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L. L. CUSTER

## AERIAL CABLE TRANSPORTATION MEANS

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2 Sheets-Sheet 1

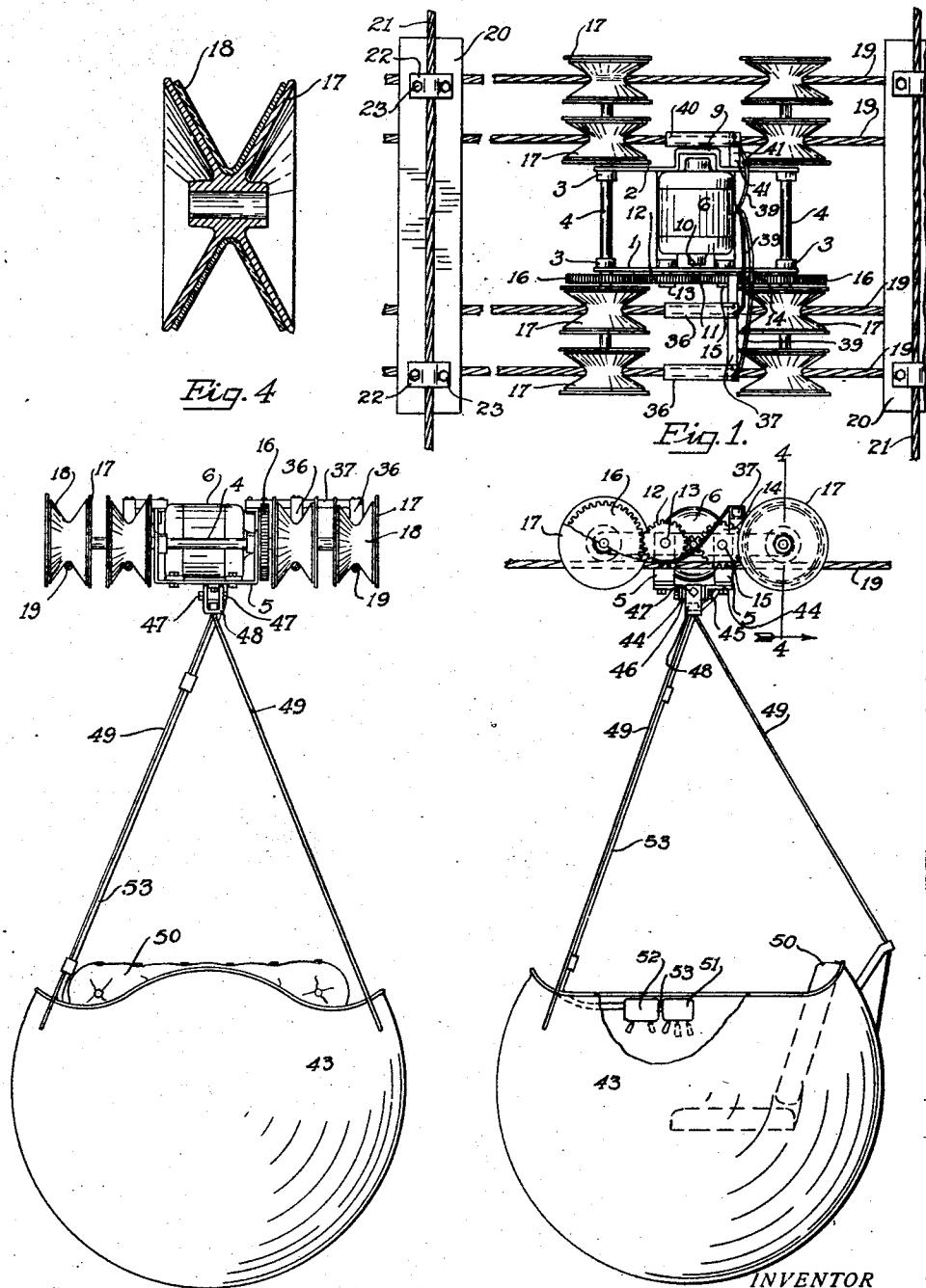


Fig. 2.

B-Y

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May 17, 1927.

