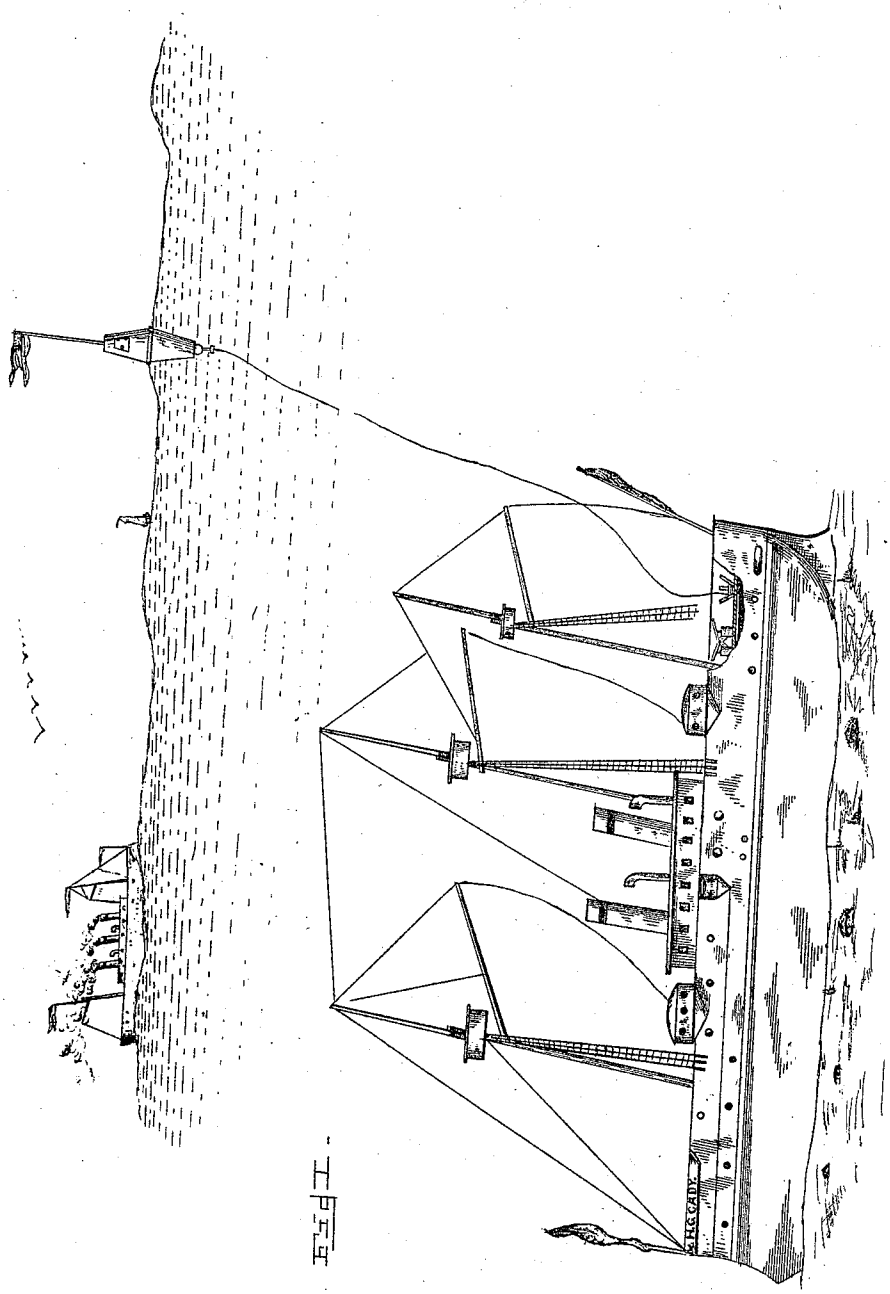
(No Model.) 4 Sheets—Sheet 1.

H. G. CADY.

BOAT SAVING APPARATUS.

No. 438,059. Patented Oct. 7, 1890.



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(No Model.)

4 Sheets—Sheet 2.

H. G. CADY.

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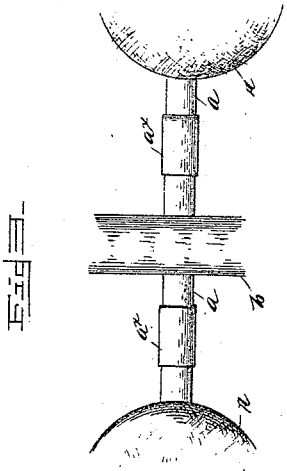

Fig. 3.

