(No Model.) 2 Sheets—Sheet 1.

T. M. CREPAR.

AIR SHIP.

No. 588,556. Patented Aug. 24, 1897.

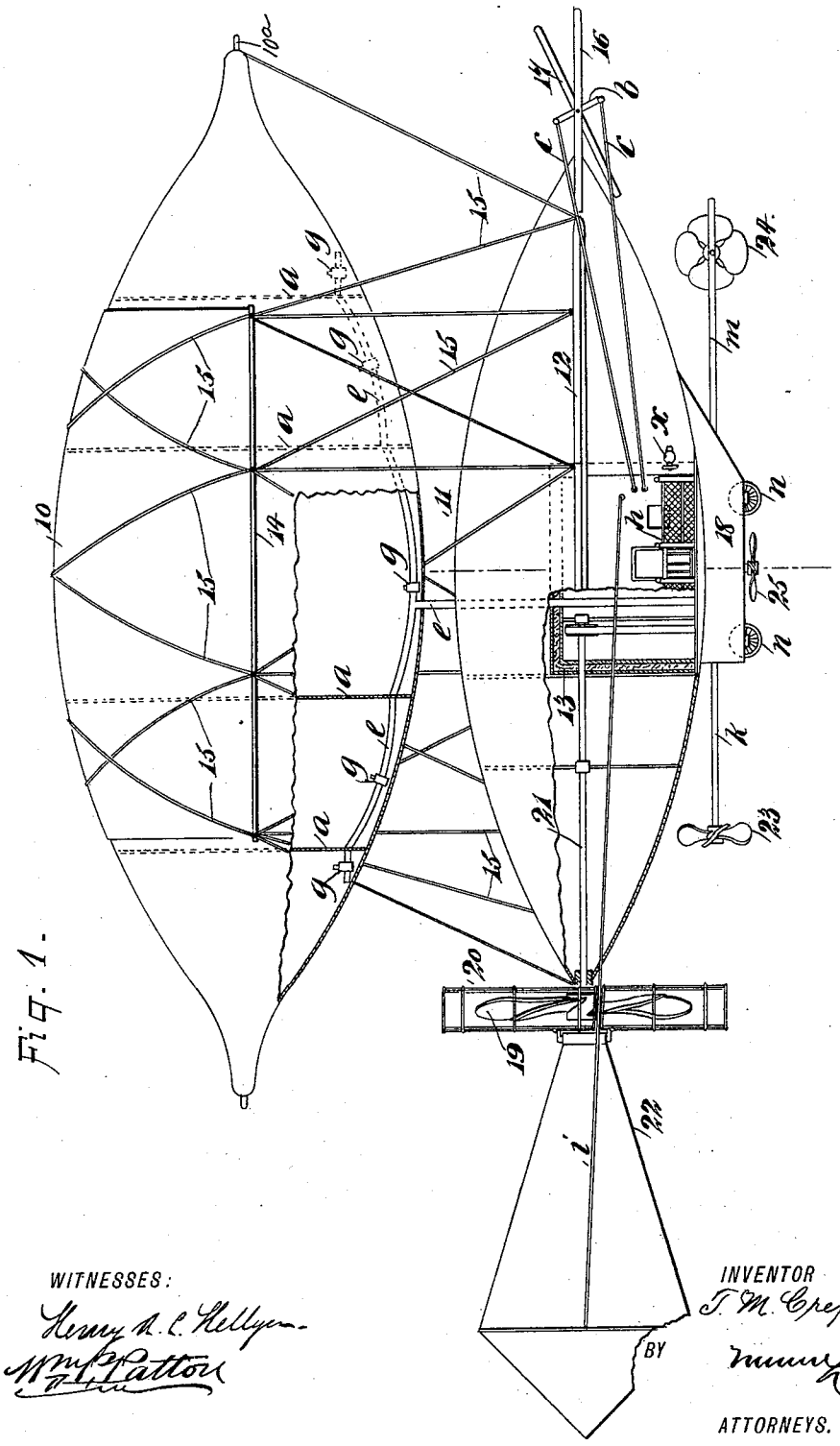


Fig. 1.

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Fig. 3.

