No. 625,802. Patented May 30, 1899.

E. D. PRIEST.

RAILWAY MOTOR.

(Application filed Jan. 8, 1898.)

(No Model.) 3 Sheets—Sheet 1.

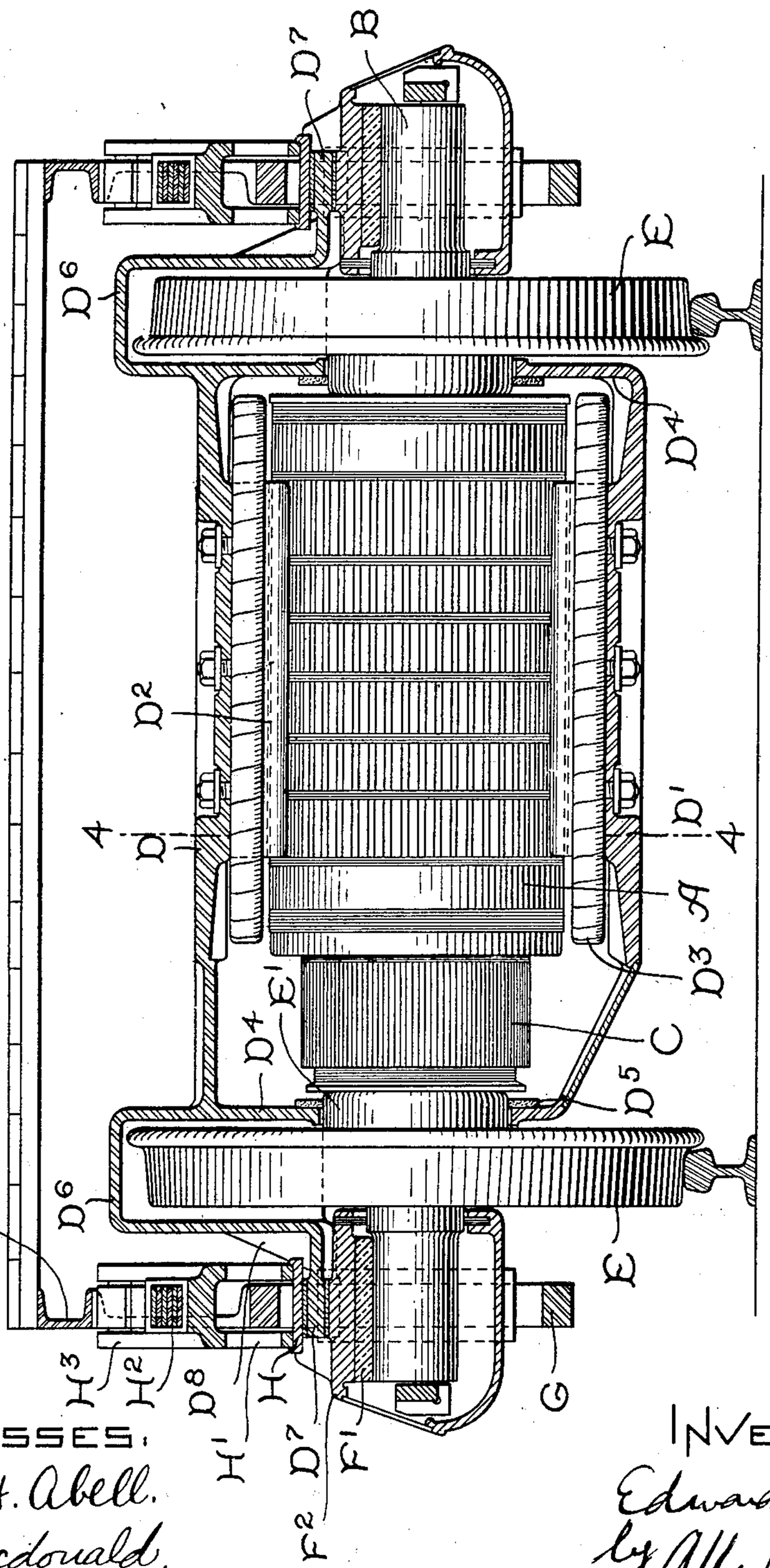

FIG. 1.

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FIG. 2.

