No. 832,319. PATENTED OCT. 2, 1906.

D. HUMPHREY.

CAR FOR ELEVATED RAILWAYS.

APPLICATION FILED AUG. 30, 1905. RENEWED AUG. 25, 1906.

3 SHEETS—SHEET 1.

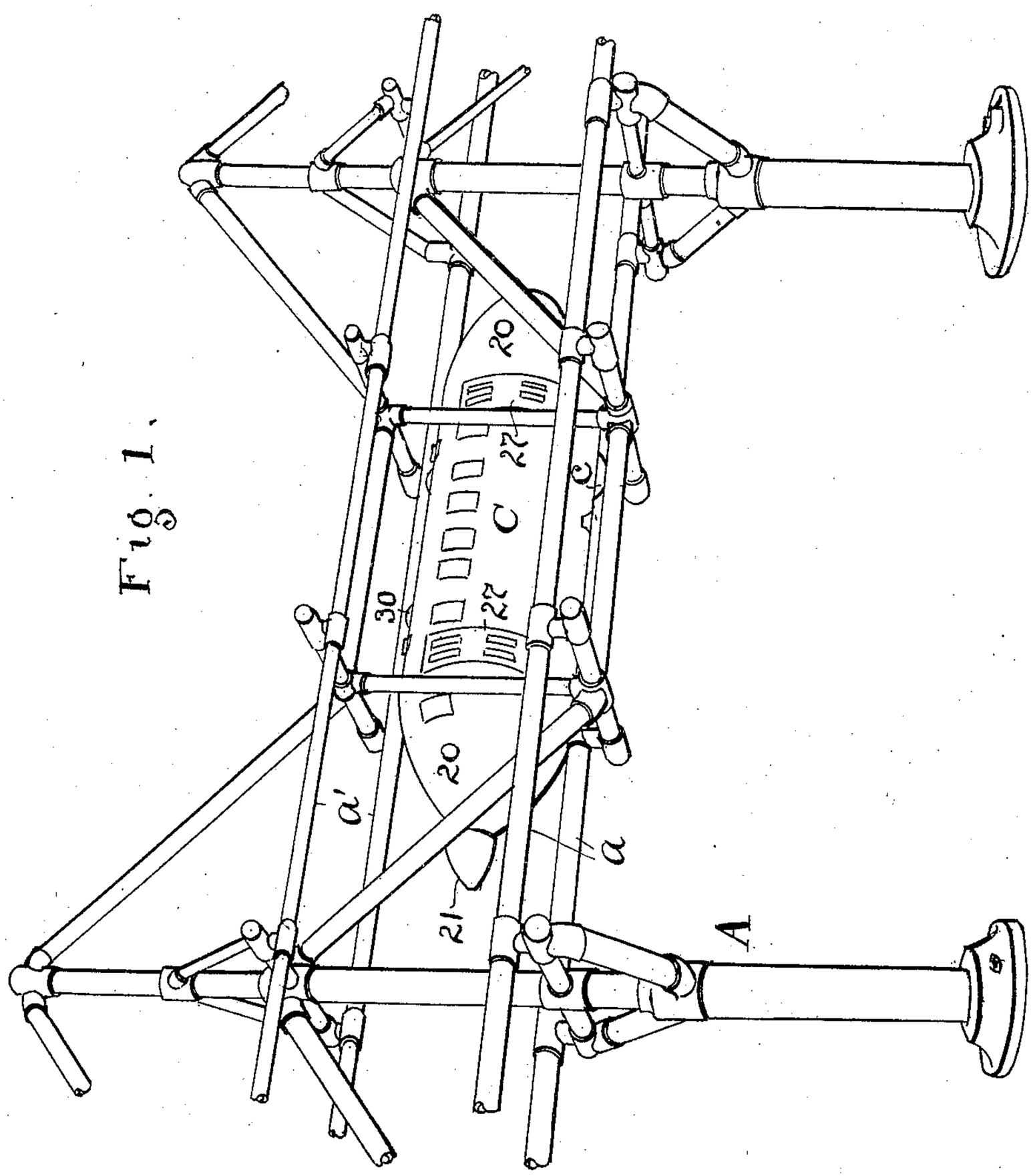

Fig. 1.

