R. CARLSON.

AIRSHIP.

APPLICATION FILED MAR. 16, 1910.

1,050,337.

Patented Jan. 14, 1913.

3 SHEETS—SHEET 1.

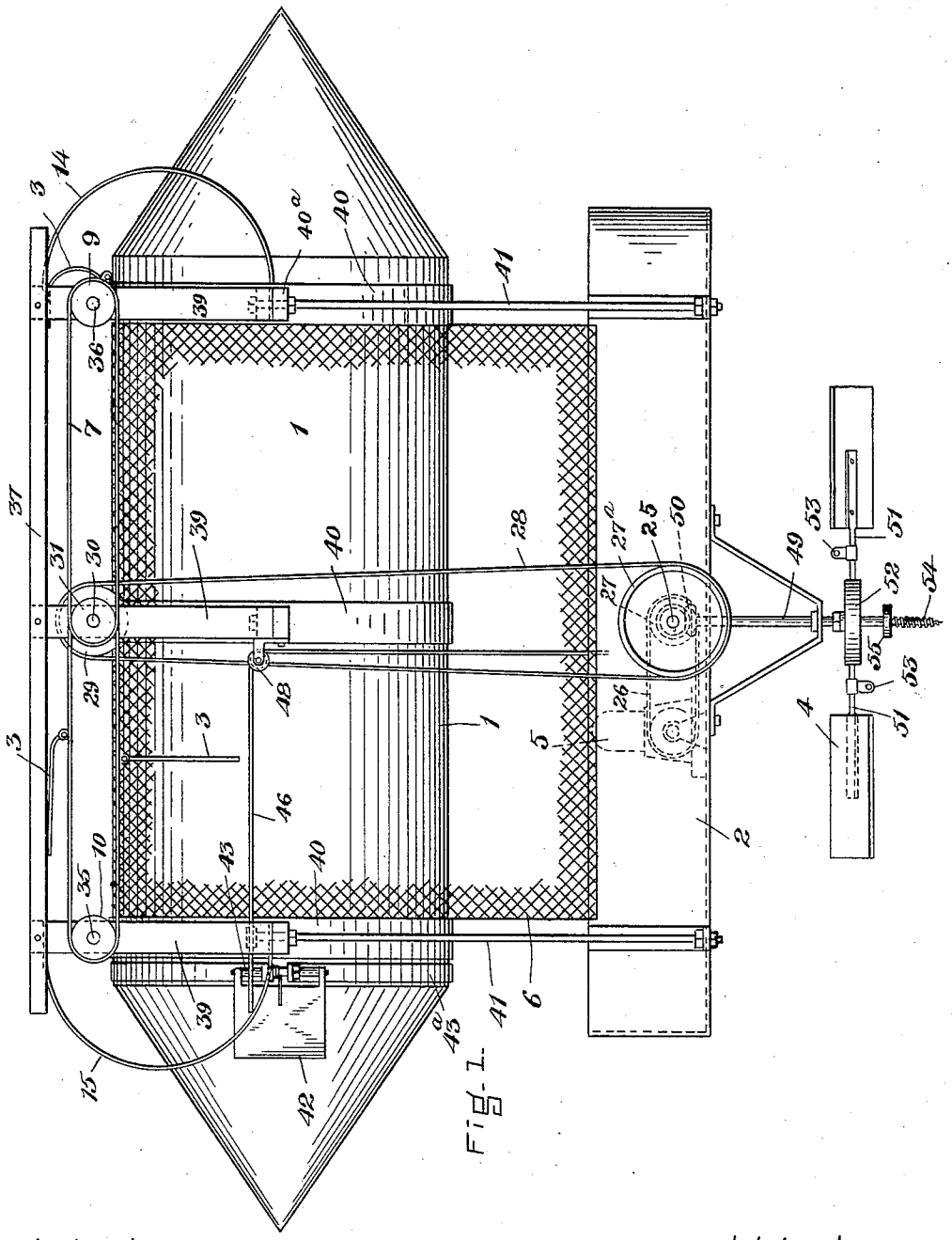

Fig. 1.

