No. 803,573. PATENTED NOV. 7, 1905.

R. B. EUBANK, JR.

CAPTIVE OBSERVATION BALLOON APPARATUS.

APPLICATION FILED MAY 24, 1904.

2 SHEETS—SHEET 1.

Fig 1

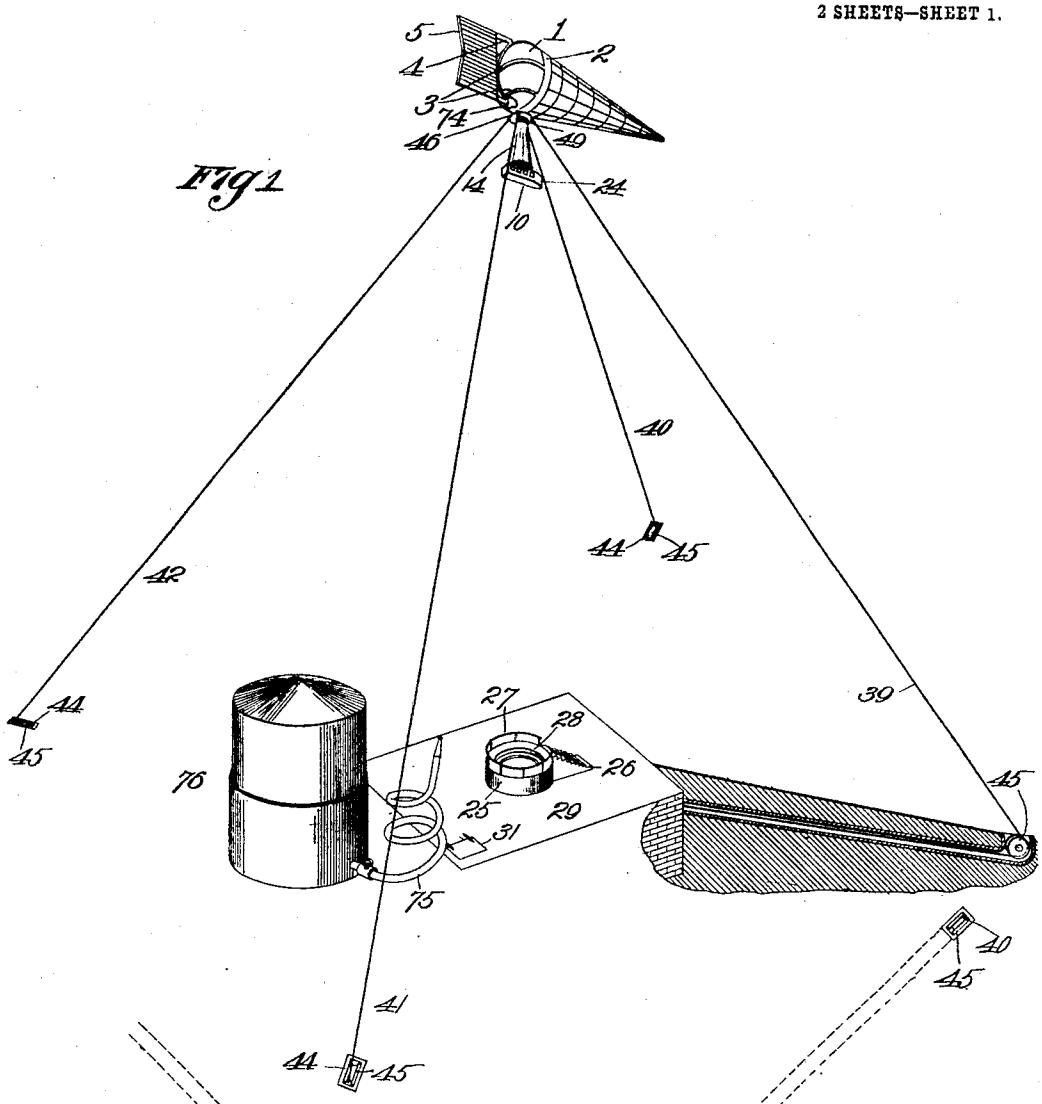
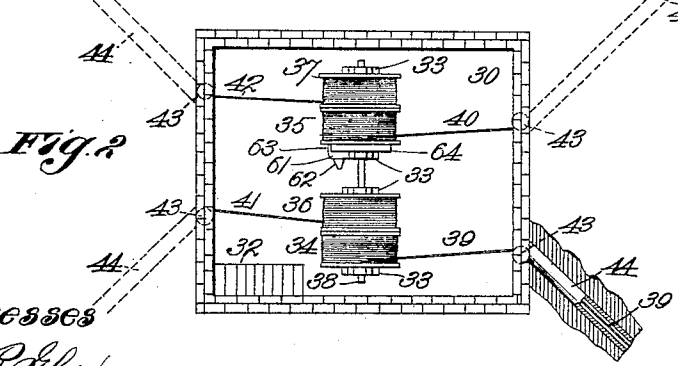


