

T. KORN BRODT.

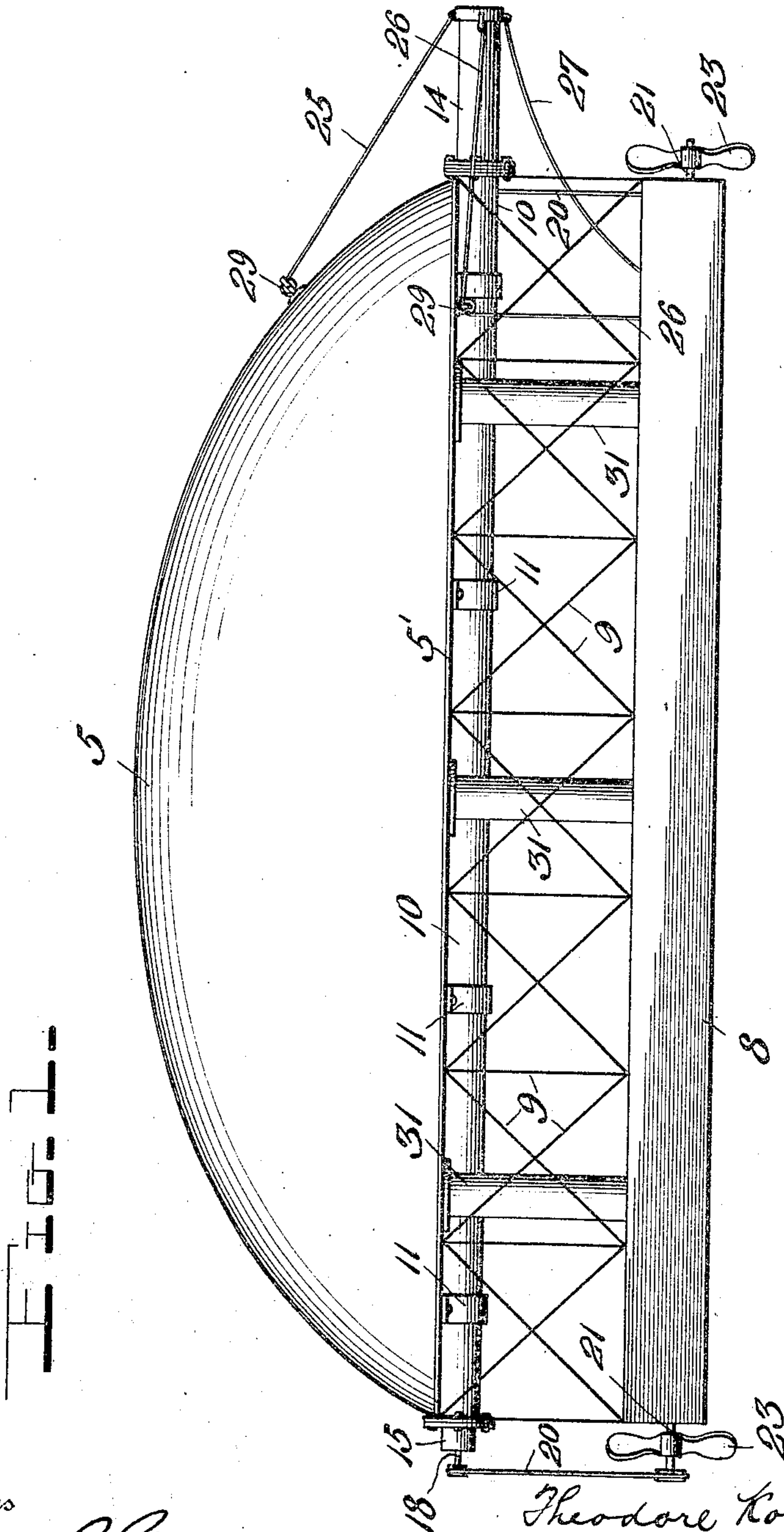
AIRSHIP.

APPLICATION FILED OCT. 28, 1909.

962,964.

Patented June 28, 1910.

