(No Model.) 2 Sheets—Sheet 1.

W. F. SHERMAN.

CAR FOR ELEVATED RAILWAYS.

No. 302,597. Patented July 29, 1884.

Fig. 1

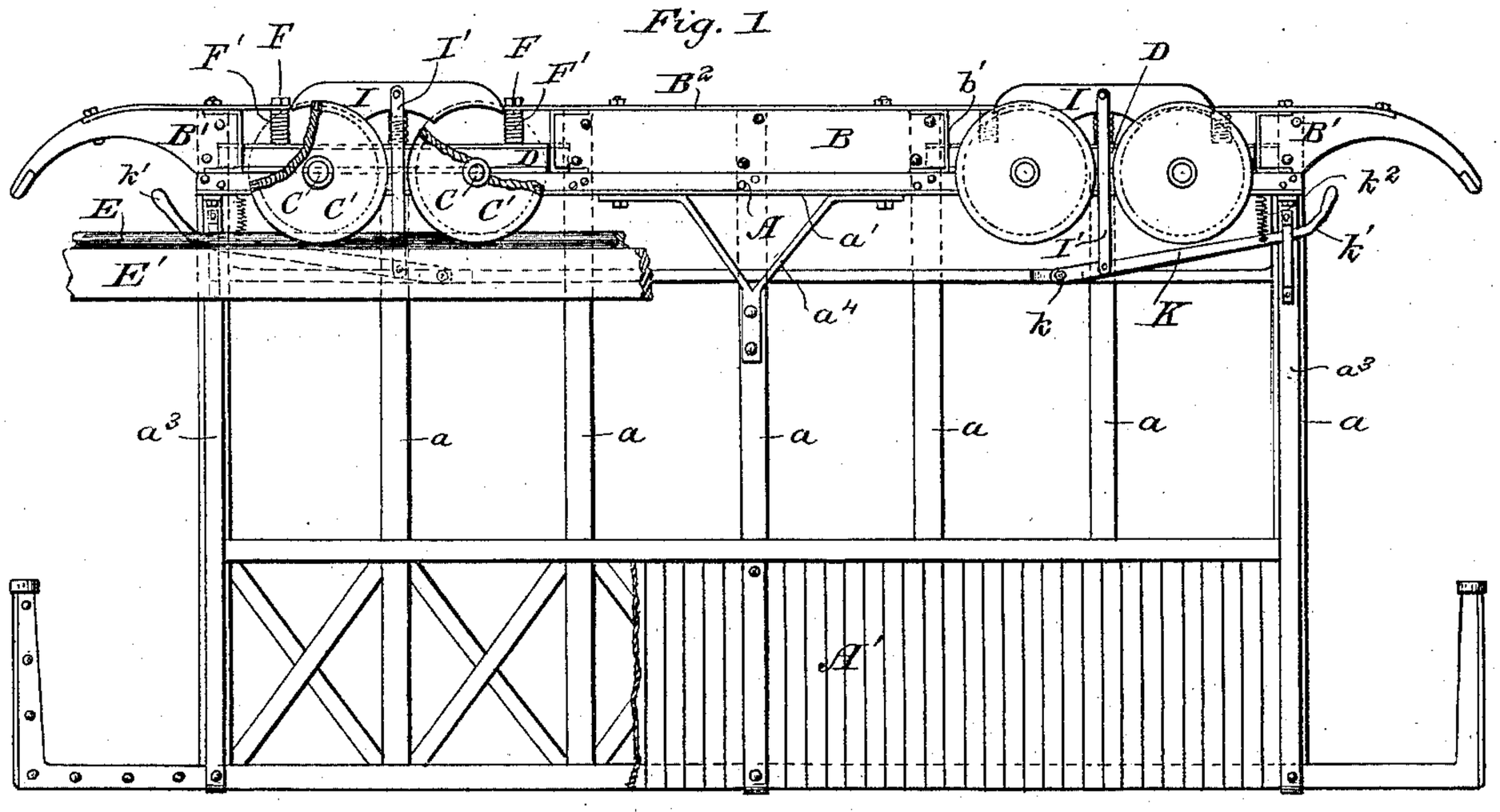


Fig. 2.