Fig. 2



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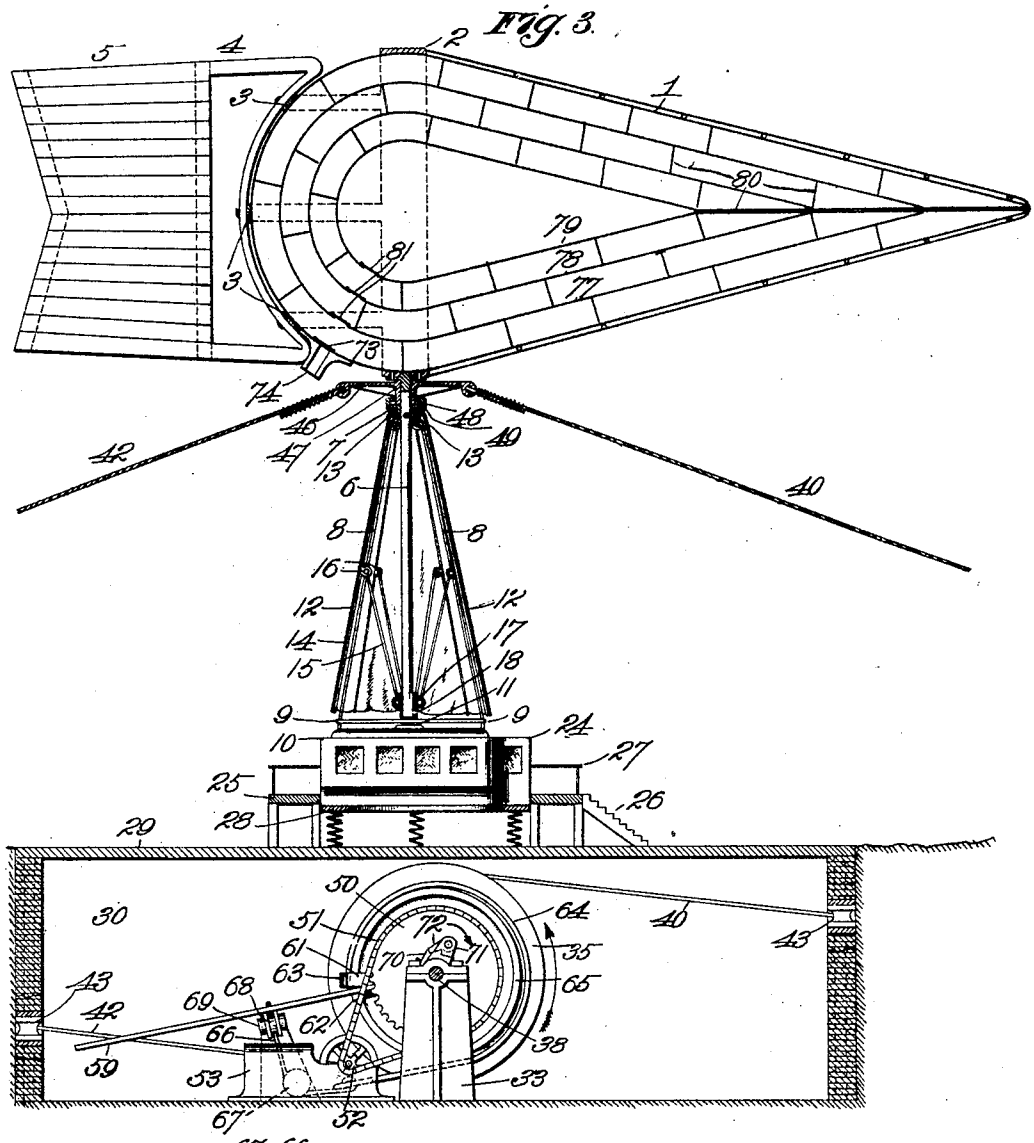
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2 SHEETS—SHEET 2.

