

T. S. C. LOWE.

AIRSHIP.

APPLICATION FILED APR. 6, 1910.

Patented May 13, 1913.

3 SHEETS—SHEET 1.

1,061,484.

Fig. 1

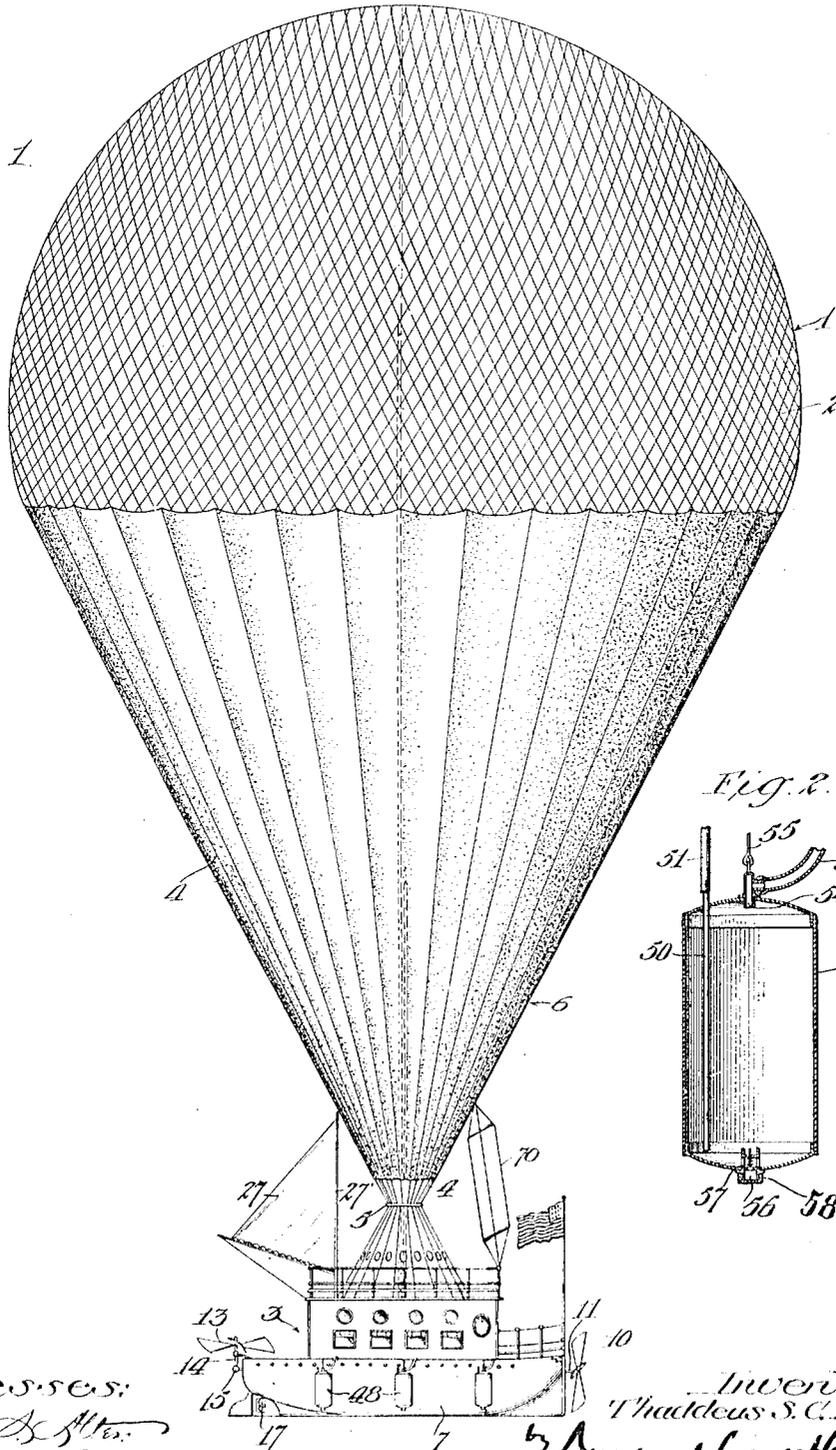
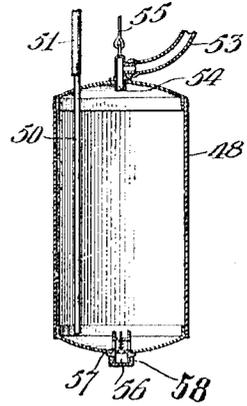


