No. 755,460. PATENTED MAR. 22, 1904.

W. DALTON & F. J. COLE.

ELECTRIC LOCOMOTIVE.

APPLICATION FILED NOV. 17, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

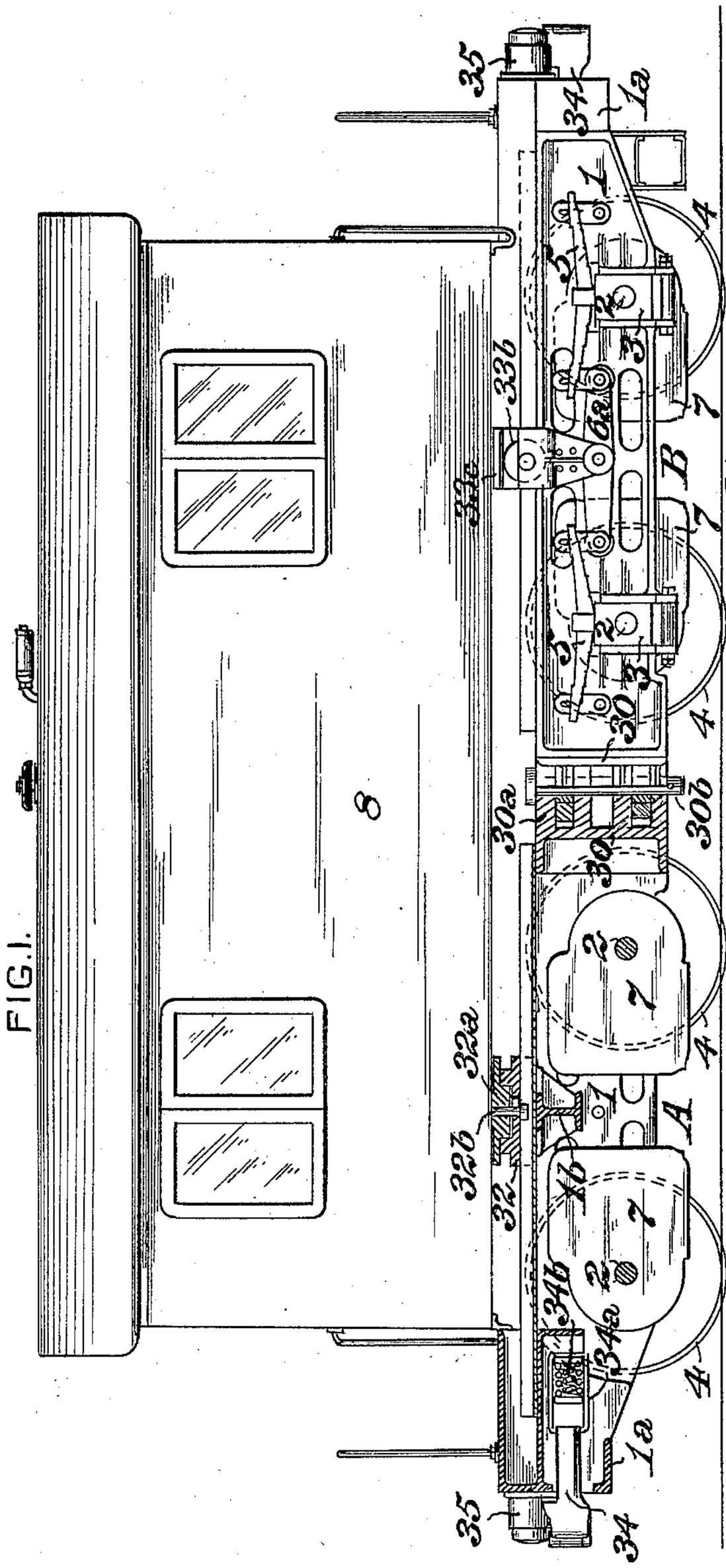

FIG. 1.