Fig. 3.



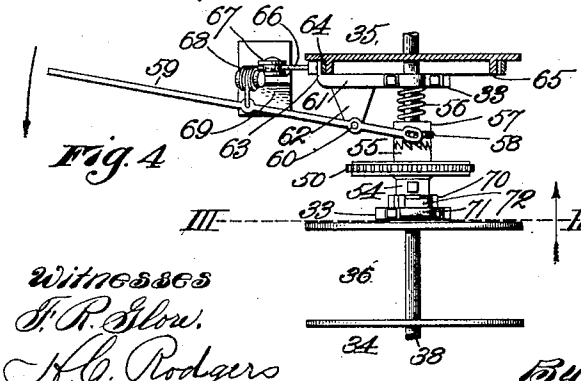
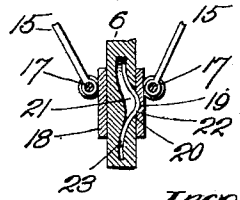


Fig. 4.

Fig. 5.



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CAPTIVE OBSERVATION-BALLOON APPARATUS.

No. 803,573. Specification of Letters Patent. Patented Nov. 7, 1905.

Application filed May 24, 1904. Serial No. 209,536.

To all whom it may concern:

Be it known that I, REUBEN B. EUBANK, Jr., a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Captive Observation-Balloon Apparatus, of which the following is a specification.

This invention relates to captive observation-balloon apparatus; and my object is to produce an apparatus of this character by which people can be safely elevated to a great height and brought back to earth with perfect safety without regard to weather conditions. Apparatus of this character will be found of great value as a temporary observatory for scientific and war purposes, as well as an attraction which the great mass of the public would be glad to patronize.

With this general object in view the invention consists in certain novel and peculiar features of construction and combinations of parts, as hereinafter described and claimed, and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1 is a perspective view of captive observation-balloon apparatus embodying my invention. Fig. 2 is a plan view, with the cover omitted, of the chamber containing the drums and mechanism for lowering the balloon and parts carried thereby, the mechanism for operating said drums being omitted because of the small scale on which said figure is drawn. Fig. 3 is an enlarged vertical longitudinal section taken centrally through the balloon, the parachute carried thereby, the platform from which the car is loaded or unloaded, and the chamber containing the drums and operating mechanism, the section of the latter being on the line III III of Fig. 4. Fig. 4 is a view showing part of the mechanism of said chamber in plan view and one of the drums and the brake in horizontal section. Fig. 5 is an enlarged vertical section of a part of the rod connecting the balloon and car and of the means for locking the parachute against opening unless the car is descending too swiftly.

Referring to the drawings in detail, 1 designates a balloon of substantially conical form and having secured to its rounded or butt end the band 2, provided with segmental arms 3, which bridge and snugly fit around said base or butt end of the balloon.

4 designates a vertically-disposed skeleton frame secured to arms 3 in the plane of the longitudinal center of the balloon and forming a support for the vane 5, which in conjunction with the conical formation of the balloon will keep the latter pointed in the direction from which the wind blows.

6 designates a vertical rod rigidly secured at its upper end to band 2 below the balloon, and rigidly secured to such rod near its upper end is a collar 7, to which are secured the upper ends of downwardly-diverging braces 8, secured at their lower ends to a skeleton frame 9, mounted rigidly on the top of a car 10, to which car the lower end of rod 6 is also rigidly secured, as at 11, so that rotary movement of the balloon shall be attended by like movement of the car.

A parachute consists of a series of radial downwardly-diverging ribs 12, pivoted at their upper ends, as at 13, to sleeve 7 and connected by a cover 14 like an umbrella-cover, so as to permit the ribs to approach or recede at the lower ends when folded or unfolded.

