No. 880,477. PATENTED FEB. 25, 1908.

F. M. BRINCKERHOFF.

CONDUCTING CONDUIT FOR VEHICLES.

APPLICATION FILED MAR. 12, 1907.

6 SHEETS—SHEET 1.

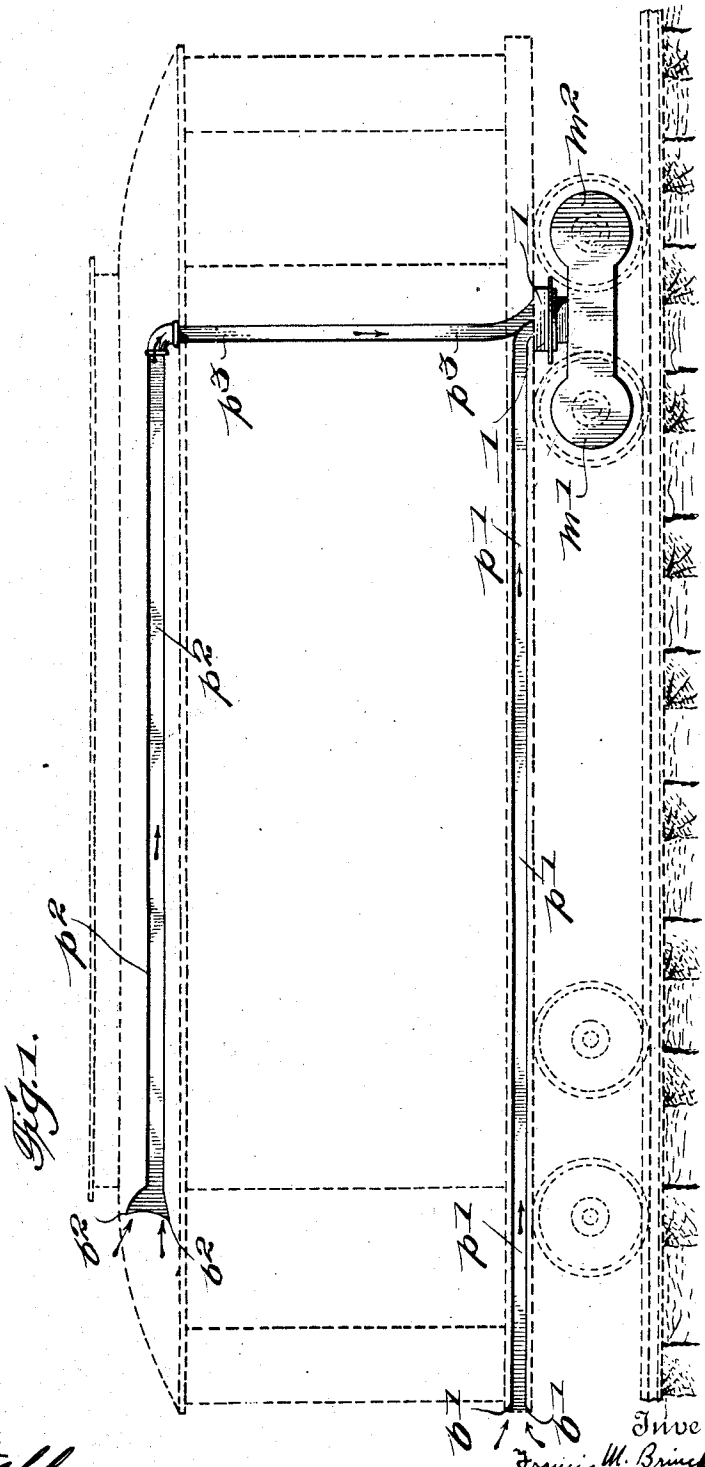


Fig. 1.

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6 SHEETS—SHEET 2.

