(No Model.) 3 Sheets—Sheet 1.

E. PYNCHON.

AIR SHIP.

No. 508,753. Patented Nov. 14, 1893.

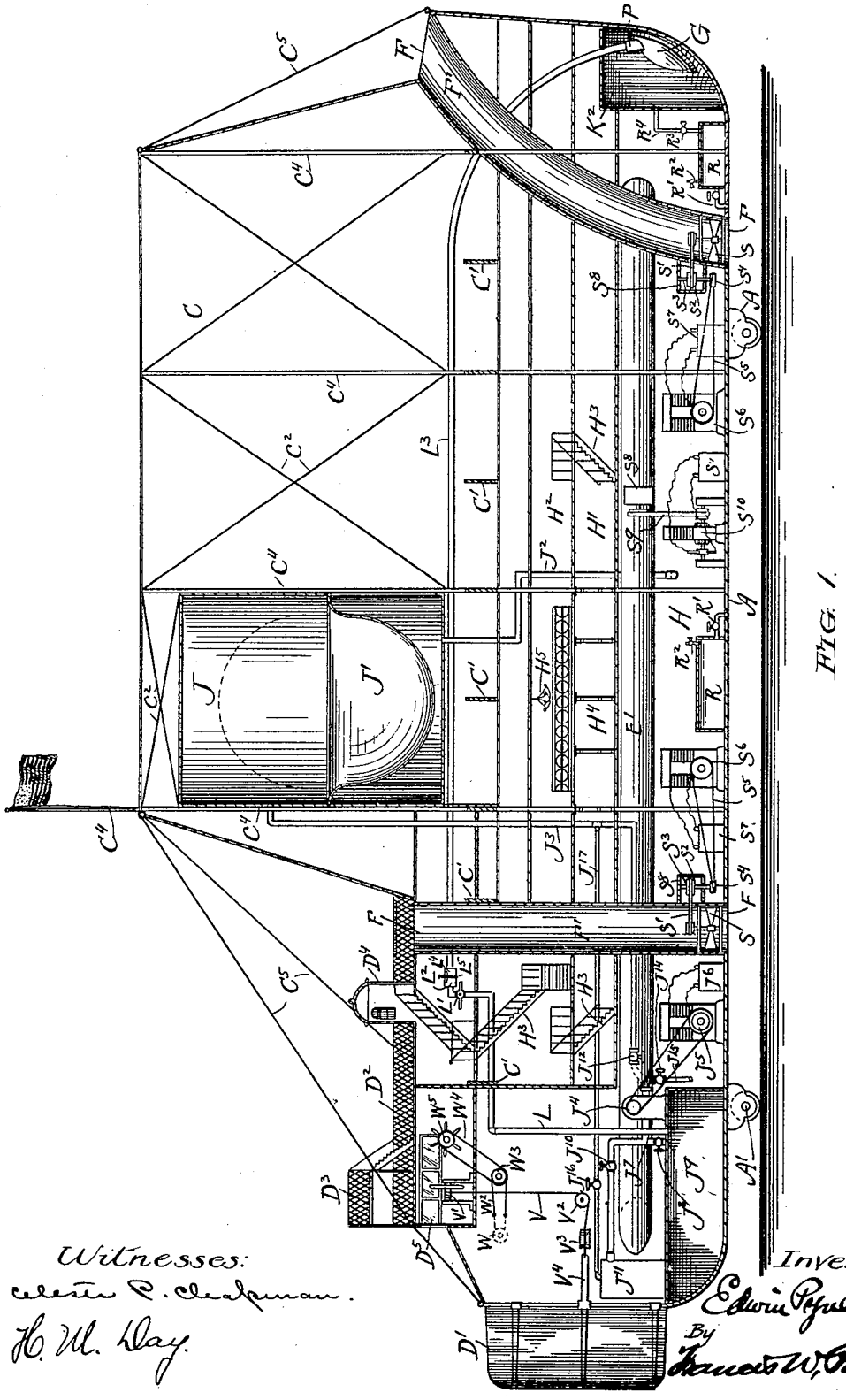

FIG. 1.

Witnesses:
Chester P. Chapman.
H. M. Day.

Inventor:
Edwin Pynchon
By Francis W. Parker,
Atty.

(No Model.) 3 Sheets—Sheet 2.