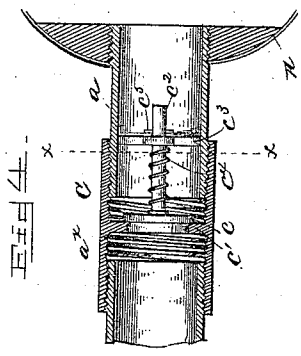

Fig. 4.

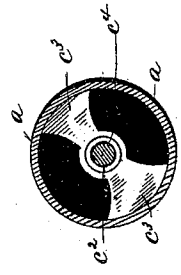

Fig. 5.

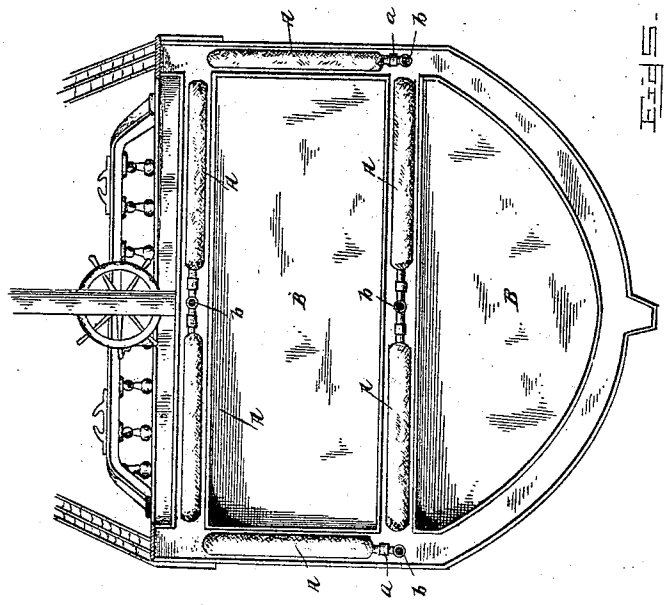

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

H. G. CADY.

BOAT SAVING APPARATUS.

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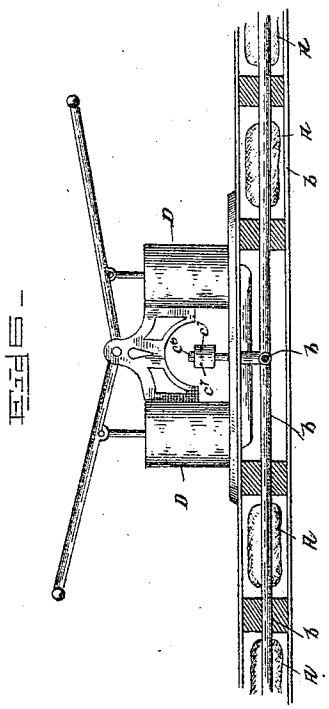

Fig. 5.

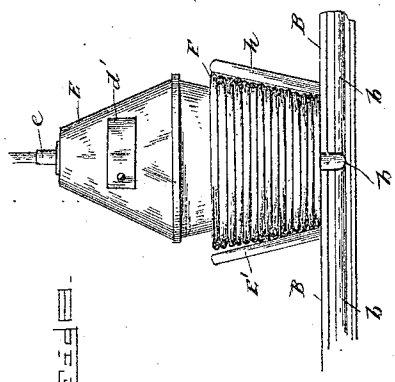

Fig. 3.

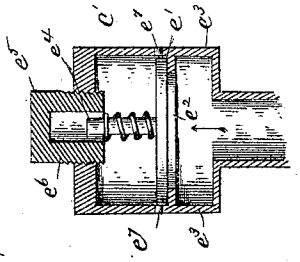

Fig. 4.

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(No Model.) 4 Sheets—Sheet 4.

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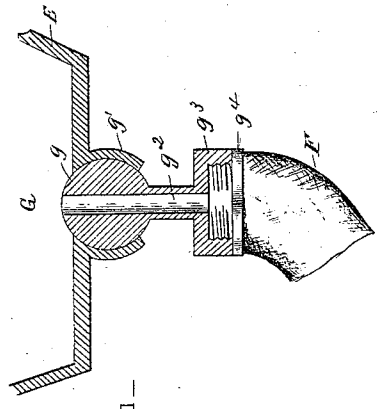

FIG. 1.

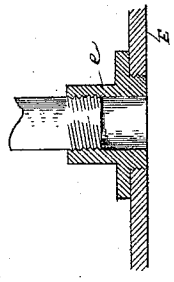

FIG. 4.