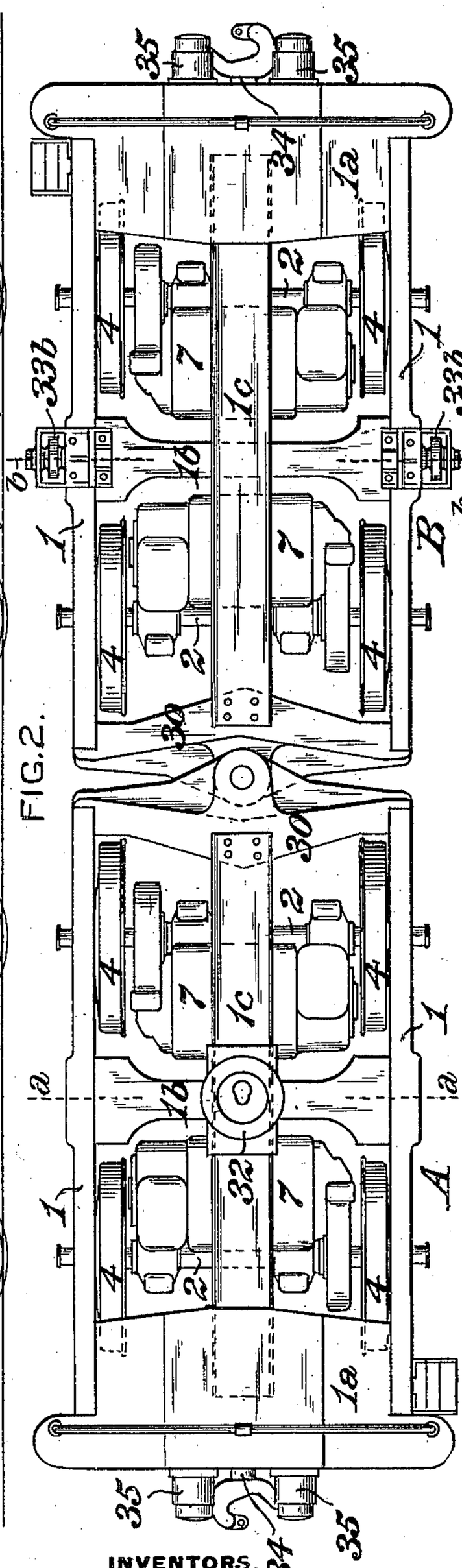

FIG. 2.

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NO MODEL. 3 SHEETS—SHEET 2.

FIG. 3.

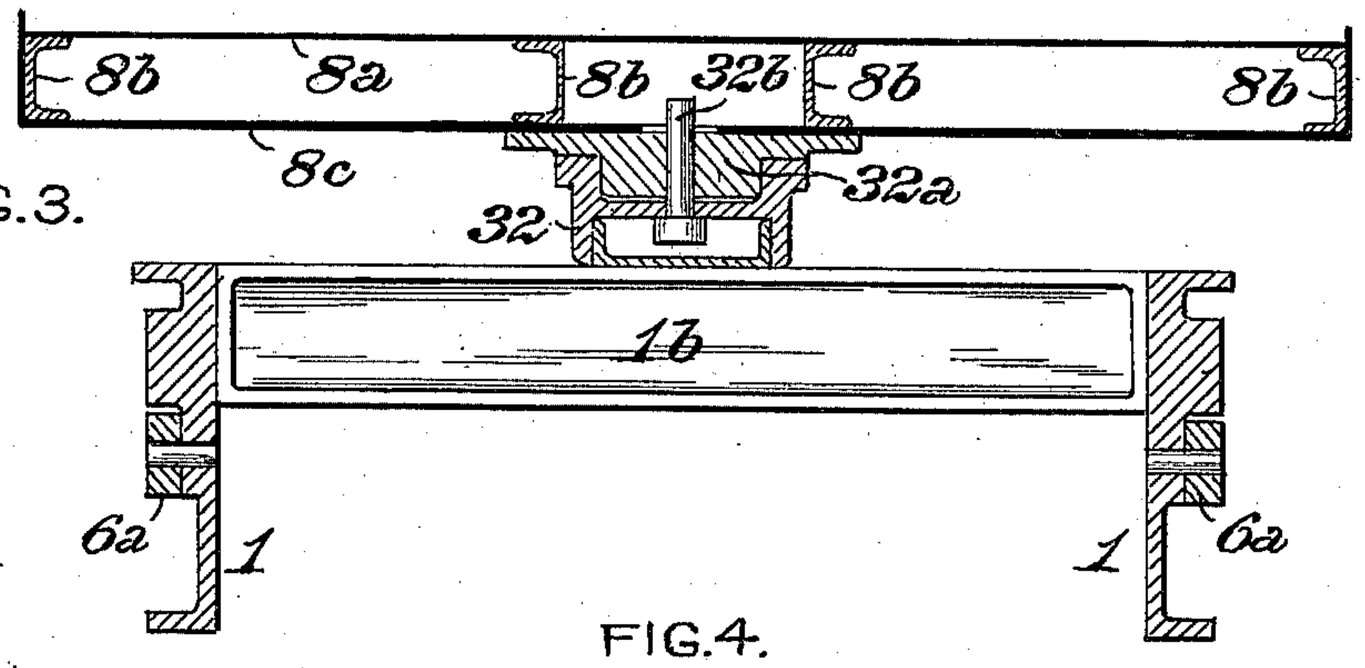

FIG. 4.