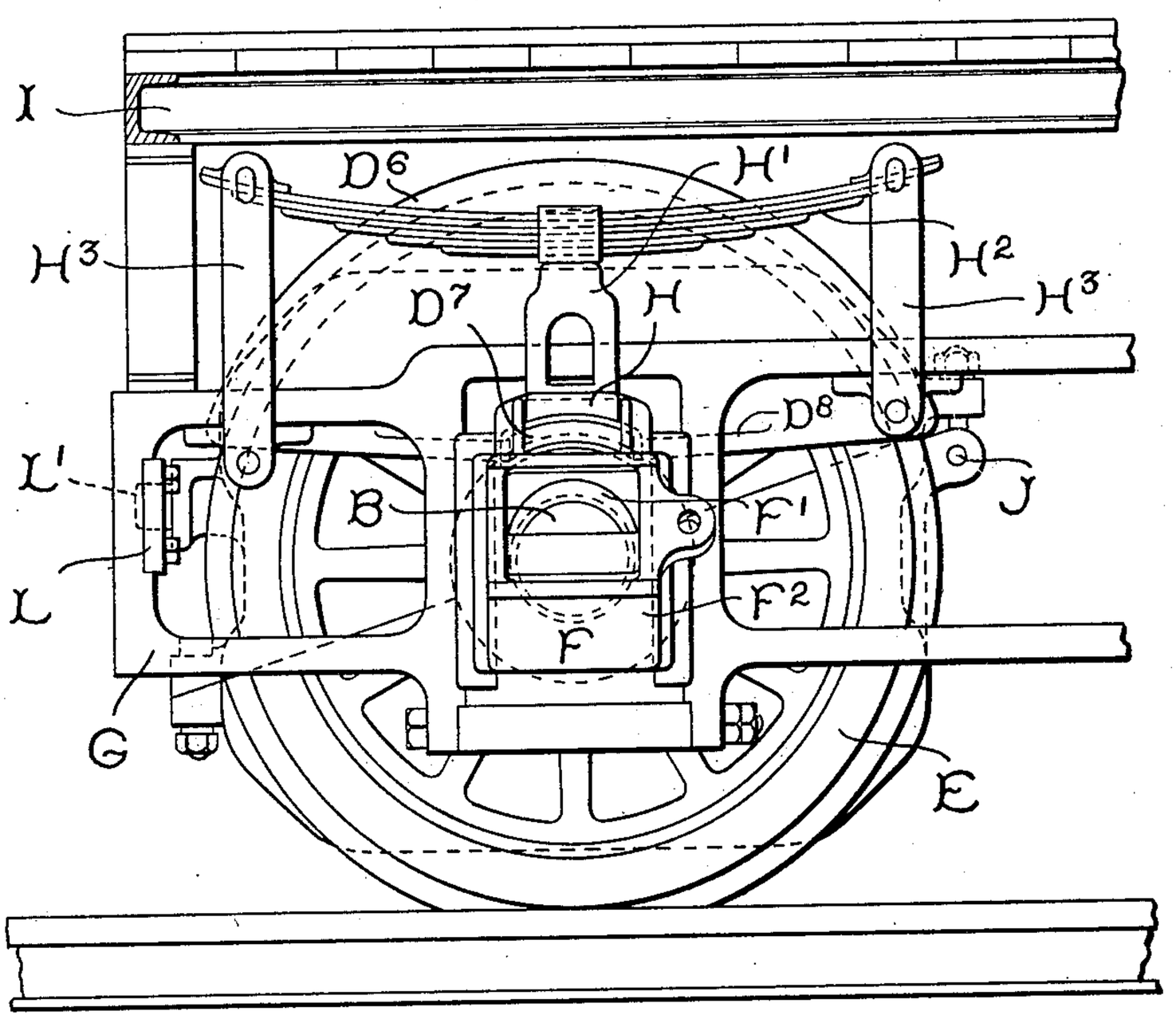

FIG. 3.