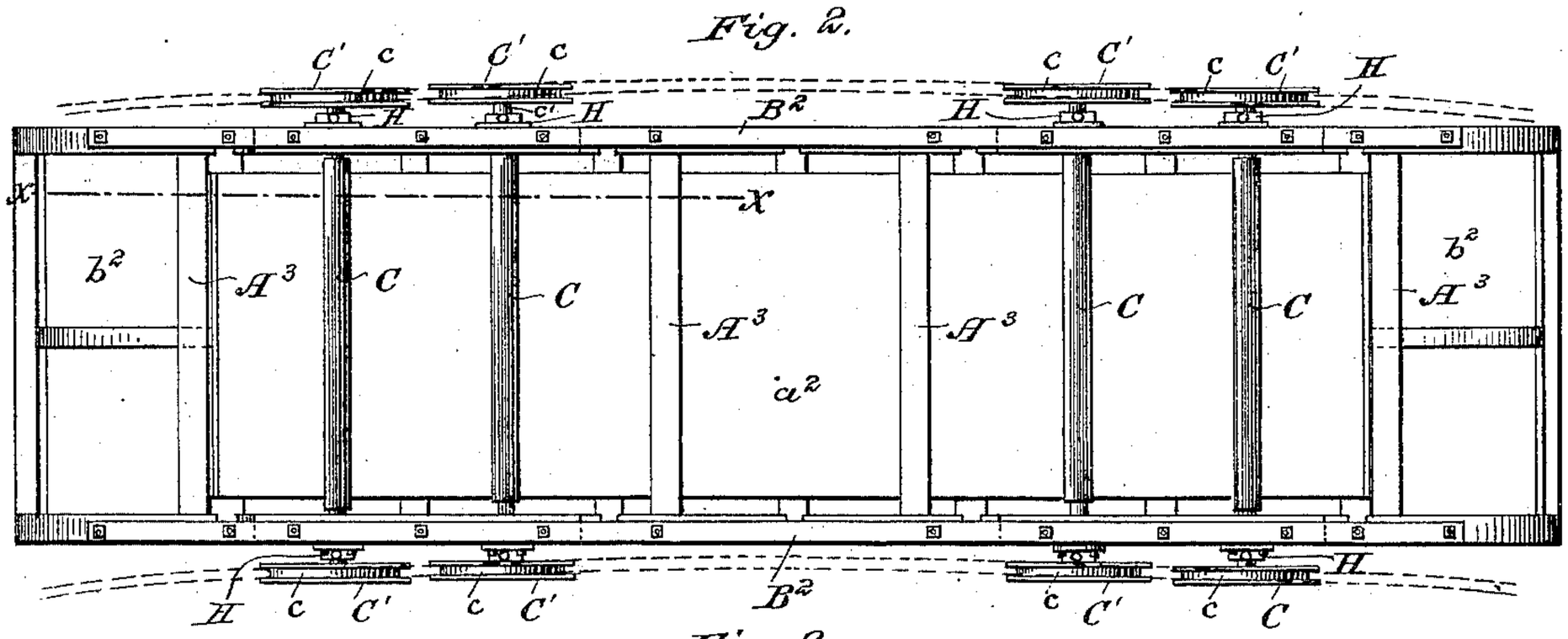
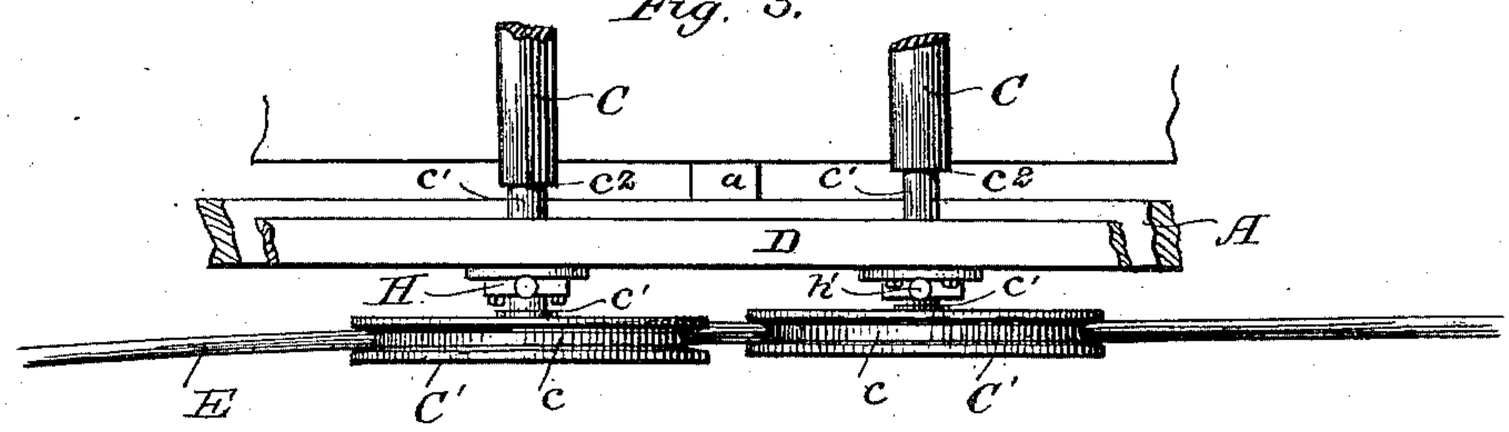