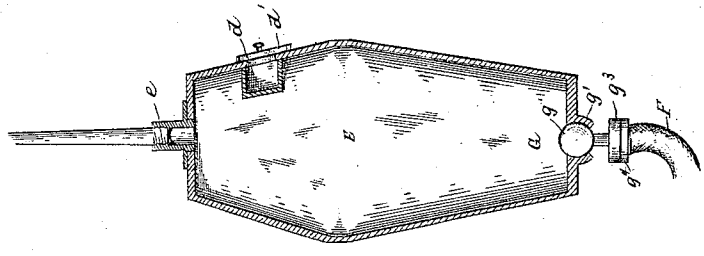

FIG. 3.

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UNITED STATES PATENT OFFICE.

HENRY G. CADY, OF PINE BLUFF, ARKANSAS.

BOAT-SAVING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 438,059, dated October 7, 1890.

Application filed January 8, 1890. Serial No. 336,227. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. CADY, a citizen of the United States of America, residing at Pine Bluff, in the county of Jefferson and State of Arkansas, have invented certain new and useful Improvements in Boat-Saving Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in apparatus for preventing the sinking of vessels and for raising sunken vessels, wherein the principle of the displacement of water by the action of air aided by the buoyant action of the air is employed for raising the vessel; and to these ends the invention consists of the use of air-containing receptacles or closures disposed throughout the vessel under the deck and other suitable points where they will be out of way, combined with an air-pump and a buoy or float, which is designed to be connected by hose or flexible pipe with said air receptacles or closures, and which buoy with the hose or pipe is, when not in use, stowed away on shipboard in a box or receptacle, whereby it is obvious in the event of the sinking of the vessel the buoy will float on the surface of the water, while its hose will uncoil or straighten out as the ship or vessel sinks. Thus the whereabout of the sinking of the vessel or ship is not only located, but provision is also made, by invoking the aid of an air force-pump and making connection therewith of the hose connected to the buoy, for the raising of the sunken vessel. If, however, it is desired not to make the outlay beforehand that would be involved in providing the vessel or ship with air receptacles or closures and hose-pipe to guard against the possible disaster of the sinking of the vessel or ship, the buoy or float may be anchored to the submerged or sunken vessel or ship simply by means of a cable or rope previously connected thereto, the same as in the use of hose-pipe, which would be required in using air receptacles or closures, and thus for the purpose of designating the locality of the sunken or submerged vessel or ship serves equally as well as said hose-pipe, all as will more fully appear hereinafter from the following description and accompanying illustrations, in which—

Figure 1 is a view showing my invention in use. Fig. 2 is a cross-section of a vessel, showing the air-receptacles in position. Fig. 3 is a detail view of the connection between the main supply-pipes and the air-receptacles, parts being broken away. Fig. 4 is a sectional view of one of the branch pipes. Fig. 5 is a cross-section of the same taken through the lines x x. Fig. 6 is a side elevation of the air force-pump, showing its connection with the air-supply pipes. Fig. 7 is a sectional elevation of the exhaust-valve. Fig. 8 is a side elevation of the buoy and its connection with the air-supply pipe. Figs. 9, 10, and 11 are detail sectional views of the same.

In carrying out my invention I employ a series of receptacles or closures A A, which are adapted to contain air, and which are disposed throughout the hull of the vessel or ship B under the deck and in between the lining and the sides of the hull of the vessel, as also in the space under the flooring between the hold and the steerage and other suitable points where they will be out of the way. These receptacles or closures, which may be of rubber or other suitable material, are connected one to the other by short pipes or tubes a, those tubes or pipes a connecting with the receptacles or closures disposed under the deck, however, being connected with a central pipe b, extending in the direction of the length of the hull of the vessel or ship, as shown.

The pipes a are each provided with an automatic valve C, consisting of a valve-disk c, fitted to slide thereon, and limited in its outward movement by valve-seat c' and stop c^5 on the pipe, and having a stem c^2, held in position by a guide c^3, bearing against the sides of the pipe, said stem being encircled or acted upon by spring c^4, normally holding it against said seat. The valve-seat c' is screw-threaded on its periphery, and engages the screw-threaded sleeve or tube $a^\times$. Hence it will be observed that by moving the valve-seat in the required direction, which is effected by turning or manipulation of the sleeve $a^\times$, the tension of the spring of the valve may be regulated. It will be seen that as air is forced into the pipes a, containing the valves C, the latter will be free to open or move inward

under the air-pressure and allow the air to pass, which will thence enter and inflate the air receptacles or closures, as desired. However, as air-pressure is removed from the outer sides of the valves, their actuating-springs and the pressure of the stored air will return them to their normal closed position, and thus retain them against accidental opening or unseating by any pressure from without less than that within the air receptacles or closures. Thus it will be observed that when the requisite quantity of air has been fed into the air-receptacle, the pressure from the inside of the receptacles upon the valve in connection with the springs will prevent the further opening of the valve, cutting off the ingress of air through the openings, and in this manner the quantity of air in the air-receptacles is regulated by the tension of the valve-springs, and bursting of the air-receptacles is prevented and safety-valves produced.