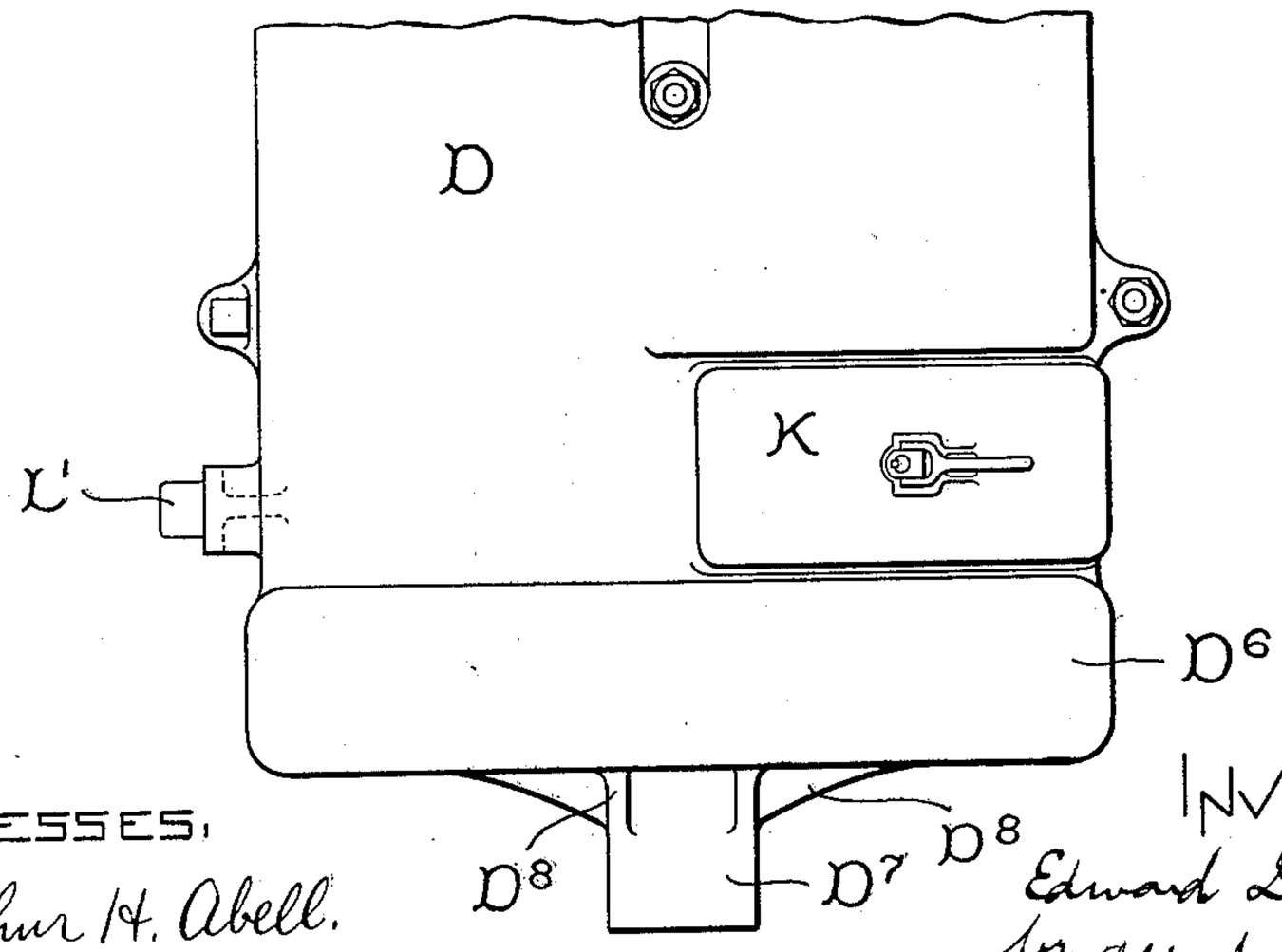

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FIG. 4.

