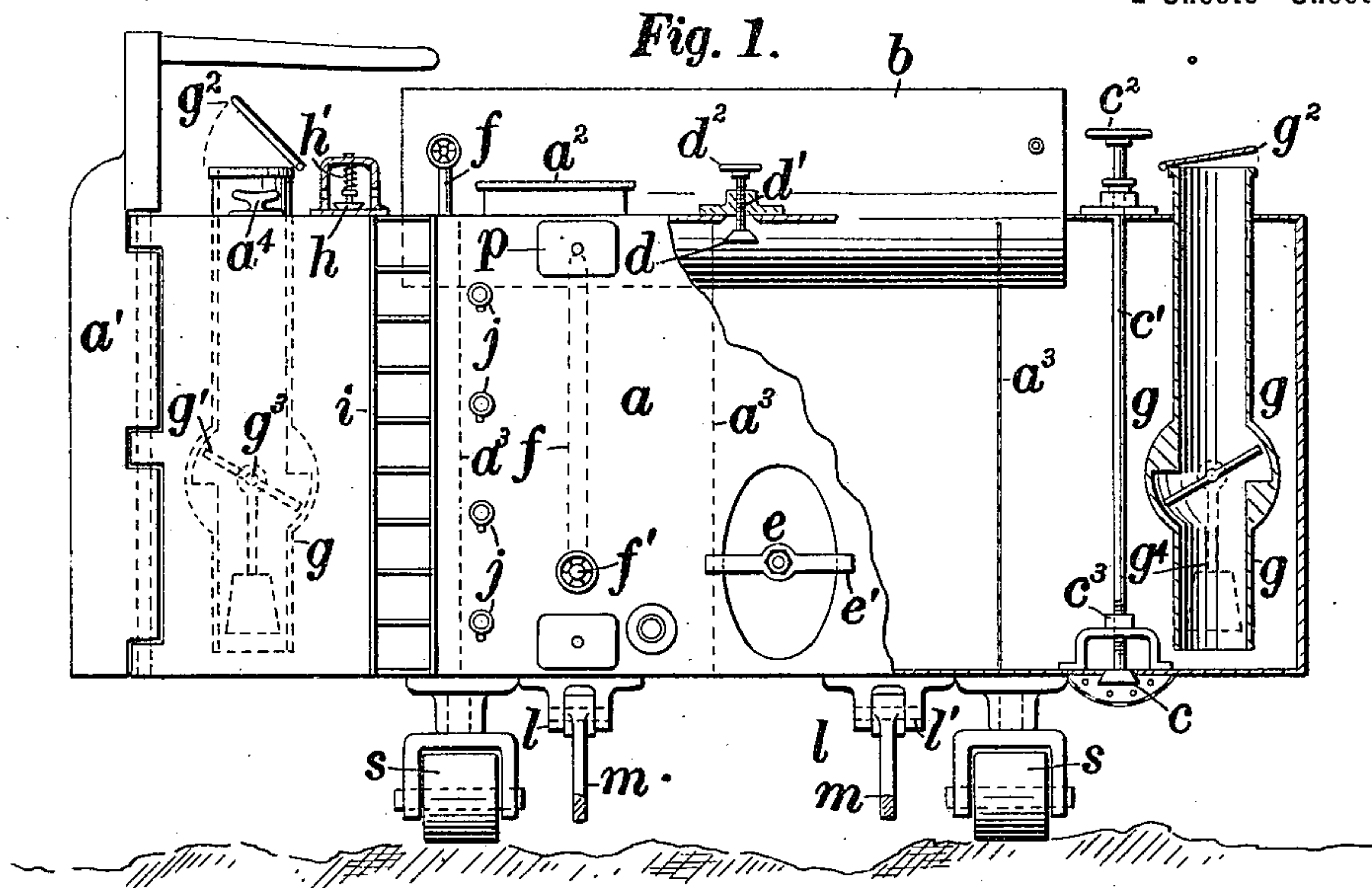
S. LAKE.

APPARATUS FOR RECOVERING CARGOES FROM SUNKEN VESSELS.

(Application filed Mar. 10, 1898.)

(No Model.)

2 Sheets--Sheet 1.



WITNESSES

Jas. W. Ganes.  
Edw. A. Rice.

INVENTOR.