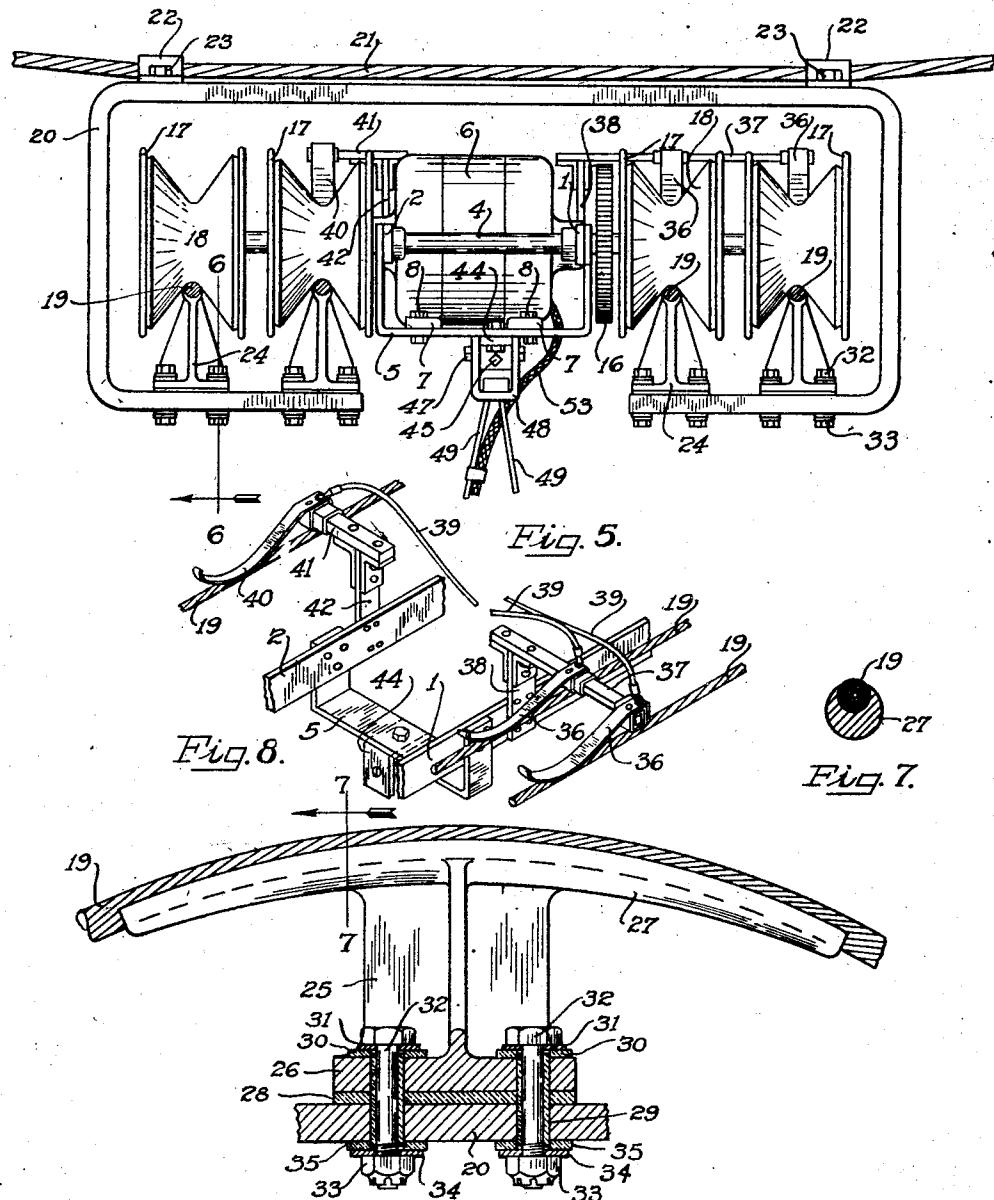
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE.

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## AERIAL CABLE TRANSPORTATION MEANS.

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It is one of the objects of my invention to provide for overhead transportation, a carriage which through pulleys has a firm traction with suspended cables over which it is propelled by a self contained motor. These pulleys are adequate in number to effect a firm traction with the cables, and are preferably lined on their peripheries with a friction material to increase that traction.

My invention is susceptible of a wide number of uses, among the most prominent of which is that of economically and swiftly transporting passengers, mail and express between points that are a short or a great distance apart. Overhead transportation of passengers within congested cities is another prominent use to which my invention may be put, since it does not exclude light from the street below, it is practically noiseless in operation, and occupies but small space above the street.

My cable track may be economically installed, since surface obstacles such as hills and valleys may be surmounted with ease; and for conducting sightseers over and around the mountains and lakes in parks such as the Yellowstone, it is admirably adapted. The invention is also well suited for long non-stop trips, since there are no crossings as on surface railways, thus making it possible to maintain a high, uniform speed between far distant points.