Fig. 3.



Witnesses.
Jno. W. Stockett.
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

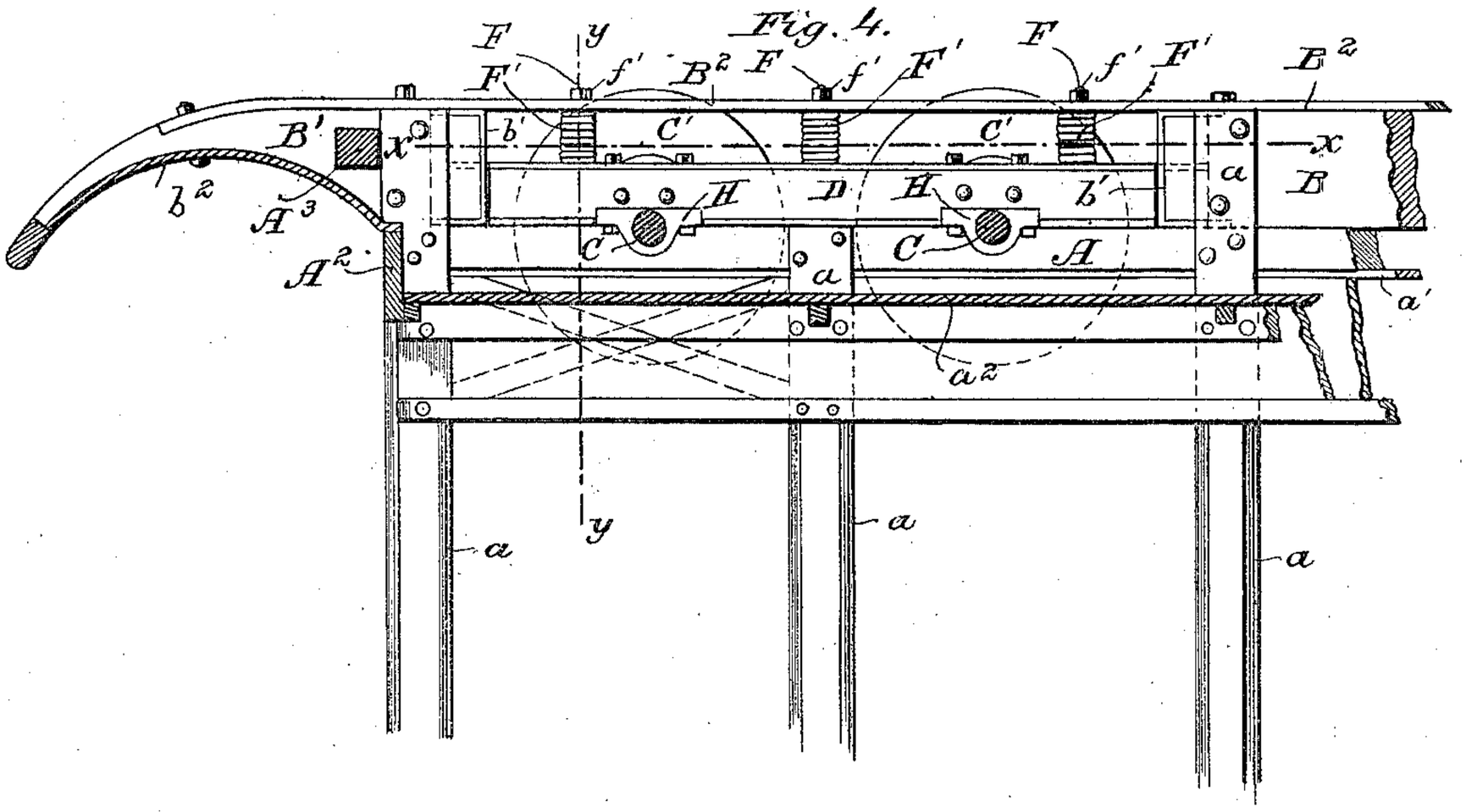


Fig. 5.

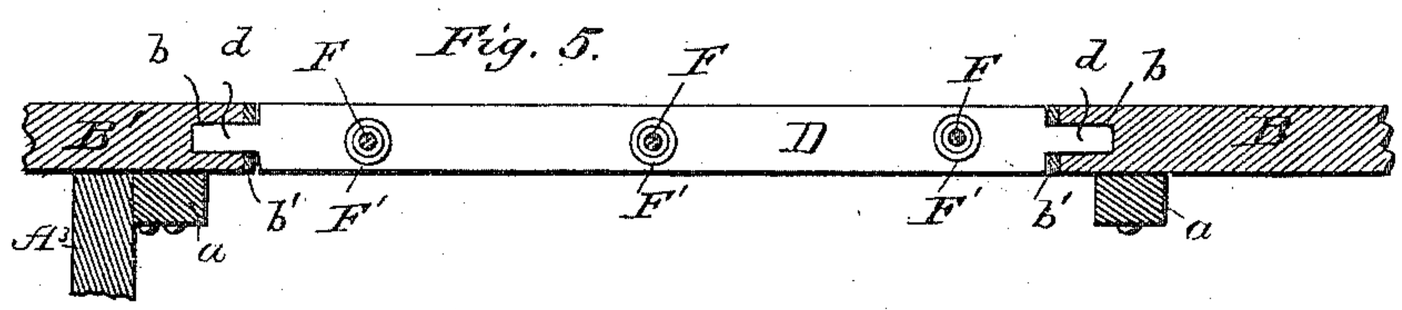


Fig. 6.