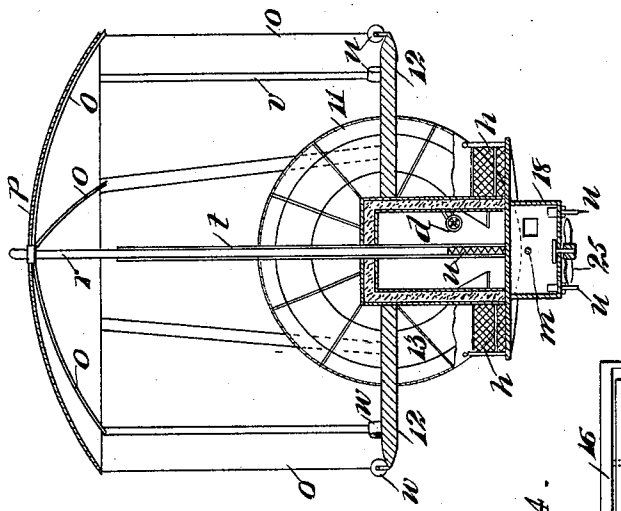


Fig. 4.

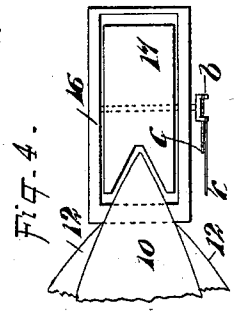
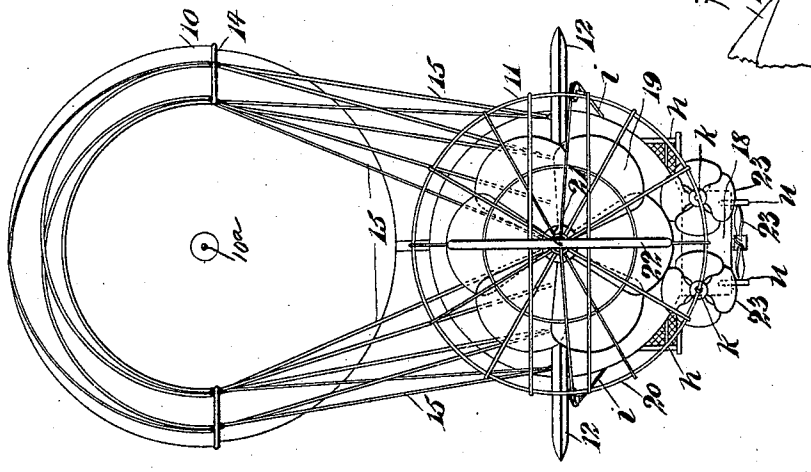


Fig. 2.



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UNITED STATES PATENT OFFICE.

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AIR-SHIP.

SPECIFICATION forming part of Letters Patent No. 588,556, dated August 24, 1897.

Application filed April 14, 1896. Serial No. 587,438. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. CREPAR, of Grand Rapids, in the county of Itasca and State of Minnesota, have invented certain new and useful Improvements in Air-Ships, of which the following is a full, clear, and exact description.

This invention relates to an improved device for aerial navigation, and has for its object to provide a novelly-constructed air-ship which will be adapted for control by operators sustained by it, whereby the traverse of the atmosphere in any desired direction at different heights is rendered practical.

The invention consists in the novel construction and combination of parts, as is hereinafter described, and defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a partly-sectional side view of the improved air-ship. Fig. 2 is a rear end elevation of the same. Fig. 3 is a transverse sectional view showing modified features of construction of a portion of the device; and Fig. 4 is a plan view of the forward end portion of the air-ship, showing a pivoted aeroplane forming part of the invention.

In Fig. 1 the flying-machine is represented as comprising two coacting main portions, of which 10 is the upper section and 11 the lower section. The section 10 consists of an elongated balloon constructed of any suitable material and having a conoidal formation at each end provided with removable plugs 10^a to afford means for removing atmospheric air while the balloon is being filled with gas, these plugs being replaced at a proper time to prevent loss of the gas that is introduced. The dimensions of the balloon 10, which is to be filled with gas that possesses maximum lifting power, should be proportioned to the weight to be supported, and preferably there are a number of compartments formed in it by the introduction of the spaced partitions *a*, which are secured by their edges to the inner surface of the balloon, as indicated in Fig. 1. The portion 11 of the air-ship is also elongated and rendered substantially conoidal at each end, its dimensions being proportioned to the requirements of the service to be performed, and within this part of the device, which is constructed of any light material suitable for the purpose, a walled cabin 13 for accommodation of passengers is located. The shell 11 is strengthened internally by any suitable means to adapt it to sustain the load it may have to carry, and at each side of said shell similar aeroplanes 12 are longitudinally extended and firmly secured, these being preferably formed of rigid material.