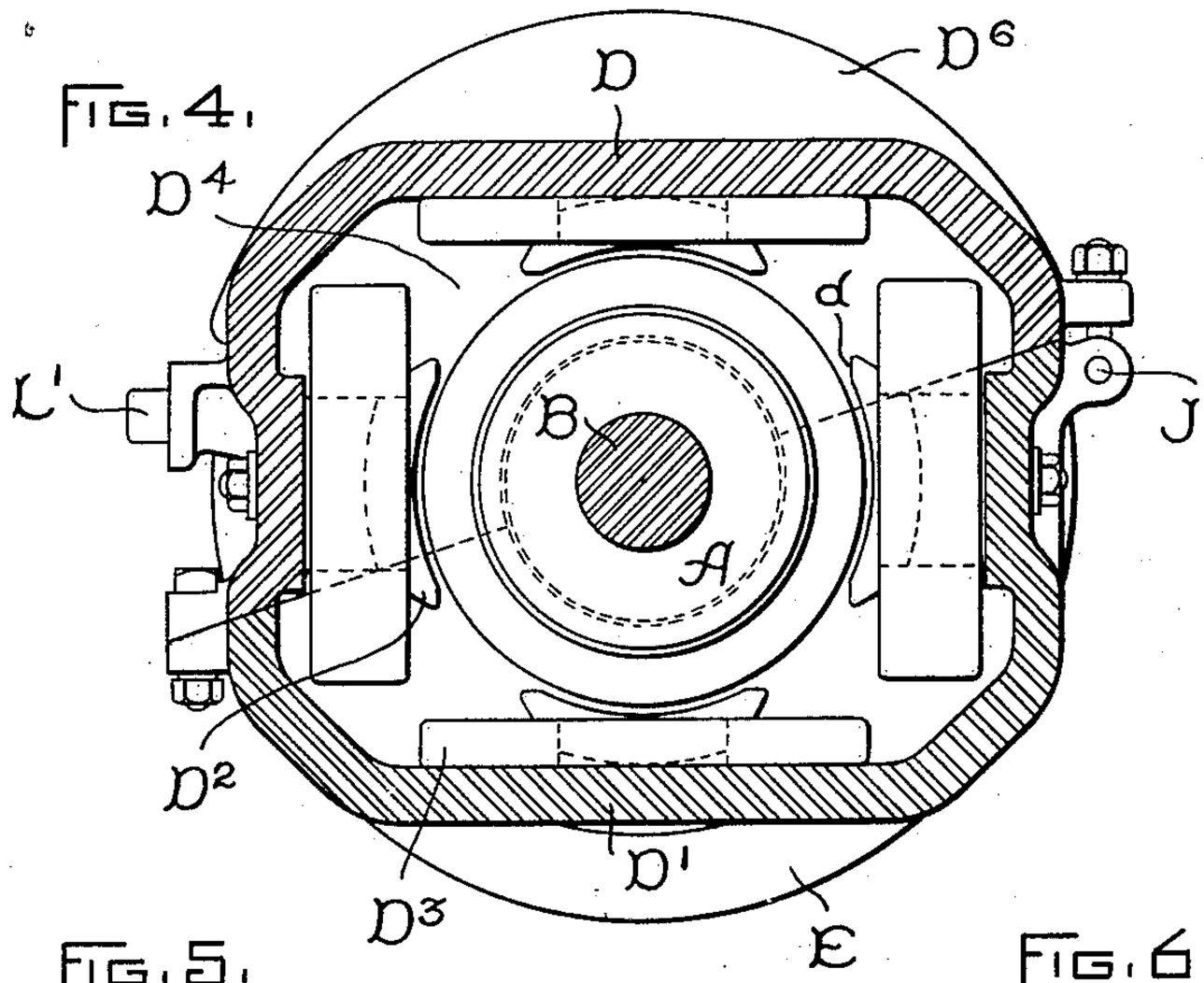


FIG. 5.