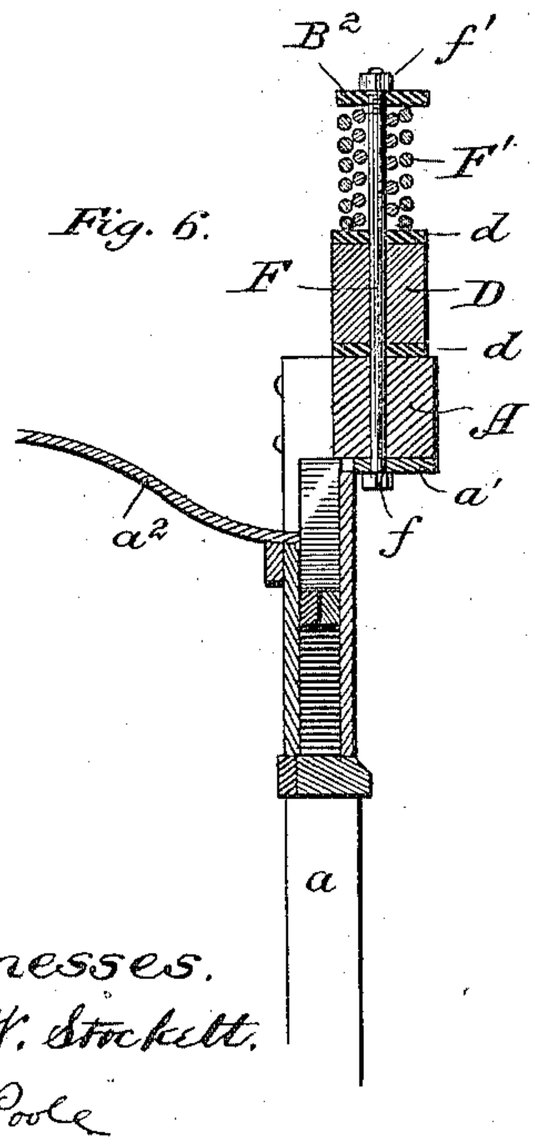


Fig. 7.

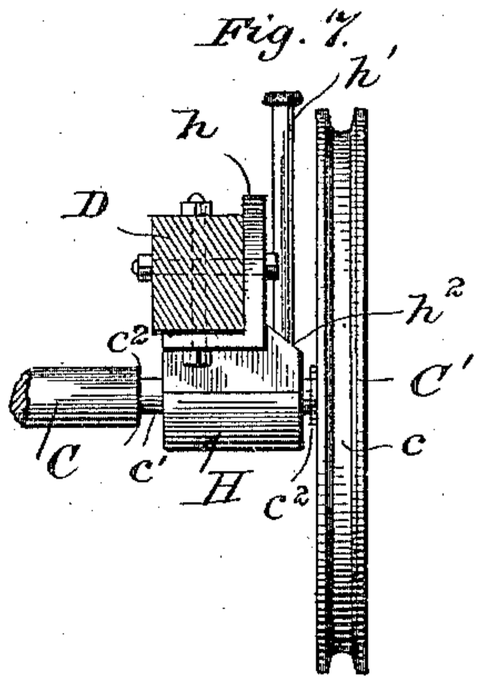
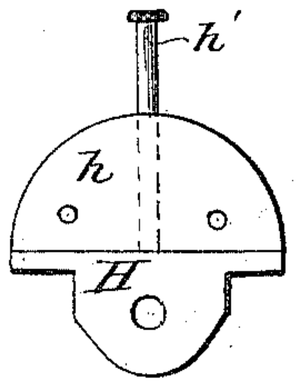


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM F. SHERMAN, OF CHICAGO, ILLINOIS.

CAR FOR ELEVATED RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 302,597, dated July 29, 1884.

Application filed September 10, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. SHERMAN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cars for Elevated Railways; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in the construction of cars for elevated railways, and more particularly to that class of cars which are suspended, or in which the supporting-wheels are placed at or near the top of the car and the body thereof hangs below the level of the rails.

Its object is to provide an improved construction in such cars; and it consists in the matters hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a car, showing a portion of track upon which it rests. Fig. 2 is a plan or top view of the same, the rails being indicated by dotted lines. Fig. 3 is a detail plan view of two of the supporting-wheels of the car and their bearings. Fig. 4 is a detail sectional view showing the two wheels and their bearings. Fig. 5 is a detail plan view. Fig. 6 is a detail vertical section taken upon line *y y* of Fig. 4. Fig. 7 is a detail elevation of one of the supporting-wheels and bearing-blocks therefor. Fig. 8 is a detail view of one of the bearing-boxes.

