United States Patent

[11] 3,596,612

[72] Inventor **Tony R. Sowder**
East 814 Grave Ave., Spokane, Wash. 99204

[21] Appl. No. **829,209**
[22] Filed **June 2, 1969**
[45] Patented **Aug. 3, 1971**

[54] **SUSPENDED SPHEROIDAL CAR**
8 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** ..... **105/329 S,** 104/59, 104/68, 104/89, 104/112, 104/173, 115/150, 115/322, 115/333, 105/343, 135/4 R, 272/1 R, 272/40, 297/184, 297/17

[51] **Int. Cl.** **A47c 7/66,** B61b 7/08, B61d 19/00

[50] **Field of Search** ..... 104/53, 54, 59, 68, 77, 78, 89, 93, 94, 95, 112, 172, 173, 202, 172 S; 105/148, 150, 154, 155, 329, 329 R, 329 S, 329 SC, 332, 333, 343; 135/4 R; 272/1 R, 1 B, 1 C, 16, 17, 38, 40; 297/17, 184

[56] **References Cited**

UNITED STATES PATENTS

649,804	5/1900	Burger et al.	105/329
3,094,079	6/1963	Greil	105/150
3,134,342	5/1964	Sorgo	105/150
3,347,173	10/1967	Carlevaro	104/173
3,353,503	11/1967	Pettit	105/150
3,461,813	8/1969	McIlvaine	104/173

FOREIGN PATENTS

1,305,220	4/1962	France	105/329 S
1,325,828	3/1963	France	105/329 S

Primary Examiner—Arthur L. La Point
Assistant Examiner—Howard Beltran
Attorney—Keith S. Bergman

ABSTRACT: A compound aerial tram chair cover formed with one smaller shell and a second larger shell pivotable about a horizontal axis to extend over the smaller shell in opening. The pivotable mounting of the cover provides shock absorption upon extreme pivotable motion and from an off-center position biases the movable shell to either closed or open positions. Means are provided to maintain the cover partially open to allow comfortable extension of a user's legs. The cover provides a small reactive surface to wind pressure while providing a large contained volume for user comfort, and allows loading during carrier motion.