Simon Lake

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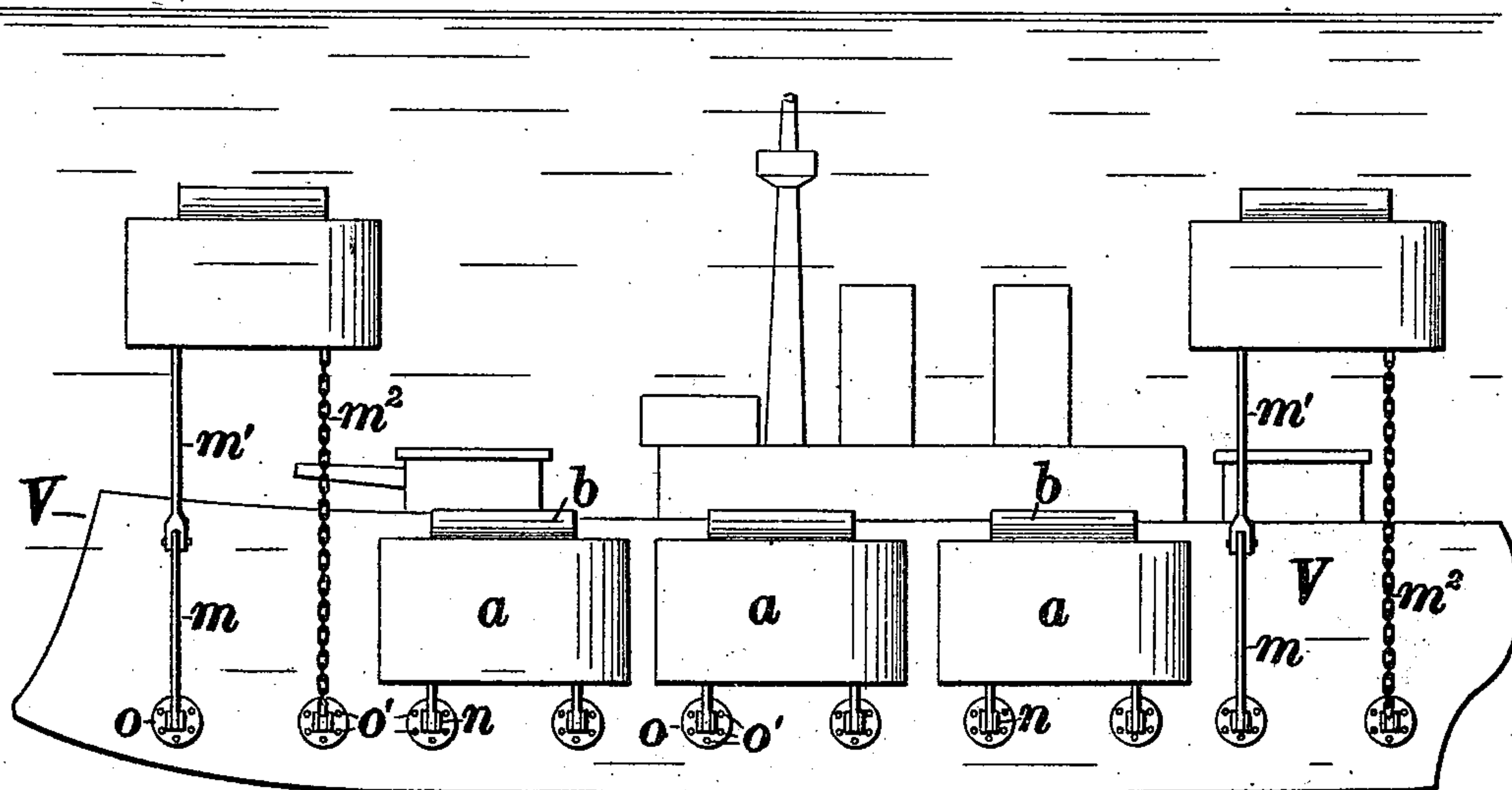


Fig. 5.