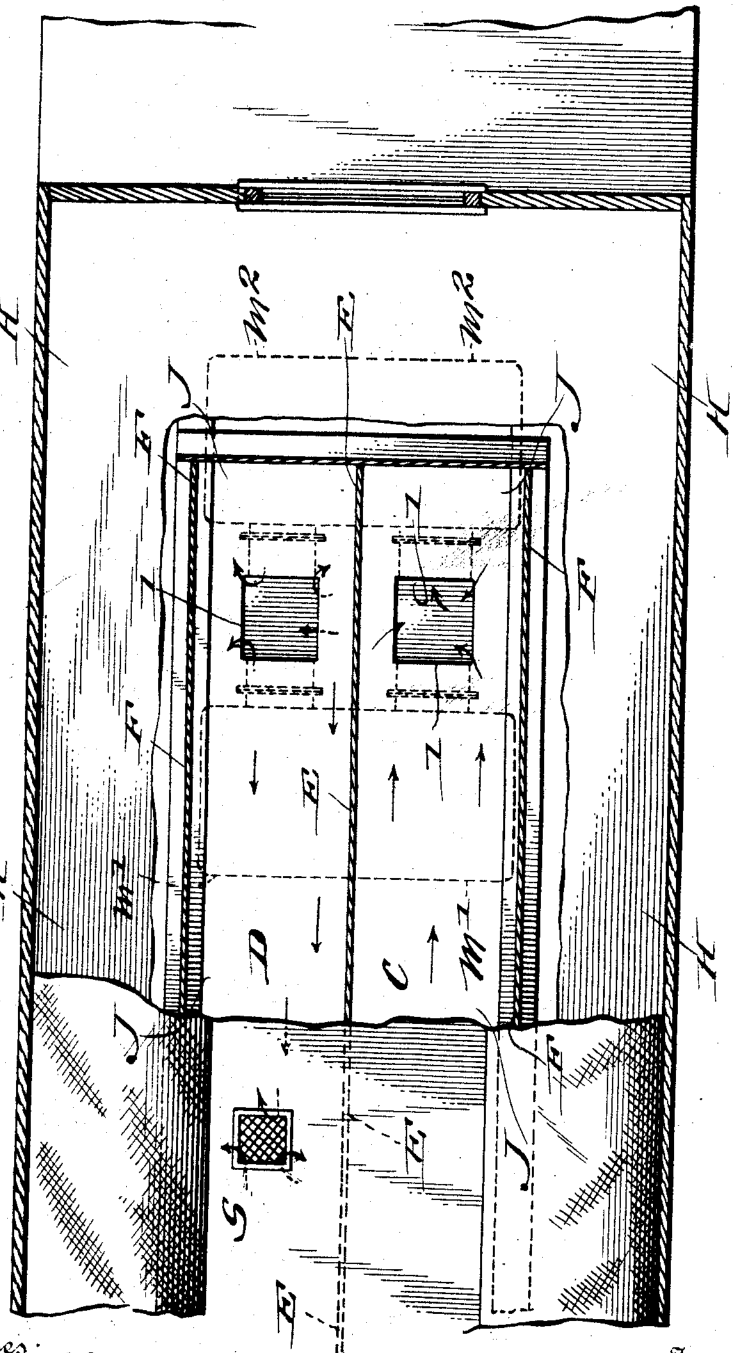


Fig. 2.