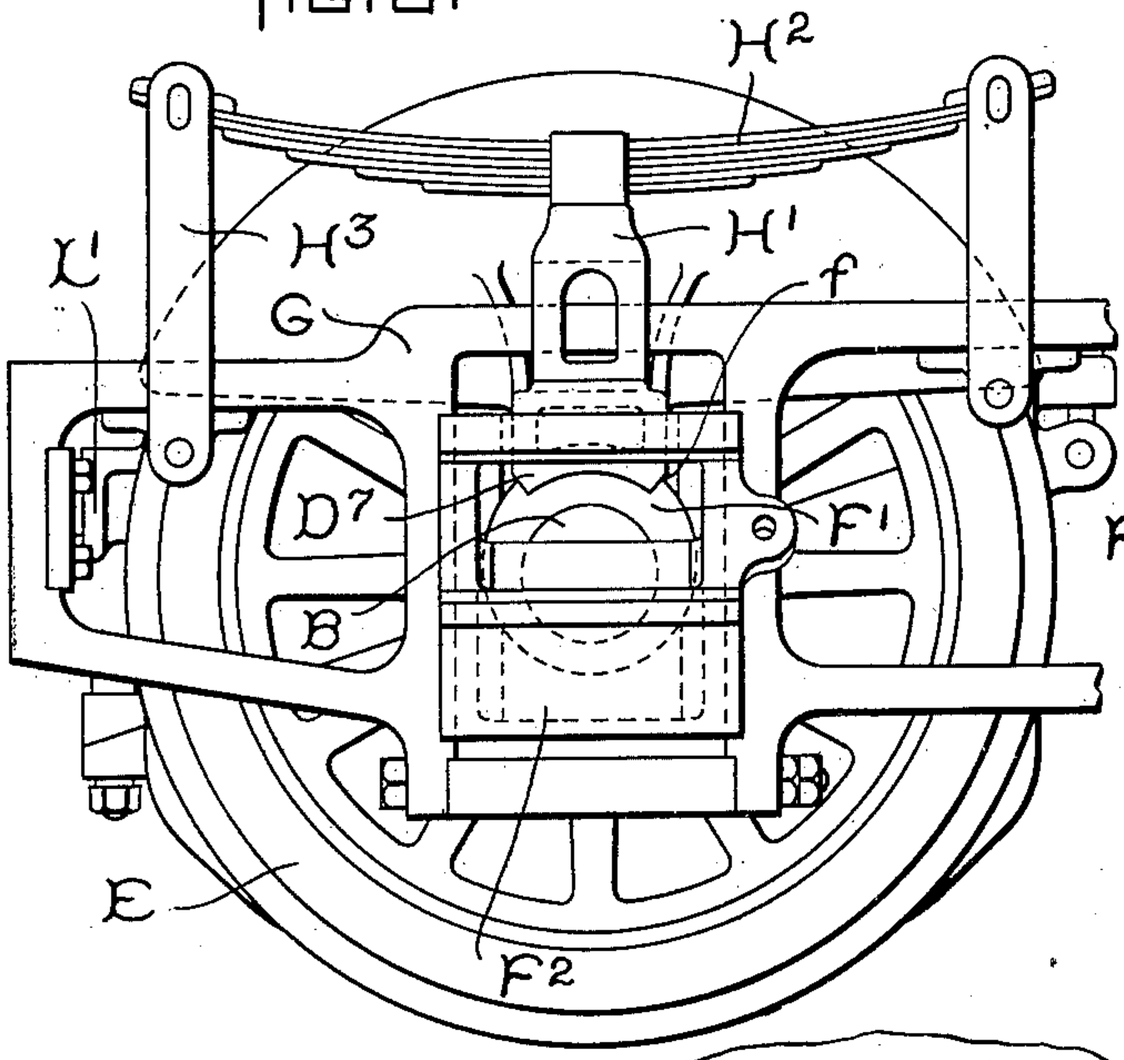


FIG. 6.

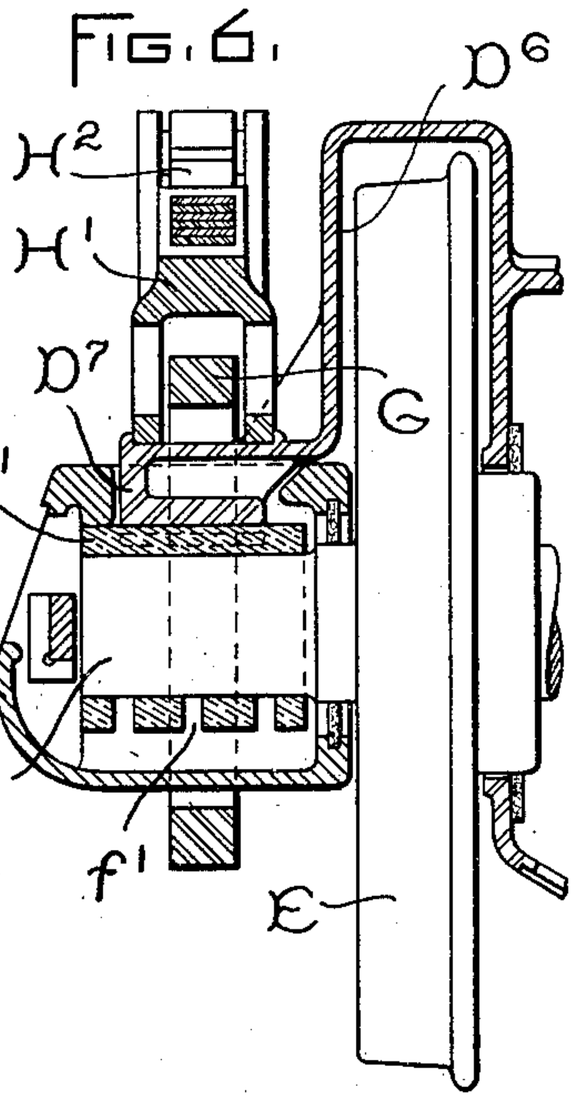
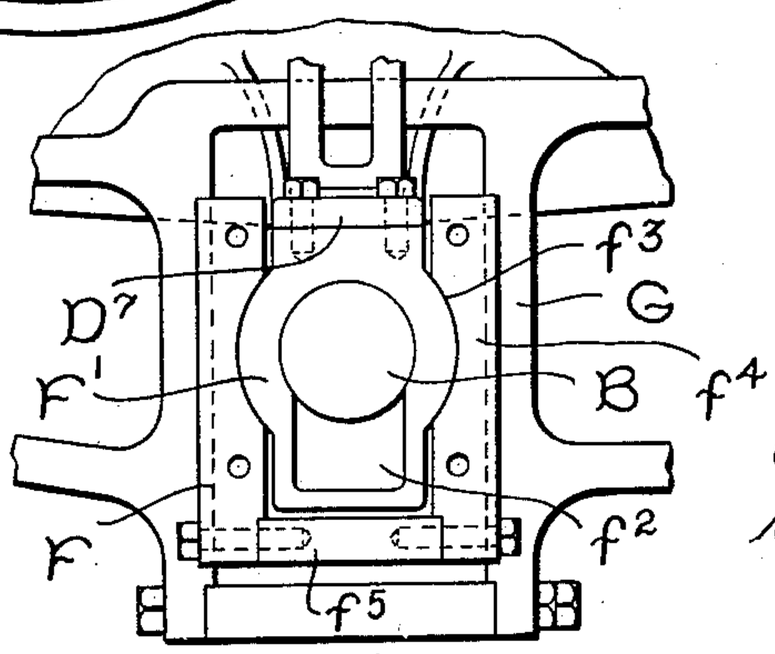