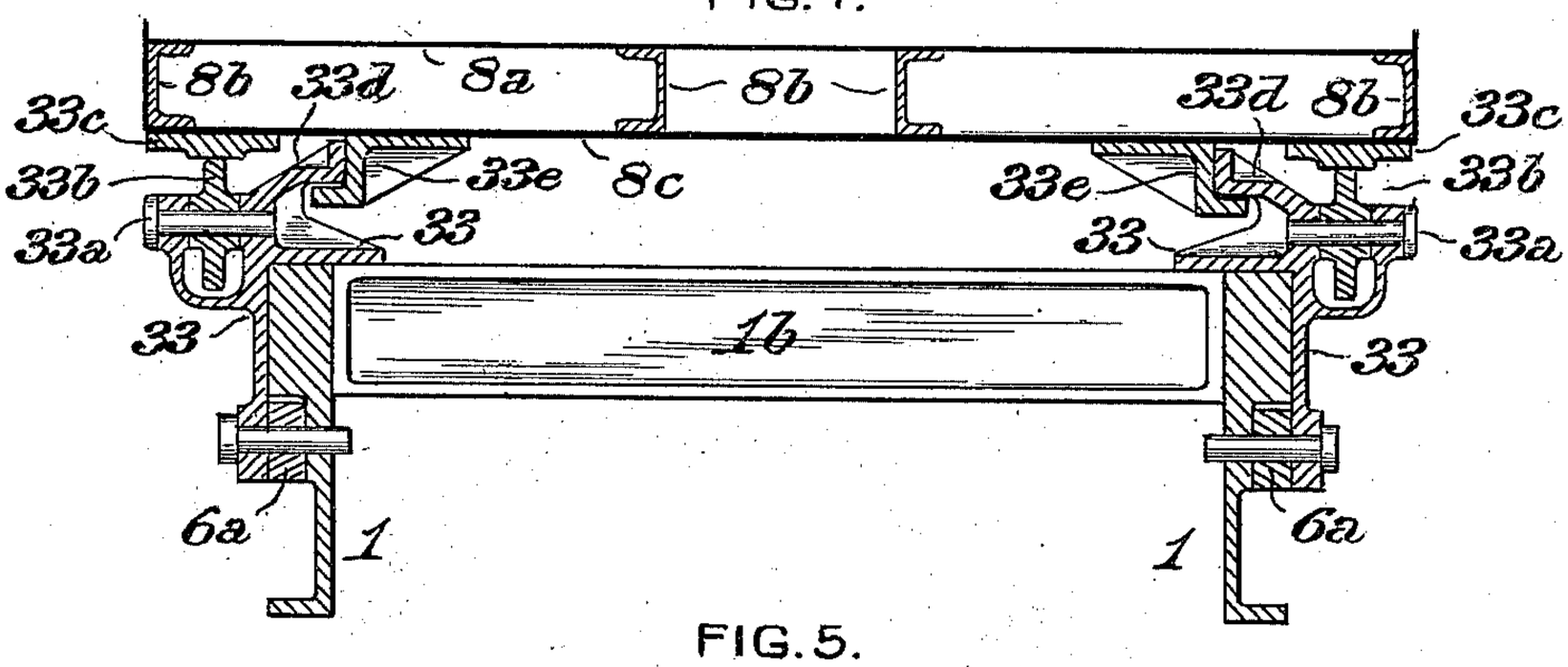

FIG. 5.

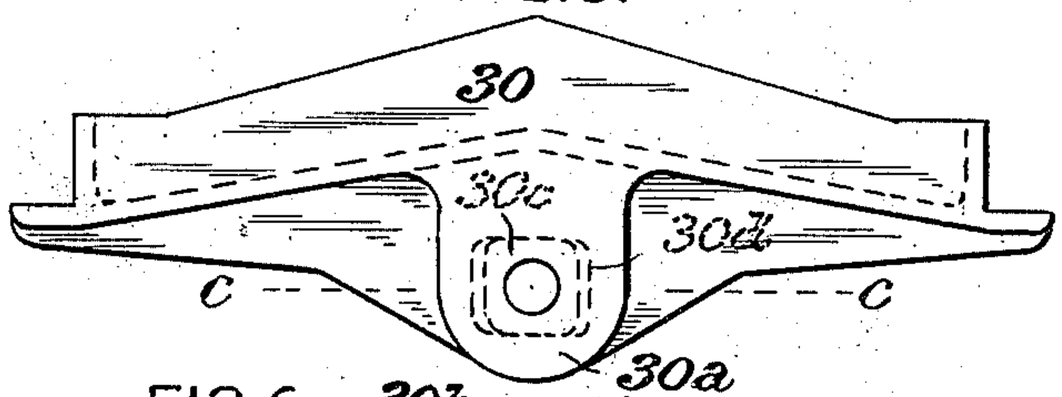

FIG. 6.