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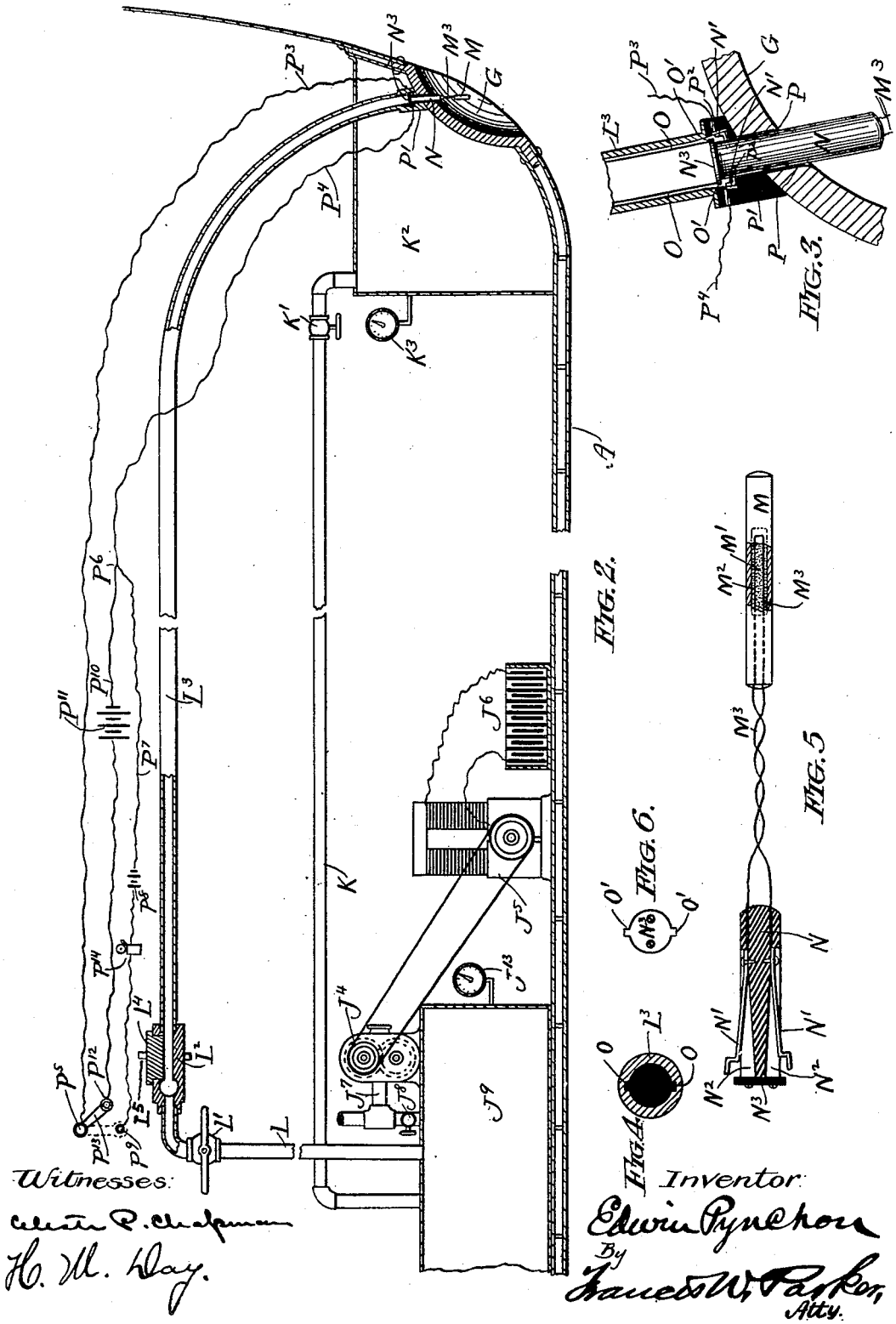

Witnesses:
Chester P. Underwood
H. M. Hay.

Inventor:
Edwin Pynchon
By Frances W. Parker,
Atty.

(No Model.) 3 Sheets—Sheet 3.

E. PYNCHON.

AIR SHIP.

No. 508,753. Patented Nov. 14, 1893.