WITNESSES.

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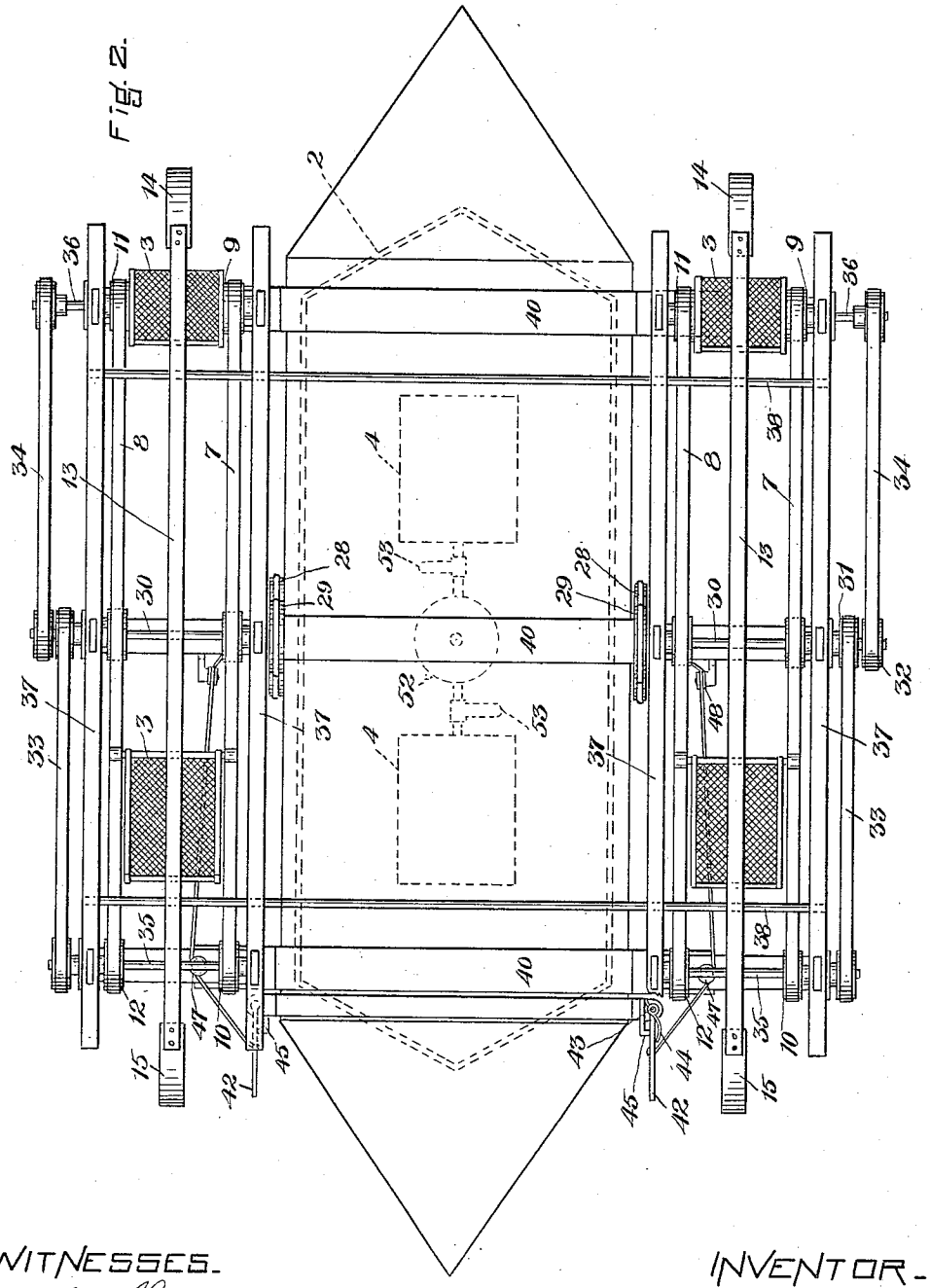
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