Fig. 2



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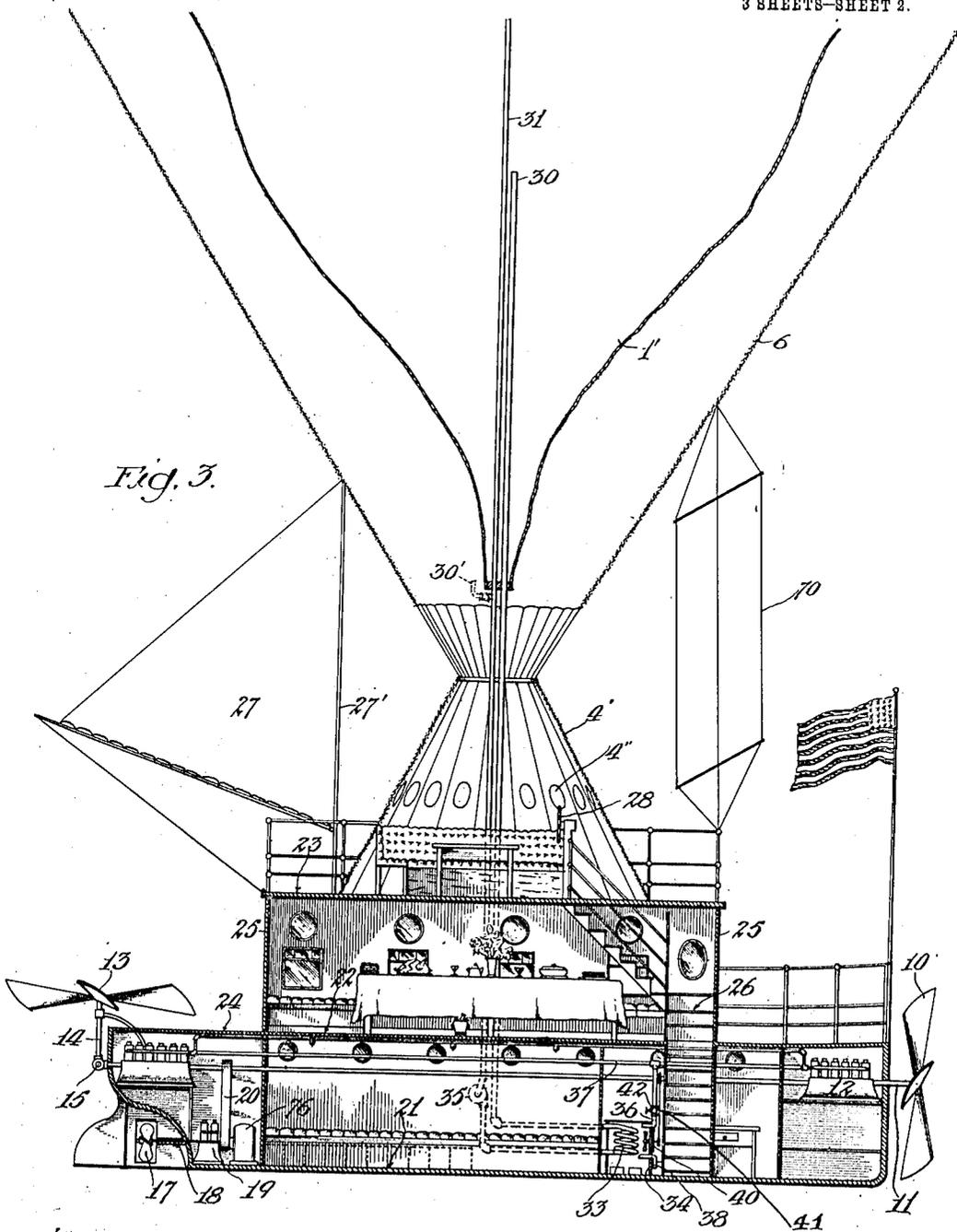
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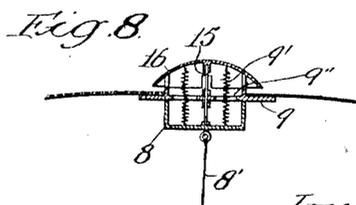