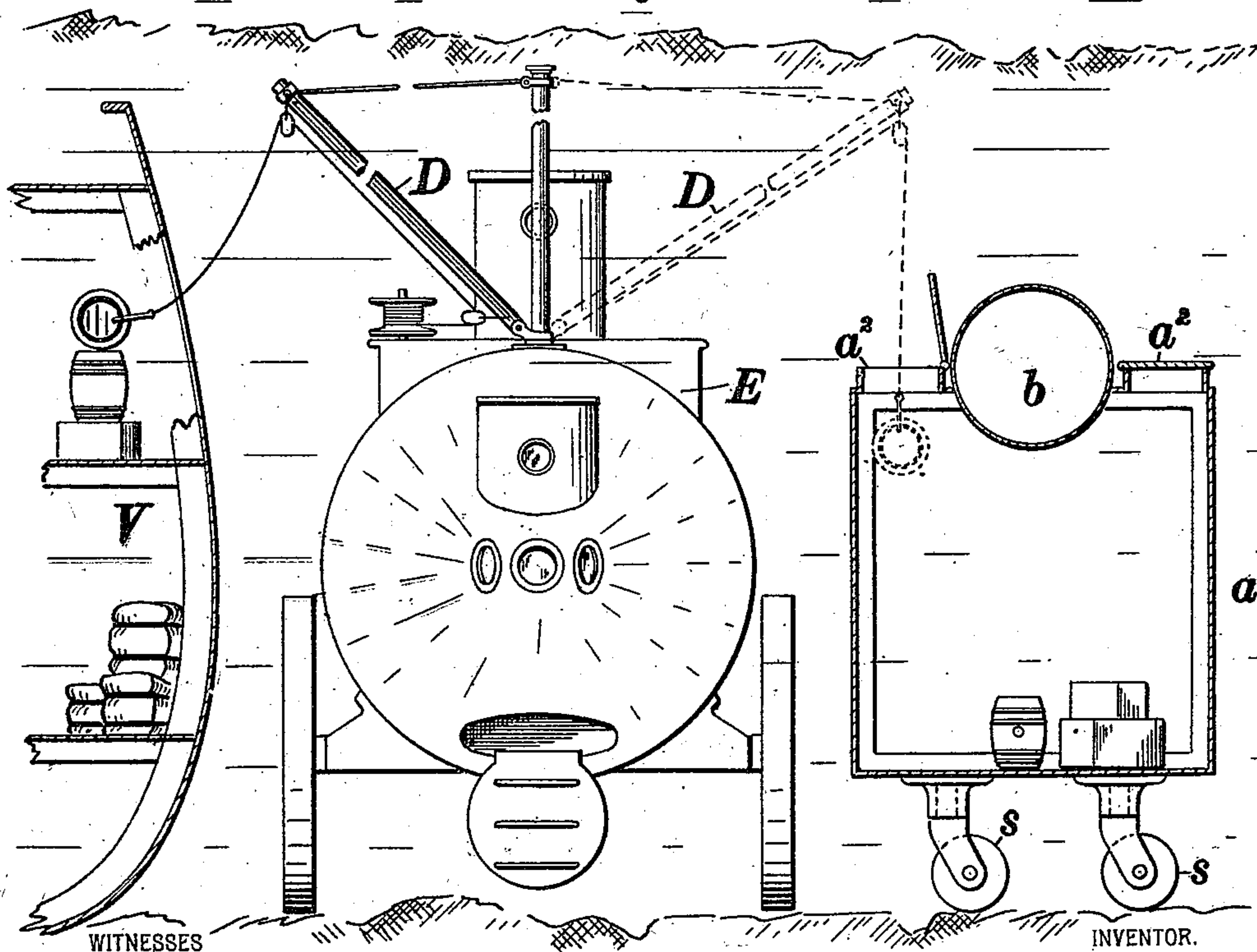


Fig. 6.

James G. Gales,  
Edward A. Osce,

Simon Lake



# UNITED STATES PATENT OFFICE.

SIMON LAKE, OF BALTIMORE, MARYLAND.

APPARATUS FOR RECOVERING CARGOES FROM SUNKEN VESSELS.

SPECIFICATION forming part of Letters Patent No. 652,970, dated July 3, 1900.

Application filed March 10, 1898. Serial No. 673,357. (No model.)

*To all whom it may concern:*

Be it known that I, SIMON LAKE, a citizen of the United States, and a resident of Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in Apparatus for Recovering Cargoes from Sunken Vessels, of which the following is a specification.

This invention has for its object, primarily, to provide a means for unloading the cargoes of sunken vessels wholly beneath the surface of the water where it is possible to avoid the difficulties commonly met in the employment of apparatus of which a portion is carried by a vessel floating upon the surface, where it is necessarily subjected to the changing effects of the weather, and consequently the condition of the water at the surface.