In amusement parks my aerial transportation means are particularly adapted to afford a thrill to patrons by carrying them through the air around and over lakes, trees and buildings within the grounds. When employed for this use, a bowl-shaped or like body may be suspended by a universal connection from the carriage to make possible a slight swinging movement of the body to impart an additional thrill to the persons who ride within it.

In the accompanying drawings, Figure 1 is a plan view of my aerial carriage, showing the arrangement of the traction pulleys. Figure 2 is an end elevational view of the carriage, showing the suspended passenger carrying body. Figure 3 is a side elevational view of the same. Figure 4 is a sectional view taken on the line 4-4 of Figure 3, through one of the traction pulleys. Figure 5 is an end view of the carriage frame, showing the traction pulleys, motor, and cable supports, with the cables in section. Figure 6 is a side elevational view of one

of the cable supports. Figure 7 is a cross sectional view taken through the same on the line 7-7 of Figure 6. And Figure 8 is a perspective view of the current collecting means.

Referring to the accompanying drawings for a detailed description of my invention, the numerals 1 and 2 designate two longitudinal side members of an aerial carriage frame. Secured to the inner surface of the members 1 and 2, near the ends thereof, are bearings 3. Passing through each pair of oppositely disposed bearings 3, 3, and holes in the side members which carry them, is a pulley shaft 4. (See Figures 1 and 5.)

Connected to the middle portions of the side members 1 and 2 are the upper ends of two U-shaped cradle members 5, 5 which support a motor 6, preferably of the electric type and arranged at right angles to the side members. The motor 6 is formed with feet 7 which are connected by bolts 8 to the U-shaped members 5, 5 for the purpose of firmly securing the motor between the side members 1 and 2, the side member 2 being offset at its middle portion 9 to clear one end of the motor. (See Figure 1.)

The motor 6 has a drive shaft 10 which projects through a hole in the side member 1 to receive on its outer end a pinion 11. On one side the pinion 11 meshes with an intermediate gear 12 mounted on a spindle 13 secured to the side member 1, and on its other side with a similar intermediate gear 14 which is mounted on a spindle 15 secured to the side member 1. (See Figure 1.) Mounted directly outside the side member 1 on each pulley shaft 4, is a gear 16. The gear 16 on one pulley shaft 4 meshes with the intermediate gear 12, and the gear 16 on the other pulley shaft 4 meshes with the intermediate gear 14, whereby both pulley shafts 4, 4 may be rotated at the same rate of speed by the motor 6. (See Figures 1 and 5.) While I have shown the above gear arrangement between the motor shaft 10 and the pulley shafts 4, 4, any other suitable power transmission means for driving the latter from the motor 6 may be provided if desired.

Each pulley shaft 4 projects a sufficient distance beyond the side members 1 and 2, to receive on each end two traction pulleys 17, 17. (See Figures 1 and 5.) While I have shown four pulleys 17 fixedly secured to each shaft 4, any greater or less number

of them may be employed as conditions warrant. Each pulley 17 is preferably lined around its peripheral groove with a strip of rubber 18 or other suitable material which 5 possesses both insulating and non-slipping properties when the pulley travels over an electric cable. In the present instance each pulley runs over an electric cable 19, there being four of said cables, two on one side 10 and two on the other side of the path of the carriage frame, and supported as follows to permit a free movement of the latter between them.

Referring to Figure 5, the numeral 20 15 designates a C-shaped supporting member which, in a horizontal position, is secured to a cable 21 or other suitable support stretched between poles, trees or other objects (not shown), or in any other desired 20 manner. When the C-shaped member is supported by the cable 21, cable clamps such as straps 22 and anchor bolts 23 are preferably employed to firmly secure said member to the cable.

25 On each free horizontal end of the C-shaped member 20 two individual cable supports 24, 24 are mounted. Referring to Figures 5 and 6, each cable support 24 preferably comprises a malleable iron casting 30 formed to provide a vertical web portion 25, a flanged base 26 and an elongated channel portion 27 that is preferably arched for some uses, although it may be made straight if desired. The flanged base 26 of each support 24 is formed at each corner with a hole 35 which is adapted to be brought above a similar hole formed in the C-shaped member 20. Between the base 26 of the support 24 and the lower horizontal part of the 40 C-shaped member 20, is a strip 28 of bakelite or other suitable insulating material, and containing holes that are adapted to be brought into registry with those just referred to in said C-shaped member and the 45 base 26 of said support. Adapted to be passed through each set of holes in the support base 26, the bakelite strip 28 and the C-shaped member, is a tube 29 preferably constructed of bakelite. (See Figure 6.)