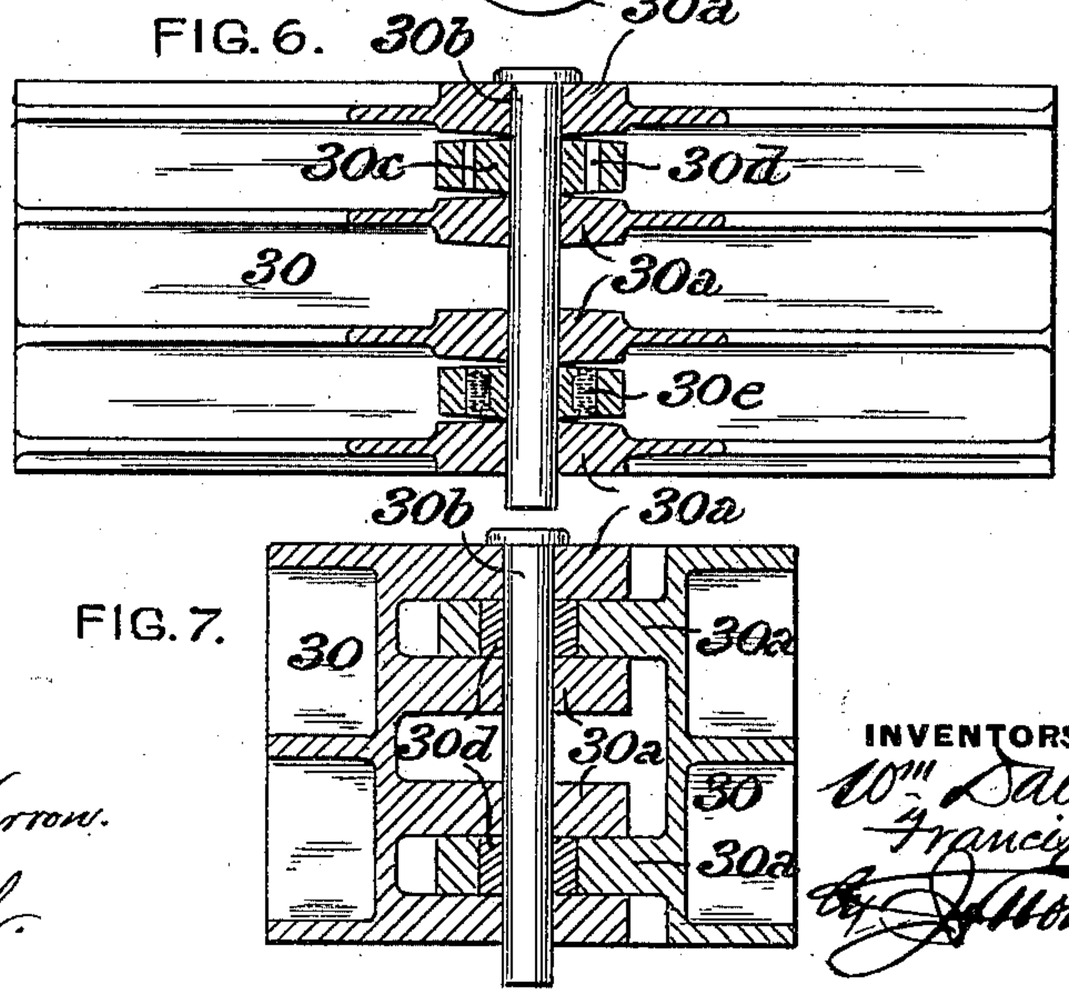

FIG. 7.

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ELECTRIC LOCOMOTIVE.

APPLICATION FILED NOV. 17, 1903.

NO MODEL.