4 SHEETS—SHEET 1.



Witnesses

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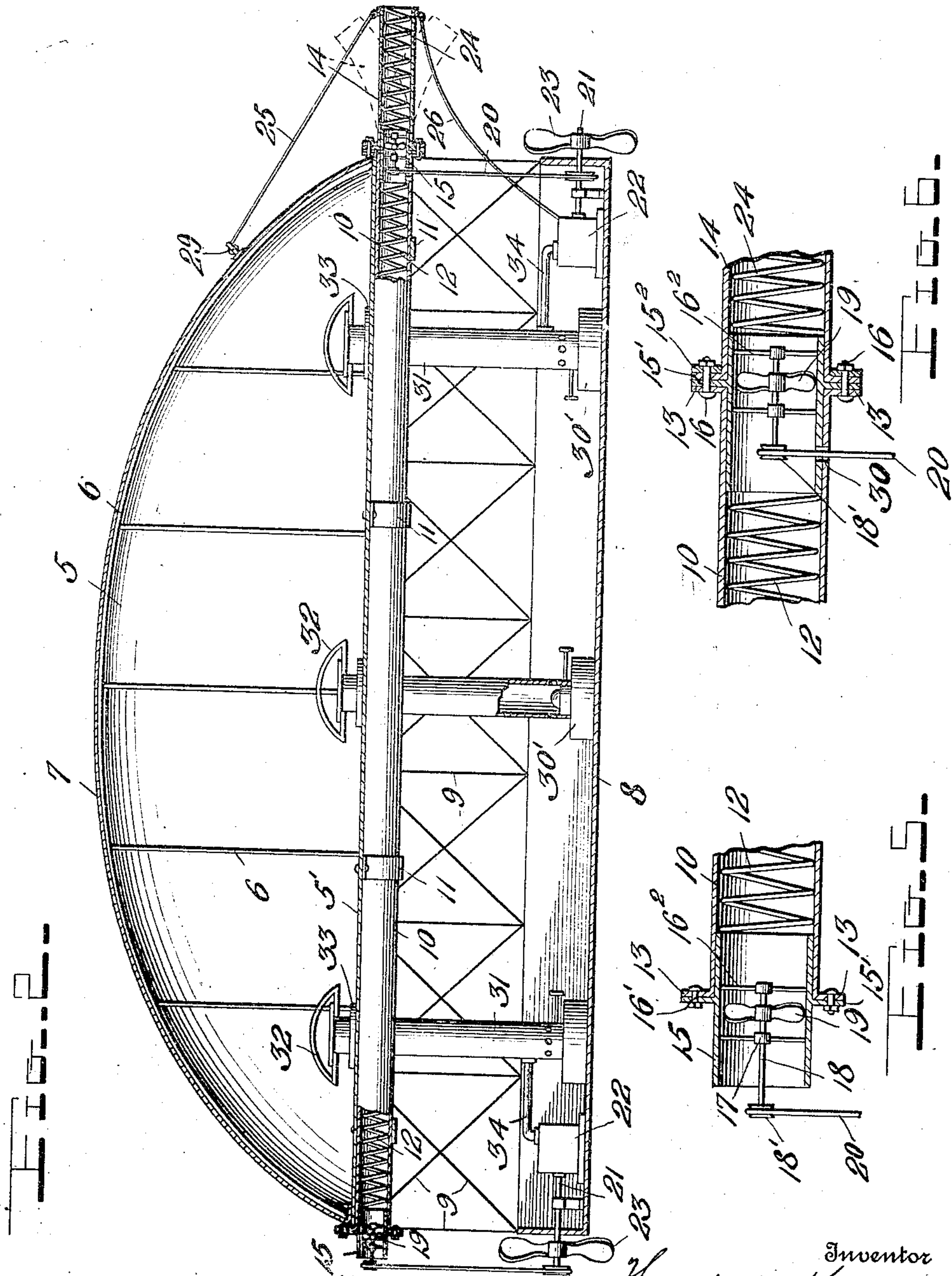
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4 SHEETS—SHEET 2.



Witnesses

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Fig. 3.