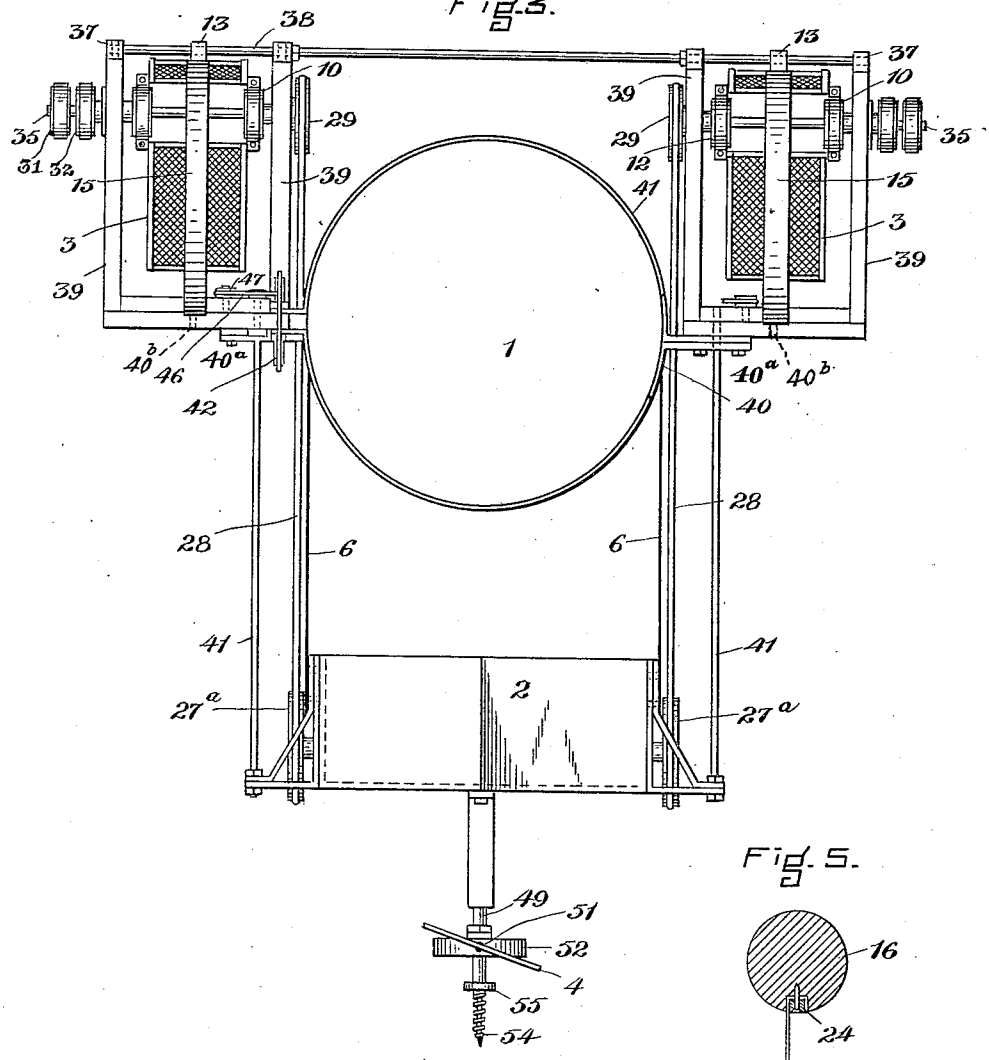
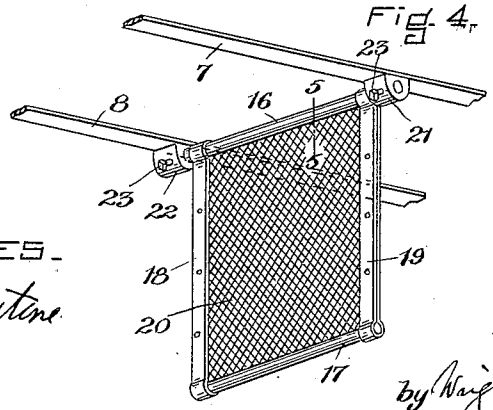


Fig. 5.