15 designates braces pivotally connected at their upper ends, as at 16, to the ribs 12 and at their lower ends, as at 17, to the sliding sleeve 18, mounted on rod 6, and said sleeve is provided internally at a suitable point with a cavity 19, which registers when the parachute is folded with the mouth 20 of a recess 21 in rod 6 to receive the hump 22 of a spring 23, secured in said recess, said humped portion by engagement with said cavity 19 locking the parachute against opening movement unless the latter descends too swiftly, as in the case of an accident, such as the collapse or loss of the balloon, in which case the pressure of the air will overcome that of spring 23 and open the parachute to effect the descent of the car at a speed which will not result in injury to the occupants thereof.

The car may be of any suitable or preferred type, but is preferably of substantially the shape shown in Fig. 1 and has the end which points in the same direction as the balloon tapered, as at 24, so as to offer the least resistance to the wind.

25 designates a circular platform of internal diameter somewhat exceeding the length of the car, so that the latter when lowered may

be surrounded by said platform, the occupants leaving or entering the car through its rear end, and in this connection it should be stated that the platform is round that the passengers may conveniently enter or leave the car without regard to the direction in which the latter is pointed. At a suitable point steps 26 are provided for the convenience of the passengers in ascending or descending from the platform, which by preference is elevated above the plane of the ground a suitable distance, and, as a precautionary measure against falling from the elevated platform, it is provided with a railing 27.

To cushion the descent of the car under certain conditions, a buffer 28 is disposed within platform 25 and is provided with cushions below it—for instance, the springs shown—though, of course, such cushion may be an air-cushion, if desired.

The platform 25 is preferably mounted upon the cover 29 of a subterranean chamber 30, though, of course, such chamber may be otherwise located if conditions render it desirable, and to give access to and egress from such chamber the platform is provided with a trap-door 31 above the steps 32.

Erected within the chamber are bearing-standards 33 for a plurality of drums—four in this instance, 34, 35, 36, and 37—to which are respectively secured the lower ends of cables 39, 40, 41, and 42, said cables 39 and 40 extending from the top of the drums and cables 41 and 42 from the lower sides of the drums, all of the cables extending around guide-pulleys 43 set in the wall of the chamber and thence diverging outward through guideways 44, preferably buried in the ground, and around guide-pulleys 45, journaled in the outer ends of said guideways. From pulleys 45 the cables converge upward to the disk 46, swiveled upon rod 6 between the band 2 and sleeve 7, so that the balloon, the car, and the parachute may be free to turn without any tendency to twist plate or disk 46 or the anchoring-cables connected thereto.

The disk 46 is preferably formed with a depending hub portion 47 to provide a wider bearing on rod 6, and said hub is, by preference, provided with a flange 48 at its lower end, engaged by the flange 49 at the top of sleeve 7, this engagement of the flanges providing a stronger and more reliable connection without interfering with the swivel movement of the balloon and rigidly-connected parts. All of the drums have a common shaft 38, journaled in bearings 33, and journaled on said shaft between the innermost drums is a large sprocket-wheel 50, connected by a chain 51 to small sprocket-wheel 52 of a gas-engine or equivalent motor 53. At one side of the sprocket-wheel 50 is a collar 54, rigid on the shaft, and at the other side said sprocket-wheel is provided with a clutch-section 55, and held normally in engagement with the same, by spring 56, is a companion clutch-section 57, adapted for longitudinal but not rotatable movement independently of the shaft.

58 is the usual collar journaled on the slidable clutch-section, having a pin-and-slot connection with a long lever 59, pivoted, as at 60, to lug 62 of arm 61 of the proximate bearing 33, said arm terminating in a laterally-projecting lug 63, to which is secured one end of a resilient brake-band 64, encircling the major portion of flange 65 on the proximate drum and having its lower end connected by cable 66 to lever 59, being guided intermediate of said points of connection by idler-pulleys 67 68, journaled on a standard 69.

To guard against the rise of the balloon in case the sprocket-chain or engine should break, shaft 38 is equipped with a rigid ratchet-wheel 70 and the proximate bearing with an arm 71, to which is pivoted a gravity-pawl 72, which is thrown into engagement with the ratchet-wheel when the engine is in operation for the purpose of lowering the balloon. When the balloon is permitted to rise, the pawl is swung back in the direction indicated by the juxtaposed arrow, Fig. 3, where it is entirely inoperative. In such operation it is unnecessary, because the ascent is controlled by the pressure of the strap-brake against the flange 65, this pressure being regulated by the engineer applying more or less force upon the lever, it being understood, of course, that during the ascent of the balloon the engine is entirely out of gear with the drums, because the operation of the lever withdraws the slidable rotating clutch-section from the path of clutch 55.