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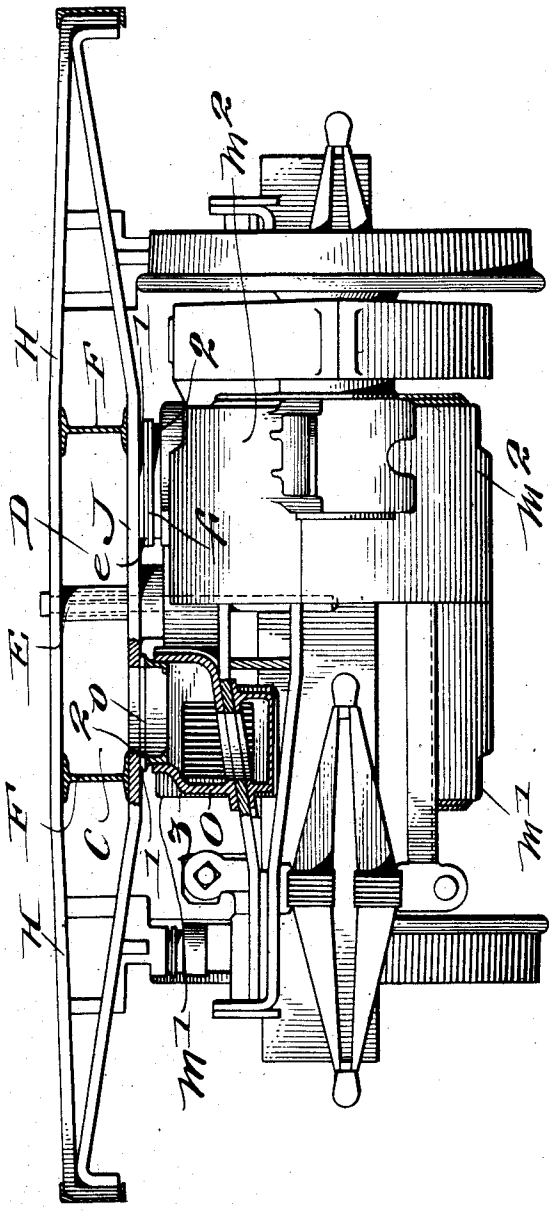
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6 SHEETS—SHEET 3.

Fig 3.



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6 SHEETS—SHEET 4.