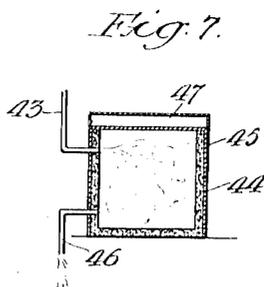
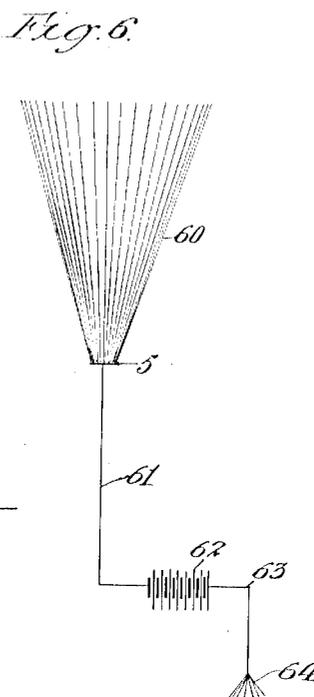
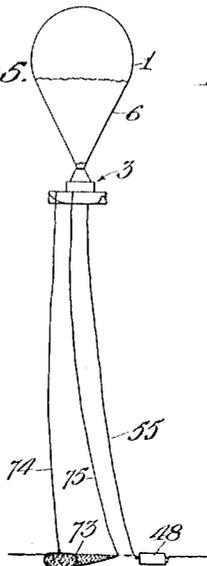
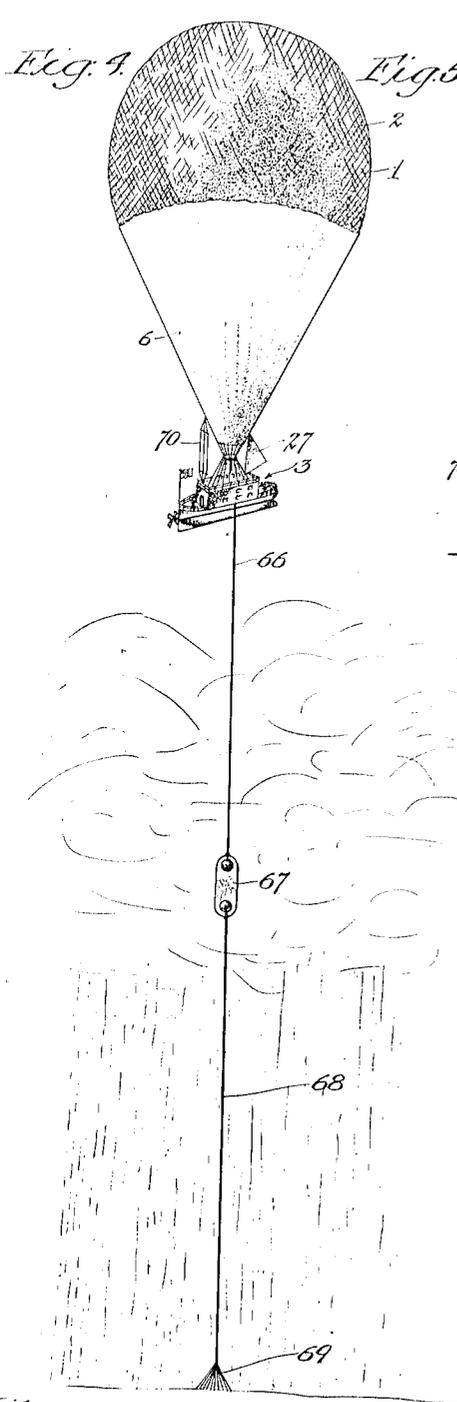
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3 SHEETS-SHEET 3.

