Mar. 6, 1923.

1,447,559

J. N. LEWIS

DIRIGIBLE AIRSHIP

Filed Dec. 27, 1921

2 sheets-sheet 1

Fig. 1.

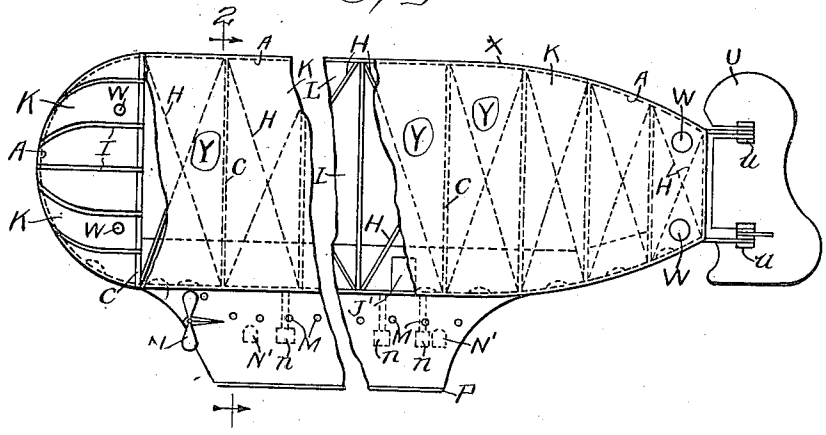


Fig. 2.

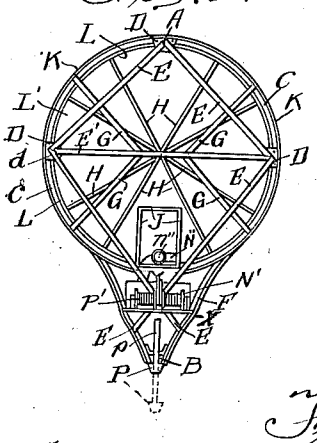


Fig. 3.

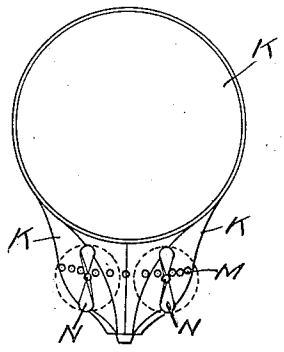
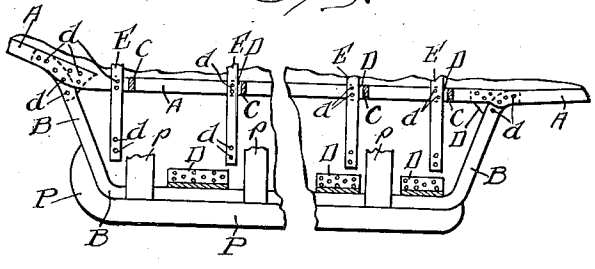


Fig. 4.



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2 sheets-sheet 2

Fig. 6.

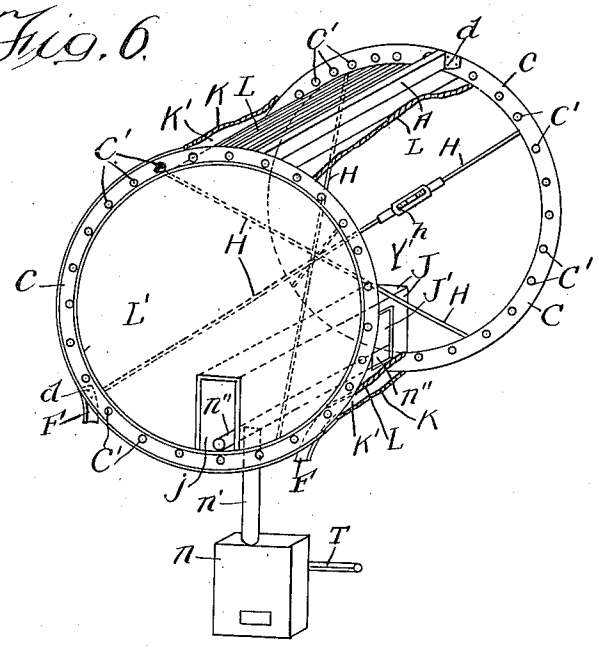
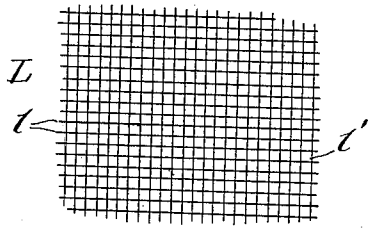


Fig. 5.