The invention consists, essentially, in a submergible car comprising an air-tight tank or receptacle having air and water valves for use in admitting and expelling air and water to and from the same, means external there- to for operating said valves, and a hatch or hatches for admitting freight to the interior of the same. This tank or receptacle is preferably provided with depending caster-wheels for supporting the same movably upon the water-bed when submerged, in order that it may be shifted freely thereupon, and as so constructed may be readily drawn upon the sea-bed to and from the sunken vessel to be operated upon by means of a submarine motor-car such as is described in my prior patent, No. 557,835, issued April 7, 1896. Whether it be towed upon the surface or upon the water-bed, it will be found necessary in practice at such time to render it buoyant, or nearly so, in order that its weight upon the supporting-wheels may be light or may be wholly removed to enable the tank to rise to the surface.

The invention further includes apparatus of specific construction and arrangement of parts, whereby it is adapted to not only receive and transport freight from submerged wrecks, but to raise the latter also, all as set forth in the claims attached hereto.

In the drawings annexed, Figure 1 is a side elevation of the apparatus embodying the me-

chanical features of the invention with a portion of the side broken away to expose its interior construction and arrangement of parts. Fig. 2 is a plan of the same. Fig. 3 is a section, upon a larger scale, of one of the bolt-hole guards hereinafter described. Fig. 4 is a cross-sectional elevation showing the apparatus attached to the side of a sunken vessel for the purpose of raising the latter. Fig. 5 is an elevation showing a series of such tanks fastened to and in the act of raising a sunken vessel from the water-bed. Fig. 6 is an elevation, partly in transverse section, of a submarine wrecking-car engaged in transferring the cargo from a submerged wreck to a submerged tank or car constructed in accordance with my invention.

The apparatus consists, essentially, of an air and water tight tank or receptacle *a*, having preferably flat sides and pointed or wedge-shaped ends and a rudder *a'* at one end. This tank is mounted upon supporting caster-wheels *s* for sustaining the same movably upon the water-bed when submerged. The top is provided with hatches *a<sup>2</sup>* for the reception of freight into the interior, which is divided into a series of compartments by gratings or lattice-work bulkheads *a<sup>3</sup>* for preventing the shifting of the load when the apparatus is in motion. Cleats *a<sup>4</sup>* are provided for use when the car is being towed upon the surface or the water-bed or for other purposes.

The car is provided at the top with a preferably-cylindrical compressed-air reservoir *b* of such size and displacement as to nearly maintain the buoyancy of the structure even when the tank is filled with water. By this means the internal and external pressures upon the walls of the tank may be maintained approximately equal under all conditions, retaining practically their initial relations at any depth below the surface, as the structure will not sink until filled with water, when free communication may be established between the interior and exterior. As it is desirable to provide a compressed-air supply for effecting the expulsion of the contained water when desired, I prefer the form of reservoir shown, which adapts it for the twofold purpose; but it is obvious that a compressed-



air reservoir or receiver could be readily partitioned off the interior of the tank (the same being suitably stayed to give the necessary strength and stiffness) for maintaining the buoyancy of the structure until the remaining space is filled with water, or the tank could be made with double walls with intermediate air-space to provide such air-reservoir.

10 A water-inlet valve *c* is provided in the bottom of the tank *a* to admit water to the interior for overcoming its initial buoyancy, the same having a stem *c'* extended upwardly through the top of the tank and provided  
15 with a hand-wheel *c''* for turning the same. The valve-stem *c'* is threaded where it passes through the internally-threaded bearing *c'''*, whereby the rotation of the stem by means of its hand-wheel operates to open or close  
20 the valve. The air-outlet valve *d* in the top, having threaded stem *d'* with hand-wheel *d''*, serves to permit the escape of air displaced by water admitted through the valve *c*. To submerge the car, it is only necessary to open  
25 the valves *c* and *d*, when the filling of the tank with water operates to destroy the normal buoyancy and causes the car to sink to the water-bed, where it rests upon its supporting caster-wheels *s* and serves as a submarine car capable of being shifted with ease  
30 into the desired relation to the sunken vessel whose cargo is to be transferred into the same.