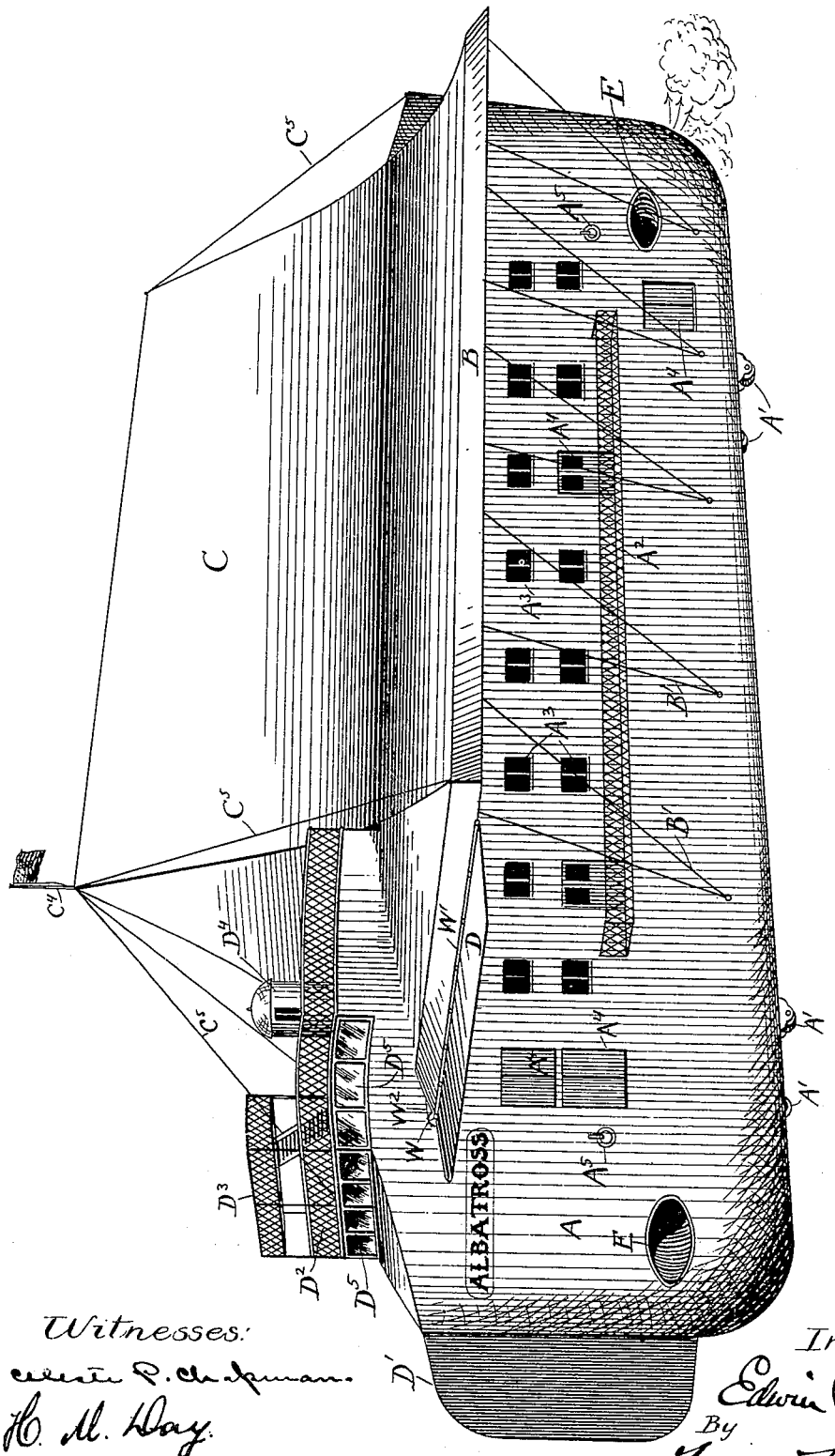

FIG. 7.

Witnesses:
Edwin P. Chapman.
H. M. Day.

Inventor:
Edwin Pynchon
By
Francis W. Parker,
Atty.

UNITED STATES PATENT OFFICE.

EDWIN PYNCHON, OF CHICAGO, ILLINOIS.

AIR-SHIP.

SPECIFICATION forming part of Letters Patent No. 508,753, dated November 14, 1893.

Application filed March 23, 1891. Serial No. 385,979. (No model.)

To all whom it may concern:

Be it known that I, EDWIN PYNCHON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in the Propulsion of Vessels, of which the following is a full, clear, and exact specification.