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UNITED STATES PATENT OFFICE.

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AIRSHIP.

1,061,484.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed April 6, 1910. Serial No. 553,870.

To all whom it may concern:

Be it known that I, THADDEUS S. C. LOWE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Airship, of which the following is a specification.

This invention relates to the class of air ships that is dependent upon the use of a medium lighter than air contained in a suitable envelop for suspension of the ship in the atmosphere.

The main object of the present invention is to provide an air ship of this character having maximum lifting effect for a given weight and dimensions. For lightness, the envelop for the gas or medium lighter than air is made of light fabric, such as silk, contained in a suitable netting carrying the weight to be suspended, said envelop being distended by the pressure of the gas contained therein. The greatest contained volume for a given weight of such material and also the greatest strength and stability of form is presented by a globular or spherical envelop and my invention is directed partly to the utilization of such an envelop in such manner as not to interfere with the speed and stability of the vessel when used as a dirigible balloon or as a self-propelled air ship. In order to decrease the resistance of the air to self-propelled air ships, the same have generally been made of elongated form, but such construction introduces difficulty in maintaining the shape of the envelop, necessitating special bracing and also an unsafe and wasteful compression of the gas in order to produce the requisite distension of the envelop.

Another object of the invention is to provide an air ship construction of the lighter-than-air type which will be stable or capable of maintaining its shape under the conditions of wind pressure actually occurring in practice.

A further object of the invention is to provide for maintaining operative condition of the envelop or gas envelop of the machine under varying conditions of atmospheric pressure, for example, under considerable variations in height, such as will occur in practice. Owing to variations in height of the ship or balloon and also varia-

tions in temperature of the gas therein due to effect of the sun's rays, etc., there is liable to be great variation in the volume occupied by a given amount of gas, for example, in order to go three and sevenths miles above sea level in a balloon without the loss of gas, the gas envelop or holder must not be inflated beyond one-half of its capacity at sea level, the atmospheric pressure at the height aforesaid being one-half of that at sea level. Consequently it is necessary that the gas envelop should not be completely filled, and as a consequence the lower portion of the gas envelop not being distended, is loose and in a collapsed form and liable to be pushed above by the air currents in a manner that is detrimental to steady and rapid progression of the ship through the air, irregularity of form of this lower portion of the gas envelop and the irregular movements thereof increasing the frictional resistance. In this connection my invention is directed to providing a smooth exterior to the lower portion of the gas envelop irrespective of the amount of distention of the gas envelop itself. For this purpose I provide an outer casing in the form of an inverted cone attached to the gas envelop at its upper end and to a concentrating ring at its lower end.

A further object of the invention is to dispense with the necessity of discharging either ballast or gas in providing for the usual raising or lowering of the air ship in the atmosphere.

Another object of the invention is to provide in connection with such an air ship, means for facilitating its use by the occupants for prolonged periods by providing the requisite facilities for cooking, heating, etc.

A further object of the invention is to provide improved means for carrying the fuel for propulsion of the air ship and for utilizing such carrying means, for holding ballast after the fuel is exhausted therefrom.

A further object of the invention is to provide means for utilization of electricity collected from the atmosphere in the movement of the vessel.

Another object of the invention is to provide for the carrying away of such elec-

tricity, if necessary, to a lower strata of air or the earth in order to avoid injury to the ship.

