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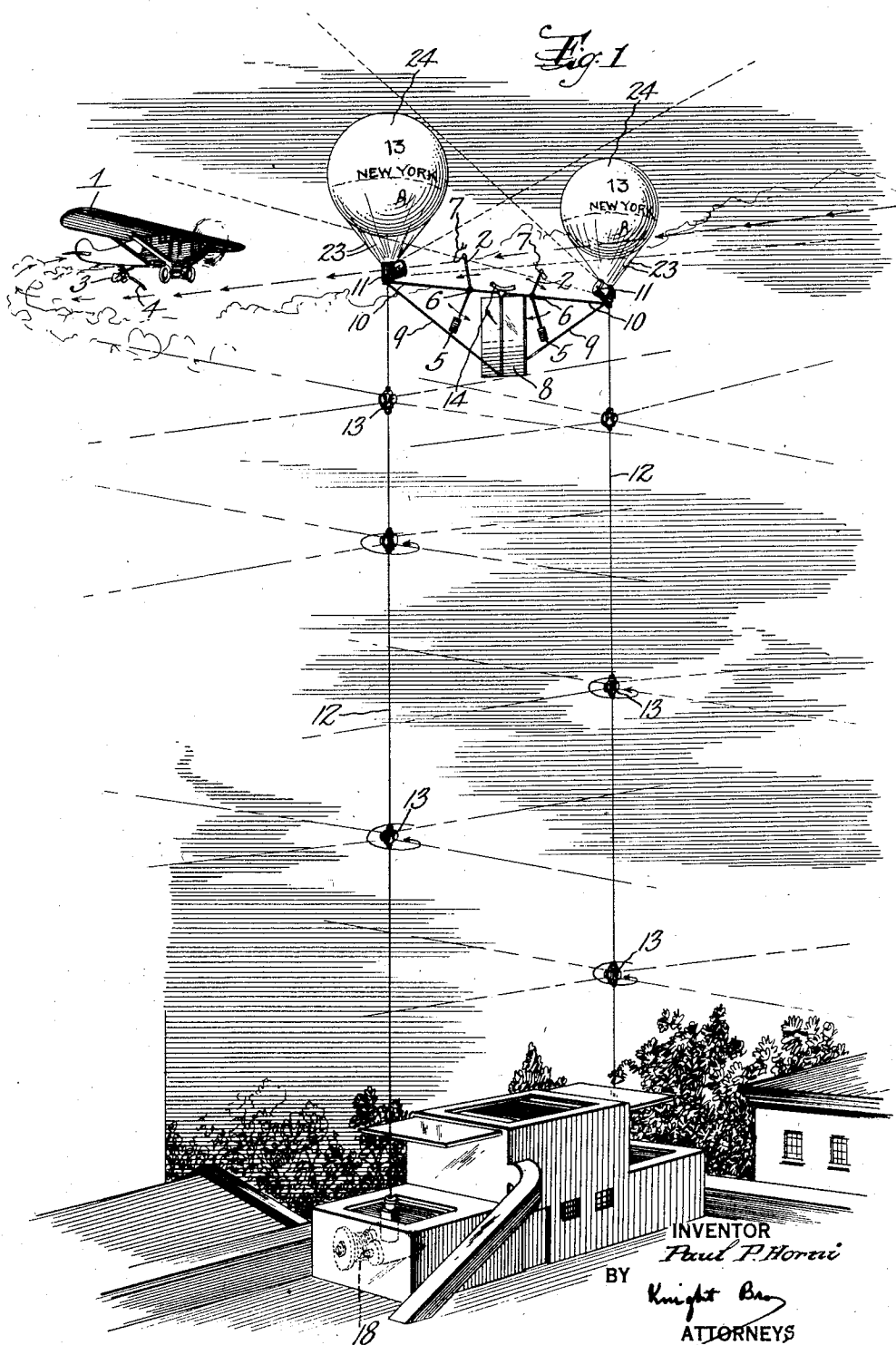
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AERIAL PACKAGE CARRIER AND SIGNAL