ATTEST.
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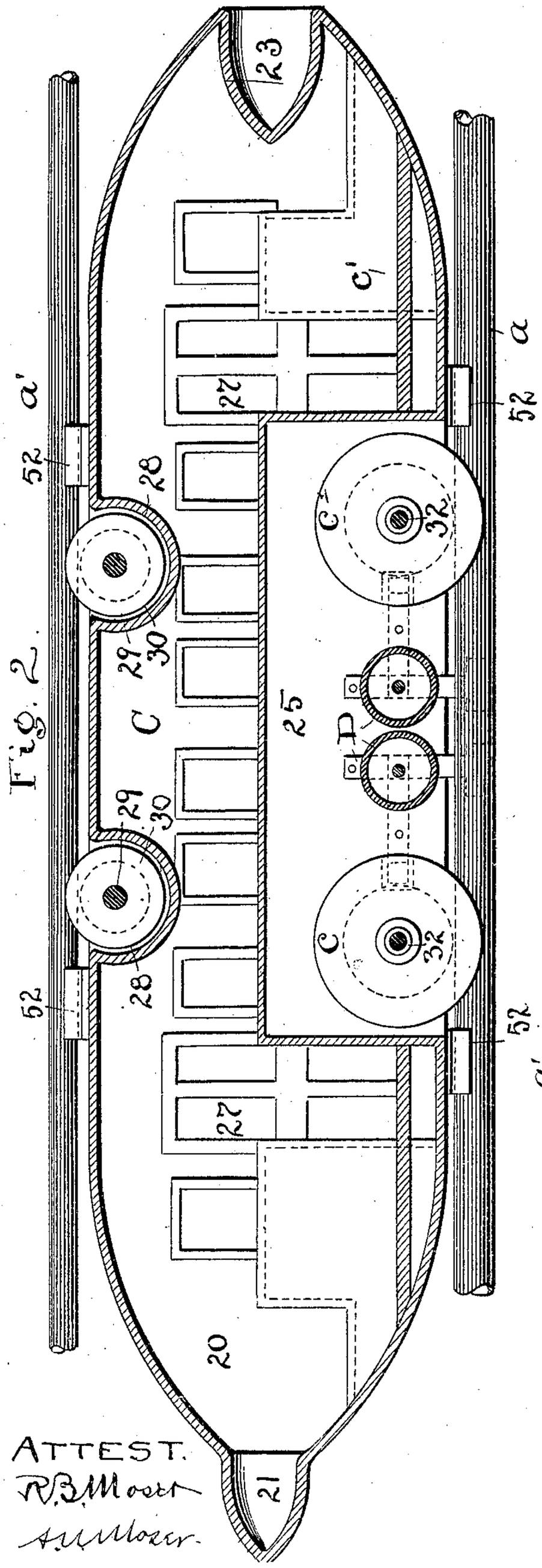

Fig. 2.

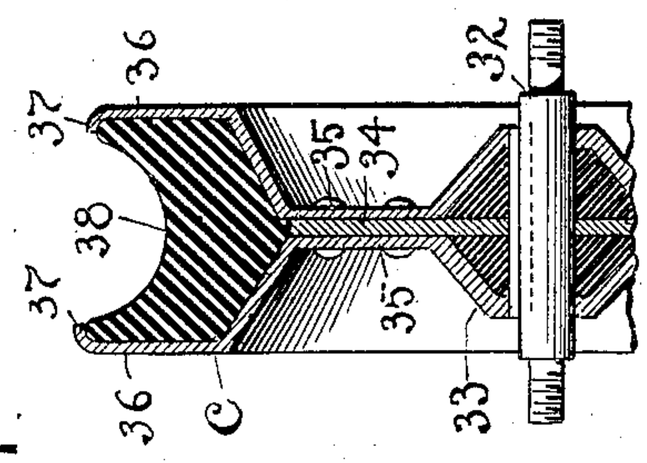

Fig. 4.