3 SHEETS—SHEET 3

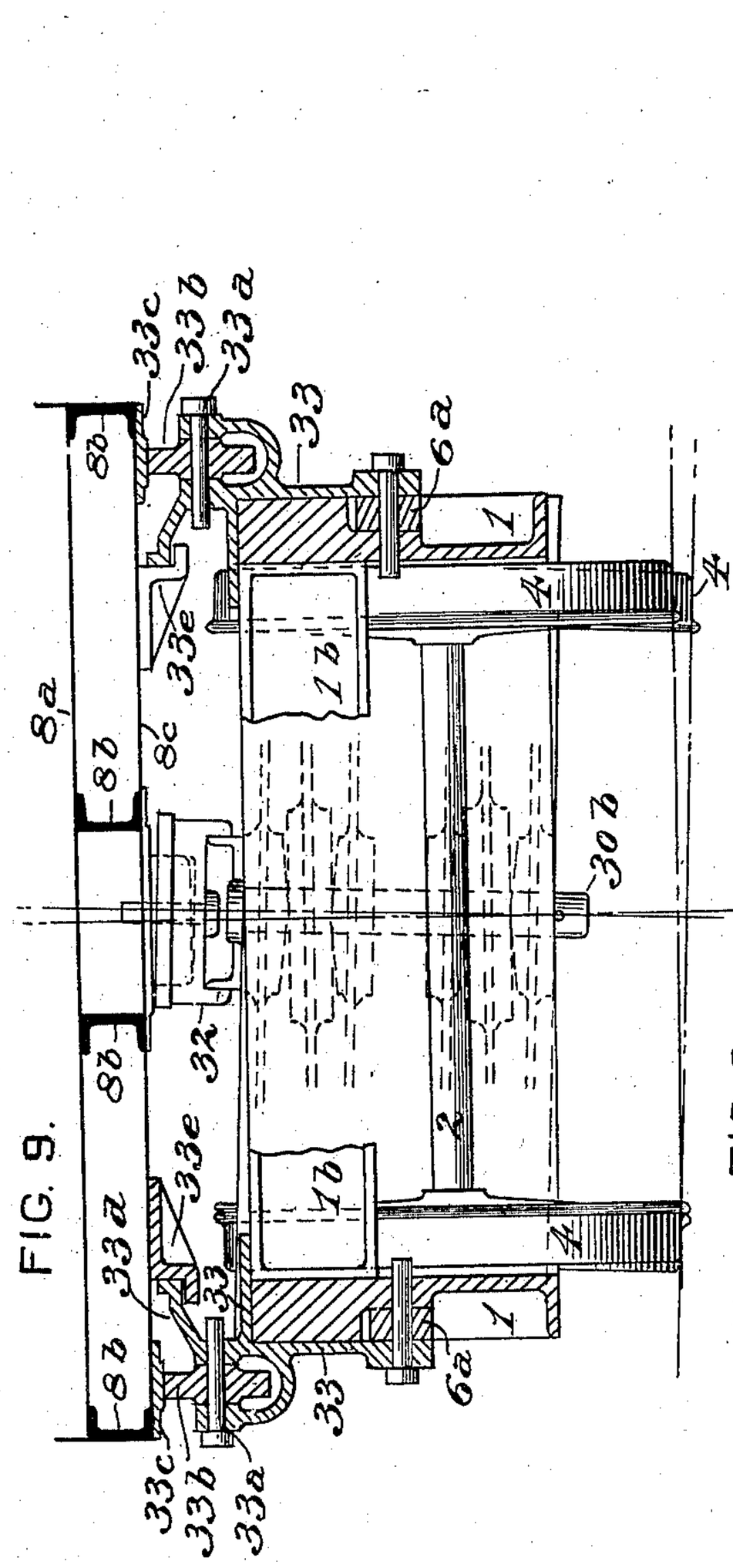

FIG. 9.