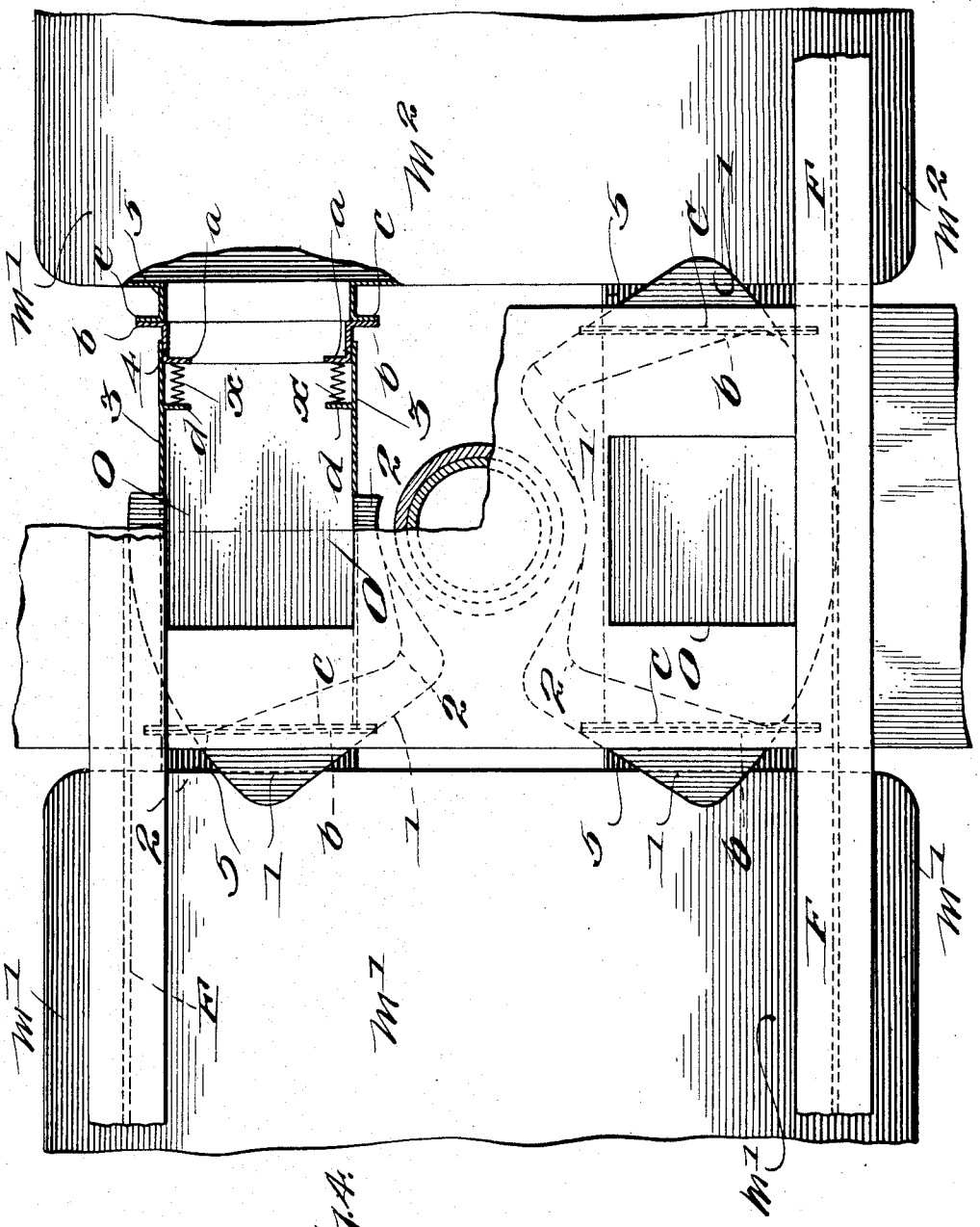


Fig. 4.

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6 SHEETS—SHEET 5.

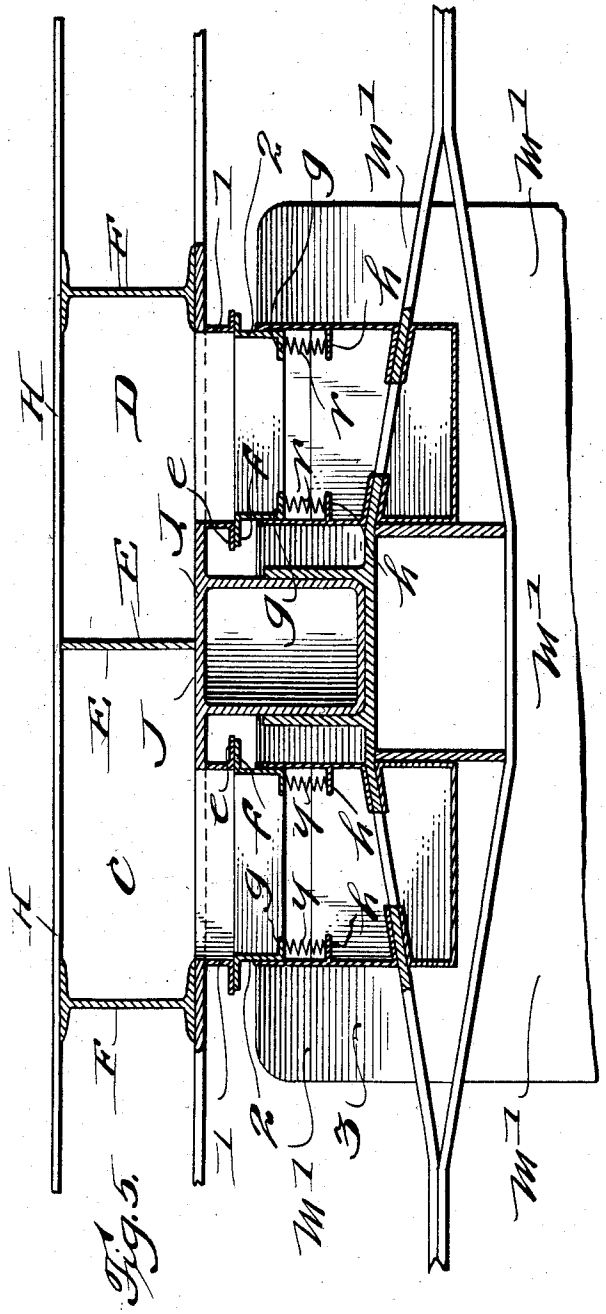


Fig. 5.

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CONDUCTING CONDUIT FOR VEHICLES.

APPLICATION FILED MAR. 12, 1907.

6 SHEETS—SHEET 6.

Fig. 6.