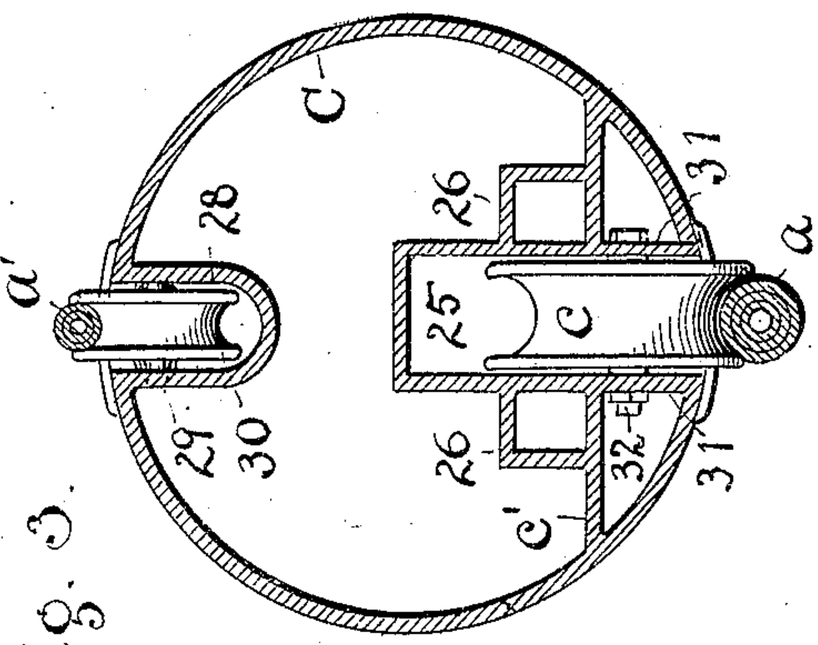

Fig. 3.

ATTEST.

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3 SHEETS—SHEET 3.

Fig. 5.