Fig. 4.



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ROBERT CARLSON, OF CORBIN, MONTANA.

AIRSHIP.

1,050,337. Specification of Letters Patent. Patented Jan. 14, 1913.

Application filed March 16, 1910. Serial No. 549,632.

To all whom it may concern:

Be it known that I, ROBERT CARLSON, of Corbin, in the county of Jefferson and State of Montana, have invented certain new and useful Improvements in Airships, of which the following is a specification.

This invention relates to flying machines or air ships of the dirigible balloon type, and has for its object to provide improved driving and controlling means by which the air ship may be propelled and its height controlled, together with novel means for rigidly connecting the car with the driving and controlling means, and flexibly connecting the same with the buoyant body or member of the air ship.

In the accompanying drawings I have illustrated an air ship or dirigible balloon illustrating the principles of my invention, from which, and from the following description referring to said drawings, the essential principles of the invention may be understood.

In the drawings, Figure 1 represents a side elevation of the air ship. Fig. 2 represents a plan view of the same. Fig. 3 is a front elevation of the same. Fig. 4 is a perspective view of one of the propelling or driving elements by which the air ship is set in motion. Fig. 5 is a detailed sectional view of the part of the said propelling element representing a section taken on the line 5—5 of Fig. 4.

The same reference characters indicate the same parts in all the figures.

The air ship comprises essentially a supporting body or member 1, a car 2 in which the operator is carried, propelling members 3 by which the air ship is put in horizontal motion, and an elevating and lowering device 4 and a motor 5, with suitable driving connections to the propelling means and height controlling means.

The supporting body 1 is preferably a gas bag of sufficiently light, strong and impervious fabric of proper dimensions to contain a sufficient volume of light gas to suspend the weight of the machine and its load in the air. Preferably the gas bag is made in cylindrical form, with pointed ends, to reduce air resistance to the minimum. The car 2 is suspended from the gas bag by any suitable flexible suspension means, such as a rope mesh fabric 6 passing around the upper portion of the gas bag and connected at its opposite edges to the car. The propelling members 3 are preferably planes or blades, of which there are two sets, one on each side of the air ship, which are driven horizontally in a direction parallel to the longitudinal axis of the air ship. The blades are carried by flexible carriers, preferably bands or belts 7 and 8, shown in Fig. 2, each blade being connected to two bands. The bands are carried over pulleys 9, 10, 11 and 12, which hold them parallel to the longitudinal axis of the air ship. Thus as the bands are driven, the propelling blades are carried by the lower stretches of the bands from front to rear of the air ship, and by the upper stretches of the bands from the rear forward. I provide in connection with these blades guides for causing their resistance to the air to be reduced to the minimum when moving forwardly, so that they are enabled to act only when passing from the forward end toward the rear of the air ship, and are thus enabled to propel the air ship forward. The guides are represented at 13 and are parallel with the belts or bands 7 and 8, and at such a height above the latter as to permit the blades to pass under them, but to bend the blades back almost flat on the bands, whereby the blades in passing from the rear to the front are carried practically edgewise and present the least possible surface to the air. At each end of the guide 13 are curved strips 14 and 16 respectively, which allow the blades to assume gradually their perpendicular position with respect to the carrying bands when passing around the forward guide pulleys 9 and 11, and respectively to be gradually bent back against the carrying bands when passing around the rear guide pulleys 10 and 12. The strips or auxiliary guides 14 and 15 are curved eccentrically to the guiding pulleys, and their lower ends are separated from said pulleys by a greater distance than the length of the blades. In order to permit the blades to be thus brought alternately approximately parallel with and perpendicular to the carrying band I prefer to construct them somewhat as shown in Figs. 3 and 4. As here shown, each plate consists of a frame having ends 16 and 17, sides 18 and 19 and a light fabric 20 between the members of the frame. Preferably the end member 16 is a bar contained in blocks 21, 22, carried by the bands 7 and 8 respectively, in which they are fixedly held by means of set screws 23 or otherwise. The side members 18 and 19 of the frame