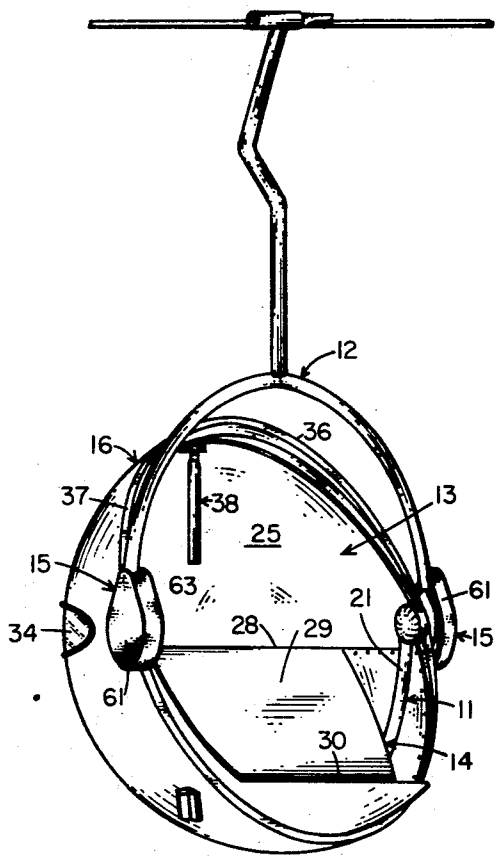


FIGURE 1

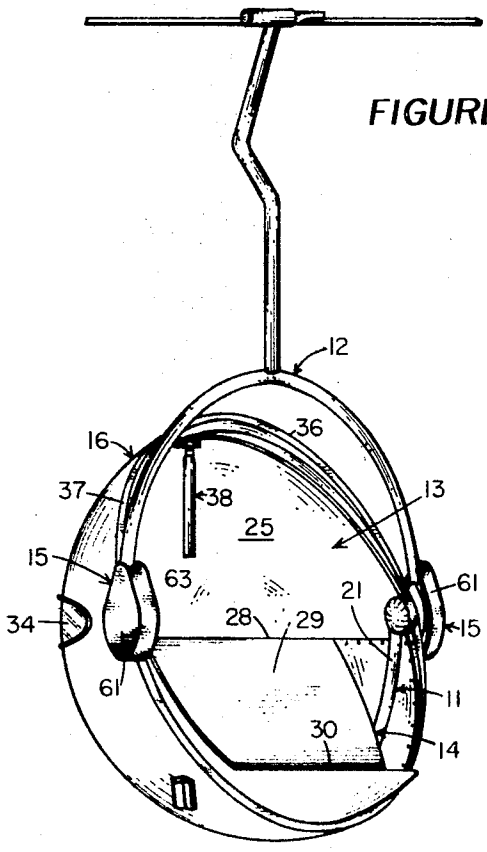


FIGURE 2

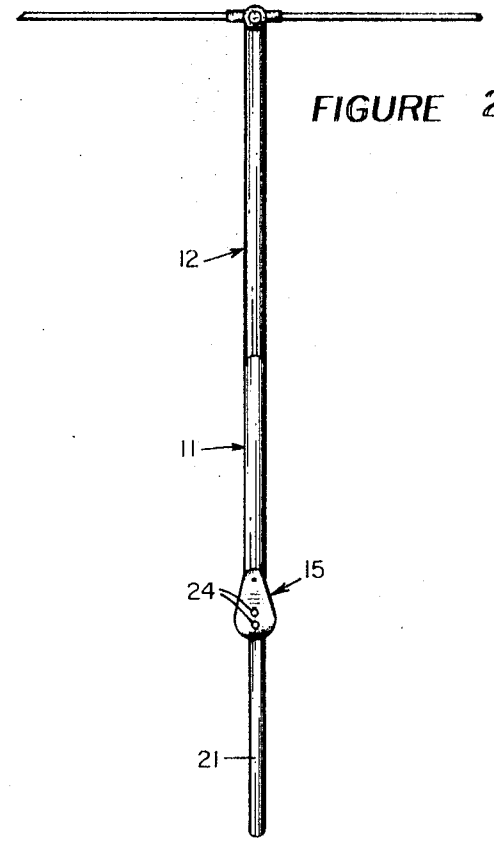


FIGURE 3

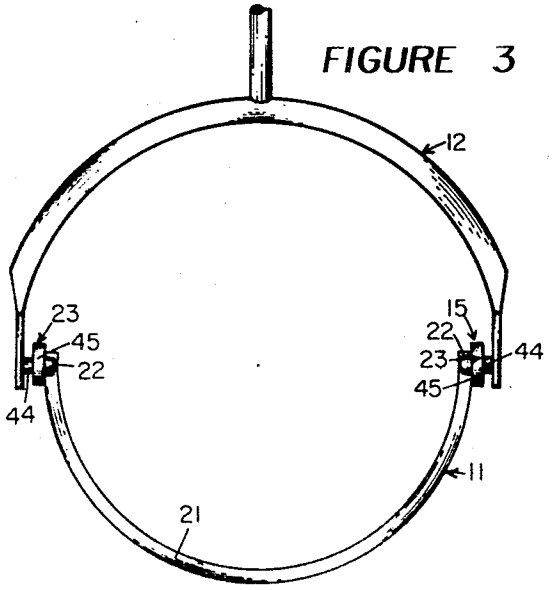
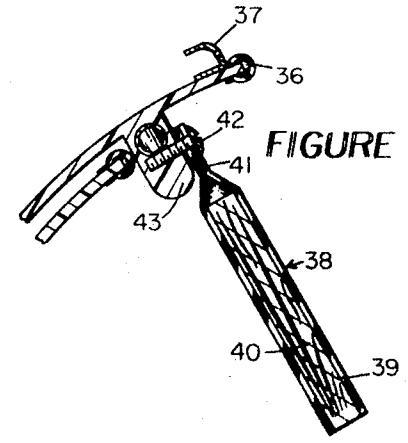


FIGURE 4



Tony R. Sowder, INVENTOR.