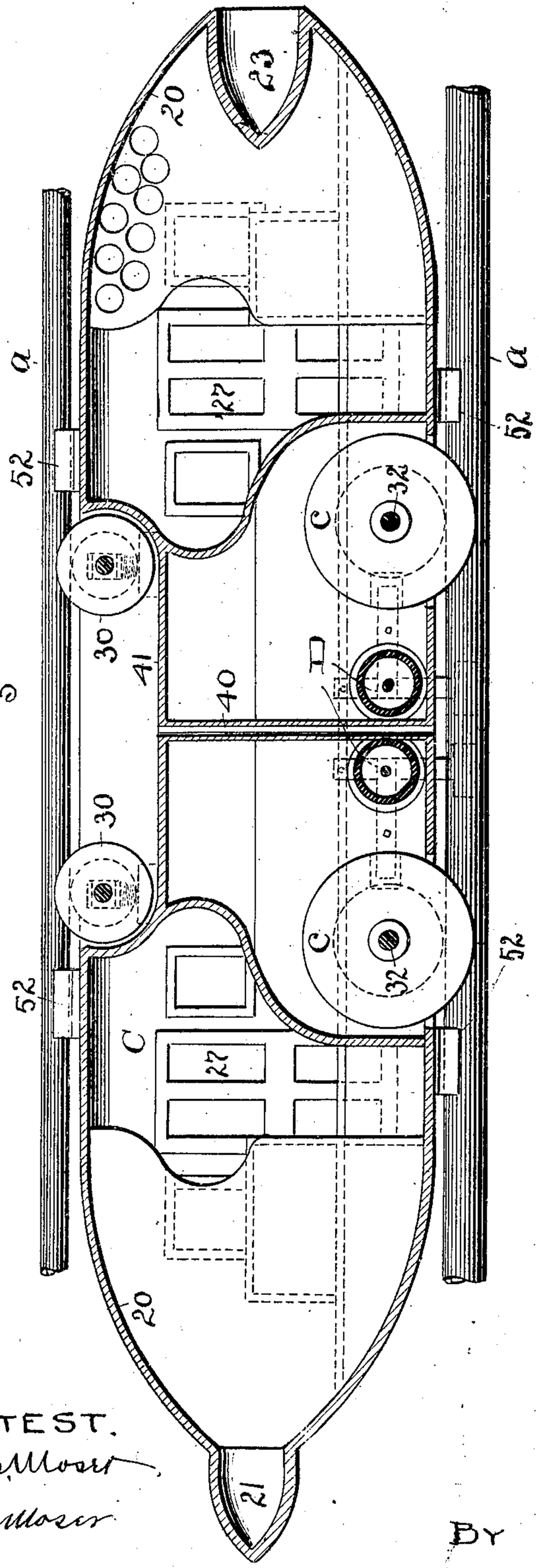
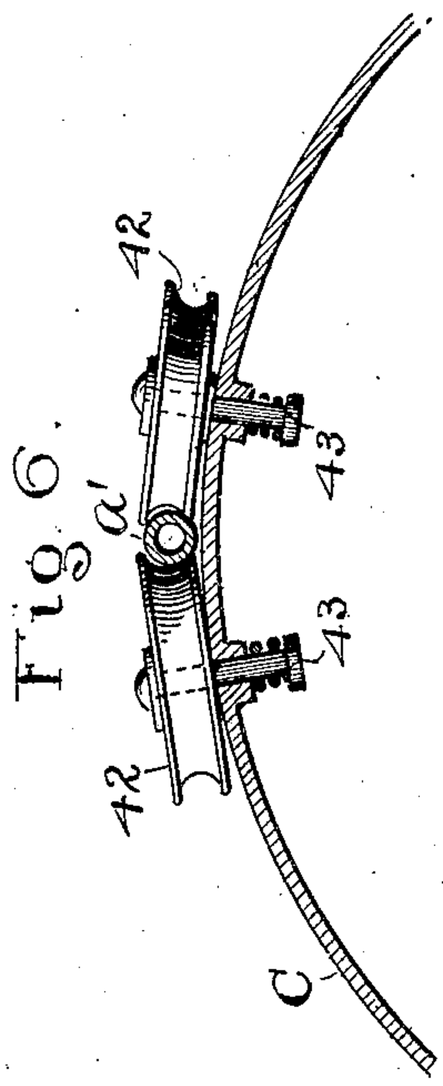


Fig. 6.



ATTEST.

R. B. Moore

A. Wilcox

INVENTOR

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UNITED STATES PATENT OFFICE.

DAVID HUMPHREY, OF CLEVELAND, OHIO.

CAR FOR ELEVATED RAILWAYS.

No. 832,319. Specification of Letters Patent. Patented Oct. 2, 1906.

Original application filed May 18, 1904, Serial No. 208,542. Divided and this application filed August 30, 1905. Renewed August 25, 1906. Serial No. 332,016.

To all whom it may concern:

Be it known that I, DAVID HUMPHREY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Cars for Elevated Railways; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in cars for elevated railways, and is a division of an application filed by me on the 18th day of May, 1904, Serial No. 208,542, and in which the structural framework of the road is the subject-matter of invention and claims.