FIG. 7.



WITNESSES:
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INVENTOR:
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UNITED STATES PATENT OFFICE.

EDWARD D. PRIEST, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

RAILWAY-MOTOR.

SPECIFICATION forming part of Letters Patent No. 625,802, dated May 30, 1899.

Application filed January 8, 1898. Serial No. 666,033. (No model.)

To all whom it may concern:

Be it known that I, EDWARD D. PRIEST, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Railway-Motors, (Case No. 658,) of which the following is a specification.

The present invention has for its object to improve the construction of railway-motors, and particularly those in which the armature is directly connected to the axle of the truck.

In the accompanying drawings, Figure 1 is a longitudinal section of a motor embodying my invention. Fig. 2 is a partial side elevation of a truck, showing the motor mounted in position. Fig. 3 is a partial plan view of the motor. Fig. 4 is a cross-section of the motor on the line 4 4 of Fig. 1. Figs. 5 and 6 are respectively a side elevation and a section of a modified form of my invention, and Fig. 7 is a detail of a further modification.

I have shown my invention as applied to a gearless motor in which the field-magnet and armature are concentric with the car-axle; but I do not limit myself to this construction, for it can be applied to motors having gearing between the armature and axle.

The armature A may be mounted on a sleeve and the sleeve keyed or otherwise secured to axle B, or the armature may be spring-supported and flexible connections employed between the sleeve and axle. The armature shown is of the ordinary laminæ construction and provided with the well-known Eickemeyer winding. On the left is a commutator C, the brushes having been removed for the purpose of illustration.

Surrounding the armature and concentric with the axle is a field-magnet divided on a diagonal plane into two parts D and D′.

The motor is preferably provided with four or more poles, as shown in Fig. 4. These are provided with detachable pole-pieces D^2, having energizing-coils D^3.

The ends of the armature are protected from dust and moisture by sides D^4 of the field-magnet in the usual manner, and between the magnet and the hubs of wheels E are felt washers D^5, serving as additional protection against dust and moisture. In addition to protecting the armature the upper half of the field-magnet is provided with two extensions D^6, one on each end, which rest on the journal-boxes and support the field-magnet at points outside of the wheels. These extensions when viewed from the end are curved on a diameter somewhat larger than that of the wheel to allow for clearance and extend down over the outside of the wheels, forming shells similar to the ordinary gear-case. Formed integral with each shell is a support D^7, curved concentric with the axle. These projections rest directly on the journal-boxes without the intervention of springs and are provided with strengthening-ribs D^8.