BY

ATTORNEY.

FIGURE 6

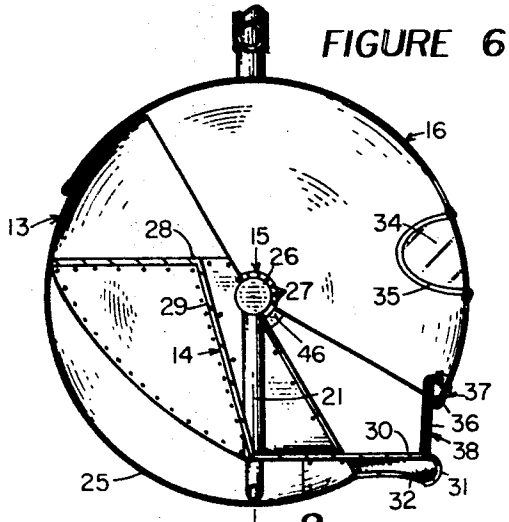


FIGURE 5

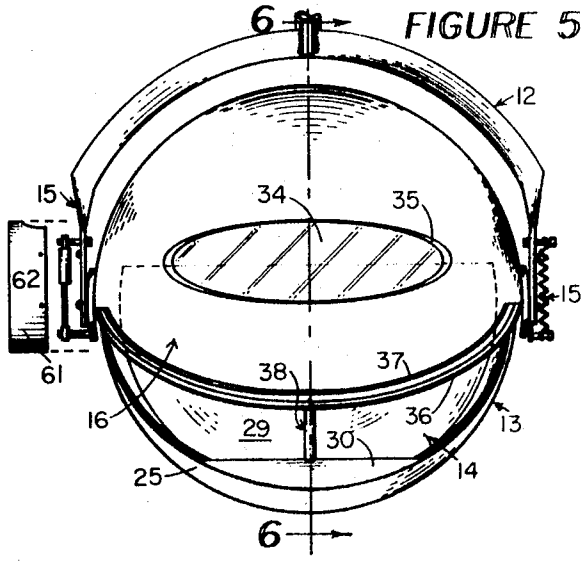


FIGURE 7

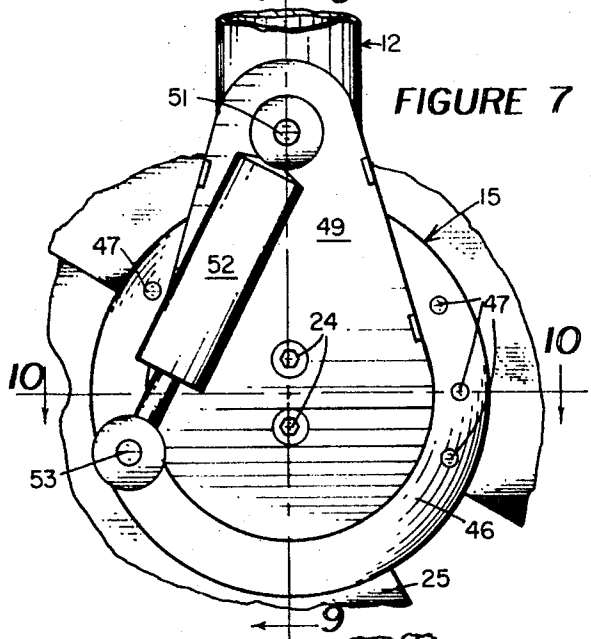


FIGURE 8

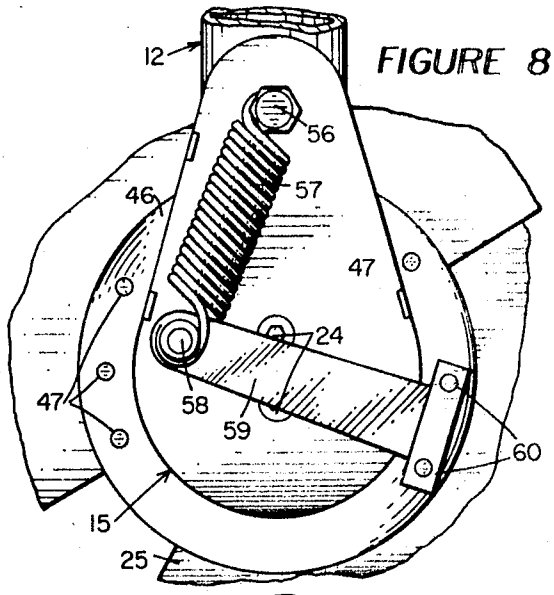


FIGURE 9

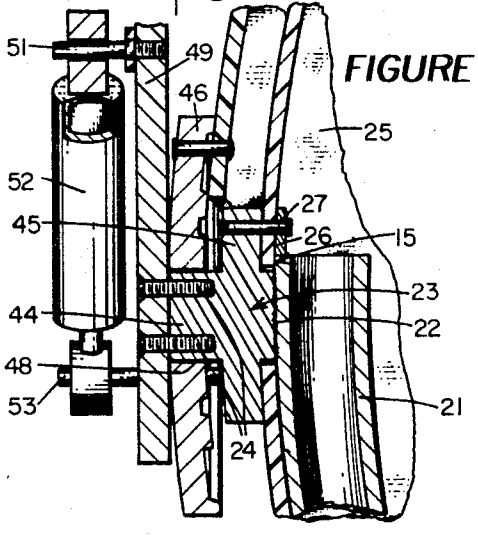
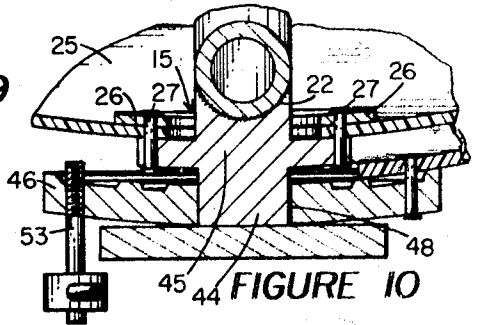


FIGURE 10



Tony R. Sowder, INVENTOR.

BY

ATTORNEY.

SUSPENDED SPHEROIDAL CAR

BACKGROUND OF THE INVENTION

RELATED APPLICATIONS

There are no applications related hereto now filed in this or any foreign country.

FIELD OF INVENTION

My invention relates generally to relatively movable compound covers for aerial tram passenger carriers and more particularly to a spheroidal shell-like cover with one larger element pivotable about a medial horizontal axis over a slightly smaller element to allow access through the cover.

DESCRIPTION OF PRIOR ART

Passenger trams having chairlike carriers are commonly operated in mountainous areas during severe weather conditions, particularly in the transport of skiers in the winter. With such operation it has become desirable to provide a cover for the carriers to increase passenger comfort during transport and heretofore various covers accomplishing this purpose have become known.

Such a cover to be effective must substantially cover the user. Especially in the case of skiers this requirement presents some physical problems as provision must be made for transport of the user's skis, preferably without requiring removal of them from normal operative position on the skiers' boots. Various compound covers having movable portions have become known to open to allow a skier to be seated in a chair-type carrier and thereafter close to cover a substantial part of his body but yet allow at least the feet to extend from under the cover and be maintained in a position which will allow the skis to be worn during transport. The known covers of this type have provided some sort of vertically elongate shape with a relatively great cross-sectional area, oftentimes in a direction parallel to carrier motion. Since the typical tram carrier is suspended from a traction cable by linkage that allows relatively free motion in any direction, the structure tends to behave somewhat as a pendulum when wind forces are applied and oftentimes such foreces may cause displacement of the carriers in excess of operative limits. Chair covers having large cross-sectional areas in any plane, or an adverse aerodynamic shape, cause greater displacement than would be caused in chairs without such covers.