My invention relates to improvements in air ships and has for its object to provide a simple, cheap and convenient ship with various improvements with respect to locomotion, and the like, as hereinafter set out.

It is illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical longitudinal section of the vessel. Fig. 2 is a detail sectional part diagrammatic and broken view of the devices for propelling the ship. Fig. 3 is a detail cartridge holder and section of detonating plate. Fig. 4 is a cross section of the cartridge conduit pipe. Fig. 5 is a detail of the cartridge and holder. Fig. 6 is an end view of the cartridge holder. Fig. 7 is a perspective view of the ship in motion.

Like parts are indicated by like letters in all the figures.

A is the body of the ship having rollers A′ beneath upon which it may rest when upon the earth, and side projecting balconies A^2, the windows A^3, the doors A^4 A^4, the securing rings A^5 A^5 and connected above with the aero-planes B B by means of the long braces B′ B′. The body rises above the forward ends of the aero-planes as indicated in Figs. 1 and 7. The forward end of the body and aero-planes are made sharp so as to give the minimum of resistance while in motion. The body is shaped after the pattern of a marine ship and is made of any desired material, but so as to have the greatest strength with the least weight, as, for example, aluminium. The same is true of the aero-planes, and the envelope of the buoyancy chamber C which rises above and is connected with the aero-planes, which extend slightly downward to serve in descent as a parachute. The inner frame work of such chamber and aero-planes may be constructed as occasion may require, and experience approve, but probably with light metallic beams, bars, wires and cables as indicated by the letters C′ C^2. Posts as shown in the drawings, four in number pass through the bottom of the body to the top of the buoyancy chamber and give rigidity and strength to the frame. They are lettered C^4 C^4. The buoyancy chamber and aero-planes may be divided into a suitable number of separate compartments. Strengthening wires C^5 C^5 reach from the top of the buoyancy chamber to the body and aero-planes. Forwardly projecting from the aero-planes are the steering wings D which are placed at an angle so as to reduce the resistance of air pressure when the ship is in rapid motion, and forwardly projecting from the boat is the vertical steering wing D′.

D^2 is a promenade deck, and D^3 the captain's deck; D^4 a round house above the stairway leading to the promenade deck D^2.

D^5 are windows opening into the pilot house.

E E are the forward and rear openings of the pipes E′ E′, in which the vertical propellers are placed.

G is a concave detonating plate at the rear and base of the body and exterior to which the propelling cartridges are exploded.

H is a compartment on the bottom of the body of the boat and adapted to hold the machinery, freight and other heavy substances, which serve as ballast to balance the ship and is situated as far below the supporting aero-planes as possible and midway between their lateral extremities.

H′ H^2 are passenger apartments above.

H^3 H^3 are suitable stairways connecting the several compartments and decks.

H^4 is the dining-room with the elevated chandelier above.

From the ceiling of the apartment H^2 upwardly, is the buoyancy chamber which as above stated may be divided into various compartments.

J is a compartment within the buoyancy chamber provided with the diaphragm J′ connected with the air pipe J^2 and by the pipe J^3 with the condensing pump J^4 driven by the motor J^5 which is itself energized from the generator J^6. From this pump leads the pipe J^7, one branch of which opens through the valve J^8 into the condensed air chamber J^9, and the other branch leads through the valve J^{10} to the condensed hydrogen gas chamber J^{11}.

J^{12} is a valve controlling the pipe J^3. When the valves are open in a suitable manner the operation of the pump J^4 is such as to withdraw hydrogen gas from the chamber J above

the diaphragm J′ and to condense it in the chamber J^{11}. By this action air is permitted to flow into the chamber J below the diaphragm J′, and this operation may continue until the diaphragm has assumed the position indicated in dotted lines. By thus introducing air into the buoyancy chamber it is understood that the buoyancy of the boat will be decreased. When it is desired to again increase the buoyancy of the ship, as for example when it is proposed to alight, gas may be released from the gas chamber J^{11} by opening the valve J^{16} when the gas will pass through the pipes J^{17} and J^{8} and expand in the chamber J above the diaphragm or collapsing partition J′. By means of the apparatus indicated, the buoyancy may be altered and changed so as to control the position of the boat. Obviously a series of such chambers J could be supplied, or other similar device or devices accomplishing the same result could be substituted and variously disposed about the ship as required. Another means of securing such result would be to introduce into the several compartments means for elevating or lowering the temperature of the gas therein contained.