The balloon 10 is connected with the shell 11 by a flexible hanger-band 14, that is adapted to cover the upper portion of the ballon when the latter is inflated, and the said band has a network 15 of cordage applied to it and so secured thereto that pendent end portions of the net will be adapted to flexibly connect the shell with the balloon when the extremities of these pendent cords are affixed at intervals to the aeroplane 12, as shown in Figs. 1 and 2. At the front of the shell 11 a frame 16 is secured thereto by its rear end so as to project forwardly, and an aeroplane 17 is pivoted in the frame intermediately of its ends, so as to be rockable in a vertical plane.

An arm *b* is affixed between its ends on one projecting journal end of the pivot-shaft that sustains the aeroplane 17 on the frame 16, and two cords *c* or like flexible connections are respectively secured by one end of each to an end of the arm mentioned, these cords being rearwardly drawn through lateral perforations in the cabin 13, so that they may be attached to a hand-wheel device *d*, which by its rotatable support on the wall of the cabin will afford means for rocking the aeroplane 17 when the hand-wheel is manipulated. The main portion of the shell 11 is designed to be filled with gas having great lifting power—as, for example, hydrogen gas—and such gas is preferably introduced within the several compartments of the balloon 10 until all atmospheric air is expelled.

To effect the inflation of the balloon 10, a tubular conduit *e* is upwardly extended from the cabin 13, and at the upper extremity is branched in each direction, so that said lateral extensions will pass through the partitions *a* in an air-tight manner and lead gas

from a source of supply to which the lower end of the conduit is connected and discharge it into each compartment of the balloon, such discharge being effected through check-valves *g*, that prevent return of the gas to the conduit. The provision of the plurality of compartments in the balloon 10 renders the latter more safe from collapse, as should any of such separate compartments be ruptured those remaining intact will still hold gas and aid in supporting other parts hung therefrom.

As indicated in Figs. 1 and 3, the cabin 13 is composed of double and spaced walls, these being of any light strong material, and preferably the cabin 13 is located near the longitudinal center of the shell 11, so that the ballast and machinery it may contain will be disposed in a manner that will avoid an improper distribution of the load in any direction. At each side of the cabin a balcony *h* is constructed by a lateral extension of the floor of said cabin, and they are inclosed at the sides with wire-netting to prevent occupants from being accidentally thrown therefrom while the air-ship is in motion, doors being provided in the cabin side walls to permit persons to pass onto the platforms or balconies. The space between the walls of the cabin is filled with wool or other heat non-conductor which will serve to prevent an excessive change of temperature that might result from the rise of the air-ship to a great elevation. Foldable seats or berths may be attached to the sides of the cabin, as shown in Fig. 3; or, if preferred, they may be hung to swing pendent from the ceiling for the accommodation of the occupants of the cabin.

Below the cabin 13 a power-room 18 is firmly secured to the floor of the same, this chamber being designed to contain the motors which are to be utilized for driving machinery required for the propulsion and control of the air-ship, and it may here be explained that any available motive power is to be employed.

It will be observed that the front of the power-room is sloped upwardly, so that frictional resistance to the forward movement of the device will be reduced to a minimum.

The main propeller-wheel 19, provided for the progressive movement of the air-ship, is located at the rear end of the shell 11 and is constructed in the usual form for such appliances, the weight of the same being reduced to the utmost limit permissible, so as to insure necessary strength and lightness. The wheel 19 is supported to rotate on the shell in a skeleton frame 20, that completely incloses said wheel and thereby prevents a contact with it of the balloon 10 in case the latter should be tipped rearwardly by force of air-currents that may be encountered while the air-ship is in motion.

The wheel 19 is affixed on the rear end of the horizontal shaft 21, that is journaled on the frame 20, and thence projects forward into the cabin 13 to receive rotary motion through a pulley thereon belted to any available engine or source of power and motion that is stationed below in the power-room. A rudder 22, constructed of light strong material and having correct proportions, is hinged by one end to the frame 20, so as to project its blade rearward and dispose it edgewise in a vertical plane.