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Patented Mar. 6, 1923. 1,447,559

UNITED STATES PATENT OFFICE.

JAMES N. LEWIS, OF DETROIT, MICHIGAN.

DIRIGIBLE AIRSHIP.

Application filed December 27, 1921. Serial No. 524,954.

To all whom it may concern:

Be it known that I, JAMES N. LEWIS, a citizen of the United States, and a resident of Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in a Dirigible Airship, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a specification.

This invention relates to a lighter than air ship which is provided with means for propelling it and directing its course.

The objects of the invention are to obtain a dirigible lighter than air vehicle, to be used to carry passengers, and freight, and in which the elevating medium preferably consists of heated air; a device which requires a minimum quantity of heat to be applied to the air by means of which it is elevated or suspended; a device which will not be liable to collapse or break when made of a considerable size; a device which will permit examination and, when required, repairs of the elevating means, and all parts thereof, and a device which is simple in construction and economically made.

Additional objects are set forth in the specification and included in a device coming within the terms of the claims.

I have illustrated a construction embodying this invention in the drawings accompanying this specification, in which—

Fig. 1 is a side elevation, with a portion of the outer envelope or shell removed, to show some of the interior construction, and

Fig. 2 is a vertical section on line 2—2 of Fig. 1, viewed as indicated by arrows.

Fig. 3 is a front end elevation;

Fig. 4 is a view of a portion of the frame of the air ship, and

Fig. 5 is a plan illustrating the manner of constructing a partition board which forms an element of the device.

Fig. 6 is an isometric perspective of a chamber in the elevating member, with some of the coverings thereof broken away, showing some of the members which are adjacent thereto and contained therein.

Figs. 4 and 5 are on a considerably enlarged scale from Figs. 1, 2, 3 and 6.

A reference character applied to designate a given part indicates said part throughout the several figures of the drawings wherever the same appears.

The frame of the device comprises a longitudinally extending rib, (which also extends vertically around the forward end of the frame), indicated by the broken lines lettered A in Fig. 1, (a portion thereof being illustrated in Figs. 2 and 4), the additional longitudinally extending ribs B; the circular trusses C, (which are of metal and are respectively provided with apertures C′); the tie plates D; the chords E and E′, ribs F, struts G, ties H, (which are provided with turn buckles *h*), and braces I, I.

Ribs A and B, trusses C, C, chords E, E′, ribs F, F, and struts G, G, respectively, are adapted to withstand compression as well as tension. Ties H, H, are made of wire strands or cables, and are adapted to withstand tension. Tie plates D, D, are illustrated as joined to the several members connected together thereby by rivets *d*, *d*.

J, J, represent partitions which extend longitudinally in the frame (hereinafter termed frame X), which is obtained by the above recited parts, to secure a longitudinally extending passage way *j*; and J′ represent doors or valves which, when open, establish communication between the passage way *j* and the several chambers hereinafter described.

The frame X is provided with an exterior cover, K, preferably of thin sheet metal; which extends beyond said frame on the outside of ribs F, F, to form the exterior of the car X′. The frame X is also provided with the interior wall designated, (Figs. 2 and 5), by the reference letter L. This wall L is impervious to gas. The truss rings C, C, are provided with a cross partition which are designated L′, L′, in Figs. 2 and 6, of the same material as partition L. The construction of wall L is indicated in Fig. 5, as consisting of a loosely woven base, preferably of metal or textile strands *l*, *l*, covered by plastic material, as paper mâché, (contour lines whereof are indicated by the line *l*′, Fig. 5).

By means of the inner wall L, and cross partitions L′, L′, a plurality of chambers, (Y′, Y′,), are obtained in the frame X. All of said chambers communicate with the passage way *j*, by means of openings which are duplicates of the one designated in Figs. 1 and 6 by the reference character J′. These openings are respectively closed by a door which constitutes a valve.

The car or nacelle X′ is provided with the ports indicated by the reference letter M in Fig. 1. N, N, represent propellers which

are illustrated as driven by a motor indicated by reference character N′ in Fig. 2. *n*, *n*, indicate heaters, by which air is heated and conveyed through conduits *n′*, *n′*, to the conduit *n″* in passage way *j*. The several chambers Y′, Y′, are supplied with gas, preferably heated air, by branch conduits which are duplicates of the one designated by the reference character N″, in Fig. 2.

T, Fig. 6, represents a fuel supply pipe to air heater *n*. U, Fig. 1, represents the balanced rudder controlling horizontal movement of the air ship, said rudder being pivotally mounted at *u*, *u;* and *u′* represents the connection by means of which the position of said rudder is controlled.