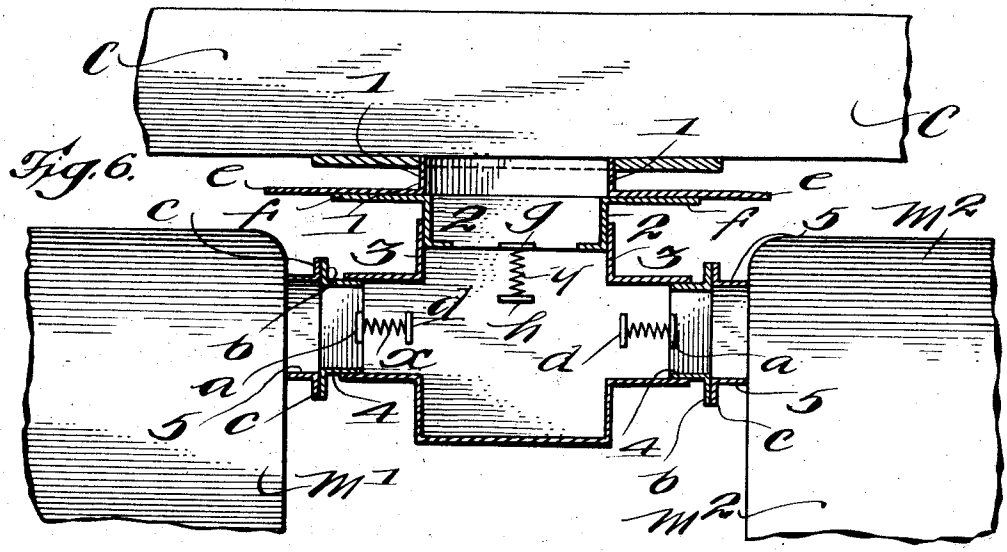


Fig. 7.

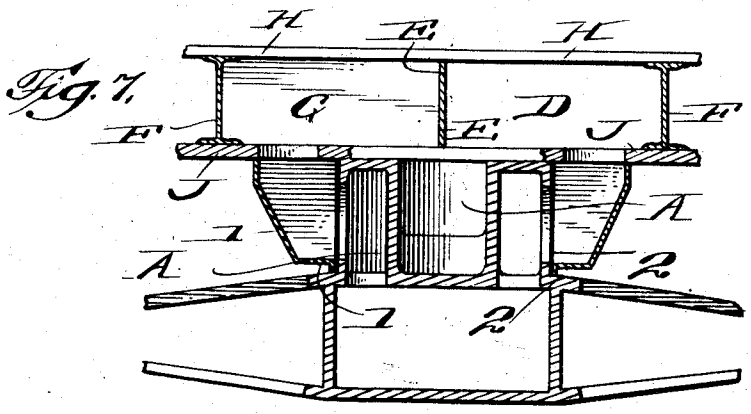
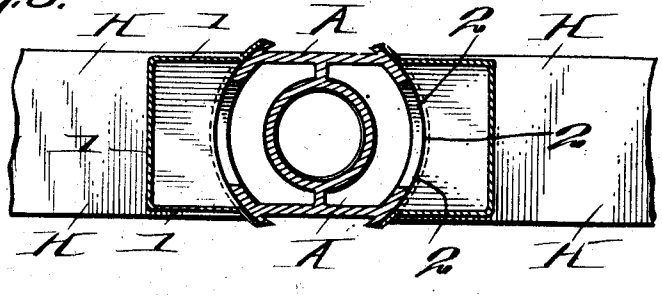


Fig. 8.



Witnesses:
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UNITED STATES PATENT OFFICE.

FRANCIS M. BRINCKERHOFF, OF NEW YORK, N. Y.

CONDUCTING-CONDUIT FOR VEHICLES.

No. 880,477. Specification of Letters Patent. Patented Feb. 25, 1908.

Application filed March 12, 1907. Serial No. 361,920.

To all whom it may concern:

Be it known that I, FRANCIS M. BRINCKERHOFF, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Conducting-Conduits for Vehicles, of which the following is a specification.

My invention relates to electrically-propelled vehicles; and it consists in the novel construction of certain parts and combinations of parts pointed out in the claims concluding this specification.

In electrically propelled vehicles endeavors have constantly been made toward the solution of the problem of reducing the weight of the equipment. Such endeavors have resulted in the construction of certain devices whereby air may be conducted into and circulated through the motors, rheostats, etc., in order to cool the same, such air becoming heated in the operation and being directly discharged from the motor outlets, or further utilized for heating the car in cold weather.