A further object of the invention is to provide in such connection means for the utilization of the electricity in the production of rain.

The invention further comprises a wireless telegraph apparatus in connection with the air ship.

Another object of the invention is to provide an air ship with a car or passenger vessel adapted to travel on the water in case the ship should descend into a body of water, which not only is important as a safeguard in case of accident but also extends the range of usefulness of such a ship in enabling it to travel either upon the water or in the air, as desired.

Another object of the invention is to provide means whereby the air ship can be used to advantage in fishing operations.

A further object of the invention is to provide improved means for anchoring the air ship while over bodies of water.

Other objects of the invention will appear hereinafter.

The accompanying drawings illustrate the invention, and referring thereto: Figure 1 is a side elevation of the air ship. Fig. 2 is a detail section of one of the combined fuel and ballast tanks. Fig. 3 is a longitudinal, vertical section through the lower portion of the air ship showing the internal construction of the passenger carrier or vessel. Fig. 4 is a perspective showing the use of the air ship and the apparatus carried thereby for the production of rain. Fig. 5 is a side elevation showing the application of the invention in connection with fishing operations. Fig. 6 is a diagrammatic view showing the system of electrical conductors for collecting atmospheric electricity. Fig. 7 is a vertical section of the heating and cooking means. Fig. 8 is a vertical section of the valve for release of gas from the gas envelop.

1 designates the gas envelop or body of the balloon or envelop which may have a tapering or funnel-shaped lower portion 1' and is provided with an inclosing netting 2 from which the passenger vessel 3 is suspended by flexible suspension means 4 connected to or passing through a concentrating ring 5 drawing them relatively close together and extending downwardly therefrom for connection to the top of the vessel 3. The valve shown in Fig. 9 is provided at the top of the gas envelop consisting of a cup-shaped member 8 of wood or aluminum normally held against the seat 9 by springs 9', said valve member being slidably mounted by a rod 15 working in a fixed guide on said seat, and said seat having ports 9'' covered by a protecting dome 16, a cord 8'

being connected to said valve member 8 and extending down to the vessel 3 for convenient operation of said valve when it is desired to allow escape of gas from the envelop.

All the above described parts of the valve are preferably made of wood or aluminum for the sake of lightness.

A protecting casing 6 of sail cloth or light canvas in the form of an inverted cone is attached at its upper end to the netting 2 somewhat below the greatest diameter of the balloon and extends downwardly around or in contact with the flexible suspension means 4 nearly to the contracting ring 5 so as to present a substantially smooth and regular surface on the outside and leaving the neck or funnel portion 1' of the gas envelop free to collapse, as indicated in Fig. 3, while preserving the regular contour of the envelop as a whole. The vessel 3 is preferably formed with a hull portion 7 adapted to ride on or float in water and means are provided whereby said vessel may be propelled either by action on the atmosphere or by action on the water. The atmospheric propelling means may consist of a propeller or fan 10 mounted on a shaft 11 extending longitudinally of the vessel and journaled in bearings thereon, said shaft being, for example, connected to be driven directly by an engine 12 which may be an internal combustion engine.

Another propeller 13 may be provided mounted on a shaft 14 having universal joint connection with shaft 11 aforesaid and adapted to either swing into horizontal or vertical position, whereby said propeller or fan 13 may be used either for forward propulsion or for raising or lowering the vessel. In order to propel the vessel in water, a supplementary propeller 17 may be provided mounted on a shaft 18 driven by a supplementary engine 19 or if desired by a belt connection 20 with the shaft 11 aforesaid. The vessel 3 is shown as comprising several stories or decks 21, 22, 23, the upper deck being, for example, an observation deck, the next deck 22 being used as a living room, the lower deck 23, being used as a smoking room, stairways, indicated at 26, being provided between the several decks. The main deck 24 may be extended beyond the housing 25 inclosing the cabin. A rudder 27 in the form of a sail is provided at the rear end of the vessel 3 above the upper deck 23, said rudder being pivotally supported on a mast 27' and connected to the tiller or pilot wheel 28, this upper deck being preferably used as an instrument room and pilot room, and being partially covered by the conical casing 4' provided with port holes or openings 4''.