Access to the interior is provided to divers without by means of the manhole *e*, with  
35 fastening-bar *e'*, which may be readily removed, the water-pressures upon both sides being equal during submergence. The transfer of freight may be effected by means of a derrick *D* upon the submarine wrecking-car  
40 *E* from the hatches or a hole made in the side of the sunken vessel, as *V*, Fig. 6, and through the hatches of the car *a*, where it serves to displace a portion of the contained water. After the hatches are again shut down and  
45 the car closed up the opening of either of the valves *f' f'* in the air-outlet pipes *f f*, leading from the air-reservoir *b* into the interior of the car, serves to displace the whole or a portion of the contained water through the  
50 water-outlet pipes *g*, extended downward from the top at the opposite ends of the car, whose pivoted gate-valves *g'* are normally open for the purpose. These outlet-pipes are provided each at the top with caps *g''*, hinged  
55 thereto upon one side and operating as self-closing valves which open only when the pressure underneath exceeds that of the surrounding water, but remain normally closed at other times. The stems *g'''* of the valves *g'* are provided externally to the pipes *g* with depending weighted arms *g''''*, acting as pendulums in maintaining said valves in their normally-open relation. While the valve-seats lie in a plane transverse to the pipes, the valves are  
65 retained in oblique relation thereto, each being inclined downwardly and inwardly toward

the center of the car, so that in case one end of the car should rise above the level of the other in the manipulation of the structure the pendulum-actuated valve *g'* at such end  
70 would close automatically to prevent the escape of air through the pipe *g* and the similarly-actuated valve at the opposite end would open still wider for the expulsion of the contained water collected in such end. 75

It is obvious that other means governed by the trim of the car may be substituted for that specifically shown and described herein without departing from the present invention and that such automatically-controlling devices  
80 may be applied equally well to the air or water inlet or outlet valves which regulate the quantity of water contained in the car, and the term "water-valves" as employed in the claims annexed hereto is thus to be understood as applying to any such valves governing either directly or indirectly the admission or expulsion of water to and from the interior of the car. 85

In case the water should be expelled so rapidly as to enable the car to suddenly rise to the surface, where the external water-pressure would be relieved without a corresponding reduction of the internal air-pressure, which might prove excessive for the strength  
90 of the tank *a*, an air-relief or safety valve *h* is provided, which may be set to blow off at a given excessive pressure, so as to insure the escape of the surplus air under such condition. This relief-valve is obviously closed automatically upon the reduction of the abnormal internal air-pressure by means of the spring *h'*. 95

For convenience of divers when the car is resting upon the water-bed a ladder *i* is provided upon one side for access to parts requiring to be operated from the top, and a series of gage-cocks *j* is provided near the ladder for determining the height of the water within when the car is closed. 100

While it may be found preferable usually to tow the car to the vicinity of the wreck while floating upon the surface, there are conditions when it will be found desirable to operate the car wholly beneath the surface and  
110 while resting upon the water-bed, it being maintained so nearly bouyant as to rest very lightly upon its supporting-wheels while being towed to and from the vicinity of the wreck and the place of unloading. The latter conditions may be found to prevail during stormy weather, when it would be impracticable to venture out into rough water upon the surface, in which case all the operations of recovering the cargo could be readily performed  
115 while remaining beneath the surface. 120

Thus far the apparatus has been described in connection with its function as a submarine freight-car; but, as before indicated, it may be readily adapted for employment as a  
125 pontoon in raising sunken vessels themselves, as well as in recovering their cargoes. To ef- 130



fect this adaptation, it is only necessary to provide suitable means for attachment to the side of the vessel. Heretofore it has been the practice to connect the pontoons or floats together on opposite sides of the sunken vessel by tunneling under the latter for the passage of the connecting chains, which has been objectionable, because of the labor and expense of such a mode of operation, as well as its extreme difficulty in many cases. I am enabled to avoid these objections by securing to the wrecked vessel's hull fastening-plates having means of attachment with the exterior of the cars and providing the latter with means co-  
 15 operating therewith. In Fig. 4 is shown such a device, comprising lugs  $l$  upon the under side of the car  $a$ , near the edge, connected by pivotal pins  $l'$  with one end of the links  $m$ , whose opposite ends are similarly connected  
 20 by pivotal pins  $n'$  with lugs  $n$  upon the fastening-plates  $o$ , secured to the skin of the vessel  $V$  by means of the tap-bolts  $o'$ . Fig. 5 shows a series of such cars fastened to the sides of a submerged vessel, the number re-  
 25 quired for raising the same being determined by their size and the character of the vessel to be raised. It will be observed that as the buoyancy of the cars is restored they are drawn in rising close to the side of the vessel  $V$ , against which they are steadied in their sub-  
 30 sequent operation. This mode of fastening wheeled pontoons or cars directly to the skin of the vessel obviously affords the advantage of convenience in such operation, as the cars  
 35 may be readily shifted to place them in the required relation to the vessel, and they may be attached while standing a few feet away from the hull for easy access to all parts of the apparatus, being subsequently drawn up  
 40 against the hull in rising, as already described. It will also be observed that the fastening-plate may be secured to the hull  $V$  before connection with the car.