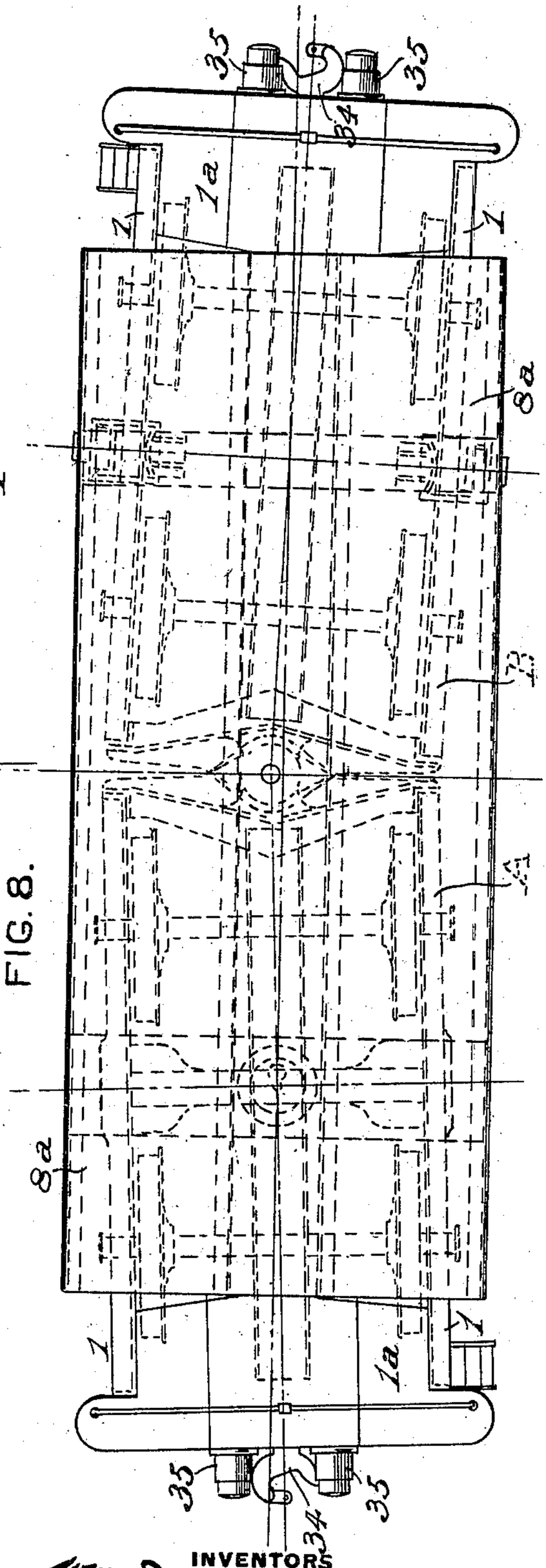

FIG. 8.

WITNESSES

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No. 755,460. Patented March 22, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM DALTON AND FRANCIS J. COLE, OF SCHENECTADY, NEW YORK, ASSIGNORS TO AMERICAN LOCOMOTIVE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ELECTRIC LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 755,460, dated March 22, 1904.

Application filed November 17, 1903. Serial No. 181,471. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM DALTON and FRANCIS J. COLE, both of Schenectady, in the county of Schenectady and State of New York, have jointly invented a certain new and useful Improvement in Electric Locomotives, of which improvement the following is a specification.

Our invention more particularly relates to electric locomotives having a plurality of driving-axles, and consequently a comparatively long wheel-base; and its object is to provide a construction which will attain the advantages as to easy riding of a long frame and wheel-base, together with those of sufficient flexibility to take curves easily and without liability to derailment at high speeds, of the provision of a rigid structure for the housing of the electrical controlling equipment, and of the transmission of strains between the axles and the draft-gear directly through the side frames of swiveling trucks without passing through a center-pin to and through a rigid cab-framing.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a view, partly in side elevation and partly in longitudinal central section, of an electric locomotive, illustrating an application of our invention; Fig. 2, a plan or top view with the cab-frame and cab removed; Fig. 3, a transverse section, on an enlarged scale, through the cab-supporting frame and adjoining truck-frame on the line *a a* of Fig. 2; Fig. 4, a similar section on the line *b b* of Fig. 2; Fig. 5, a plan or top view of one of the coupling-transoms; Fig. 6, a vertical transverse section through the same on the line *c c* of Fig. 5; Fig. 7, a vertical longitudinal central section through the two transom-sections when coupled in operative position; Fig. 8, a plan or top view with the cab removed, showing the locomotive on a curved portion of a railroad-track; and Fig. 9, a transverse section on the line *b b* of Fig. 2 and on an enlarged scale, the locomotive being in the position shown in Fig. 8.

It is well recognized in railroad practice that in locomotives having a comparatively long rigid wheel-base there is a tendency of the flanges of the leading driving-wheels to mount the rails in passing curves of short radius and to thereby cause derailment, and independent leading trucks, of either two or four wheels, are generally employed in present standard practice to guide the locomotive around curves. In order to attain the necessary flexibility for safely taking curves without the employment of independent leading and trailing trucks, we provide a main supporting-frame of such construction as while retaining a long driving-wheel base to be horizontally flexible and rigid vertically.

In the practice of our invention the main supporting-frame is composed of two or more independent and pivotally-coupled trucks, each supported on two or more axles, said trucks carrying the electric motors by which the locomotive is propelled and the end trucks (when more than two are used) having the draft-gear and buffing apparatus connected directly to their frames. The cab and electric controlling equipment are carried by an independent cab-frame, which is supported upon the trucks, preferably, through a center bearing on one end truck and side bearings on the other.

Referring to the drawings, our invention is herein exemplified as applied in an electric locomotive having a plurality of driving-axles 2, in this instance four in number, upon which the driving-wheels 4 are secured. The driving-axles are mounted in two swiveling-trucks A and B, the frames of which comprise in each truck a pair of side members 1, having jaws or pedestals for the reception of the journal-boxes 3, of two driving-axles, and suitable transverse connecting members, which, as shown, consist of coupling-transoms or transverse tie-braces 30 at the inner or adjacent ends of the trucks and buffer-beam castings 1^a at their outer ends. The side members are also connected at or near the middle of each truck by bearing-transoms 1^b and

the coupling-transoms, and buffer-beam castings may be connected by longitudinal center sills 1^c.