Filed Dec. 24, 1928

4 Sheets-Sheet 1



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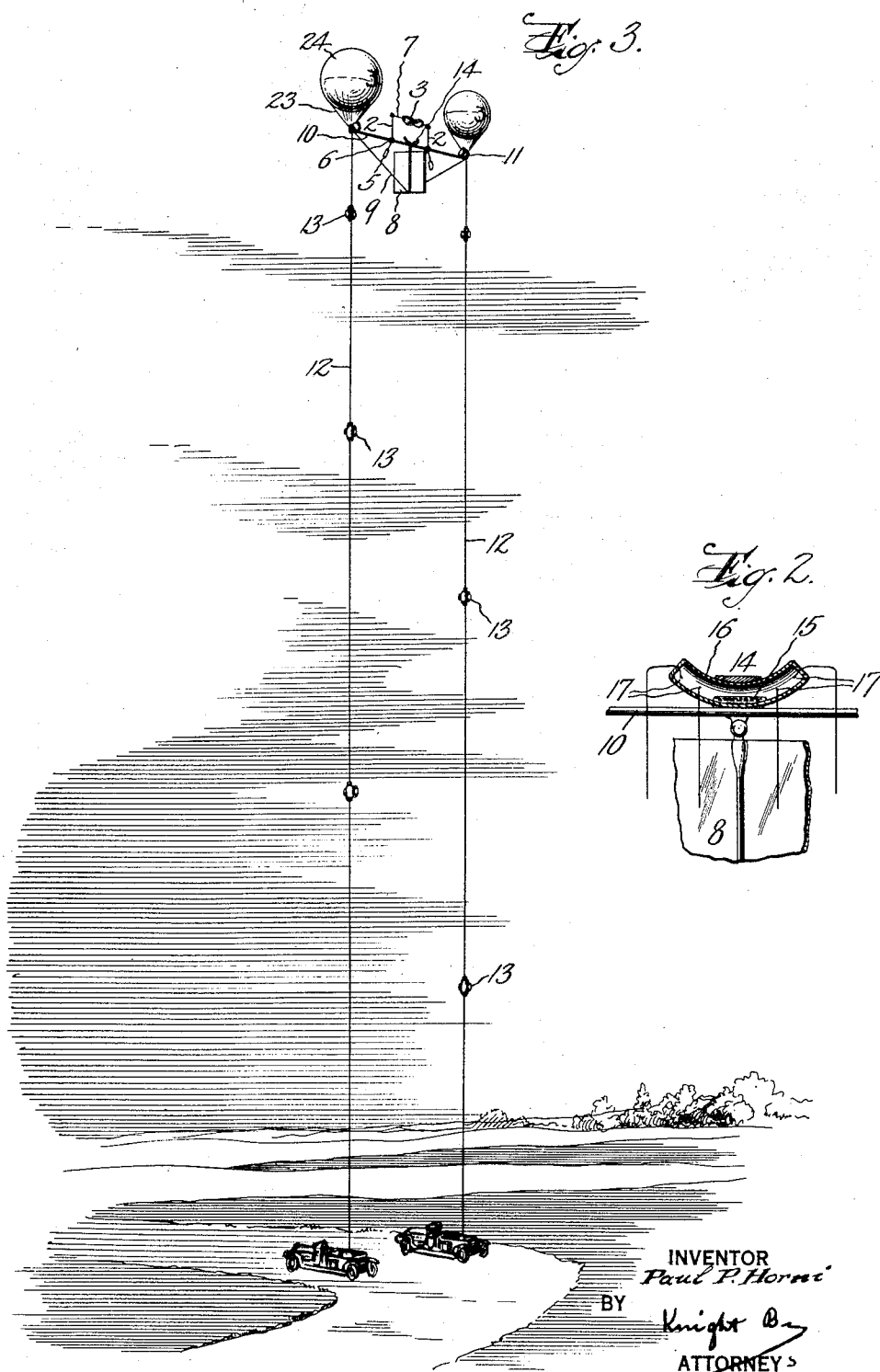
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4 Sheets-Sheet 2