A device of the above general character is described and shown in Letters Patent of the United States to Lewis B. Stilwell, No. 811,967, dated February 6, 1906, and the purpose of my present invention is to provide improved forms of connections between the various conduits through which the air passes in its travel to and from the motors, rheostats, etc., after it has passed through or before it is discharged into the passages in the body of the car; such connections having a universal movement in relation to the car body and the motors, rheostats, etc.

By reason of the various movements, vertical, horizontal, and swivel, rendered possible by reason of the improved joints, my invention is especially suitable for use on cars and trucks operating on curves of short radius where the use of ordinary connections is extremely difficult.

In the accompanying drawings, Figure 1 is a side view of a car showing the general system of air conduits, connections and inclosed motors. Fig. 2 is a longitudinal plan view partly in section of the car body, floor, and sills, showing a general plan of air distribution. Fig. 3 is an end elevation showing the car body bolster resting on the truck with half of a motor removed. Fig. 4 is a plan of the motors and car body bolster showing in section the connection between a motor and a horizontal air conduit. Fig. 5 is a sectional view in end elevation of the car body bolster resting on the truck and connected to vertical air conduits. Fig. 6 is a view in side elevation, with a modified form of universally movable connections shown in section. Fig. 7 is a sectional view in end elevation of a modified form of connected vertical conduits. Fig. 8 is a sectional plan view of the construction shown in Fig. 7.

Similar characters of reference indicate same or corresponding parts in the several figures.

I will now describe the various structures shown in the accompanying drawings, which drawings illustrate forms of my invention at present preferred by me; but it will be understood that various modifications and changes may be made without departing from the spirit of my invention and without exceeding the scope of the claims concluding this specification.

Referring to Fig. 1, the body of the car is shown in dotted lines.

m', m^2 are motors suitably inclosed and connected by air conduits.

p' is the conduit for in-take of air, running lengthwise of the car between the floor and bottom ceiling thereof, being provided at one end with a broad mouth b' and at the other connected with the air passage in the plates or boxes 1 attached to the car body; the movement of the car is considered as being toward the left. Another form of air in-take is shown as p^2 running lengthwise between the roof and upper ceiling of the car and provided with a mouth b^2; its connection with the car body bolster being by means of conduit p^3 running vertically in or near the side wall of the car.

Referring to Fig. 2 the motors m', and m^2 are shown in dotted lines with the connections between them and suitable plates or boxes 1, which are attached to the car body and have apertures for the passage of air, there also being apertures in the lower ceiling J of the car above 1. In the preferred form as shown two air conduits C and D are formed by the sills F, the lower ceiling J, the floor H, and a partition E placed between J and H, at the center line of the car. The left end of C (not here shown) is provided with an opening for the admission of air and the car being in motion toward the left the air enters in a stream which takes the direc-

tion of the lower series of arrows and enters the motors through 1 and its connections. Having been forced through the motors, by reason of pressure caused by the movement of the car, the air escapes through the corresponding motor connections and box 1 on the other side of the center line of the car into the air conduit D, taking the direction shown by the upper series of arrows; thence, by any suitable means, the air may be conducted through the car in order to heat the same, and be discharged through an opening, such as S, placed in the roof of the car, or the air after leaving the motors may be directly discharged without so passing through the car.

Referring to Fig. 3 the car body bolster is shown resting on the truck with half of the motor m^2 removed and the connections between the air passage C and the motor m' shown in section.

F, F indicate the sills of the car body, H the floor and J the lower ceiling thereof; E indicates a partition between the floor and said ceiling at the center line of the car.

C and D indicate the air passages thus formed, there being suitable openings in the lower ceiling J at the point at which it is desired to connect the passages C and D with the conduits to the motors m' and m^2.