The frame members of each truck are supported upon the driving-axles thereof through the intermediation of springs 5, which are connected to equalizers 6^a, pivoted on the side members 1, as in ordinary steam-locomotive practice. The detailed construction of the spring arrangement does not form part of our present invention, and the same is not, therefore, herein at length set forth.

Power for the rotation of the driving-axles of each of the trucks A and B is applied thereto from electric motors 7 of any suitable and preferred construction. In the instance herein exemplified each driving-axle is shown as provided with an independent motor, which is supported upon the axle and suitably connected to the truck-frame. The number, construction, or special driving mechanism of the electric motors is not, however, an essential of our present invention, and, if preferred, a single electric motor may be used on each truck and power transmitted therefrom to the driving-axles through a crank-shaft, gearing, and coupling-rods, as in the construction set forth in Letters Patent of the United States No. 744,304, granted and issued to the American Locomotive Company as our assignee under date of November 17, 1903.

The trucks A and B are pivotally connected, so as to be horizontally flexible—that is to say, capable of relative horizontal movement and substantially rigid vertically—by a vertical coupling-pin 30^b, which passes through openings in overlapping perforated lugs or eyes 30^a, formed centrally on the adjoining faces of the coupling-transoms 30, which connect the side frame members of the truck A and B at their inner ends. In order to permit a slight degree of relative lateral movement of the trucks upon the coupling-pin, blocks 30^c, having holes for the passage of the coupling-pin, are fitted in openings 30^d in the eyes 30^a of one of the coupling-transoms, said openings corresponding in form with the blocks, but being of greater length transversely of the truck-frame, so as to permit the desired amount of lateral movement or side play. Packing-strips 30^e, of rubber or other elastic material, are fitted between the lower block 30^c and the ends of the opening in which it fits in order to limit the side movement of the lower portion of the coupling-pin.

The cab 8 and the inclosed electrical controlling equipment (which latter, as it does not in and of itself constitute part of our present invention, is not herein shown) are fixed to a suitable floor or deck 8^a, which is mounted upon a cab-supporting frame, comprising longitudinal side and center members or sills 8^b, which may be, as shown, in the form of channels and are connected by transoms or cross-ties 8^c. The rigid cab-supporting frame is carried upon and supported by the trucks A and B through the intermediation of any suitable bearings which will admit of movement of the trucks in a horizontal plane, relatively one to the other and to the cab-supporting frame. In the instance shown the cab-supporting frame is carried on one of the trucks, A, by a center-bearing, and on the other, B, by side bearings; but either system of bearings may be used on both trucks in the discretion of the constructor.

The center-bearing of the truck A is of the ordinary form, comprising a lower center-plate-casting 32, fixed to the bearing-transom 1^b, a corresponding upper center-plate casting 32^a, fixed to the adjacent transom 8^c of the cab-supporting frame, and a king-bolt or center-pin 32^b passing through the upper and lower center plates. Each of the side bearings of the truck B comprises a casting 33, secured to one of the side members 1 of the truck and having eyes for the reception of a horizontal pin 33^a, on which is mounted a roller 33^b, which abuts against a bearing-plate 33^c on the cab-supporting frame, and an inwardly and upwardly projecting arm 33^d, which overlaps a flange on a guide-plate 33^e, secured to the cab-supporting frame. The weight of the adjacent end of the cab-supporting frame is carried by the truck through the rollers 33^b, and tipping or undue lateral movement is prevented by the engagement of the arms and guide-plates.

The strains of draft and buffing are transmitted from the driving-axles to the draft and buffing apparatus, and vice versa, directly through the side frames of the trucks instead of through a center-pin and independent frame, as in such prior constructions as are within our knowledge and information. To this end a draft and buffing apparatus is mounted upon and carried by the buffer-beam casting 1^a of each of the end trucks. The draft and buffing apparatus, which may be of any suitable and preferred construction, is in this instance shown as comprehending a draw-head 34, draft-strap 34^a, and draft-spring 34^b, and independent side buffers 35, and as various types of apparatus of this character are familiar to those skilled in the art it is not herein fully and in detail set forth.

It will be seen that the means afforded by our invention for enabling an electric locomotive to readily and safely pass around curves are conveniently applicable in the type to which the invention relates and provide the substantial equivalent of a separate guiding-truck and attain its advantanes without involving the additional expense and complication of a special structure independent of the driving-wheels. A further and an important advantage is attained in the avoidance of the disadvantages of motor-driven

trucks in connection with an independent frame which carries the draft-gear, as in prior practice, under which construction the load is usually drawn by the trucks through the intermediation of a long center pin and a comparatively loose and insecure truck-bolster construction, such transmission of power, moreover, tending to tip the truck and impart eccentric strains to the cab-framing. Under our invention draft strains are transmitted as nearly as practicable in a straight line from the draft-gear, and the cab-flooring can be of very light construction, as it is wholly exempt from pulling or buffing strain.