Two flexible connections *i* are affixed at their rear ends, one on each side of the rudder 21, and thence forwardly drawn through the side walls of the cabin 13 for control of the rudder by an operator in the cabin. Below the shell 11 on the two horizontal shafts *k*, that are rearwardly projected from the power-room 18, two similar propeller-wheels 23 are mounted and secured, which wheels, with their shafts, are designed to receive rotary motion afforded by a suitable engine or the like located in the power-room. From the front of the power-room another shaft *m* is forwardly projected for support of a winged wheel 24, that is laterally held to rotate on said shaft or any suitable attachment thereto, and effective means (not shown) are provided to transmit motion from the power-room to the wheel 24. A propeller-wheel 25 is rotatably supported in a horizontal plane below the power-room 18, to be driven by any available motor in said room. At each side of the power-room 18 a pair of tandem wheels *n* are held to rotate, these four similar wheels being preferably of the same general construction as are bicycle-wheels, and portions of said wheels project below the floor of the power-room to adapt them for contact with the ground, the wheels being available to conveniently move the entire structure, except the balloon, into a desired position before the ship leaves the ground.

While it may be preferred to employ the balloon 10 as an aid for elevation of the air-ship to a proper height for progressive movement, it may in some cases be dispensed with and a parachute (shown in Fig. 3) be substituted therefor to facilitate the safe and easy descent of the air-ship. As shown, the parachute appliance consists, essentially, of a foldable frame *o*, covered with a light strong fabric *p*, secured to the frame, so as to be stretched taut when the latter is spread, the frame being properly mounted on a vertical shaft *r*, that slides in a tubular standard *t* and is seated on a spring *u*, placed within the standard at its base.

The hollow standard *t* is sustained upright by its attachment to the floor and ceiling of the cabin 13, passing gas-tight through said ceiling, as indicated in Fig. 3, and it will be evident that the folding of the parachute will be adapted to compress the spring *u*. In order to conveniently draw the shaft *r* down, and thus compress the spring *u* while folding the parachute, cords or bands *v* are attached by one end of each to the outer ends of the parachute-frame *o*, and thence extended down to have the lower ends of the cords each affixed to a spring roller device *w*, which lat-

ter is adapted to take up slackness of the cords when they are drawn upon to fold the parachute.

It is only necessary that the gas-chamber of the ship represented by the shell 11 shall contain enough gas to overcome the weight of the shell and attachments thereto and the balloon 10 have a lifting capacity that will quickly elevate the entire ship to a desired height for free sailing movement.

The propeller-wheel 19 from its position and area is designed to communicate to the poised ship a progressive movement, while the smaller wheels 23, if simultaneously revolved in the same direction as the wheel 19, will coact therewith for the propulsion of the air-ship.

It will be apparent that by changing the direction of rotative movement for the wheels 23—that is to say, run one with the wheel 19 and the other in an opposite direction—the direction of the ship will be diverted from a straightforward movement, so that measurable control of the direction of the sailing craft will be afforded. It is also obvious that with the wind in the right direction the adjustment of the rudder 22 will coact with the twin screw-wheels 23 in steering the ship. By an adjustment of the aeroplane 17 the shell 11 and parts hung from and carried by it will be caused to receive an upward or a downward inclination and thus correspondingly control the direction of the air-ship in a vertical plane.

It will be obvious that the rotation of the winged wheel 24 will have a tendency to push the bow of the ship laterally, and as said wheel is to be run in either direction by suitable means the sailing craft may therewith be turned to head it in a desired direction. Should the balloon 10 be dispensed with and the parachute be attached in lieu of it, the rotation of the wheel 25 in a proper direction, together with the inclination of the aeroplane 17, will enable the operator to raise or lower the air-ship, as may be desired.

In case of accident and the ship should become unmanageable by the described means the parachute may be employed to gently lower the entire structure, in which case gas in sufficient quantity may be withdrawn from the shell 11 through a valve x, (shown in Fig. 1,) which valve will also be of service for filling the shell 11 and also as a means for preventing improper strain on the shell should the gas in it be dangerously expanded in volume by the heat of the sun.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An air-ship having a gas-shell, an aeroplane running around the sides of the gas-shell, a cabin projecting upwardly from the bottom of the gas-shell and into the interior thereof, the cabin opening at the sides of the gas-shell and having a power-room beneath it, and propelling and controlling devices running from the cabin and power-room to the exterior parts of the shell, substantially as described.

2. An air-ship having a gas-shell, an aeroplane running around the sides of the gas-shell, a frame held at the front of the gas-shell and in horizontal alinement with the aeroplane, a rocking aeroplane mounted within the frame and coacting with the first-named aeroplane, and means for controlling the rocking aeroplane, substantially as described.

THOMAS M. CREPAR.

Witnesses:
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DELLA BROWN.