are preferably strips of elastic and resilient material, such as spring steel of sufficient flexibility to enable them to be bent back against the bands and of sufficient resilience and stiffness to cause them to spring back perpendicular to the band when the blades are free of the guides, and to cause them to exert sufficient pressure against the air for obtaining the forward propulsive effect.

If desired the blades may be set so that when not under stress they extend at a slightly acute angle to the bands, in order to neutralize the tendency which the resistance of the air might have to bend them, so that when at work they will act squarely in the line of propulsion.

A convenient mechanical construction for the spring sides of the frame is to form the strips of twice the length of the blade, bending them around the member 17 of the frame and binding them together to clamp the edges of the fabric 20 between them. For fastening the ends of the fabric sheet to the members 16 and 17 of the frame, the latter members may be recessed as shown in Fig. 5 and the fabric clamped in the recess by a binding strip 24. I desire it to be understood that, although this is a convenient and practical way of constructing the blades, it is by no means the only manner in which they may be made, but it is also feasible to have the blade made from a single sheet of sufficiently resilient and stiff, strong metal.

I prefer to provide three blades in each set, as this arrangement enables me to have at least one blade in full operation at all times.

The motor 5 is contained in the car 2 and drives the blades through the following connections. In the car is a transverse shaft 25, driven from the motor shaft by a belt 26 and pulley 27. On the ends of the shaft outside of the car are pulleys or sprocket wheels 27^a, which drive belts, ropes or chains 28 passing over pulleys or sprocket wheels 29 on shafts 30. Each of these shafts carries pulleys 31 and 32 on its end, which by means of belts 33 and 34 respectively drive the shafts 35 and 36, carrying the pulleys 9, 10, 11 and 12 for the driving blade carriers. The construction of the propellers, and the means for driving them, are alike on both sides of the air ship, so that the description of one suffices for both.

The guides and supports for the propelling blades and the driving means therefor form a rigid frame work connected with the bag, so that all the parts are held in their proper relations. The frame work consists of longitudinal bars 37, two of said bars being arranged on each side of the gas bag, transverse rods 38 connecting each pair of bars 37 and depending vertical U-shaped members 39 mortised into the longitudinal bars, and carrying the shafts 30, 35 and 36. These vertical members are connected with the bag by straps 40, which surround the bag and have lugs 40^a on which the members 39 rest, and in which pins 40^b projecting from the lower ends of the members are contained.

Inside of the bag, within the zones encircled by the bands 40, are stiffening bands of thin wood veneer or other sufficiently light and strong material, which are preferably somewhat wider than the bands 40 and prevent the latter from indenting and distorting the fabric of the bag. The propelling means and the guides therefor are thus supported by the gas bag independently of the car, and independently of the rope mesh or net 6, which supports the latter. Rods 41 are adjustably connected at their lower ends with the car, and at their upper ends pass through the lugs 40^a of the bands 40, for the purpose merely of steadying the car and preventing it from swaying. These rods do not act in any sense as supporting means for the car, and are so adjusted in length that the entire weight of the car is borne by the net. Preferably the latter is connected with the car in such a way that it may be adjusted so as to raise or lower the car with respect to the gas bag and the propelling blades, and thus obtain the proper tension on the belts or chains 28. As a convenient mode of attaching the net, I propose to attach straps and buckles at suitable intervals along the sides of the car and pass the straps around portions of the net or outer eyes in a fabric binding or other stiffener connected to the edges of the net. By adjusting these straps in the buckles, an adjustment may be made of the car sufficient to secure exactly the proper degree of tension in the belts or chains.