In the car illustrated in the accompanying drawings the principal portion of the frame thereof consists of two longitudinal beams, A, at the top of the car, to the upper edge of which are secured re-enforcing pieces B and B′, and which are connected at their ends by cross-pieces A^2 (shown more clearly in Fig. 4) and by intermediate cross-pieces, A^3. The suspended portion A′ of the body of the car is supported from the longitudinal timbers A and B by means of vertical pieces *a*, as shown, which are bolted to said pieces A and B at their upper ends, and are connected at their lower ends with the floor-timbers and to longitudinal pieces constituting the car-body, as shown. Two pairs of supporting-wheels, C′, are preferably used at each end of the car, said supporting-wheels being rigidly attached to axles C, having bearings at either end in longitudinal bars D, secured by spring-connections to the pieces A and B. The said bars D are preferably located above the piece A, and the wheels C′ are secured upon the extreme ends of said axles outside of said bars, and are provided with deep grooves *c*, constructed to fit upon rails E, which are attached to stringers E′, supported upon or forming part of an elevated-road structure of any desired or preferred construction.

As a preferred means of constructing the spring-connections between the bars D and the beams A and B, the said bars D are located immediately above and in contact with the beams A, and are attached thereto by means of rods or bolts F, which are secured in the said beams A, pass through vertical apertures in the bars D, and extend above said bars, and are provided upon their upper ends with nuts *f′*, between which nuts and the said bars B are placed strong coiled springs F′. The beams B and B′, as shown, are separated, so as to permit the insertion of said bars D between them, and said bars D are held at their ends by means of projections *d* thereon, which enter vertical grooves *b* in the ends of the parts B′ and B, and are constructed to slide freely therein.

As a preferred construction in the parts mentioned, and in order to support and steady the upper ends of the rods F, an iron strap or bar, B^2, is bolted to the upper edge of the beams B and B′, and extends over the bars D. The latter bars are made of considerably less width than the beams B, and the upper ends of the bolts F are arranged to pass through the said bar B^2, and the nuts *f* thereon are placed outside of or against the upper surface of said bar, and the springs F′ between the bar B^2 and the bar D, as shown.

Any number of bolts F may be used to connect the bar D with the beam A, a spring, F′, being placed around each bolt above the bar D, in a manner before described; or, instead of the spiral spring shown, any other suitable form of spring—as an elliptical one—may obviously be placed between the bars B^2 and the

bar D. The form of spring shown is, however, preferred for several reasons.

One advantage arising from the use of the bolts and springs F′, for supporting the car-frame from the bars D, as described, is that such bars and springs are simple and inexpensive to manufacture. Another advantage is that a number of such bolts and springs may be used and placed at short distances apart upon the bars D, for the purpose of distributing the transverse strain equally over the entire length of the bars D, so as to obviate any possibility of breakage therein, and to enable said bars to be made of comparatively small cross-sectional area. Still another and important advantage arising from the construction described is that the several springs located above the bar D hold said bar firmly in a horizontal position, and in the event of one of a pair of the supporting-wheels breaking, the other wheel will not be affected by such breakage, but will be held securely in its place, so as to support the weight of the car; and one pair of wheels will in the same manner support the car independently in case an axle breaks or the other pair is in any other way disabled. The bar D is, as shown, provided at its upper and lower surfaces with re-enforcing strips *d*, of metal; but such bar may obviously be composed of iron and constructed in any form desired and necessary to give the requisite strength. The ends of the beam B are also provided, as shown, with metal bearing-strips *b′*, against which the ends of the bars D rest. The construction shown in the bars A, B, and B′, by which portions of the bar B are removed, in order to permit the bar D to come in contact with the beam A, is not essential, and said beam B may be continuous; or a single beam, taking the place of the beams A and B, may be used, and the bar D located above such beam or beams, and connected therewith by bolts F and springs F′, in the manner before described. In the case last mentioned, the bar B^2 could obviously be bent upwardly over the said bar D and connected with the upper ends of the rods F in the manner before described. The shafts C of the supporting-wheels C′ are preferably mounted in boxes H, secured upon the bars D at the lower edge thereof, such boxes being provided with flanges *h*, which are bolted to the said beams in the manner shown more plainly in Fig. 7. The boxes H are preferably made in a single piece and with a circular aperture therein for the entrance of the axle, which is inserted in said apertures previous to securing the wheel thereon.