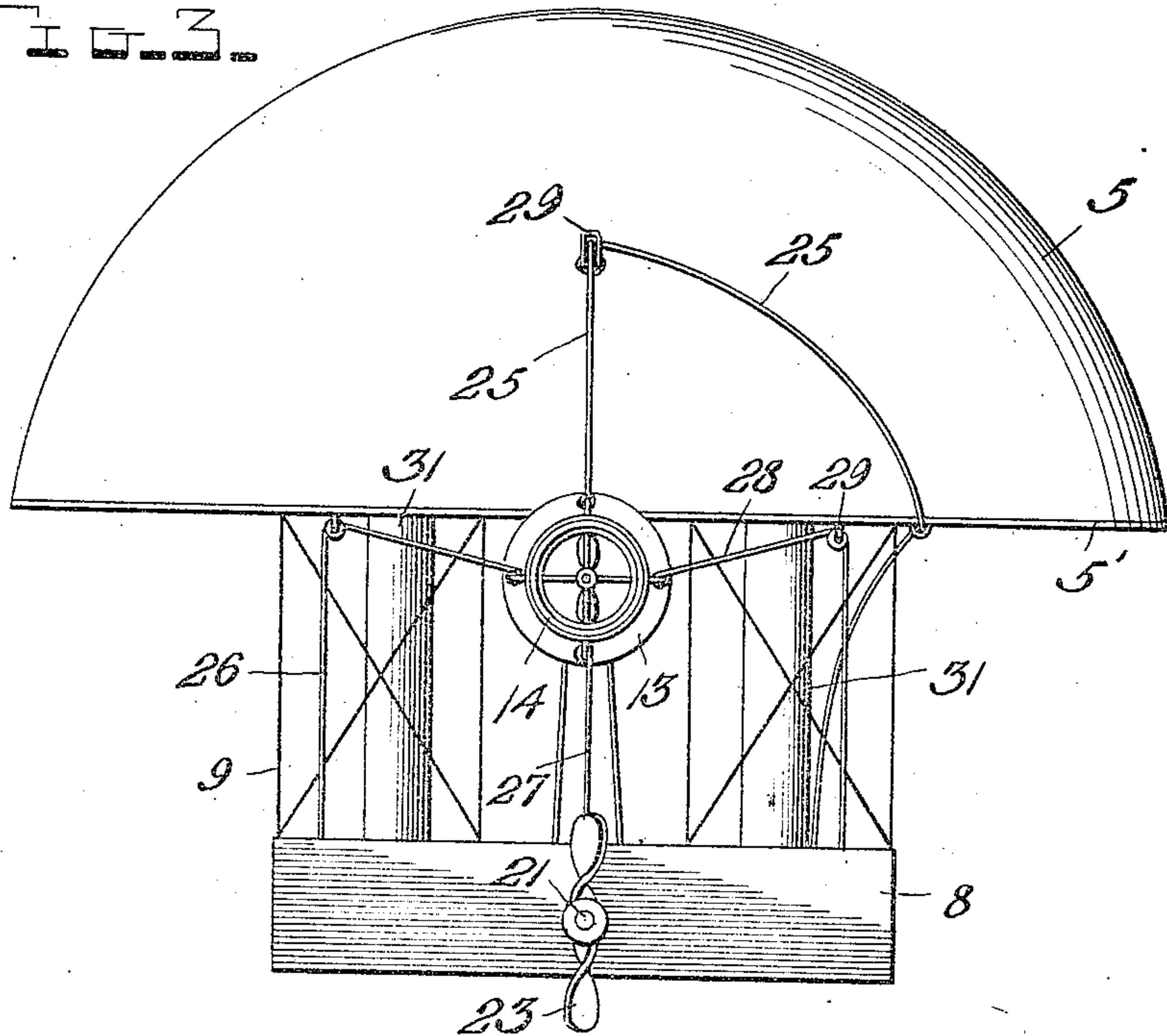