The instant invention seeks to solve this problem and is distinguishable from the prior art, in providing a spheroidal chair cover which gives minimal surface area and better aerodynamic configurations in most planes therethrough to thusly reduce the resultant wind force displacement to a minimum. My invention is further distinguished from the prior art by providing a two piece spheroidal cover with slightly larger forward portion pivotally mounted on a medial horizontal axis carried by a slightly smaller rearward portion so that the forward portion opens by moving rearwardly about the rearward portion to present a cross-sectional area no greater upon opening than when in closed position, whereas other pivotably opening covers heretofore known have had a cover motion away from a medial point to increase cross-sectional area upon opening. My invention is further distinguished from the prior art in cover bias toward an open position and a closed position from a medial position therebetween; in providing a shock absorbing system to prevent excessive impact upon both opening and closing of the cover; in providing a support means to maintain the cover at a spaced distance above a user's protruding legs; and in providing means for preventing water from dripping downwardly from the cover surface onto a user's protruding legs. My invention further provides a novel shell-like structure which may embody both cover and seat, with metal supporting framework, to create a covered passenger carrier of extremely lightweight maximum included area, and great passenger comfort.

SUMMARY OF INVENTION

My invention provides a compound spheroidal cover, for chairlike passenger supports of aerial trams, having an outwardly hemispherical rearward element structurally communicating about the passenger support and pivotably mounting on a medial horizontally axis a slightly larger hemispherical, shell-like forward element pivotably movable over the rearward element to open, all to create a cover with minimal wind deflection.

To accomplish this I provide a curvilinear frame communicating in its end parts with a U-shape upper yoke suspended from a traction cable in the normal fashion. The lower frame communicates with and supports a seatlike passenger carrier and the hemispherical back cover extending about the passenger carrier. The back cover is of spheroidal shape having a diameter of revolution substantially cover is to the distance between the opposed end parts of the support frame. The forward cover is a similar partial spheroidal shell of internal configuration very slightly larger than the external configuration of the rearward cover so that it might pivotably move thereover. This forward cover is pivotably mounted upon the back cover along a horizontal axis extending through the joinder of supporting yoke and frame.

The pivotable mounting of the forward cover is such as to bias it to a closed position as it moves toward this position and to an open position as it moves from a medial point toward the open position. A shock absorber is associated with the pivot structure to lessen impact upon opening and closing of the cover and an adjustably positionable support device is associated with the lower edge to maintain it at a spaced distance above the protruding legs of a user. A rim is provided about the lowermost edge of the front cover to prevent water dripping downwardly over that cover from reaching the protruding legs of a user.

In providing such a cover it is:

A principal object of my invention to create a spheroidal compound chair cover that presents a surface to minimize the effect of winds tending to move the carrier from its normal vertical position while at the same time proving a maximum enclosed area for user comfort.

A further object to provide such a cover that has a larger forward part pivotably movable about a medial horizontal mounting over a smaller rearward part to present an area when open no greater than when closed.

A further object to provide such a cover that during use may be maintained in a partially opened condition to allow a user's legs to protrude therefrom and carry skis in the habitually familiar fashion.

A still further object of my invention to provide such a cover that may be readily adapted for use with existing passenger carrying chairs without major modification of either chair or cover.

A still further object of my invention to provide such a cover that is of new and novel design, of rugged and durable nature, of simple and economic manufacture and one otherwise well adapted to the uses and purposes for which it is intended.

Other and further objects of my invention will appear from the following specification and accompanying drawings which form a part of this application. In carrying out the objects of my invention, however, it is to be understood that its essential features are susceptible of change in design and structural arrangement with only one preferred and practical embodiment being illustrated in the accompanying drawings, as required.

IV. BRIEF DESCRIPTION OF DRAWINGS

In the accompanying drawings which form a part of this application, and wherein like numbers of reference refer to similar parts throughout:

FIG. 1 is an isometric view of a part of a traction cable supporting a passenger carrier with the cover in my invention in open condition thereabout.

FIG. 2 is an orthographic side view of a carrier yoke supporting the framework of my invention.

FIG. 3 is an orthographic front view of the structure illustrated in FIG. 2, showing its details from this aspect.

FIG. 4 is a partial enlarged cross-sectional view of the support that maintains the front cover at a spaced distance above a user's protruding legs.