We claim as our invention and desire to secure by Letters Patent—

1. In an electric locomotive, the combination of two main supporting-trucks, driving-axles journaled in bearings in said trucks, electric motors, each supported on one of said trucks and adapted to rotate one or more of the driving-axles thereof, coupling mechanism by which said trucks are connected with the capability of relative horizontal movement but rigidly in a longitudinal vertical plane, and a cab-supporting frame which is carried upon said trucks with the capacity of relative horizontal movement.

2. In an electric locomotive, the combination of two main supporting-trucks, driving-axles journaled in bearings in said trucks, electric motors, each supported on one of said trucks and adapted to rotate one or more of the driving-axles thereof, coupling mechanism by which said trucks are connected with the capability of relative horizontal movement but rigidly in a longitudinal vertical plane, a cab-supporting frame, a center-bearing through which said frame is supported on one of the trucks, and side bearings through which it is supported on the other truck.

3. In an electric locomotive, the combination of two or more main supporting-trucks, driving-axles journaled in bearings in said trucks, electric motors, each supported on one of said trucks, and adapted to rotate one or more of the driving-axles thereof, coupling mechanism by which said trucks are connected with the capacity of relative horizontal movement, but rigidly in a longitudinal vertical plane, a cab-supporting frame which is carried upon said trucks with the capacity of relative horizontal movement, and draft mechanism connected directly to the frame of one or both of the end trucks.

4. In an electric locomotive, the combination of two or more main supporting-trucks, driving-axles journaled in bearings in said trucks, electric motors, each supported on one of said trucks and adapted to rotate one or more of the driving-axles thereof, coupling mechanism by which said trucks are connected with the capacity of relative horizontal movement, but rigidly in a longitudinal vertical plane and substantially without relative vertical movement, and draft mechanism connected directly to the frame of one or both of the end trucks.

5. In an electric locomotive, the combination of two main supporting-trucks, driving-axles journaled in bearings in said trucks, electric motors, each supported on one of said trucks, and adapted to rotate one or more of the driving-axles thereof, coupling mechanism by which said trucks are connected with the capability of relative horizontal movement but rigidly in a longitudinal vertical plane, a cab-supporting frame which is carried upon said trucks with the capacity of relative horizontal movement, and draft mechanism connected directly to the frames of the trucks.

6. In an electric locomotive, the combination of two main supporting-trucks, driving-axles journaled in bearings in said trucks, electric motors, each supported on one of said trucks and adapted to rotate one of the driving-axles thereof, coupling mechanism by which said trucks are connected with the capacity of relative horizontal movement but rigidly in a longitudinal vertical plane, and means connected with the coupling mechanism for permitting a limited degree of relative tipping movement or lateral inclination of the trucks while maintaining their rigidity in a longitudinal vertical plane.

7. In an electric locomotive, the combination of a motor-truck, an independent cab-supporting frame, side-bearing roller-supports fixed to the truck-frame and having upwardly and inwardly projecting arms, rollers journaled in said supports, bearing-plates fixed on the cab-supporting frame in position to contact with the rollers, and guide-plates projecting downwardly from the cab-supporting frame and having flanges engaging the arms of the roller-supports, said plates allowing free radial motion of the truck while preventing sidewise movement of the frame thereon or elevation of the frame therefrom.

8. In an electric locomotive, the combination of two motor-trucks, coupling-transoms fixed to the adjacent ends of the frames of said trucks and having overlapping perforated lugs or eyes, blocks, fitting with a limited degree of lateral movement in the lugs of one of the coupling-transoms, and a coupling-pin passing through said blocks and through the lugs of the other coupling-transom.

9. In an electric locomotive, the combination of two motor-trucks, coupling-transoms fixed to the adjacent ends of the frames of said trucks and having overlapping perforated lugs or eyes, blocks, fitting with a limited degree of lateral movement in the lugs of one of the coupling-transoms, elastic packing interposed between the ends of said blocks and the adjacent walls of the recesses in the lugs, and a coupling-pin passing through said blocks and

through the lugs of the other coupling-transom.

10. In a motor-truck for electric locomotives, the combination of side frame members, a coupling-transom uniting the side frame members at one end, a bumper-beam member uniting the opposite ends of the side frame members, draft and buffing apparatus connected to the bumper-beam member, and a longitudinal center-sill connected, at its opposite ends, to the bumper-beam member and to the coupling-transom.

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