By arranging each motor on a separate axle and independently sleeving their field-magnets on the journal-boxes of the truck I am enabled to provide a construction which will permit the axle, with its motor, to move up and down as it passes over inequalities in the track independent of the other motor or motors on the truck without straining the truck-frame. A further advantage is derived by dispensing with the additional bearings commonly employed to maintain the field-magnet in alinement with the axle. This I accomplish by mounting the field-magnet supports D^7 on a non-rotating part of the truck. It is true that there is a slight oscillating movement of support D^7 concentric with the axle as the motor is started, but the movement is very slight and requires practically no lubrication.

The upper half of the field-magnet is provided with lugs L′, which enter and make a loose fit in holes in the transverse truck-beam L and prevent the field-magnet from rotating. The two halves of the field-magnet are bolted together, and the arrangement is such that the lower portion can be swung downward around pin J as a center. The upper half of the magnet is provided with a removable cover K, permitting the inspection of the commutator and brushes.

On account of the enlarged pole-faces and the restricted space on the truck, which necessitates making the motor very compact,

the pole-pieces are chamfered at *d*, Fig. 4, to permit the lower field-magnet to be swung downward around pin J as a center.

The journal-boxes F may be of any desired construction, those shown in the drawings comprising a brass F′, which rests on axle B, and a cast-metal box F^2, arranged to work in guides on the jaws of the truck G. The upper part of each box is curved concentrically with the axle, and resting on this curved portion is the field-magnet support D^7. Situated on the magnet-supports are plates H, curved concentrically with the car-axle on the lower side and provided with flat surfaces on their upper sides. Mounted on the upper side of plates H are saddles H′ for leaf-springs H^2. The springs are employed to support truck-frame G by means of pairs of links.

The body of the vehicle is carried by an auxiliary frame I, which is situated above the wheels and rigidly secured to truck-frame G.

Fig. 3 is a plan view showing one end of the motor, and it will be seen that the shell or projection D^6 extends across the entire end of the motor. The curved projections D^7 are reinforced by horizontal and vertical ribs D^8.

In Figs. 1 and 4 is illustrated what may be termed a "safety" device to prevent the field-magnet from striking the armature in case one of its supports breaks or becomes injured from any cause, as running off the track, for example. The hub E′ of wheel E is turned to a standard size, and the opening in the side D^4 of the field-magnet frame is made slightly larger in diameter than the hub, leaving, for example, an eighth of an inch clearance. The field-magnets are then bored and a clearance of a quarter of an inch allowed between the armature and pole-face. If for any reason extension D^6 is sprung or support D^7 broken, the field-magnet, as soon as it has dropped an eighth of an inch, will rest on the hub of the wheel and be no longer dependent upon its outside supports. This will slightly decrease the air-gap at the upper pole and slightly increase it at the lower pole; but this will not materially affect the operation of the motor. It is of course not intended that the motor shall continue to run in this manner for any length of time, but for the purpose of completing a trip the arrangement serves very well and at times may prevent the blockading of the road.

In Figs. 5 and 6 I have shown a slight modification in which the field-magnet support D^7 rests directly on the axle-brass instead of the journal-box. The axle-brass F′ is made in the form of a sleeve and is slipped on the axle from the end. The upper side of the brass is cut away at *f* to receive the field-magnet support D^7. The under side of the brass is provided with holes *f*′ for lubricating the axle, that portion of the journal-box directly under the brass being provided with a receptacle for oil and waste. The journal-box is cut away on the upper side to allow field-magnet support D^7 to enter and rest on the axle-brass. Support D^7 is similar to the one shown in the previous figure, except that it is made somewhat thicker, so that it can project downward through the top of the journal-box. In this modification I employ the same safety device for the field-magnet and armature as described in connection with Figs. 1 and 4.

In Fig. 7 I have shown a further modification, in which support D^7 is bolted to the journal-box instead of resting thereon, as in the previous case. The truck-frame G is provided with a jaw of the usual construction, and mounted therein is a journal-box F, comprising a brass F′, adapted to be slipped endwise on the axle, and is provided with an opening f^2 for receiving oil and waste. The upper part of the brass is provided with an extension to which is bolted support D^7 of the field-magnet frame. The sides of the brass are provided with cylindrical surfaces f^3, which rest in the side pieces f^4 of the journal-box. The side pieces are connected by a bottom piece f^5 and by a plate extending across the end of the axle, but which has been removed for the purpose of illustration.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of a motor-truck with motors mounted thereon, comprising axially-supported armatures, a divided field-magnet for each armature mounted on non-rotating parts of the truck, a support secured to one portion of each field-magnet and extending outside of a wheel, and means for securing the parts of the field-magnet together, the arrangements being such that each field-magnet is free to move with its axle independent of the truck-frame.