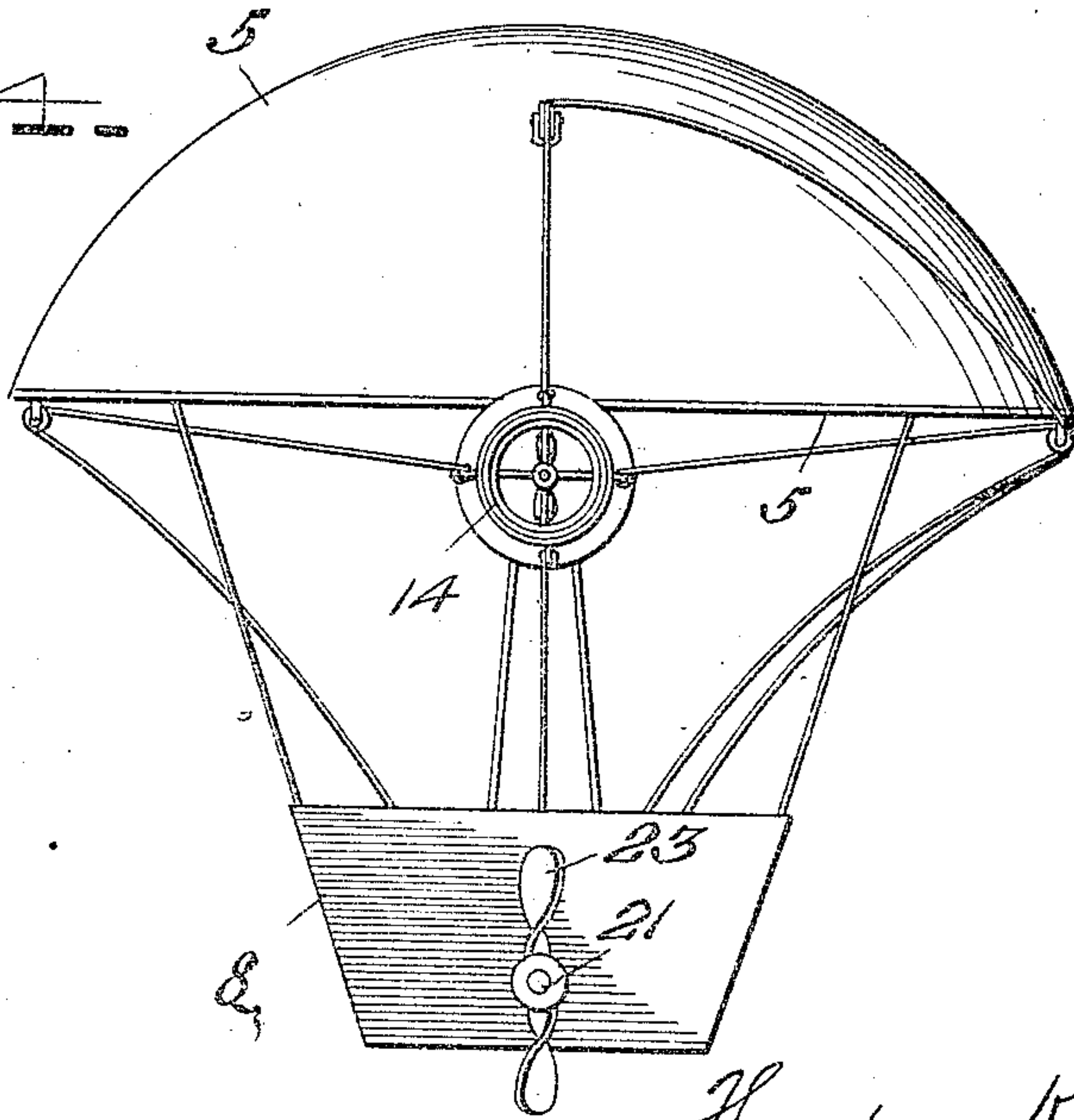