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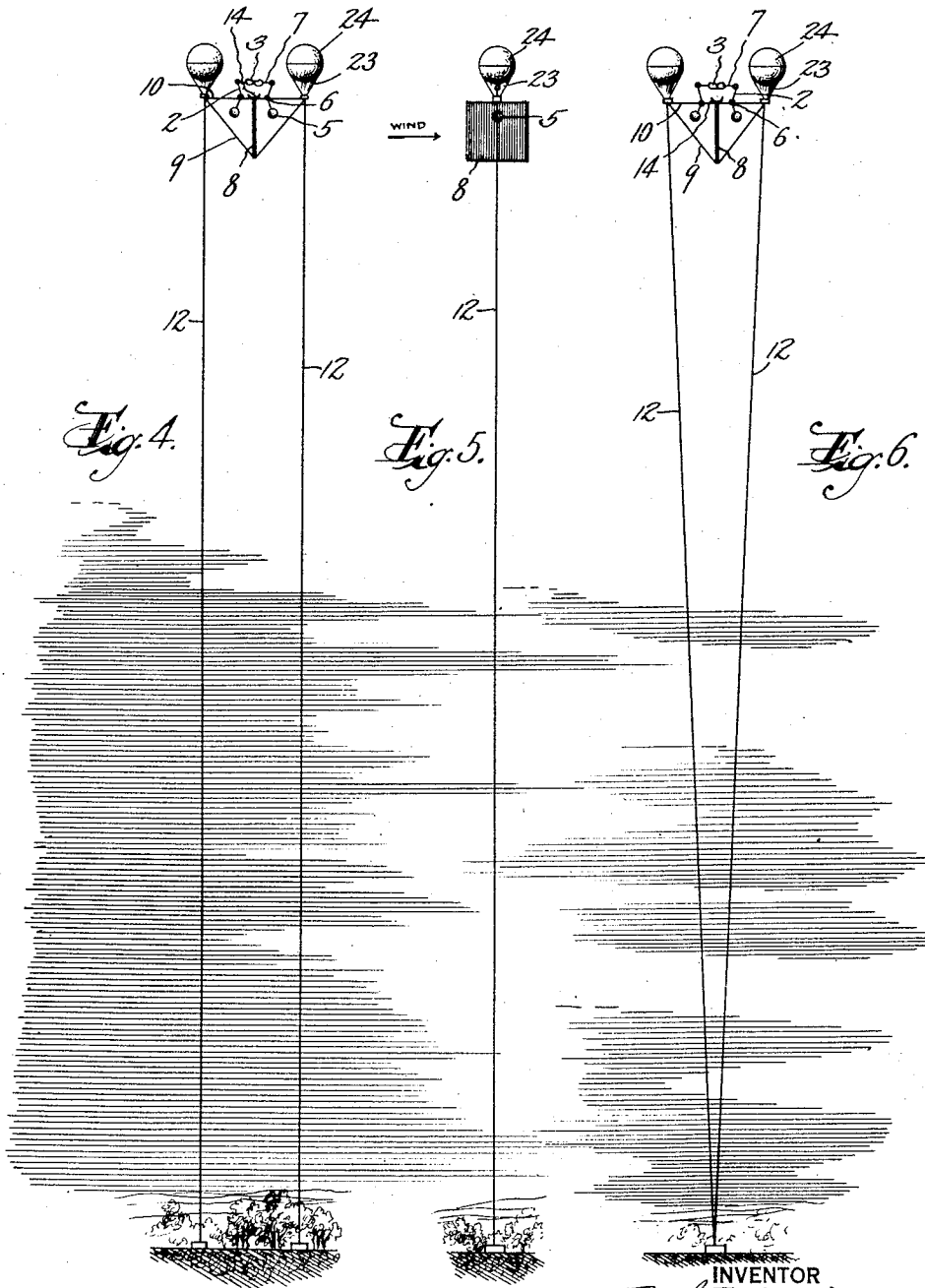
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