J^{13} is a pressure gage connected with the chamber J^{9}.

J^{14} is a valve controlling pipe J^{15} whereby air may be fed to the pump J^{4} when it is desired to compress air in the tank, J^{9}. Leading from the chamber J^{9} is the pipe K controlled by the valve K′ which leads into the cushioning chamber K^{2}, the walls of which are composed in part of the detonating plate G, and it is provided with the pressure gage K^{3}. Leading from the compressed air chamber J^{9} is the pipe L controlled by the valve L′, which pipe opens into the cartridge receiver L^{2} from which leads the cartridge conduit L^{3} to an opening in the detonating plate G. When two such plates are used, the plates are of course located toward the sides of the stern of the body of the boat. The receiver L^{2} has a lid L^{4} which may be secured by the strap L^{5} or other suitable securing device as the lid must remain firmly in position against the pressure of the air which passes through the pipe L and forces the cartridge through its conduit. The cartridge consists of the envelope M with the discharge cap M′ within the same and surrounded by a suitable high explosive which fills the envelope and contains the cap.

M^{2} is a platinum wire within the discharge cap M′ and surrounded by the primary or initial explosive and in circuit with the insulated conductor M^{3}, the two ends of which pass into the cartridge holder which consists of the insulation body N, the spring contact plates N′ N′ adapted to lie in the grooves N^{2} N^{2} and the end piece N^{3} preferably made of leather which serves as a piston in the conduit L^{3}.

The ends of the conductor M^{3} are connected respectively with the contactors N′ N′. The pipe L^{3} has internal grooves O O adapted to engage the projecting lugs O′ O′ on the plate or piston N^{3}.

P is an aperture in the plate G about which is disposed the insulation P′, and through which an aperture is made to connect with the pipe L^{3} so that the pipe L^{3} is firmly secured and its aperture connected with the exterior air at the plate G through the body of insulation. In this body of insulation lie contact plates P^{2} P^{2} adapted to be engaged by the springs N′ N′, and from which lead respectively the conductors P^{3} P^{4}. The conductor P^{3} leads to the switch P^{5} and the conductor P^{4} branches at P^{6}, one branch P^{7} containing the battery cell P^{8}, and terminating in the contact point P^{9}. The other branch P^{10} contains the heavy battery P^{11} and terminates at a contact point P^{12}. The contact points P^{9} and P^{12} are located so as to be within the range of the switch arm P^{13} whereby the circuit may be completed in the one case through the battery P^{11}, and the other through the battery P^{8}.

P^{14} is a signal bell placed in the conductor P^{7}.

I have shown in the mechanism last above described means for supplying, conveying and discharging propelling cartridges, but obviously these means could be greatly altered without departing from the spirit of my invention and among other changes, or adaptations, I will suggest that with respect to supplying the cartridges to their receiving chamber, the same could be accomplished by suitable mechanism in an automatic and therefore regular manner, rather than by any as shown in the drawings. When a cartridge like that shown in Fig. 11, for example, is placed in the cartridge receiver L^{2}, the lid will be securely fixed in position and the valve L′ will be opened sufficiently so as to supply an air pressure from the chamber J^{9} to such cartridge sufficient to force the same through the conduit L^{3} and until the contactors N′ N′ are permitted to expand in the enlargement about the contact plates P^{2} P^{2}. The progress of the cartridge is here arrested by such expansion of the spring contact plates and their engagement with the shoulders, on the insulation block. At this moment these contact springs come into engagement with the contact plates and if the parts are properly in contact the circuit will be completed through the conductors P^{4} and P^{3}. At this time the switch P^{13} should be in the position shown in dotted lines so that the circuit will be completed through the battery P^{8}, and the bell P^{14}. This will be a light current not sufficient to discharge the cartridge, but just sufficient to ring the bell and notify the operator or engineer that the cartridge is suitably placed for explosion, or in other words that the cartridge holder N is placed as indicated in Fig. 3 and that the cartridge M is hung as indicated in Fig. 2, in proper relation to the detonating plate G. Now the switch is moved to the position shown in full lines and circuit com-

pleted from the battery P^{11} whereupon a heavy current is sent through the conductors M^3 and the platinum conductor M^2 and cartridge M′ is exploded by the heating of the platinum wire M^2 the high explosive within, the envelope M being detonated so as to apply the pressure caused by such detonation against the plate or plates G and this forces the air ship forward. After the explosion of the cartridge the valve L′ is turned so as to increase the pressure of air in the pipe L^3 and the springs N′ are broken off by such increased pressure, and the whole of the cartridge holder is expelled from the end of the pipe.