For steering the air ship I provide rudders 42 at the after part thereof, pivoted upon vertical pintle rods 43, which connect the halves of a ring or band 43^a surrounding the bag. These rudders are normally held in a straight fore-and-aft position by springs 44 coiled about their pintle rods and pressing them against stops 45. They are controlled by lines 46 passing around pulleys 47 and 48 into reach of the occupant of the car. The rudders and their operating devices are identical with each other, but oppositely arranged, and a description of one applies to both. Each rudder is therefore effective for turning the ship in only one direction, the port rudder with its controlling line being used for guiding the ship to port, and the starboard rudder being used for guiding it to starboard.

For controlling the elevation of the air ship, I provide a vertically acting propeller 4, consisting of two or more inclined blades or vanes carried by a vertical shaft 49, which preferably is arranged below the car

and projecting through the car bottom 6. This shaft is driven by the motor through beveled gearing 50 thrown into operation by a suitable clutch when desired. It will be readily understood that by rotating the elevating and lowering propeller and adjusting or reversing the angles of the blades thereof, the air ship as a whole may be raised or lowered at any desired speed. For permitting adjustment of the blades the latter are made independent of one another and formed with shanks 51, which are held in a hub 52 carried by the shaft 49. These shanks have arms 53 adapted to be turned for adjusting and reversing the pitch of the blades, by the operator reaching down from the car with his hand or any implement suitable for the purpose.

In order to anchor the air ship to the earth and prevent it from careening, I provide on the lower end of the shaft 49 a screw 54 which is driven into the earth by rotation of the shaft. Above the screw is a foot piece 55 in the form of a disk on the shaft, which bears upon the ground when the screw is driven in and assists in steadying the machine.

I claim,—

1. An air ship comprising a buoyant gas container, a car suspended from said container, a motor in said car, a belt, bands surrounding the container, a frame secured to said bands, guides for the belt mounted on said frame, a propelling blade carried by said belt and moved bodily thereby, being independent of the car, and a driving connection between said motor and belt.

2. An air ship comprising a buoyant sustaining member, a car suspended from said member, a driving motor mounted in said car, a rigid frame work connected with said sustaining member, endless belts mounted on said frame work on each side of the sustaining member, guide pulleys about which said belts pass located so as to hold the belts extending in a fore and aft direction, blades carried by said belts rigidly connected thereto so as to extend perpendicularly therefrom, but being elastic and yielding, whereby they may be bent back close to the belts, and a guide adjacent to each belt so arranged as to bend back the blades on the stretches of the belt which travel in direction of movement of the ship, and to release the blades on those stretches of the belt which travel in the opposite direction, whereby said blades are caused to advance the ship.

3. An air ship comprising a container for buoyant gas, a flexible fabric surrounding the upper part of said container and hanging freely therefrom at the sides, a car secured to and supported by such flexible fabric, bands surrounding the container, frames secured to said bands on each side of the container, guide pulleys carried by said frames, endless belts passing about said guide pulleys, propelling blades carried by said belts, a motor mounted in the car, and driving mechanism operated by said motor and connected with said belts for driving the latter and the blades.

4. An air ship comprising a container for buoyant gas, a flexible fabric surrounding the upper part of said container and hanging freely therefrom at the sides, a car secured to and supported by such flexible fabric, bands surrounding the container, frames secured to said bands on each side of the container, guide pulleys carried by said frames, endless belts passing about said guide pulleys, propelling blades carried by said belts, a motor mounted in the car, and driving mechanism operated by said motor and connected with said belts for driving the latter and the blades, and rods connected with the car and frames at their lower and upper ends respectively for steadying the car and preventing it from swaying.

In testimony whereof I have affixed my signature, in presence of two witnesses.

ROBERT CARLSON.

Witnesses:
ARTHUR H. BROWN,
P. W. PEZZETTI.