FIG. 5 is an orthographic front view of my invention in position for use, with the pivot structure covers removed.

FIG. 6 is a cross-sectional view of the device of FIG. 5, taken on the line 6–6 thereon in the direction indicated by the arrows.

FIG. 7 is an enlarged orthographic side view of the right pivotable mounting structure, showing particularly the shock absorber associated therewith.

FIG. 8 is an enlarged orthographic side view of the left pivotable mounting structure, showing particularly the off-center biasing mechanism associated therewith.

FIG. 9 is a vertical cross-sectional view through the pivot structure of FIG. 7, taken on the line 9–9 thereon in the direction of the arrows.

FIG. 10 is a horizontal cross-sectional view through the pivot structure of FIG. 7, taken on the line 10–10 thereon in the direction indicated by the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in more detail and particularly to that of FIG. 1, it will there be seen that my invention generally comprises frame 11, supported by suspension yoke 12, and in turn immovably supporting rear cover 13 and seat 14, and carrying pivot structure 15 which supports forward cover 16 in pivotable relation to the frame and elements carried by it.

Suspension yoke 12 is of the type commonly used for supporting aerial tram carriers, providing U-shaped downwardly projecting support element 17 communicating by offset suspension arm 18 with connector 19 carried by traction cable 20. The only thing in this structure essential to my invention is that the distance between the ends of yoke 17 be slightly greater than the maximum diameter of the cover elements and the yoke configuration be such as to allow cover positioning therebetween and support thereon.

Frame 11, as shown in FIGS. 2 and 3, comprises rigid tubular element 21 formed to a half circular shape of such size and configuration as to fit immediately inwardly adjacent the lower portion of the rearward cover. This frame element, if of metal, is structurally fastened, preferably by welding 22, to the inwardly facing surfaces of paired opposed pivot body structures 23. These structures in turn are carried by the lowermost ends of yoke 17 by means of releasable fasteners 24 extending therebetween as seen particularly in FIG. 9. The frame is formed preferably of some light, strong material such as tubular aluminum.

Rear cover 13 comprises the hemispheroidal shell-like member seen particularly in FIG. 6. A spherical shape provides the ideal aerodynamic qualities and substantially the maximum of user space, but this particular figure is not necessary to my invention. Any spheroidal shape having substantially circular cross sections through the axis of cover pivot to allow the specified cover motion is operative with my invention, and the shape could even conceivably degenerate to a cylinder—though its aerodynamic characteristics are not the best. The term spheroidal as used herein is intended to include any convex shapes of revolution, even including a cylinder. The particular choice of shape must interrelate such factors as aerodynamic stability, user space, cost, manufacturing procedures, aesthetics, and the like.

This member must have rigidity not only to support its own dead weight but also to support the normal passenger loads that might be impressed upon the structure either directly or by support of a seat. I prefer to form this element of a plastic material such as a fiberglass or reinforced polyvinyl chloride.

The back member fits immediately outwardly adjacent frame element 21 and is fastened thereto preferably by adhesion. In each of its side parts the back carries forwardly projecting, structurally communicating annular flanges 26 mechanically fastened, in this embodiment by rivets 27, to the inner surface of pivot body structure 23. The interior chamber of back 25 supports, or at least partially encloses, the seat structure including top 28, back 29 and set 30 having forward edge 31 formed by folding seat structural element 32 backward to the lowermost edge of back 25. The seat structure may be formed as an independent element, especially when my cover is used with existing carriers but in a seat particularly adapted for use with my cover, I prefer to form it in the form illustrated. If a seat of normal construction is used, preferably it is supported in a similar position within back shell 25, by this shell and the framework.

Forward pivotable cover 16 is a similar hemispheroidal shell 33, of the same configuration and inside radius slightly greater than the outside radius of the back shell, to allow the forward shell to pivot thereabout in opening. The forward shell has medially positioned transparent window 34 maintained in appropriate viewing position in a corresponding hole in the forward part of the shell by peripheral flexible 35. The forward lower part of the cover is provided with auxiliary blunt edge 36 to provide more comfort to a user, should the cover rest upon his protruding legs. Drip mold 37 carried at a spaced distance upwardly from lower forward edge 36 provides a channel to catch water running downward along the forward cover. This mold has exit orifices for contained water positioned in its lower medial part to allow the discharge between two passengers seated in the carrier and not on either.