R is a tank in the bottom of the boat which is controlled by the pipes and valves R′ R^2, and may be used for a water supply, and may also be used as a water ballast chamber for the air ship when upon the water. When the tank R is thus filled with water as ballast and it is desired to free the same before flight of the ship such result may be secured by first opening the valve R′ and next the valve R^3 so as to permit the compressed air in chamber K^2 to pass through the pipe R^4 until all of the water is expelled. If found specially important for this use the chamber R could be made larger or there might be a series of them.

In each of the vertical pipes F′ F′ is placed a horizontal propeller S driven by the belt S′ on the pulley S^2 on the shaft S^3 operating in the box S^8 and which shaft is itself driven by the pulley S^4 on the belt S^5 from the motor S^6, which motor is driven by the generator S^7. These boxes S^8 are continuous with the air shafts or pipes F′ F′ to which they are attached and are intended to be air tight so that none of the air being forced through said pipes can escape into the compartment H of the ship. The reason for using said boxes is because it is easier to make a shaft work through an air tight hole than it is to make a belt work in same manner. These air and water tight boxes S^8 would also be necessary to prevent the entrance of water into the ship should the vessel by accident or otherwise alight upon the sea.

The operation of this mechanism is such as to vary the position of the air ship or cause it to raise or lower vertically. The air can be forced in either direction through the pipes F′. A similar propelling mechanism is placed in each of the pipes E′ E′, its driving mechanism being contained in the box S^8 and is driven from the belt S^9 from the motor S^{10} which is supplied with current from the generator S^{11}. The boat may be steered and its speed moderated or controlled by the operation of these fans which are shaped to force the air in either direction from such pipes E′.

V is a rope passing over the windlass V′ on and about the pulleys V^2 V^3 and connected with the arm V^4 on the vertical steering wing D′. There are two such pulleys V^3, one situated on each side of the arm V^4 in the usual manner, so that by operation of the windlass V′, the steering wing D′ may be moved in either direction to guide the vessel.

W is a sprocket wheel on the shaft W′ of the horizontal steering wing D, and W^2 is a chain or belt connected therewith which passes over the pulley W^3 which is operated by the belt W^4 through the windlass W^5. By turning this windlass the steering wing D may be raised or lowered to direct the vessel with reference to its vertical course.

It is quite evident that many of these various parts may be omitted or replaced by others without constituting any material departure from the spirit of my invention.

In using my device after some degree of ascent has been made and some degree of momentum forward secured a pair of small cartridges are caused to detonate and are followed at appropriate intervals by other cartridges of increased size. The cartridge is placed in the tube and with a light pressure of ten or fifteen pounds to the square inch of compressed air is slowly shot through the tube. When in proper position for firing a circuit is closed, causing a magnetic bell to ring by aid of the weak current which in its course passes through the cartridge. The cartridge is then fired by passing a strong current through it. Meantime the pressure of fifteen pounds to the square inch is allowed to remain in tubes. After explosion of cartridge the wooden plug is blown out by turning on full force from compressed air tank, say three hundred pounds to the square inch, which cleans and cools the tube. In order to secure the low pressure an auxiliary tank in addition to the one shown may have to be employed. In the present design as shown, it is intended that these cartridges shall be selected and placed in the tubes by hand though it will in future be an easy step to provide a mechanism whereby this will be done automatically as in case of the magazine gun. While buoyancy is desirable in elevating the ship and sustaining the same until momentum shall have been secured such buoyancy becomes less and less required in ratio to the speed attained; hence it is intended that as forward progress is being made the buoyancy gas shall be gradually and sufficiently condensed in order to secure a proper weight of the ship so that it may benefit thereby and through such acquired weight utilize the resistance of the atmosphere to the fullest degree.

The large container filled with compressed air at the bows of the ship will serve as a cushion to reduce the shock in event of an accidental collision. At the stern of the vessel back of the detonating plates compressed air is caused to serve the same purpose and to reduce to a minimum the vibrations produced by the detonations.