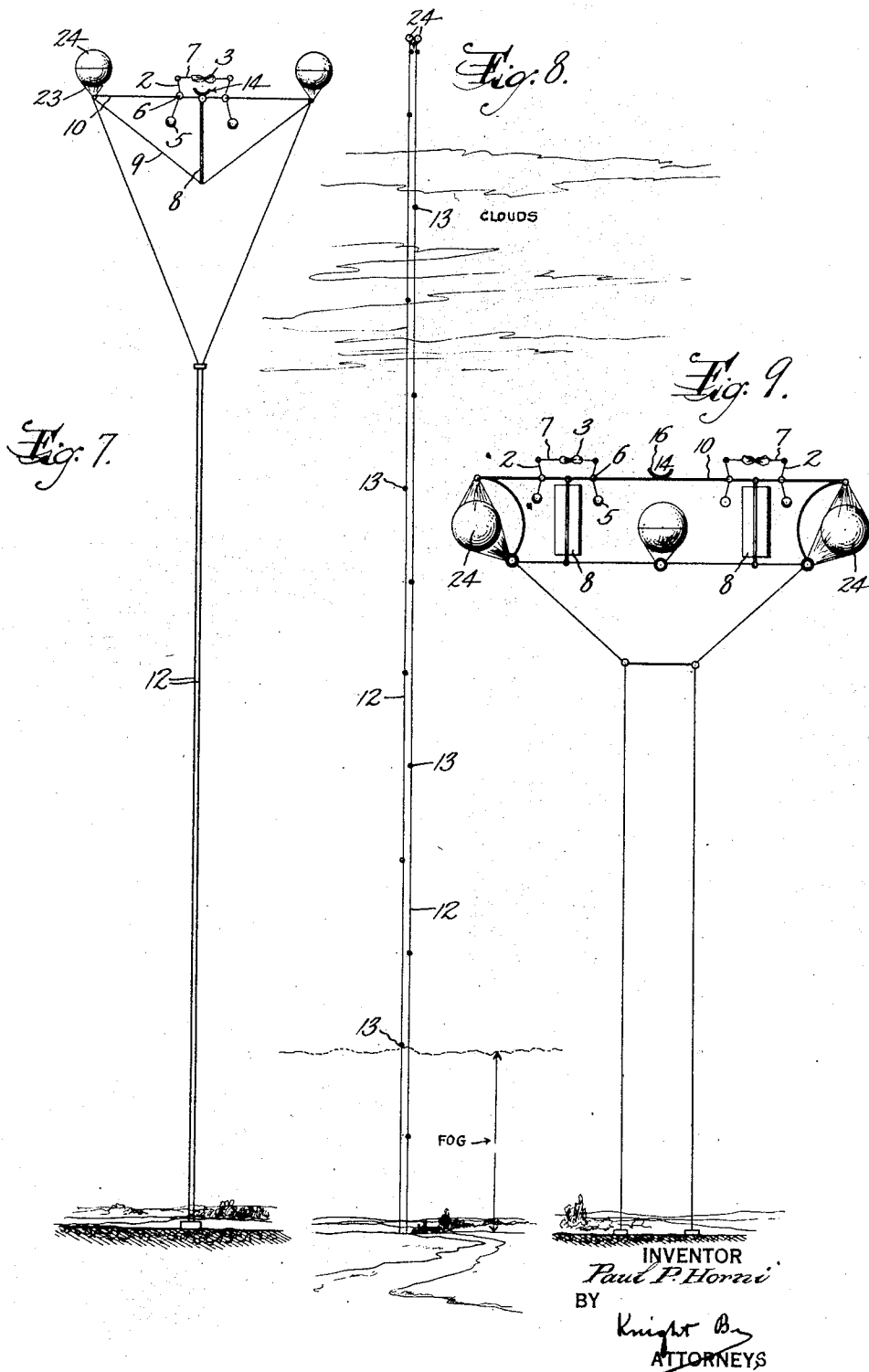
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UNITED STATES PATENT OFFICE