The double cover K, L, is primarily to obtain an enveloping space or chamber K′ to chambers Y′, Y′, which space will contain a comparatively still body of air, to protect the heated contents of said chambers Y′, Y′, from being cooled by the cooling of the walls of said chambers, Y′, Y′, through the direct contact of the atmosphere on said wall L of said chambers; and to control the movement of air in said space or chamber K′, between walls K and L, valves which are indicated by the circles W, W, in Fig. 1, are located in covering K. The opening and closing of these valves varies the flow of air to said space or chamber K′.

The broken lines lettered Y, Fig. 1, indicate valves positioned in covering L, which, when open, permit a flow of air from chambers L′, L′, into space K′.

To elevate and maintain sustension of this air ship, air is heated in heaters N, N, and discharged through conduits *n′*, *n″*, into chambers L′, L′, (valves Y being open).

When said chambers L′, L′, are filled with air heated sufficiently to cause elevation of the air ship continuous sustension thereof is maintained through continuous heating of air in one or more of the heaters *n*, *n*. The course of the air ship is controlled by the rudder U, and forward movement by the propellers N, N, in the ordinary manner.

In case the coverings K, L, or either of them, are punctured access is had to the chamber L′ of which said covers are walls, through the passage way *j* and apertures J′, Fig. 6, in the vertical walls of said passage way.

By means of the cross ties H, H, (in addition to the several chords E, E′, struts G and braces I), I obtain a truss like structure to the body of the air ship which is well adapted to resist strains in all directions.

I claim:

1. In a lighter than air structure air ship, the combination of a metallic frame comprising circular members respectively provided with truss rods and stays, a covering attached to the outside of said frame, a plurality of gas containing chambers respectively provided with circular walls of reinforced material, said circular walls constituting the internal wall of a double walled structure, and the end walls of said chambers consisting of cross partitions of said re-inforced material, which are common to adjacent chambers, means to obtain access to said chambers, means to heat air and continuously discharge said heated air to said chambers, and means to withdraw air from said chambers.

2. In a lighter than air structure air ship, the combination of a metallic frame comprising circular members respectively provided with truss rods and stays, and an inner and an outer covering, respectively attached to the outside and to the inside of said circular members, in spaced relation, transverse partitions in said frame attached to said inner covering to obtain a plurality of chambers respectively adapted to form gas containers, additional ties attached to said circular members and extending from the upper corners of said chambers diagonally therethrough to the opposite lower corners thereof, means to suspend and maintain continuous suspension of said air ship, said means comprising air heating devices to continuously supply heated air to said gas containers, and means to withdraw air from said containers.

3. In a lighter than air structure air ship, the combination of a metallic frame comprising circular members respectively provided with truss rods and stays, a covering attached to the outside of said frame, and a covering attached to said circular members within and in spaced relation to said outside covering, apertures in said inner covering, transverse partitions in said frame attached to said last named covering to obtain a plurality of chambers respectively adapted to form gas containers, additional ties attached to said circular members and extending from the upper corners of said chambers diagonally therethrough to the opposite lower corners thereof, and means to suspend and to maintain suspension of said air ship, said means comprising air heating devices to continuously supply heated air to said gas containers, and valves adapted to seat and close said apertures in said inner covering.

4. In a lighter than air structure air ship, the combination of a metallic frame comprising circular members having apertures to permit a flow of air therethrough and respectively provided with truss rods and stays, inner and outer coverings attached, in spaced relation, to said members, transverse partitions in said frame arranged to obtain in combination with said inner covering, a plurality of chambers respectively adapted to form gas containers, said inner covering and said partitions consisting of

re-inforced plastic material, additional ties attached to said circular members and extending from the upper corners of said chambers diagonally therethrough to the lower opposite corners thereof, means to suspend and to maintain suspension of said air ship, said means comprising air heating devices to continuously supply heated air to said gas containers, and means to withdraw air from said containers.

5. In a lighter than air structure air ship, the combination of a metallic frame comprising circular members respectively provided with truss rods and stays, a covering attached to the outside of said frame, transverse partitions in said frame and an inner wall attached to said frame and to said partitions to obtain a plurality of chambers respectively adapted to form gas containers, additional ties attached to said circular members and extending from the upper corners of said chambers diagonally therethrough to the lower corners thereof, a keel, ribs attached to said circular members and to said keel, and a plurality of laterally extending ties to said keel.

JAMES N. LEWIS.

In the presence of—
CHARLES TURNER BROWN,
SAMUEL M. BOOTH.