In the accompanying drawings, Figure 1 is a perspective view of an elevated-railway structure and my improved car therein. Fig. 2 is a longitudinal sectional view of a car embodying my invention, enlarged as to Fig. 1. Fig. 3 is a cross-sectional view of the car as shown in Figs. 1 and 2. Fig. 4 is a cross-sectional view of one of the traction-wheels of the car. Fig. 5 is a longitudinal sectional elevation of somewhat-modified form of car-body; and Fig. 6 shows a modified arrangement of guide-wheels arranged to stand horizontally with the upper track or cable between, as hereinafter fully described.

A designates a supporting structure or elevated framework of a road adapted to use this style of car and serves to illustrate the position of the car in practical working relations.

C represents the car as a whole, adapted to run in said structure and which is built with a relatively long projectile or cigar-shaped shell or casing having conical tapered ends 20 and provided with a nose-point 21 at its front and a correspondingly-shaped cavity 23 in its rear, axially in line with nose 21, the construction in these particulars being such that in case of a collision between two cars the sharpened nose 21 on the front of one car will be accommodated by cavity 23 on the rear of the other car, and thus by forming a substantial air-cushion between the cars avoid accident by the cushioned impact. The car also is provided centrally and between its ends with a substantially box-shaped space 25, open from beneath and having its walls extending up into the car, as seen in cross-section, Fig. 3, and designed to serve as a housing or inclosure for the traction-wheels *c*. The vertical sides of said box are so disposed in the center of the car that seats 26 may be placed along the same at either side. The said seats are arranged back to back against the sides of said box or space 25. The entrance to the car is through doors 27 in the outer side of the car near each end, and at the ends of box 25 in this instance, and the body of the car being cylindrical I provide a false bottom or floor *c'* for the passengers.

The top of the car is formed with a series of two or more cavities or depressions 28, the walls of which have bearings for the axles 29 of the grooved guide-wheels 30, located in said cavities on said axles and which contact with the upper track-rail *a'* of the main frame and serve as guides for the car along its top.

The traction-wheels *c* at the bottom of the car in the lower portion of box 25 have axles 32, bearing in posts or supports 31, and in this instance I prefer to employ two of such wheels for each car arranged therein substantially as shown.

The construction of wheel *c* is seen in detail, Fig. 4, and comprises a hub portion 33, a central disk 34, formed of any suitable metal, sheet-metal side members 35, bolted or riveted to said disk and which are first flared outwardly about their outer portion and formed with parallel flanges 36. Said flanges are slightly bent inward at their peripheries 37 to confine the tread portion 38 of the wheel. The said tread portion is preferably of rubber of suitable consistency and firmness, but may be of any other suitable material, and is confined between the flared and flanged side plates 35 and formed with a semicircular tread or channel, as clearly seen in Fig. 4. The working relation of both the upper guide-wheels 30 and lower traction or power wheels *c* is shown in Fig. 5, wherein they are disposed one above the other centrally of the car.

The traction-wheels *c* contact with and run along the lower rails *a* of the track structure, as is clearly shown in Fig. 3, while the upper wheels run along rail or track *a'* above. The inwardly-bent edge portions 37 of the sides of the traction-wheels prevent the rub-

ber tread from pulling or being otherwise forced from the wheel, while the rigid flanges 36, going down over each side of rail *a*, will keep the wheel upon the rail, and there is little liability of the car jumping the track and endangering the lives of the occupants; but as a further precaution against the car leaving the track I employ stationary guides 52 top and bottom of the car and which are riveted and bolted rigidly to the car-frame and are adapted to run along the sides of tracks *a* and *a'* and prevent the car from leaving the tracks if anything happens to the wheels. Otherwise they do not engage said tracks and are out of service when the wheels are in service.