The tubes F′, F′, and their fans are used in ascending. If the weight of the ship were nearly balanced by the buoyancy of the gas

contained, it could be made to ascend by revolving the fans in the said tubes, and under such conditions the fans would not need much lifting power. The tubes E', E', and their fans are used to propel the ship when it is intended to go at a slow rate of speed, for example, when preparing to alight. They are also used in guiding the ship and turning it around when going at a slow rate of speed, by revolving one fan in one direction and the other in the opposite direction.

I claim—

1. In an air ship the combination of a cartridge conduit through which the cartridge passes, a detonating plate at the stern of the ship in proximity to which the cartridge is discharged, and an aperture in the plate through which the cartridge passes and which is normally closed by the cartridge holder.

2. In an air ship the combination of a cartridge conduit with an air pressure tank connected therewith, a detonating plate at the stern of the ship, an aperture in the plate through which the cartridge passes, and which is normally closed by the cartridge holder and through which the cartridge holder may be discharged by increasing the pressure of the air.

3. In an air ship the combination of a detonating plate toward the stern with a high explosive cartridge, a holder therefor, discharging wires which pass through the cartridge and to insulated contacts on the holder, a conduit through which such cartridge and holder passes, contact plates at the mouth of such conduits adapted to be engaged by the contact plates on the cartridge holder and conductors connected with such contact plates.

4. In an air ship the combination of a high explosive cartridge with a holder therefor and discharging wires which pass through the cartridge and to insulated contacts on the holder, a conduit through which such cartridge and holder pass, contact plates at the mouth of such conduits and adapted to be engaged by the contact plates on the cartridge holder and conductors connected with such contact plates, said conductors connected so that either a strong or a weak current can be sent through the conductors and through the cartridge, and a detonating plate toward the stern near which such cartridge is discharged.

5. In an air ship the combination of a high explosive cartridge with a holder therefor and discharging wires which pass through the cartridge and to insulated contacts on the holder, a conduit through which such cartridge and holder pass, contact plates at the mouth of such conduits and adapted to be engaged by the contact plates on the cartridge holder and conductors connected with such contact plates, said conductors divided into two circuits, one containing a weak battery and signaling bell, and the other a heavy discharging battery, and a detonating plate toward the stern near which such cartridge is discharged.

6. In an air ship the combination of a high explosive cartridge with a holder therefor and discharging wires which pass through the cartridge and to insulated contacts on the holder, a conduit through which said cartridge and holder pass, contact plates at the mouth of such conduits and adapted to be engaged by the contact plates on the cartridge holder and conductors connected with such contact plates, said conductors divided into two circuits, one containing a weak battery and signaling bell, and the other a heavy discharging battery, and a switch whereby either of these circuits may be closed at will, and a detonating plate toward the stern near which such cartridge is discharged.

7. In an air ship the combination of a grooved pipe with a cartridge holder, having an end with projecting lugs to be received into the groove, so that the cartridge is properly positioned when it arrives at the terminus of the conduit, and a detonating plate toward the stern near which the cartridge is to be discharged.

8. In an air ship the combination of a grooved pipe with a cartridge holder having an end with projecting lugs to be received into the groove, so that the cartridge is properly positioned when it arrives at the terminus of the conduit, and spring contacts on the side of the cartridge holder and a shouldered enlargement in the end of the conduit, so that said springs expand and engage the shoulders and prevent the cartridge holder from leaving the conduit except under considerable pressure, and a detonating plate toward the stern near which the cartridge is to be discharged.

9. In an air ship the combination of a grooved pipe with a cartridge holder, having an end with projecting lugs to be received into the groove, so that the cartridge is properly positioned when it arrives at the terminus of the conduit, and spring contacts on the side of the cartridge holder, and a shouldered enenlargement in the end of the conduit, so that said springs expand and engage the shoulders and prevent the cartridge holder from leaving the conduit except under considerable pressure, and means for varying the pressure in the conduit so that the cartridge holder can be first forced into position and then be discharged from the conduit by means of varying pressure, and a detonating plate toward the stern near which the cartridge is to be discharged.

10. In an air ship the combination of detonating plates at the rear of the air ship with conducting and exploding devices whereby high explosive cartridges may be discharged in proximity to such plates and cushions of compressed air back of such detonating plates to diminish the shock of the discharges.

EDWIN PYNCHON.

Witnesses:
CELESTE P. CHAPMAN,
H. M. DAY.