Spacer bar 38 maintains the forward cover in an appropriately open position to allow protrusion of occupants' legs from under the partially open cover, as seen particularly in FIG. 4. The spacer bar includes an appropriate length of flexible plastic tube 39 carrying rigid internal support 40 through most of its length but collapsed at one end to form attachment ear 41. Screw 42 passes through this attachment ear and into threaded engagement with dog 43 on the lower medial inner surface of the forward cover to position the fastening bar thereon. Since plastic tube 39 has some elasticity or plasticity, as the case may be, the structure will be normally biased to the position shown in FIG. 4 but manually movable to the position shown in FIGS. 5 and 6 to support the forward cover somewhat above the forwardmost edge of seat 30 at a distance sufficient to allow protrusion of users' legs in this space. Normally the enclosed carrier would be configurated for two users, each having legs protruding over the seat on one side of spacer bar 38.

Pivot structure 15, as shown in FIGS. 7, 8, 9 and 10, provides pivot body 23 formed with radially smaller laterally extending journal element 44 and radially larger medially extending fastening elements 45. These structures communicate, in paired opposed fashion, at each end of the frame structure between the frame structure ends and supporting yoke ends, as before specified.

The pivotable journaling of the front cover is illustrated in FIG. 9. Annular fastening disks 46 are structurally carried in paired opposed fashion at the lateral midpoints of the forward shell by mechanical fastenings, in the illustrated embodiment rivets 47, communicating therethrough. Each disk has central hole 48 pivotably journaled upon outward journal element 44 of pivot body 23 to pivotably mount forward cover upon this pivot structure.

On the right side (looking forward) right yoke end 49 irrotatably communicates as aforesaid with the end part of outward journal element 44 of the pivot body by plural screws 24 extending through the yoke end and into threaded engagement with the pivot body structure. Pin 51 is threadedly carried by the upward part of this yoke end and into threaded engagement with the pivot body structure. Pin 51 is threadedly carried by the upward part of this yoke end to support one end of cylindrical, double acting shock absorber 52 of ordinary commercial design. The other end of the shock structure is supported by pin 53, carried by and projecting laterally out-

wardly from the rearward part of annular fastening disk **46**. The shock absorbing structure is eccentric to the axis of pivotable motion of the forward cover and passes on both sides of the axis on pivotable motion of the cover to lessen impact of the cover on extreme upward or downward motion.

On the left side of the pivot structure, left yoke end **54** is irrotatably carried by the outwardly extending journal element **44** of pivot body structure **23** again by means of plural screws **24** extending through the yoke end and into threaded engagement with the pivot body structure. Spring fastening pin **56** is carried in the upper medial part of this yoke end to support one end of extension spring **57**. The other end of this spring is carried by fastening pin **58** positioned slightly downwardly and forwardly from the other pin by means of offset spring arm **59** carried laterally outward of yoke end **54** on annular fastening disk **46** by means of bolts **60** threadedly communicating therebetween. The spring-arm, by its offcenter position illustrated, will bias the forward cover from a partially open position to a completely open one.

It is further to be noted that by reason of the pivotable mounting of the forward cover, with the plane through the major diameter angling forward and downward when closed, it will be overbalanced forwardly, with its center of mass forward of the pivot, and thusly biased by gravity to a closed position as it approached this position.

Similar opposed pivot structure cover members **61** are provided to cover each of the pivot structures and prevent damage thereto or injury therefrom. These covers are the appropriately configured shell-like elements illustrated, fastened in place by plural bolts **63** extending into fastening ears **62** on the yoke ends.

Having thusly described the structure of my invention, its operation may now be understood.

Firstly a cover is formed according to the foregoing specification and positioned for operation about the normal tram carrier or one specially designed for use with my invention. To use the device the cover is opened by manual manipulation as it approaches a loading station. Some type of mechanical opener could be provided, but his is not part of the instant invention. In the opening operation it is to be noted that only slight force will be required to cause the opening because of biasing by spring **57**.