In order to permit the several wheels which are mounted in the bars D, as before described, to adjust themselves to the curves in the rails when the car is passing over a curved track, the said axles are constructed to move longitudinally in their bearings in the boxes H, they being provided for this purpose with journals *c′*, of considerably greater length than the boxes H. The journals *c′* are preferably made of less diameter than the main portion of the axles, so as to form shoulders c^2, to limit the longitudinal movement of the said journals in the boxes.

The operation of the car-wheels having their bearings constructed as described is clearly illustrated in Fig. 2, in which a portion of curved track is shown in dotted lines, and the wheels as moved at unequal distances from the car, so as to follow the curvature of the rails. The two pairs of wheels at each end of the car are preferably placed close together, so that the movement of one pair with reference to the other is relatively slight. The several axles being held rigidly in a position parallel to each other and at right angles to the car, the wheels, when the car is passing around a curve, are inclined slightly to the tracks. To obviate any possibility of the wheels leaving the track on this account, and to prevent the wheels binding on the rails, the grooves *c* therein are preferably made of considerable depth, and with outwardly-flared flanges, as shown. The inclination of the wheels to the rails with tracks of ordinary curvature, and with cars of the usual length, is not, however, sufficient to cause any considerable tendency in the wheels to leave the rails, or to cause them to bind thereon. The grooves in the wheels are preferably made slightly wider than the tops of the rails, so as to allow some play therein, and the bottom of said grooves are tapered or curved from the flanges inwardly toward the central portion thereof, so that the wheels will tend to remain centrally above the rails.

In order to provide means for lubricating the boxes H, a small vertical tube, *h′*, is secured to the portion, h^2, of said boxes which projects outside of the bar D, said tube communicating with the interior bearing-surface of the said boxes, and having upon its upper end a cap, which may be removed for the introduction of oil.

A preferred construction in a brake mechanism to be applied to the cars described is shown in Fig. 1, and consists of a bar, I, which is supported over each pair of wheels, and has its ends curved to fit the peripheries thereof, said bar being connected by means of a vertical link, I′, with a hand-lever, K, pivoted at *k* to the side frame of the car, and having a handle, *k′*, located at the ends of the car above the platform, by which the said bar is drawn downwardly and into contact with the wheels. A spring, k^2, is preferably connected with the free end of the lever K and a part of the car-frame above it, so as to keep said lever at the upper limit of its movement, and to throw the bar I away from the wheels when said lever is released.

In the device shown the side horizontal beams, B′, are constructed to project beyond

the car-frame, and are curved downwardly, so as to form supports for a curved roof, b^2, over the car-platforms. The beam A, as shown, is provided with a re-enforcing strip, a', of metal upon its lower edge, against which the heads f of the bolts F rest, and a covering or roof, a^2, is placed over the interior of the car, and is connected with the vertical bars a, either in line with or below the beam A. A second or outside roof may obviously be placed over the whole top of the car, above the axles C and the roof a^2, in order to protect the several parts. As shown in the drawings, a strap, a^3, is connected with the beam A at each end thereof by means of a bolt passing through the ends of said strap, the beam A, the beam B', and the strap or bar B^2, as shown, said strap a^3 extending beneath and entirely around the car-body. A brace, a^4, is also shown as connected with the beam A and the central vertical bar, a, so as to give additional rigidity to the car-frame; but said car-frame and devices for bracing the same may obviously be constructed in any desired or preferred manner. The beam B, which extends between the bars D at the central portion of the car, obviously serves to strengthen and support the said central part; but said beam may be entirely dispensed with and a suitable truss substituted therefor. The longitudinal side beams, A and B, and the parts connecting them form the main supporting-frame of the structure, and the part A', which is intended for the accommodation of passengers, and which hangs below the level of the rails, is made with a relatively light frame-work suspended from said main frame by the uprights a.