Heretofore weight has always been added when more traction was needed to haul more or to go faster; but with my simple arrangement of rails and concave or equivalent tires I am enabled to dispense with former excessive weights on rapid-transit lines, and thus make a large saving in power and in the pound or jar of the engine or motor for propelling the car. The same is true of my cars as to weight. They seat, say, twenty-six people, and need not weigh exceeding three thousand pounds, while cars of other systems seating from thirty-six to fifty people frequently weigh from thirty thousand to two hundred thousand pounds in the aggregate. Furthermore, the drive-wheels of all other engines or motors with which I am familiar are so made as to slip or "race" a large share of the time when at high speed; but in my construction the upper wheels run so close as to hold the drivers down, and they work to advantage all the time, and these having a rubber traction engage the track and travel without slipping. Thus by doing away with extra weight and running in safe guides with positive traction a marvelous speed can be attained and with absolute safety. Running smoothly my rolling-stock will not wear out nor tear the road-bed to pieces. All this means material economy, as the power is expended in hauling a profitable load instead of dead-weight.

Any suitable means may be used for drawing or driving the cars. For instance, a motor of any suitable character, such as an electric motor, may be employed directly on the car, or a separate locomotive or engine may be coupled to the car.

In Fig. 5 I show a modification of the car-body, especially in that there is a drain-pipe 40 from the bottom 41 of the chamber or space above for guide-wheels 30, and in Fig. 6 I show a further modification in which the guide or bearing wheels 42 are arranged horizontally on opposite sides of the track *a'* instead of standing vertically beneath said track or cable, as they do in the other forms, and the top of the body is rounded transversely and the said wheels have spindles with springs 43 about their inner ends, which tend to normally hold said spindles in working relation to permit more or less yielding to accommodate them to the track or cable *a'*.

Almost any tolerable rate of speed may be attained with perfect safety, say, two or three hundred miles per hour, because the long tubular shape of the car with bullet-shaped front end eliminates or reduces to a minimum the frictional resistance of the atmosphere and enables me to carry loads with very much less expenditure of energy than would be required with a shape of car that would be hindered or impeded by a front atmospheric pressure it could not overcome without great outlay of power on that account alone.

The brake mechanism, partially developed herein and indicated by D, Fig. 2, is made the subject-matter of a concurrently-filed application, Serial No. 276,397.

What I claim is—

1. In railways, a substantially cylindrical car-body, traction-wheels set into the bottom of said body and guide-wheels in the top thereof in the same vertical axis as said traction-wheels, and safety-guides on said body at its top and bottom in line with the said wheels.

2. In railways, a substantially cylindrical shaped car-body having grooved traction-wheels at its bottom and guide-wheels at its top axially over said traction-wheels and midway of said body transversely, in combination with upper and lower tracks on which said wheels are engaged.

3. In railways, a car-body having a walled space longitudinally in its bottom extending up into said body, traction-wheels supported in said space, and guide-wheels set down into the top of said body over said traction-wheels.

4. In railways, a car-body having a walled space lengthwise in its middle and bottom, said space open beneath the said body and having parallel walls inside said body, grooved traction-wheels in said walled space and grooved guide-wheels at the top of said body.

5. In railways, a car-body having a space in the bottom thereof between its ends open beneath and closed about its sides and top within said body and grooved traction-wheels in said space, grooved guide-wheels centrally at the top of said body and a track structure in which said car is adapted to run having single upper and lower tracks for said traction-wheels and guide-wheels respectively.

6. In railways, a car having a plurality of wheels top and bottom along the axial center of the car, the body of the car having cavities in its top for the upper wheels and a boxing in its bottom for the lower wheels, fixed bearings for all said wheels and said wheels having grooved treads of yielding ma-

terial and rigid flanges at the edges of said treads.

7. In railways, a substantially projectile-shaped car having tapered ends and provided with a nose on one end and a cavity in the other end having substantially the same cross-section and outline as said nose, whereby an air-cushion is formed when one car runs into another.

8. In railways, a car having top and bottom wheels provided with concave treads and located centrally as to the sides of the car, and fixed safety-guides on the car top and bottom adapted to overreach the sides of the rails carrying said wheels.

In testimony whereof I sign this specification in the presence of two witnesses.

DAVID HUMPHREY.

Witnesses:
R. B. MOSER,
C. A. SELL.