Fig. 4.



Witnesses

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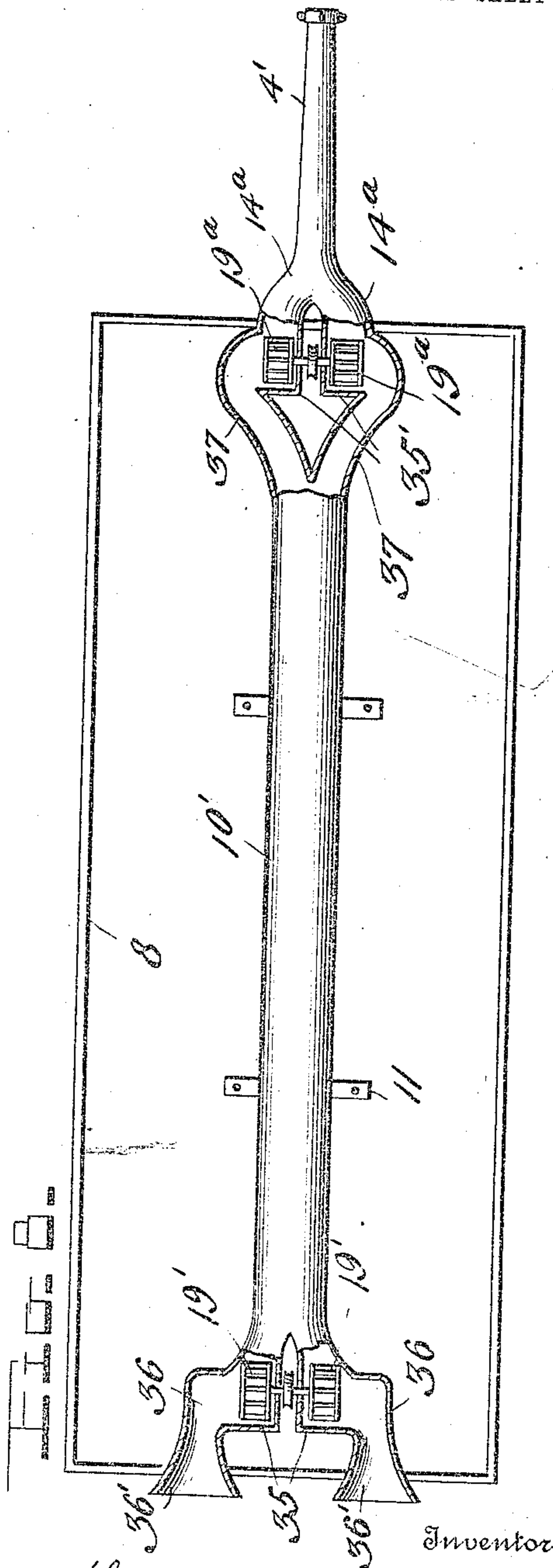
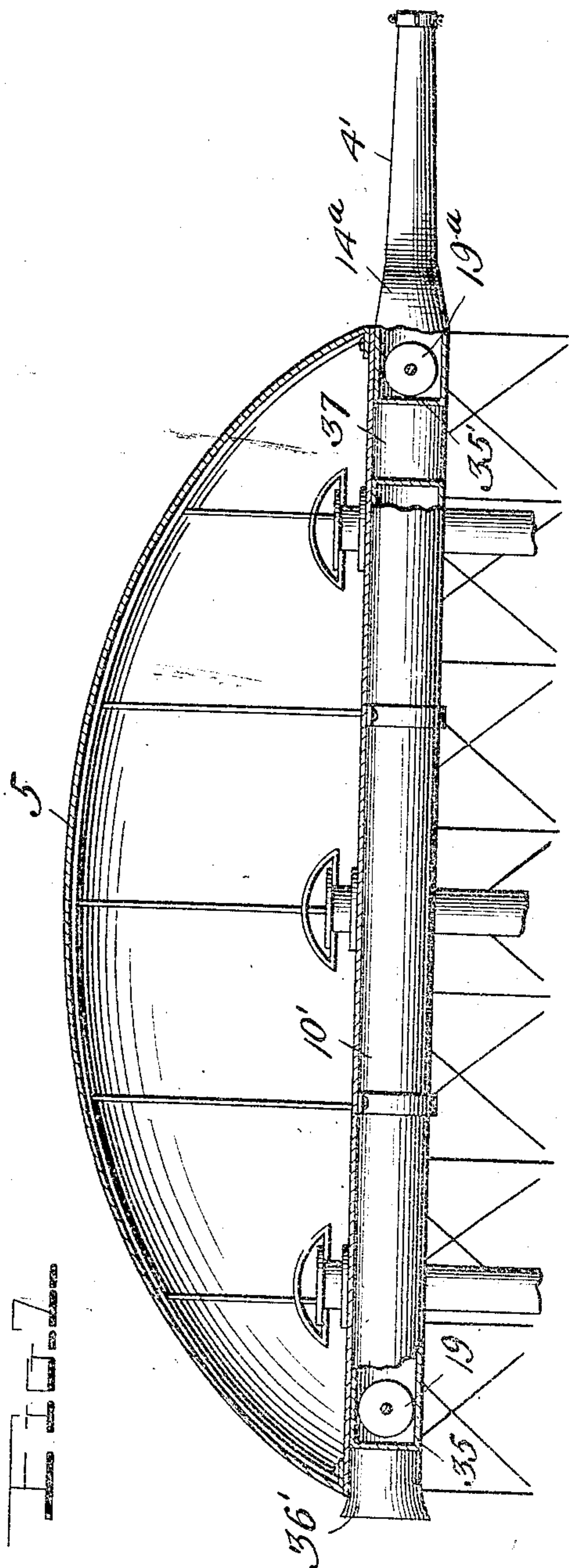
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