In open condition the carrier is allowed to approach the loading station and passengers seat themselves therein in the habitually familiar fashion, normally during carrier motion. With a chair such as that illustrated, two passengers will be carried, one on either side of the chair. With passengers in position, a passenger or operator, manually moves the forward cover downwardly, generally by means of manipulation of depending spacer bar **38**.

At this time the users will be seated on seat **30** with their legs extended forwardly over and downwardly from seat edge **31**. The forward cover may be moved downwardly until the lowermost portion of spacer bar **38** comes to rest on the upper forward surface of seat **30** to maintain the forward cover in this position at a spaced distance above the users' protruding legs. The forward cover can, of course, be used without spacer bars **38** and allowed to rest directly upon the upper portion of the users' protruding legs, but operation may cause some motion of the forward pivotable cover to cause discomfort to a user during transit.

The operation is reversed generally by the user to open the cover to allow exit of therefrom in the habitually familiar fashion.

From the foregoing description it is to be particularly noted that my cover in open position present no more cross-sectional area in any plane than when in closed position and when in closed position the cover presents a small cross-sectional area, and in the case of sphere a minimal cross section, in any direction as compared to other geometrical shapes.

It is further to be noted that the spherical shape of the cover presents an aerodynamic surface resulting in minimum force on the carrier upon application of multidirectional wind forces thereto, and the other shapes present only a small force.

The foregoing description of my invention is necessarily of a detailed nature so that a specific embodiment of it may be set forth as required, but is to be understood that various modifications of detail, rearrangement and multiplication of parts may be resorted to without departing from its spirit, essence or scope.

Having thusly described my invention, what I desire to protect by Letters Patent, and what I claim is:

1. For aerial tram carriers a spheroidal cover providing a passenger supporting seat structure and adapted for use with a suspension yoke having a lower U-shaped carrier supporting portion, comprising in combination:

two pivot structures, each having laterally inner fastening disks and laterally outer journal elements structurally carried by each lower end of the suspension yoke;

a frame depending from and communicating between the fastening disks of the opposed pivot structures:

a hemispheroidal back cover structurally communicating for support at least with the frame, with an axis of revolution substantially through the pivot structures, rearwardly enclosing a seat structure to support passengers; and

a shell-like, hemispheroidal forward cover with inside radius slightly greater than the outside radius of the back over and with annular fastening disks along a diameter substantially coincident with an axis of revolution, the fastening disks being journaled respectively upon the outer journal elements of the opposed pivot structures to mount the forward cover for pivotable opening motion over the rearward cover.

2. The invention of claim **1** further characterized by:

mechanical biasing means associated with at least one pivot structure to bias the forward cover from a medial position to an open position.

3. The invention of claim **1** further characterized by:

shock absorbing means associated with at least one pivot structure to aid in lessening the inertia of motion of the forward cover in approaching extreme positions.

4. The invention of claim **1** further characterized by:

a movable mounted spacer bar manually manipulatable to a position supporting the forward cover open a spaced distance from the lower edge of the rear cover.

5. The invention of claim **1** further characterized by:

the hemispheroidal covers mounted with the planes of their greatest areas angling forwardly and downwardly relative the tram carrier to bias the forward cover to a closed position, with aid of gravity, as it approaches this position.

6. The invention of claim **1** wherein the hemispheroidal shapes comprise hemispheres.

7. In a compound, relatively movable aerial tram carrier cover, supported by a U-shaped depending yoke, the combination comprising:

a hemispheroidal rear cover carried by the depending yoke along a substantially horizontal axis of revolution;

passenger carrying means associated with the rear cover and carried substantially within the enclosed volume thereof;

paired opposed pivot structures carried by the end parts of the depending yoke; and

a forward hemispheroidal cover having internal radius slightly larger than the external radius of the rear cover, journaled along an axis of revolution on the opposed pivot structures for pivotable opening motion over the rear cover.

8. The invention of claim **7** wherein the hemispheroidal shapes are hemispherical.