Means are provided for maintaining substantially constant the bulk of gas contained

in the gas envelop 1 irrespective of the variations in external or in internal temperature, and for this purpose pipes 30, 31 extend up into the gas envelop from the vessel 3 and communicate with a coil 33 in the casing 34 in the lower cabin or hull of the vessel, a pump or blower 35 being connected in said pipes for producing circulation through said coil so as to draw the gas from the gas envelop and return it to the gas envelop. A pipe 36 connected with the exhaust 37 of the gas engine extends into said casing and an outlet 38 is provided therefrom so that the said exhaust may be caused to traverse said casing to heat the coil 33 in such manner as to warm the gases taken from and returned to the gas envelop 1 to compensate for cooling of the said gas by reason of exposure to external cold or to compensate for decreased volume thereof by increase of external pressure as in descending to a comparatively low level. It is also desirable to provide for cooling the gas within the gas envelop, for example, in case the same is subjected to undue heating by the solar rays or other cause. For this purpose a blower or exhaust indicated at 40 is provided driven by suitable driving connections 41, and adapted to force or draw air through the casing 34 to cool the contents of the coil 33 therein so as to maintain a substantially constant temperature in the contents of the gas envelop irrespective of the exposure of said envelop to such heating influences. A valve 42 may be provided for turning off the exhaust connection to the casing 34 when said casing is to be used for cooling the gas as stated. An exhaust connection 43 may also be made to a casing 44 (see Fig. 7) having an asbestos lining 45 and provided with an outer connection 46 and with a movable cover 47, said casing being adapted to be used as a cooking and heating stove. Instead of heating or cooling the gas in the envelop directly, the same effect may be produced by heating or cooling the air in the space between the lower extension 1' of the gas envelop and the outer casing 6, communicating means for this purpose being indicated at 30' in dotted lines in Fig. 3.

The invention further provides an improved fuel storage means consisting of one or more vessels or tanks indicated at 48 in Fig. 2 adapted to contain liquid fuel, said tank being provided with an outer pipe or connection 50 extending to the lower portion thereof and connected by a flexible pipe 51 with the fuel supply means for the engines 12 and 19, another flexible pipe 53 being connected to an inlet 54 at the top of said tank whereby compressed air may be forced into said tank to force the liquid fuel, for example, gasoline, out from the tank 48 and to the fuel supply means for the engine. Said tanks 48 are suspended by means of

flexible suspensions or cables 55 whereby the same may be lowered into a body of water, in case the vessel is passing over such a body, to relieve the vessel of the weight of the fuel. The tank 48 is also preferably provided with an inlet valve 56 in its bottom held to closed position by a spring 57, a screw cap 58 being provided to tightly close this inlet connection when the tank is used for fuel. When the tank 48 has been exhausted of fuel, said screw cap may be removed therefrom, and by then lowering the tank into a body of water, a valve 56 is caused to open allowing the tank to be filled with water which may be used as ballast for the vessel and for any other purpose desired.

Means are provided for collecting atmospheric electricity generated by the movement of the vessel through the air or by the contact of the vessel with a highly charged portion of the atmosphere, for example, the clouds, such means comprising conductors in the form of fine wires 60 (see Fig. 5) extending from the concentrating ring 5 upwardly along the cone portion 6, said conductors being connected by a wire 61 to the storage battery 62, the other side of which is connected by a wire 63 depending from the vessel to make contact with the earth or with a lower stratum of the atmosphere, said wire 63 being preferably provided with a brush or antennæ 64 at its lower end, whereby the electric energy absorbed by the conductors 60 from the atmosphere is stored in the battery 62 and may be utilized for lighting or other purposes. The electricity so generated or collected may also be utilized for the production of rain, as indicated at Fig. 4, where 66 indicates a conductor suspended from the vessel and connected to a spark gap means 67. The other electrode is connected by a connector 68 to a grounding brush or means 69 whereby sparks or electrical discharges of high tension may be produced in a cloud or stratum of considerable humidity for producing precipitation.