Members 1 are suitable plates or boxes attached to the car body, each having an aperture o for the passage of air, and having suitable flanges e which are in contact with flanges f of members 2 and are retained in such contact, in order to form a tight joint, by means of springs such as r r and y, y, shown in Fig. 5, or by other suitable means. Members 2 are made a snug fit for members 3, which in turn are attached either to the truck bolster or to the truck frame as may be desired. The air being forced in through C, passes through the passages formed by members 1, 2 and 3, and enters the motor m' through other members 4 and 5 forming the passage O, as is shown in Fig. 4, and the motor m^2 by a similar passage. Having circulated through the motors the air passes through a like series of passages formed by another series of members 5, 4, 3, 2, and 1, on the other side of the center line of the car and entering D is conducted to a point of discharge. By the combination of these three members 1, 2 and 3, as shown, the following motions between the car body and the truck have been provided for. The flanged surfaces of members 1 and 2 are free to move in relation to each other in a horizontal plane, consequently the truck can swivel under the car body without breaking the joint between 1 and 2. Members 2 and 3 are free in a vertical plane, consequently any variation in height between car body and truck bolster is provided for.

Referring to Fig. 4, there is shown a plan view of the motors and car body bolster with one-half of one set of the members 1, 2 and 3 cut away and the passage O into the motor m^2 shown in section. Member 3 is provided with a projection in a horizontal plane adapted to receive a member 4 with a sliding joint; member 4 is provided with flanges, a and b, the latter being in contact with a flange c on a member 5 in such a manner as to secure a tight joint between 4 and 5; such contact is maintained by means of springs x, x, which rest on flanges d projecting from the wall of member 3 and press against flanges a of member 4, or by other suitable means. Member 5 is suitably attached to the motor at a convenient point, and is provided with an aperture for the passage of air to or from the motor. By this combination of the horizontal projection on member 3, and the members 4 and 5, as shown, motion in a horizontal plane between the truck bolster and the truck frame, on which the motors rest, is provided for.

Referring to Fig. 5, there is shown, in sectional end elevation, a simplified view of the connections of the vertical conduits between the air passages C and D and the motors m' and m^2, which passages have heretofore been described in connection with Fig. 3. The members 2 are shown as held in contact with members 1 by means of the springs r, r, and y, y, which press against inturned flanges g of members 2 and rest upon flanges h which project from the inner wall of member 3.

Referring to Fig. 6, there is shown in sectional side elevation one of the continuous passages between C and D, the air passages in the car body, and the motors m', m^2, with a modified arrangement of the springs x and y, which preserve the close contact between members 1 and 2 and members 4 and 5, respectively. By making a sufficiently tight joint between members 2 and 3 and 3 and 4 respectively, the spring members may be dispensed with, if desired, but their use may be preferred in some cases. Considering the air supply as being attached to the passage C, we have a passage from the car body through the openings in members 1, 2, 3, and 4 and 5 to the motors m', and m^2, through which the air can pass by various ways to the other side of the motors and thence pass out through other sets of members 5, 4, 3, 2 and 1, to passage D to be distributed as desired. It is obvious that the direction of the air may be varied and that both sets of members may be used to convey air to the motors m' and m^2, and the air be allowed to escape at once from the motor outlets if so desired. As may be clearly seen by reference to Fig. 6, the motions are provided for, comprising the swivel motion between members 1 and 2, the vertical motion between members 2 and 3, and the horizontal motion between the horizontal projections 3' and the members 4. I have thus provided a continuous passage be-

tween the car-body and the motors, composed of members free to move in relation to each other, but provided with means to maintain a tight joint against leakage.

Referring to Fig. 7, there is shown in sectional end elevation a modified form in which my flexible connections may be embodied. The members 1 and 2 are here so arranged that their flanges are disposed in a vertical plane and are formed in the shape of an arc of a circle having the center of the truck center plate A as its center, the air passing from C through the members 1, 2, and 3, as heretofore described. Such a construction may be further modified in order to provide for the passage of the air through the center plate casting A, itself, and thence into the bolster, but the construction as shown is preferred.

Referring to Fig. 8, there is shown a sectional plan view of the construction described in connection with Fig. 7.

In the figures which have been described in the foregoing portions of this specification the various members 1, 3, and 5 have been shown respectively as attached to the car body, the bolster and the motors, but these members may be cast or formed as integral portions of the car body, bolster or motors, as may be found advantageous in some constructions. This may be illustrated in the case of member 3 which is shown as partly within the truck bolster, but which may be constructed so as to form an integral part of the bolster.