As indicated in Fig. 5, in order to maintain  
 45 the upright position of the vessel while being raised it is preferable to permit certain of the cars  $a$  to rise some distance above the same for steadying the vessel during the lifting operation, for which purpose an extra link  
 50  $m'$  or an extra length of chain  $m''$  may be interposed between the cars and the fastening-plates  $n$ . It is obviously immaterial what kind of connections be employed for securing together the plates  $n$  and the cars  $a$  so long  
 55 as they are of flexible character and that either links or chains are suitable for the purpose.

In some cases it may be found desirable to secure the bodies of the cars directly to the  
 60 sides of the vessel, for which purpose I have provided the perforated bosses  $p$  at the top and bottom of one of the sides with internal countersinks  $p'$ , through which fastening-  
 65 bolts may be projected from the interior, with their heads resting in the countersinks. To close such apertures from the penetration of

air or water in raising or sinking the cars, threaded plugs  $p^2$  are provided, which are secured into similarly-threaded sockets at the inner ends of the countersunk apertures for  
 70 the fastening-bolts.

The method of handling submerged freight incidentally described in the foregoing specification is not claimed herein, as it forms the subject of my application Serial No. 15,461,  
 75 filed May 4, 1900, and constituting a division of the present application.

Having thus set forth the nature of the invention, what I claim herein is—

1. A submarine car comprising an air-tight  
 tank, air and water valves for use in admit-  
 ting and expelling air and water to and from  
 the same, means external thereto for actuat-  
 ing said valves, and a hatch or hatches adapt-  
 ed for admitting freight to the interior of the  
 same. 80
2. A submarine car comprising an air-tight  
 tank, air and water valves for use in admit-  
 ting and expelling air and water to and from  
 the same, means external thereto for actuat-  
 ing said valves, a hatch or hatches adapted  
 for admitting freight to the interior of the  
 same, and supporting caster-wheels for sus-  
 taining the same movably upon the water-  
 bed when submerged. 85
3. A submarine car comprising a closed  
 tank or receptacle provided with valves for  
 the admission and expulsion of water, and  
 mechanical means governed by the trim of  
 the car for automatically controlling said  
 valves. 95
4. A submarine car comprising an air-tight  
 tank, air and water inlet valves, an air-escape  
 valve, and water-outlet pipes at the ends lead-  
 ing from the bottom and having pendulum-ac-  
 tuated valves reversely operated by changes  
 in the trim of the car, as and for the purpose  
 set forth. 105
5. A submarine car comprising an air-tight  
 tank, air and water inlet valves, an air-escape  
 valve, water-outlet pipes at the ends leading  
 from the bottom and having pendulum-ac-  
 tuated valves reversely operated by changes  
 in the trim of the car, and automatically-clos-  
 ing covers constituting check-valves for pre-  
 venting the inflow of water through said inlet-  
 pipes, as and for the purpose set forth. 115
6. A submarine car comprising an air-tight  
 tank with suitable air and water valves where-  
 by to effect the admission and expulsion of  
 water for affecting its buoyancy, and with  
 means for positively attaching it to the skin  
 of a sunken vessel, and supporting caster-  
 wheels upon the bottom of the car for sus-  
 taining it movably upon the water-bed dur-  
 ing submergence. 125
7. The combination, with a submarine car  
 comprising a normally-closed tank or recep-  
 tacle, air and water valves for the same, means  
 for actuating said valves for the admission  
 and expulsion of water to and from the same,  
 and a hatch or hatches for admitting freight 130



to the interior thereof, of means for introducing freight into said tank or receptacle through its hatch or hatches while the latter are open and during submergence.

- 5 8. The combination, with a submarine wrecking-boat provided with means, as a derrick, for transferring freight from submerged wrecks, of a normally-closed tank or receptacle provided with hatches for the introduc-

tion of freight, and means for effecting the admission and expulsion of water to and from said tank or receptacle.

Signed at Baltimore, State of Maryland, this 9th day of March, A. D. 1893.

SIMON LAKE.

Witnesses:

WILLIAM H. BERRY,  
MURRAY HANSON.