50 Surrounding the tube 29 directly above the cable support base 26, are washers 30 which are preferably constructed of bakelite, and immediately above them are smaller washers 31 that are desirably constructed of steel. These washers 31 are engaged by the heads of bolts 32 which pass downwardly through the tubes 29 to receive on their lower threaded ends nuts 33. Disposed 55 between the latter and the C-shaped member 20 are washers 34 desirably constructed of steel, and larger washers 35 preferably made of bakelite. By means of the bolts 32 and nuts 33, the cable supports 24 are firmly secured upon the lower horizontal 60 portions of the C-shaped member 20. This

member, which is preferably constructed of structural steel, is properly insulated from the cable supports 24, which are within an electric circuit, by the bakelite strip 28, tubes 29 and washers 30 and 35 just described. (See Figures 1 and 6.)

70 For the purpose of conducting electric current from the cables 19 to the electric motor 6, the following means are preferably employed. These cables, which are preferably charged with an alternating current from a source not shown, are on one side of the motor 6 each engaged by a traveling brush 36. (See Figure 1.) Each brush 36 is secured at its inner end to, and insulated from, a horizontal member 37 that is attached to the upper end of a vertical support 38 which is connected at its lower end to the side member 1. Each brush 36 consists of a strip of spring metal whose free end is curved to provide a firm spring contact with the electrically charged cable 19 over which it is adapted to be drawn. Leading from each of the brushes 36, 36 to the electric motor 6, for the purpose of conducting electric current thereto, is a flexible electrical conductor 39. A similar electrical conductor 39 runs from the electric motor 6 to a brush 40, similar to each one of the brushes 36, 36, for the purpose of collecting electric current from the inner electrically charged cable 19 on the opposite side of the carriage frame. The brush 40 is secured to, and insulated from, a horizontal member 41 which is attached to the upper end of a vertical support 42 that is secured at its lower end to the side member 2. (See Figures 1 and 8.)

90 Although any suitable type of passenger, mail or express carrying body may be suspended from the carriage frame just described, I have shown a bowl-shaped body 43 connected to it by the universal joint means soon to be described. Such a body 95 may be used in amusement parks, to give to the passengers the thrill which its swinging movement will impart as it is carried through the air.

100 Referring to Figures 2, 3 and 5, there is bolted or otherwise suitably secured to the lower face of each U-shaped cradle member 5, a right-angled supporting piece 44. The vertical ends of these supporting pieces 44, 44 face each other, and are provided with 105 oppositely disposed holes to receive a swivel stud 45 upon which a swivel block 46 is mounted. Pivotal attached to the swivel block 46 by means of cap screws 47, 47, is a U-shaped member 48 to the bottom of which 110 supporting rods 49 for the bowl-shaped body 43 are connected. The pivotal means just described provide a universal joint connection between the carriage frame and the 115 bowl-shaped body to allow the latter a transverse and longitudinal movement to impart 120 125 130

an additional thrill to its passengers when it is in motion.

In front of a seat 50 within the body 43, a variable speed switch 51 and a reversing switch 52 may be secured to one side of said body. An electric cable 53 runs from these switches to the motor 6 to control the latter, and through it, the forward and backward movement of the car. (See Figures 10 3 and 5.)

By employing a multiplicity of traction pulleys 17,—in this instance eight, I obtain effective traction with the cables 19 when the motor 6 is started. Furthermore, by 15 lining the peripheral groove of each pulley with a friction material such as rubber, I increase the effective traction contact between the pulley and the cable. The rubber lining not only acts as a non-slipping 20 agent, but it also serves to insulate the pul-

leys from the cables when the latter are electrically charged. My cable carriage is economical, compact and efficient for the various uses to which it may be put.

Having described my invention, I claim: 25

A device of the type described, comprising aerial supports, cables secured to said supports, and being electrically charged, a group of spaced pulleys on said cables, a lining of friction and insulating material upon the 30 grooved periphery of each pulley, a carriage to which said pulleys are secured, an electric motor within the carriage between the pulleys, and electric brushes on said carriage in circuit with the motor, to collect current 35 from said cables.

In testimony whereof I have hereunto set my hand this 17th day of December, 1924.

L. LUZERN CUSTER.