What I claim and desire to secure by Letters Patent is:

1. In combination with a vehicle, including operating mechanism, of a horizontally movable conduit consisting of flanged members interposed between the vehicle body and said operating mechanism.

2. In combination with a vehicle, including operating mechanism, of a vertically movable conduit consisting of flanged members interposed between the vehicle body and said operating mechanism.

3. In combination with a vehicle, of motors, a conduit, between the vehicle body and said motors, said conduit consisting of flanged members and having a universal movement in relation to the vehicle body and said motors.

4. In a vehicle, a conduit comprising a plurality of flanged connected sections, and means for maintaining the conduit substantially air tight at the points of connection of the sections.

5. In electric vehicles the combination of a motor, a chamber containing said motor, means for causing a current of air at substantially atmospheric pressure to flow through said chamber and a conduit, consisting of flanged members having a universal movement in relation to the vehicle body and said motor, for conveying the air so heated to and from the chamber.

6. In electric vehicles in combination, flanged members forming a continuous air passage between the vehicle body and a motor, said members being adapted to move in horizontal and vertical planes in relation to each other.

7. In electric vehicles, in combination, a continuous passage consisting of connected flanged members from the vehicle body to a motor and means for maintaining the joints of said passage substantially air tight under movement in vertical and horizontal planes.

8. In electric vehicles, in combination, flanged members in close contact forming a continuous passage between the vehicle body and a motor and spring members adapted to preserve said flanged members in contact.

9. In electric vehicles, in combination, flanged members in close contact forming a continuous passage between the vehicle body and a motor and means for maintaining said members in contact at their abutting surfaces.

10. In electric vehicles in combination a flanged member attached to the body of the vehicle, a second flanged member in close contact with said first member and adapted to move in a horizontal plane in relation thereto, and apertures for the passage of air through said members.

11. In electric vehicles in combination a flanged member attached to the body of the vehicle, a second flanged member in close contact with said first member and means for maintaining such contact, said members being adapted to move in a horizontal plane in relation to each other and having apertures for the passage of air.

12. In electric vehicles in combination a flanged member attached to the body of the vehicle, a second flanged member in close contact with said first member, a third flanged member overlapping and fitting around said second member in close contact therewith, and apertures for the passage of air through said members.

13. In electric vehicles in combination a flanged member attached to the body of the vehicle, a second flanged member in close contact with said first member, a third member overlapping and fitting around said second member in close contact therewith, said second and third members being adapted to move in a vertical plane in relation to each other, and apertures for the passage of air through said members.

14. In electric vehicles, in combination a flanged member attached to a motor, a second flanged member in contact with said first member and adapted to move in a vertical plane in relation thereto, and apertures for the passage of air through said members.

15. In electric vehicles, in combination a

flanged member attached to a motor, a second flanged member in contact with said first member, and means for maintaining said members in contact at their abutting surfaces.

16. In electric vehicles, in combination, a flanged member attached to a motor, a second flanged member in contact with said first member, a third flanged member overlapping and fitting around said second member in close contact therewith, said second and third members being adapted to move in a horizontal plane in relation to each other, and apertures for the passage of air through said members.

17. In electric vehicles, in combination a flanged member attached to the body of the vehicle, a second flanged member in close contact with said first member, said members being adapted to move in a horizontal plane in relation to each other, and means for maintaining said members in contact, a third flanged member overlapping and fitting around in close contact with said second member, and adapted to move in a vertical plane in relation thereto, a projection in a horizontal plane of said third member overlapping and fitting around in close contact with a fourth flanged member and adapted to move in a horizontal plane in relation thereto, a fifth flanged member attached to a motor in contact with said fourth member and adapted to move in a vertical plane in relation thereto, means for maintaining said fourth and fifth members in contact, and apertures for the passage of air through said five members.

18. In combination with a vehicle, a conduit therefor comprising a plurality of inflexible tubular sections movable relatively to each other.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANCIS M. BRINCKERHOFF.

Witnesses:

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ROBT. B. MORTON.