The invention further comprises a wireless telegraph equipment, the antennæ of which are indicated at 70, one end thereof being connected to the vessel 3 and the other end to the cone portion 6, thereby utilizing the structure of the cone in place of a mast, said antennæ being connected to the usual sending and receiving apparatus, not shown.

As shown in Fig. 6, the air ship may be used in fishing operations by the provision of a fishing net indicated at 73 suspended from the vessel 3 by means of a cable 74 extending to the forward end of the net and a cable 75 extending to the rear end thereof, said net being funnel-shaped or forwardly flaring so that as it is drawn through the water the fish will be caught therein. In this connection the use of an airship pass-

ing at a considerable height over the water has the advantage over a vessel immersed in the water for the reason that by reason of said height and of the lack of disturbance of the surface of the water, it is possible for persons in the air ship to detect the presence of fish at a considerable distance below the water so as to utilize the net in the most advantageous manner.

10 In place of the net shown at 73 in Fig. 6, a bag of canvas or other suitable material may be used of similar form to the net and serving to receive the water when it is immersed therein, thereby anchoring the ship in position by the resistance of a bag to be drawn through the water. When it is desired to weigh anchor, the rear end of said bag will be raised by drawing on the rear cable, the forward cable 74 being slacked at the same time, so that the bag is emptied of water and rises readily from the surface.

A dynamo indicated at 76 may be provided for charging the storage battery 62 aforesaid and for furnishing electricity for light and power where required. The antennæ for the electrical receiving and discharging conductors may consist of a metal cable having its ends expanded by being frayed out, as shown.

30 Several of the fuel tanks filled with water for ballast may be suspended from the air ship at different elevations, so as to be picked up successively from a body of water, and thereby maintaining the ship at a definite level.

What I claim is:

40 1. An air ship comprising a gas envelop, having its upper portion spherical in form and a tapering downward extension therefrom and a protecting flexible casing secured to said gas envelop at the lower part of said spherical portion and extending downwardly therefrom in the form of an inverted cone.

45 2. An air ship comprising a gas envelop having its upper portion spherical in form and a tapering downward extension there-

from and a protecting flexible casing secured to said gas envelop or netting covering the same at the lower part of said spherical portion and extending downwardly therefrom in the form of an inverted cone, a concentrating ring, at the lower end of said cone and a vessel suspended from said concentrating ring.

55 3. An air ship comprising a gas envelop having its upper portion spherical in form and a tapering downward extension therefrom and a protecting flexible casing secured to said gas envelop at the lower part of said spherical portion and extending downwardly therefrom in the form of an inverted cone, a vessel suspended from said cone-shaped cordage, an engine for propelling said vessel, and means for conducting the heated exhaust gases from said engine into the space between said casing and the depending portion of the gas envelop.

70 4. An air ship comprising a gas envelop having its upper portion spherical in form, and a tapering downward extension therefrom, and a protecting flexible casing secured to said gas envelop at the lower part of said spherical portion and extending downwardly therefrom in the form of an inverted cone, said flexible casing being provided with flexible suspending means, a vessel suspended from the said suspending means, a gas engine for propelling said vessel, a heater provided with a connection to the exhaust of said gas engine and with an atmospheric supply connection whereby a quantity of atmosphere is heated by the heat from the gas engine exhaust, and means for forcing such heated atmosphere into the space between said casing and the gas envelop.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 30th day of March, 1910.

THADDEUS S. C. LOWE.

In presence of—

ARTHUR P. KNIGHT,
FRANK L. A. GRAHAM.