THEODORE KORNBRODT, OF CHICAGO, ILLINOIS.

## AIRSHIP.

962,964.

Specification of Letters Patent. Patented June 28, 1910.

Application filed October 28, 1909. Serial No. 525,077.

*To all whom it may concern:*

Be it known that I, THEODORE KORNBRODT, 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 Airships, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to air ships and has for its object to provide a device of this character wherein a balloon is employed, said balloon being adapted to receive hot air, from suitable means carried by the body of the ship.

A further object is to provide an air directing tube centrally positioned and longitudinally extending beneath the bag, a resilient steering element being suitably connected to the rear end of said tube and adapted to be directed by suitable steering means carried by the ship, to direct the flight of the air ship as may be desired by the operator.

A further object is to provide propellers arranged in the ends of the body of the ship, the shafts of said propellers being connected to the shafts of the propellers arranged in the air directing tube, suitable engines being provided for driving said propellers, the heated air generated by said engines being exhausted into the hot air bag.

With these and other objects in view, the invention consists of the novel construction, combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of an air ship constructed in accordance with my invention; Fig. 2 is a vertical longitudinal section; Fig. 3 is a rear end elevation; Fig. 4 is a view similar to Fig. 3 illustrating a slightly modified form. Fig. 5 is a detail section of one end of the air tube and propeller casing; Fig. 6 is a similar view of the opposite end of the tube showing the connection of the steering element; Fig. 7 is a view similar to Fig. 2 illustrating a slightly modified form of the steering tube; and Fig. 8 is a top plan view thereof partly in section.

The present invention has relation to that class of air ships, described and illustrated in Patent No. 866,665, issued to me September 24, 1907, and is devised with a view to improving and simplifying the construction

therein illustrated, whereby a greater efficiency in the operation of the device may be attained.

In the above mentioned patent a gas bag was employed from which a car body of suitable construction was suspended, said bag having an air conducting tube disposed longitudinally therethrough, and a suitable steering element extending from the rear end of said tube, together with suitable means whereby said steering element is operated. In the present invention, instead of employing gas as the elevating medium for the ship, I preferably use hot air, to avoid explosions and operating expense incident to the use of gas in devices of this character.

In carrying out the aim of the present invention I employ a hot air receiving bag 5, which as shown in Fig. 1 is of substantially semi-circular cross sectional form and comprises a frame 6 upon which the covering 7 is arranged and secured. A car body 8 is suspended from the bag 5 by means of the rods or bars 9. Centrally and longitudinally disposed beneath the air bag there is a tube 10. This tube is preferably formed of a heavy flexible material and extends the entire length of the bag and is supported therefrom by the hanger plates 11 which surround the tube and have their ends suitably secured to the bottom of the bag. Within the tube 10 a spiral spring 12 is arranged, and has its extremities secured adjacent to the ends of said tube. The ends of the tube 10 are formed with the annular flanges 13, and a flexible air directing steering element 14 extends from the rear end of said tube. In each end of the tube, a casing 15 of reduced diameter is positioned, the steering element being disposed upon the outer end thereof and against the flange 15'. A circular clamping plate 15<sup>2</sup> is disposed over the end of the tube 14 and clamps the material between the flange 13 and the plate. Suitable securing bolts 16 extend therethrough and securely retain the steering element in position. In each of the casings 15 spiders 16<sup>2</sup> are arranged and are centrally formed with the bearings 17 to receive the propeller shafts 18. Upon these shafts between the spiders, the propellers 19 are secured. Upon the outer ends of the shafts 18 belt pulleys 18' are carried to receive the endless belt 20 which extends to the shaft 21 of an engine 22 of any preferred construction