Among advantages of the construction described the following may be pointed out:

First. The desired rigidity in the car-structure is mainly derived from a part thereof—to wit, said main frame—which is adjacent to the track upon which the weight rests, and embraces the axles or running-gear. The whole is therefore more reliably retained upon the track, and the running parts are less exposed to wear and tear.

Second. The part above the rails being materially heavier than the portion suspended beneath them, the center of gravity in the car, when loaded, is brought into or near the points of suspension or the plane of the rails, whereby the car is poised with reference to laterally-acting forces, and will from this cause run with greater steadiness and safety and with less wrenching strain upon its several parts.

The car above described is adapted to any known mode of locomotion—that is to say, it may be propelled by a locomotive-engine similarly suspended, or by a cable located at either the top or bottom of the cars, or by an electric motor. For the latter, the car has a special advantage, inasmuch as the motor may be located upon the top of the car, so as to be in convenient position for connection with the axles, and so, also, that the motor apparatus will be entirely out of the way, and will occupy no otherwise available space.

I claim as my invention—

1. The combination, with two elevated track-rails, of a suspended car located between the rails and extending above and below the track, and having that portion which extends above the track heavier than the part below the track when the car is empty, substantially as described.

2. The combination, with two elevated track-rails, of a suspended car located between the rails and extending above and below the track, the frame of the car-body having a rigid main portion located at its top and above the rails, and heavier than the part of the frame below the rails, substantially as and for the purposes set forth.

3. In a suspended car for elevated railways, the combination, with the wheels and axles, of longitudinal side beams at the top of a car-frame, movable bars D, provided with bearings for the wheel-axles, springs connecting the bars with the side beams, and devices for retaining the bars D movably in place, substantially as described.

4. In a suspended car for elevated railways, the combination, with the wheels and axles, of longitudinal side beams, A, at the top of the car-frame, bars D, located above the said side beams and provided with bearings for the wheel-axles, vertical bolts secured to the side beams and extending upwardly through the bars, and springs interposed between the upper heads of said bolts and the bars, substantially as described.

5. In a suspended car for elevated railways, the combination, with a supporting frame-work at the top of the car, of vertically-movable but laterally-stationary spring-supported bars D, axles C, mounted in said bars D, so as to be longitudinally movable therein, and flanged wheels rigidly secured to the axles, substantially as and for the purpose set forth.

6. In a suspended car for elevated railways, the combination, with the longitudinal side beams, A, at the top thereof, and supporting-wheels C', of bars D, provided with suitable bearings for the axles of said wheels, and located above the beams A, straps B^2, secured to the said frame and extending over the bars D, vertical bolts F, secured at their ends in the beams A and straps B^2, and passing through the bars D, and springs interposed between the bars D and the straps B^2, substantially as and for the purpose set forth.

7. In a suspended car for elevated railways, the combination, with a supporting frame-work at the top of the car, provided with vertical grooves b, of a bar, D, held at its ends in said grooves, springs for supporting the car-body from said bar, and axles C, provided with supporting-wheels C', mounted in suitable bearings in or upon said bar, substantially as described.

8. In a suspended car for elevated railways,

the combination of an upper frame-work, consisting of longitudinal beams A and timbers B and B′, horizontal straps B^2, secured to the top of said timbers B and B′, bars D, placed between the adjacent ends of the timbers B and B′, vertical bolts secured to the beams A and straps B^2 and passing through the bars D, and springs interposed between said bars D and straps B^2, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

WILLIAM F. SHERMAN.

Witnesses:
C. CLARENCE POOLE,
P. J. ELLERT.