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AERIAL PACKAGE CARRIER AND SIGNAL

Application filed December 24, 1928. Serial No. 328,177.

This invention relates to means for delivering packages to airplanes or other aircraft without the necessity of such craft making a landing. It is desirable to have the means for delivering packages to the airplane, when landing is difficult or impossible on account of the character of the ground or of the conditions of visibility, near the ground and it is also desirable to have such delivery means in order to save the time wasted in making a landing for the sole purpose of picking up mail or other matter. The invention comprises a combination of lighter-than-air suspending means arranged to be elevated and lowered by apparatus anchoring the same to the ground and having appliances attached thereto for holding packages in a position where an airplane may pick up such packages automatically as it flies near the delivery apparatus. With the delivery apparatus are combined illuminating identifying and signalling means. There are also provided means for keeping the delivery apparatus level and in line with the wind so that collisions between the aircraft and the apparatus may be prevented. These and other features of the invention will be described in connection with the accompanying drawings, in which,

Figure 1 is a perspective view of a package-shipping station equipped with one form of my apparatus.

Figure 2 is a detail partially in section of a levelling control.

Figure 3 is a perspective view of a portable delivery apparatus.

Figure 4 is a front view, Figure 5 a side view, and Figure 6 a corresponding view, showing what happens when the wind changes.

Figure 7 is a front view of a modified form for high elevations.

Figure 8 is a side view of the same.

Figure 9 is a front view of a double carrier.

Referring first to Figure 1, numeral 1 indicates an airplane which has just passed between carrier arms 2 of a package holder and picked-up package 3 on its arm 4. The arms 2 have weights or other devices 5 for holding the package taut. These arms are pivoted

at 6 and have at their upper ends package-holding devices 7 similar to such devices used for holding mail packages or bags for collection by moving mail cars. At 8 is shown a guiding vane or rudder which is held by the frame-9, 10 so as to keep said frame always at right angles to the wind. A vane of this kind is also necessary to minimize the side swing characteristic of anchored balloons; such side swinging being particularly objectionable when fairly stationary targets must be maintained for the transfers to moving planes. The part 10 of the frame carries the pivot 6 of the arms 2 near its middle and at its end is attached to the ends of the diagonal arms 9 and at this point is secured the suspending cords or cables 23 of balloons 24. Also at these points are secured light-projecting means 11 which respectively illuminate the balloons on the opposite sides of the package-holder which is illuminated by both beams of light. The whole of the suspending frame and balloons is anchored by means of cables 12, having lights 13 at intervals thereon.

The upper lights may be used for flashing automatically and intermittently the identifying code corresponding to the station, as in the example shown being the sub-station 13 of the New York area, which may for easier identification be marked with a large A or other station insignia. The other lights 13 may have a flashing or revolving effect to act as guide lights or signals for aircraft and to also prevent collision with the anchoring cables by aircraft. The anchoring cables will have electric conductors for keeping the lights illuminated and they may be further used in connection with the device shown in Figure 2, which in Figure 1 is shown at 14. This device consists of a mercury contact maker mounted on the frame 10 and comprising a mercury globule 15 in a curved tube 16, having contacts 17, which when the frame 10 tips one way, closes a circuit that will elevate one or depress the other of the anchoring cables or effect a combination of these motions that will bring the frame 10 back to a level position. The anchoring cables may be wound up or unwound by means of wind-

ing apparatus shown at 18 (Figure 1). These cables being driven by electric motors may be automatically controlled by the circuit maker and breaker 14. They may also
 5 be controlled manually for lowering the apparatus, for the placing thereon of packages and for the elevation of the apparatus to raise the package up to be within a possible path for an aircraft. By the provision of the guide vane 8, the frame 10 will
 10 always be at right angles to the wind and the airplane may therefore pick up the package either going with the wind or against the wind without possibility of side drift, the latter method of course being preferable on account of the lower relative speed involved. As shown in Figure 3, the winding apparatus for the anchoring cables may be placed on one or more automobiles so as to make the apparatus entirely portable, which would be
 15 necessary in times of emergency or in case the apparatus was used in time of war. In case there is a calm, the apparatus would stand as shown in Figures 4 and 5. A wind, however, might shift it to the position shown in Figure 6, in which position the drift leeward would throw the frame out of level when the function of the level mounting control would become operative. In Figure 7 is shown
 20 a suspension means suitable for greater altitudes as for example when it is desirable to swing the suspending apparatus to a point above a cloud or a fog-belt. In Figure 9 is shown a modified form where three balloons are used and the framework is made in such
 25 a way as to have the balloons entirely out of the way of the horizontal travel in the plane of the packages, the packages being suspended entirely above the apparatus and the balloons. This figure also shows the possibility of using two package carriers, one of which might be used for one direction and the other for the other direction.