which is carried in each end of the car body. The shafts 21 extend exteriorly of the car body and have secured thereon the two bladed propellers 23. These propellers are adapted to propel the ship, and at the same time the propellers 19 are rotated within the ends of the tube 10. A blast of air is thus directed through the tube by the forward propeller and the rear propeller expels this air through the flexible tube 14 which comprises the steering element. Within the tube 14, a spiral spring 24 is disposed and is of such resiliency that the tube will be normally held in longitudinal alinement with the tube 10 and provide a direct passage for the air. The propeller casing in the forward end of the tube 10 is secured in position by means of the bolts 16' which extend through the flange 13 and the flange 15' formed upon the casing.

A suitable steering means is provided for directing the resilient steering element and comprises a plurality of ropes, cables, or similar elements 25, 26, 27, 28. These ropes extend over suitable guide rollers 29 carried by the air bag and have one of their ends secured to eyes which are formed upon an annular plate disposed about the outer end of the flexible tubing 14, the other ends of said ropes depending into the car body within convenient reach of the operator. It will be understood that any suitable means may be provided for manipulating these ropes to direct the steering element. An opening 30 is provided in the tube 14 and casing 15 through which the driving belt 20 extends to the belt pulley 18'.

In order to provide suitable means for supplying the heated air to the bag 5, a plurality of alcohol or kerosene lamps 30' are arranged in the car body 8, and the air conducting tubes or cylinders 31 extend therefrom through the bottom of the bag 5. The upper ends of these tubes are provided with heads 32 which deflect the heated air currents as they pass into the interior of the bag. Annular reinforcing plates 33 are secured upon either side of the material of the bag at the point at which the tubes 31 are positioned therein. For the purpose of utilizing the waste heat generated by the engines 22, a short pipe 34 connects the exhaust of the engines with each of the end tubes 31 thus insuring an adequate supply of heated air to the bag at all times. It will be obvious that if desired separate conducting tubes may be provided whereby the air from the engines may be carried directly into the bag.

In the operation of the air ship, the alcohol lamps are lighted and as the heated air rises within the tubes 31 and enters the bag, the buoyancy of the ship will gradually increase and elevate the device into the air. The engines 22 are now put into operation, and as the propellers 23 are rotated the machine

will be driven forwardly. A suitable reversing mechanism may also be provided for reversing the direction of movement of the ship. The propellers 19 are at the same time rotated to create a blast of air in the tube 10. As this air is exhausted at the rear end of the tube and expelled into the resilient steering element 14 by the propeller 19, upon the manipulation of the steering ropes or cables, the steering tube will be positioned above or below or laterally of the tube 10 as shown in dotted lines in Fig. 2, and the course of the ship will continue in such direction. As the bag 5 is provided with a lower plane surface as shown at 5', the buoyancy of the machine is greatly increased and it will require but a small quantity of the heated air to keep the ship in an elevated position after it has started its flight. This bag may be made rigid or collapsible as desired. The hot air may be introduced into the bag in any other desired manner than that which is above set forth.

Figs. 7 and 8 illustrate a slightly modified form of the resilient steering element or tube, and the means for conducting the air currents thereto. In this construction it will be noted that the centrally arranged air tube 10' is separated or branched at the forward end of the machine and provided with the circular casings 35. Within each of these casings a rotary fan 19' is arranged and secured upon opposite ends of a transverse shaft 36 journaled in the sides of the casings. These fans are preferably of the form commonly known as "Sirrocco" fans, and comprise a plurality of wings or vanes secured between parallel circular heads. It will, however, be obvious that any desired form of fan may be utilized whereby the purposes in view may be attained. Extending forwardly from each of the casings 35 and outwardly thereof there is a tube 36 which may comprise a separate element or may be integrally formed with the casings. These tubes extend rearwardly of the body of the airship and are substantially funnel shaped or formed with the outwardly flared extremity 36' as clearly shown in Fig. 8. The rear end of the air conducting tube 10' is separated or branched as shown at 37. Each of these branches has its extremity inwardly or transversely directed and in communication with a casing 35 similar to those arranged in the rear end of the machine. A fan 19<sup>a</sup> is also rotatably mounted in each of the casings and is adapted to expel the air from the casings which is admitted thereto through the branch tubes 37, with suitable force into the flexible steering tube 14'. This tube is branched at its inner end as shown at 14<sup>a</sup> and is connected to each of the casings 35'. The steering tube is tapered or gradually reduced in diameter to its outer extremity to provide a contracted outlet.