D is an air force-pump or device connecting with the central pipe *b*, and by means of which the air receptacles or closures A are supplied through said pipe and the lateral pipes *a* with atmospheric air for inflating said receptacles.

E is the buoy, which is preferably of the construction shown, having a storage-chamber *d*, in which may be kept the ship's log or other valuable papers, &c., placed therein through a door *d'* in one side near the top, fitted watertight, for use to identify the vessel or ship in event of its sinking. The buoy is placed in a receptacle or box E', placed on deck, which by preference may have downward-tapering sides and be of sufficient capacity or width to receive therein in addition the hose-pipe F, which is coiled around the buoy and stored in or upon the vessel as a convenient method of compactly storing it. One end of the hose-pipe F is permanently connected at a suitable point to the pipe *b*, while its other end is connected to the buoy or float, this connection being effected by means of a ball-and-socket or universal joint G to prevent the liability of breaking or otherwise impairing the hose-pipe at that point from the constant vibration that the buoy would naturally have when in the water. This joint consists of the ball *g*, seated in a socket *g'*, pendent from the lower end of the buoy, said ball having a passage *g* through it and having a pipe or hollow stem g^2, whose bore is in alignment with the passage *g*, and which stem or pipe is formed with a screw-cap g^3, engaging a screw-threaded sleeve or collar g^4 fast to the upper end of the hose-pipe. The buoy or float E has an opening in its upper end, around which is secured a screw-threaded collar or sleeve *e*, which is adapted to permit of the attachment thereto of a section of hose-pipe leading to an air force-pump when the vessel is sunken and is to be raised. When the buoy is afloat, the opening in its upper end is plugged up, preferably, by the insertion therein of the lower end of a flag-staff, which with its flag serves as a signal. Thus constructed, in case vessels having my apparatus spring a leak or from any other cause show signs of sinking, it is only necessary by operation of the air-pump to inflate the air-receptacles, whereby sinking of the vessel is prevented.

Connected to the air-pipes near their connection with the air-pump is an air-vent or exhaust-valve C', which consists of a disk *e'* seated against the annular seat e^2 upon the inside of the casing or shell e^3, and having its spring encircled or acted upon, stem e^4 engaging a tubular chamber e^5 in a plug e^6, screwed into said shell or casing e^3 at one end, said casing or shell having air-exhaust openings e^7, normally opening through said casing or shell to the outer air; and it is apparent that in case of the sinking of a vessel or ship equipped with this apparatus the buoy would float on the surface of the water, and thus the hose-pipe uncoiling with the sinking of the vessel or ship, and being connected to the latter and the buoy, would locate the sunken vessel. Now, in order to raise the vessel or ship, a barge or other vessel or other floating contrivance armed with an air force-pump is moored alongside the buoy and the flag-staff removed from the buoy and connection effected by means of hose or other pipe between the air-chamber of the pump and the collar or sleeve *e* of the float or buoy E. The pump is then operated and the air thus forced through the pipes and buoy into the air receptacles or closures in the vessel will inflate said receptacles or closures, the water-displacing action of the air and its buoyancy having the effect to bring or float the sunken vessel or ship to the surface of the water, thus raising the vessel.

It is obvious that should it be desired not to make the outlay beforehand that would be involved in providing the vessel or ship with air receptacles or closures and hose-pipe to guard against the possible disaster of the sinking of the vessel or ship, the connection between the buoy or float and the sunken or submerged vessel or ship may be effected simply by means of a rope or cable, instead of by a hose-pipe, which of course would be required in the use of said air receptacles or closures, and thus for the purpose of designating the locality of the sunken or submerged vessel or ship, serve equally as well as said hose-pipe.

Having described my invention, what I claim is—

1. In an apparatus for preventing the sinking and for raising sunken vessels, the combination, with the air-containing receptacles or closures, of the central air-delivery pipes, the lateral pipes connecting said air-delivery pipes with the air-receptacles, and the automatic air-valves seated in each of said lateral pipes, substantially as shown and described.

2. In an apparatus for preventing the sinking of vessels and for raising sunken vessels, the combination of the air receptacles or closures with the buoy having the ball-and-socket or universal joint connection with the hose-pipe connected to the central air-delivery pipes, substantially as shown and described.