The above description refers to a preferred
 45 embodiment that my invention may assume but the invention in its broadest sense may include many other alternative devices for accomplishing the same end.

I claim:—

50 1. In a device of the character described, the combination of two balloons with a rigid frame extending horizontally between them, anchoring cables for said balloons, means for operating said cables for letting out and
 55 taking in said cables and a package carrier mounted on said frame between the balloons and having an electric contact device and circuits connecting same with the cable operating means whereby when the frame is
 60 out of level the contact will be closed to operate the cable operating means to bring the frame level.

2. An aerial package transfer means comprising balloon suspension means, cables
 65 connecting the balloons to ground apparatus,

ground apparatus for elevating and lowering the balloons by means of the cables, a frame rigidly holding the balloons apart, and a guiding vane mounted on the frame so as to keep said frame normal to the wind. 70

3. An aerial package transfer means comprising lighter-than-air suspension means, cables anchoring the same to the ground, electric conductors along said cables and electric lights distributed on the cables to
 75 act as station and warning signals.

4. An aerial package transfer means comprising a lighter-than-air suspension means, anchoring cables therefor, a vane connected to the suspension means to hold the same in
 80 fixed relation to the wind, and means also supported by the suspension means for detachably holding a package to one side of the said suspension means for the free engagement with said package of an aircraft
 85 travelling in line with the wind.

5. In a device of the character described, the combination of an elongated support, means carried by said elongated support for releasably holding a package, lighter than
 90 air means for suspending said elongated support, cables for anchoring said lighter than air means, and wind actuated means for retaining said elongated support substantially normal to the direction of the wind. 95

6. In a device of the character described, two spaced balloons, a substantially horizontal support suspended between said balloons, anchoring cables connected to opposite ends of said horizontal support, winding means
 100 connected to each of said anchoring cables, an electric contact device mounted on said support, energizing circuits for said winding means respectively, each of said energizing circuits including said electric contact device, and a package-carrier mounted on said
 105 horizontal support between said balloons, said electric contact device being operable by tilting movements of said horizontal support for controlling the operation of said
 110 winding means.

7. In a device of the character described, the combination with two spaced balloons provided with anchoring cables, of a support extending between and suspended from said
 115 balloons, a package carrier mounted on said support between said balloons, light-projecting means arranged on each side of said package carrier for illuminating the wall of the balloon on the opposite side of said package carrier, and a guiding vane connected to said horizontal support in a plane normal thereto and arranged oppositely to said package carrier in respect to said horizontal support. 120

8. In a device of the character described, the combination with a substantially horizontal rigid support, of balloons connected to said rigid support at spaced points therealong, anchoring cables connected to said
 125 balloons, and means for elevating and lowering the balloons by means of the cables, a frame rigidly holding the balloons apart, and a guiding vane mounted on the frame so as to keep said frame normal to the wind. 130

rigid support at longitudinally spaced points, a guiding vane connected to said rigid support in a plane normal thereto for holding it broadside on to the wind, a package-carrier mounted on said rigid support and centrally with respect to said balloons, and means responsive to the inclination of said rigid support for letting out or taking in said anchoring cables for returning said rigid support to horizontal position.

9. In a device of the character described, the combination with a substantially horizontal rigid support, of two balloons connected to and spaced from each other along said rigid support, anchoring cables connected to and spaced one from the other along said rigid support, a guiding vane connected to said rigid support in a plane normal thereto and midway between said cables for holding said support broadside on to the wind, a package-carrier mounted on said rigid support midway between said cables, and means responsive to the inclination of said rigid support for letting out or taking in said anchoring cables.

10. In a device of the character described, the combination with a substantially horizontal rigid support, of balloons connected to and spaced one from the other along said rigid support, anchoring cables connected to said balloons, a guiding vane mounted on and normally arranged with respect to said rigid support, and a package-carrier mounted on said rigid support.

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