By means of this construction the air is gradually compressed in the tube before it is entirely expelled therefrom, considerably increasing its force and more effectually accomplishing the steering function thereof. The tube is directed to steer the machine in the manner above set forth, and the rotary fans 19' and 19<sup>a</sup> will also operate in a similar manner to that previously described. The belt pulley is arranged upon the fan shafts centrally between the fan casings, and is connected to a similar pulley upon the motor shaft within the body of the machine. In this manner the air may be more forcibly directed through the longitudinal tube 10', and by providing the duplex fan in the rear end thereof for discharging the air currents into the steering tube, the steering action is rendered extremely positive and sensitive to the slightest movement of the steering tube.

It will also be understood that many other minor modifications may be resorted to in the construction and arrangement of the several parts without materially departing from the essential features or sacrificing any of the advantages of my invention.

While I preferably employ hot air as the inflating medium for the bag in order to reduce the possibility of an accident to a minimum, it will be understood that gas may also be employed if desired and that the bag itself may be constructed in various forms to improve the attractive appearance of the machine as may be desired by the individual owner.

Having thus described the invention, what is claimed is:

1. In an air ship, an air bag, a flexible tube extending longitudinally and centrally beneath said bag, a car body suspended from said bag, propellers arranged in the end of said body, means for rotating said propellers, a resilient steering element attached to the rear end of said tube, means connecting said tube and element, propellers arranged in the opposite ends of said tubes to direct an air blast therethrough, means co-operatively connecting the propellers in said tube with the propellers in the car body, and means carried by said car body for filling said bag with hot air.

2. In an air ship, an air bag having a plane bottom surface, an air chamber centrally and longitudinally arranged below said bag, propellers arranged in the opposite ends of said chamber, a flexible steering ele-

ment secured to the rear end of said chamber, steering means adapted to direct said element, a car body suspended from said bag, propellers arranged in the opposite ends of said body, means carried by the car body for rotating said propellers, flexible connections between the propellers in said chamber and in said car body, a plurality of heat generating elements carried by said car body, and conducting tubes extending from said element into said air bag.

3. In an air ship, an air bag having a plane bottom surface, an air conducting tube extending centrally and longitudinally beneath said body and supported therefrom, a flexible steering element secured to the rear end of said tube, a car body suspended from said bag, steering means carried by said car body and connected to said element to direct the same, propellers arranged in the opposite ends of said tube and adapted to direct an air blast therethrough, propellers arranged in the opposite ends of said car body, an engine in each end of said body adapted to simultaneously rotate said propellers, a plurality of heat generating elements carried by said car body, and means for conducting heated air generated by said elements into the air bag.

4. In an air ship, an air bag of substantially semicircular cross sectional form, an air conducting tube extending centrally and longitudinally beneath said bag and supported therefrom, a car body suspended from said bag, a flexible steering element extending rearwardly of said body and in longitudinal alinement with said tube, propellers carried by said car body, an engine located in each end of the body to rotate said propellers, means arranged in the opposite ends of said tube for creating an air blast therethrough, said engine being adapted to simultaneously actuate said means and propellers, a plurality of heat generating elements carried by said car body, tubes extending from said elements into the air bag and adapted to conduct the heated air thereto, and a connecting pipe extending from each of said engines to certain of the tubes to discharge the heated air from said engines into said tubes.

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

THEODORE KORN BRODT.

Witnesses:

WM. STANLER,

ALBERTINE KORN BRODT.