3. In an apparatus for preventing the sinking of vessels and for raising sunken vessels, the combination of the air receptacles or closures, the central air-delivery pipes connected to said receptacles by the lateral branch pipes, the automatic valves in said lateral pipes, and the buoy having the detachable ball-and-socket or universal joint connection with one end of the hose-pipe, substantially as shown and described.

4. In an apparatus for raising sunken vessels, the combination, with the air receptacles or closures and the central air-pipe connecting with said receptacles, of the hose-pipe and the buoy having a ball-and-socket or universal joint connection with said hose-pipe, substantially as and for the purpose described.

5. In an apparatus for preventing the sinking of vessels and for raising sunken vessels, the combination of the air receptacles or closures with the central air-delivery pipes, the lateral or branch pipes connecting said air-receptacles with the delivery-pipe, and the automatic valve seated in each of said lateral pipes, consisting of the adjustable valve-seat, the valve-disk, and its stem operated by the spring and the guide, substantially as shown and described.

6. In an apparatus for raising sunken vessels, the combination, with air receptacles or closures and the central air-delivery pipe, of the hose-pipe connected to said central pipe, the float or buoy having a passage through it and the ball-and-socket joint between said buoy and hose-pipe having a hollow stem or pipe formed with a cap screwed upon a sleeve or collar fast to one end of said hose-pipe, said ball also having a passage through it communicating with said stem or pipe, substantially as and for the purpose specified.

7. In an apparatus for preventing the sinking of and for raising sunken vessels, the combination of the series of connected air receptacles or closures and a central air-delivery pipe having lateral pipe-connections with said air-receptacles, said pipe-connections having automatic air-valves, the hose-pipe coiled in a receptacle on ship-board and the buoy or float having a passage through it and a storage-chamber, and the ball-and-socket joint between said hose-pipe and float or buoy, said ball having a passage through it and a pipe communicating therewith, substantially as and for the purpose specified.

8. In an apparatus for preventing the sinking of vessels and for raising sunken vessels, the buoy carrying in the screw-threaded sleeve or collar the detachable flag-staff, and having connected to its lower end a hose-pipe by means of the ball-and-socket or universal joint having a passage through its stem, in combination with the inflatable air-receptacles, substantially as shown and described.

9. In a device for preventing the sinking of vessels and for raising sunken vessels, the buoy carrying the flag-staff in a screw-threaded sleeve, the compartment or receptacle in its upper end accessible from without by means of the door, having ball-and-socket or universal joint connection at its lower end with the hose-pipe, said hose-pipe having connection at its lower end with the central air-delivery pipe connected by means of the lateral pipes containing the automatic valves with the air-containing receptacles, substantially as shown and described.

10. In an apparatus for preventing the sinking of vessels and for raising sunken vessels, the ball-and-socket or universal joint consisting of the socket and the ball having connected to its lower end the stem projecting downward through an opening in the bottom of the socket, said stem having on its lower end a screw-threaded sleeve, the stem and ball having a central passage passing therethrough, substantially as shown and described.

11. In an apparatus for preventing the sinking of vessels and for raising sunken vessels, the series of air-supply pipes, in combination with the air-receptacles, the hose connecting said pipes with the buoy, and the compartment or receptacle in the upper end of the buoy accessible through a door from the outside thereof, substantially as shown and described.

12. In an apparatus for raising vessels, the buoy carrying the signal or flag in its upper end and having connected to its lower end a hose-pipe, in combination with a ball-joint having a passage therethrough, a tubular stem or pipe connecting with the buoy, substantially as shown and described.

13. In an apparatus for preventing the sinking of vessels and for raising sunken vessels, the inflatable air-receptacles and their supply-pipes, in combination with the automatic valve-seat operated by the screw-threaded sleeve integral therewith, the valve-disk and its stem operated by the spring, and the stem-guide having the openings on either side thereof, substantially as shown and described.

14. In an apparatus for raising sunken vessels and for preventing the sinking of vessels, the series of air-supply pipes, the air-containing receptacles or compartments, the lateral pipes forming a connection between said air-supply pipes and the air-receptacles, and the automatic valves seated in said lateral pipes consisting of the adjustable valve-seat, the spring-acted-upon valve-disk, and its stem and the guide, substantially as shown and described.

15. In an apparatus for raising sunken vessels and for preventing the sinking of vessels,

the buoy having connection with the inflatable air-receptacles by means of the lateral branch pipes, the central air-delivery pipe, and the hose-pipe connected thereto and carrying the water-tight compartment in its upper end for securing the ship's papers, accessible from without through a door, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY G. CADY.

Witnesses:
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P. W. STEVENS.