2. The combination of a motor-truck with motors mounted thereon for movement independent of the truck and car-body frames, comprising axially-supported armatures, and divided field-magnets each magnet having one portion that is supported by extensions thereon which rest directly on the journals at points outside of the wheels, and permit the magnet to have a slight movement concentric with the armature, and a second portion that is bolted to the first.

3. The combination of a car-truck, a plurality of motors mounted thereon, each on a separate axle, the axle and its motor being combined to form a single unit which is free to move in its support independent of the truck-frame so that the car wheel and axle may follow all of the inequalities in the track without straining the truck-frame, each motor being provided with a field-magnet frame divided into an upper and lower part, the upper part being supported by extensions at points outside of the wheels, and also a portion being mechanically secured to the first.

4. In an electric railway-motor, the combination of an armature for driving the car-

axle, with a divided field-magnet frame having projections or extensions on one portion for supporting and maintaining the motor in alinement with the car-axle at points outside of the wheels, and a second portion hinged to the first and retained in place by bolts.

5. In an electric railway-motor, the combination of an armature for driving the car-axle, with a two-part field-magnet frame having extensions on the upper part which rest directly on the journals of the truck and form its support, and means for securing the second half to the first, which means are independent of the extension.

6. In an electric railway-motor, the combination of an armature, a divided field-magnet frame having extensions formed integral with one part of the frame, and arranged to extend over the truck-wheel and rest on the journal-boxes to support the motor.

7. In an electric railway-motor, the combination of an armature concentrically mounted with respect to the car-axle, a divided field-magnet frame having extensions formed integral with the upper part of the frame arranged to extend over the car-wheel and terminate in supports which rest on the journal-boxes of the truck.

8. In a gearless electric railway-motor, the combination of an armature rigidly secured to the car-axle, a field-magnet concentric therewith, and supports for the field-magnet which extend over the truck-wheels and terminate in curved portions concentric with the axles of the truck.

9. In a gearless electric railway-motor, the combination of an armature rigidly secured to the car-axle, a field-magnet frame divided on a diagonal plane into two parts, projections integral with the top part of the field-magnet frame forming shells over the truck-wheels and terminating in supports curved concentric with the axle and arranged to rest on the journal-boxes and support the motor in place.

10. In an electric railway-motor, the combination of an armature concentric with the axle of the truck, a divided field-magnet frame inclosing the armature on all sides and occupying substantially all the space between the wheels of the truck, extensions on the upper part of the frame surrounding a portion of the truck-wheels, and supports integral with the extensions extending parallel to the axle of the truck.

11. In combination, a truck-frame provided with jaws for the reception of the journal-boxes, journal-boxes mounted in the jaws and free to move in a vertical direction, wheels for supporting the truck-axles, a motor comprising an axially-mounted armature, a divided field-magnet provided with extensions on one of the parts which extend over the wheels and rest on the journal-boxes, the second part of the field-magnet being without these extensions, and means for securing the parts of the field-magnet together.

12. In combination, a truck-frame provided with jaws, journal-boxes mounted in the jaws, an armature mounted concentric with the truck-axle, a field-magnet provided with extensions which rest on the journal-boxes at points outside of the truck-wheels, and spring-saddles which support the truck-frame, mounted on the field-magnet extensions.

13. In combination, a truck-frame, provided with jaws for the journal-boxes, journal-boxes mounted therein, a motor-armature mounted concentric with a truck-axle, and a field-magnet provided with extensions which project through the truck-jaws and rest on the journal-boxes.

14. In combination, a truck-frame provided with vertical jaws, journal-boxes mounted in the jaws, an armature mounted directly on the truck-axle, a divided field-magnet supported by extensions which rest on the journal-boxes, means preventing the field-magnet from rotating, spring-saddles mounted on the magnet extensions, leaf-springs secured to the saddles, and links between the springs and the truck-frame.

15. In an electric railway-motor, the combination with an armature of a two-part field-magnet provided with extensions on the top half which extend over the wheels and rest on the journals, the lower half being without these extensions, and is retained in place by bolts that enter the upper half.

In witness whereof I have hereunto set my hand this 5th day of January, 1898.

EDWARD D. PRIEST.

Witnesses:
B. B. HULL,
C. L. HAYNES.