The balloon has a valve 73 to control the ingress of gas, and a communicating-tube 74 to receive the nozzle of a valve-controlled hose 75, connected to a suitable gas-holder 76, and to charge the balloon with gas it is simply necessary to fit the nozzle of the hose in said tube and open the valve of the hose. When the balloon is sufficiently charged, the supply of gas is cut off from the holder and the internal pressure in the balloon reseats its valve 73.

When the car is loaded, the engineer throws the pawl 72 to inoperative position and then swings the lever 59, as indicated by the arrow, Fig. 4, this operation, as hereinbefore explained, throwing the engine out of gear. As soon as this result is effected the balloon begins to rise and unwind the cables from the drums, the speed of ascent being regulated by the brake. As the balloon rises it will automatically turn so as to point directly toward the wind and also point the car in the same direction.

To lower the balloon, the engineer first throws the pawl back to operative position and then reverses the position of the lever or permits the spring 56 to reverse it to effect the reëngagement of the clutches. The engine is started, if it has been stopped, and be-

gins to wind the cables 39, 40, 41, and 42 upon the drums, the result being the balloon is lowered at the speed desired.

Should an accident occur, such as the deflation of the balloon or its disconnection from rod 6 while elevated, the car would of course start to fall, and the sudden descent would produce an exceedingly heavy pressure within the parachute, which pressure would be heavy enough to overcome the resistance of spring 23 and open the parachute, so that the car occupants would descend to the ground in safety.

As a further precautionary measure against danger resulting from a puncture of the balloon while elevated, I will preferably employ a series of balloons 77, 78, and 79 within the main balloon, these balloons being centralized with respect to the latter and to each other by suitable flexible connecting-strips 80, and each balloon is provided with a valve 81, so that when the balloon is being charged each compartment or subballoon will also be filled. If the main balloon should be punctured, the gas in the outer compartment only will escape and would not result in the immediate precipitation of the car and the passengers to the ground, as would occur with a balloon of the usual type.

From the above description it will be apparent that I have produced a captive observation-balloon apparatus possessing the features of advantage enumerated as desirable in the statement of invention, and which, obviously, is susceptible of modification in its form, proportion, detail construction, and arrangement of the parts without departing from its essential spirit and scope or sacrificing any of its advantages.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus of the character described, the combination of a balloon, a rod rigidly depending therefrom, a car rigidly secured to the lower end of said rod, a parachute surrounding the rod and having its upper end bearing a rigid and substantially air-tight relation to the rod, and means for holding the parachute collapsed around the rod with a yielding pressure.

2. In an apparatus of the character described, the combination of a balloon, a rod rigidly depending therefrom, a car rigidly secured to the lower end of said rod, a parachute surrounding the rod and having its upper end bearing a rigid and substantially air-tight relation to the rod, a sleeve fitting slidingly on the rod, connections between said sleeve and the parachute, and means for locking the sleeve yieldingly to and near the lower end of the rod.

3. In an apparatus of the character described, the combination of a balloon, a rod rigidly depending therefrom, a car rigidly secured to the lower end of said rod, a collar secured rigidly on the rod, downwardly-diverging braces rigidly connecting said collar with the car, a parachute fitting around said braces and having its upper end bearing a fixed and substantially air-tight relation to the collar, ribs for and within the parachute and pivoted at their upper ends to said collar, a sleeve slidingly mounted on the rod, braces pivotally connecting said ribs and said sleeve, and means for yieldingly locking the sleeve to and near the lower end of said rod.

4. In an apparatus of the character described the combination of a conical balloon disposed horizontally and provided with a vane at its rear or butt end, a rod depending rigidly from the balloon, a car rigidly secured to said rod and extending parallel with the balloon and having its front end tapered and pointing in the same direction as the balloon, a plate swiveled on said rod, cables extending divergently downward from said plate, drums attached to the lower ends of said cables, means to rotate said drums, and means to lock them against rotation.

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

REUBEN B. EUBANK, Jr.

Witnesses:

H. C. Rodgers,

G. Y. Thorpe.