(No Model.) 2 Sheets—Sheet 1.

C. E. GAREY.

CAR SPRING.

No. 364,008. Patented May 31, 1887.

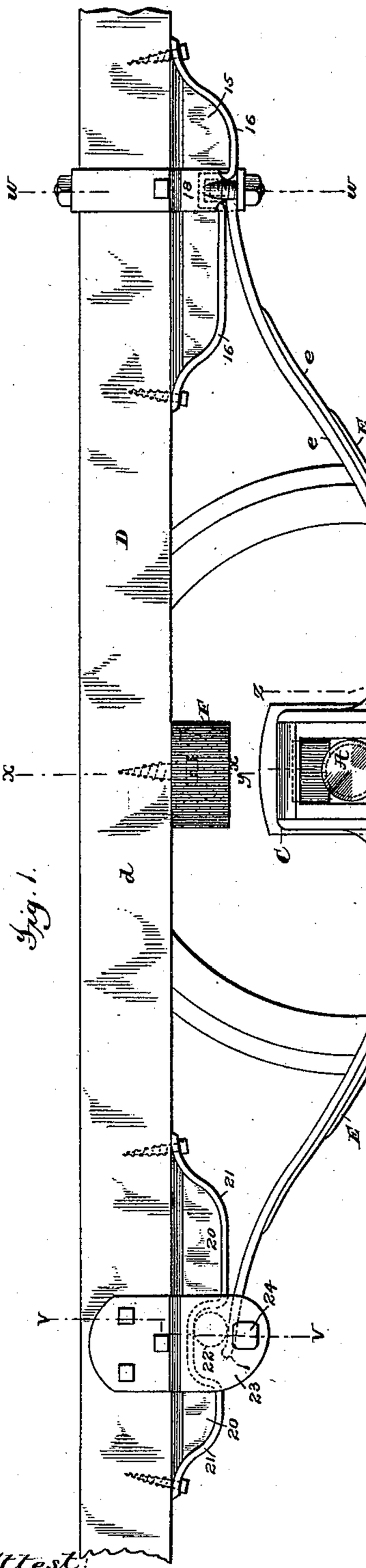

Fig. 1.

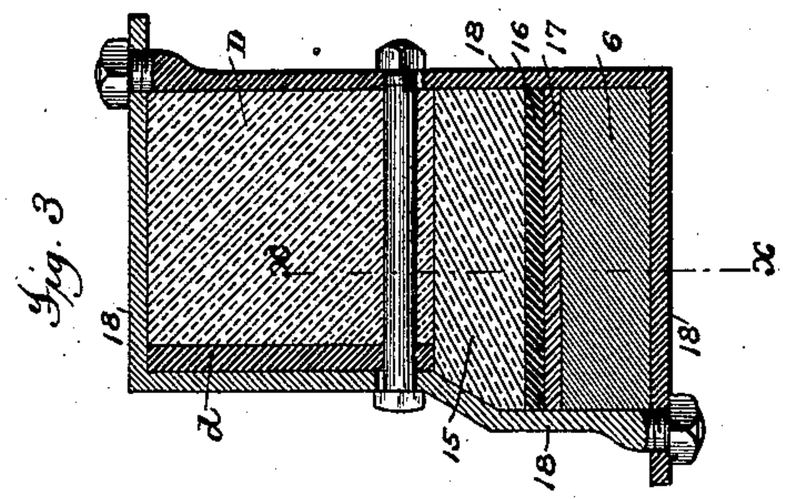

Fig. 3.

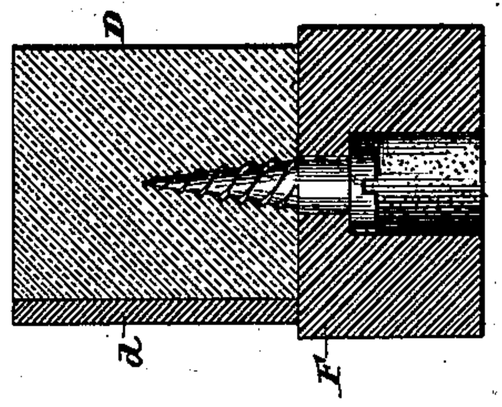

Fig. 4.

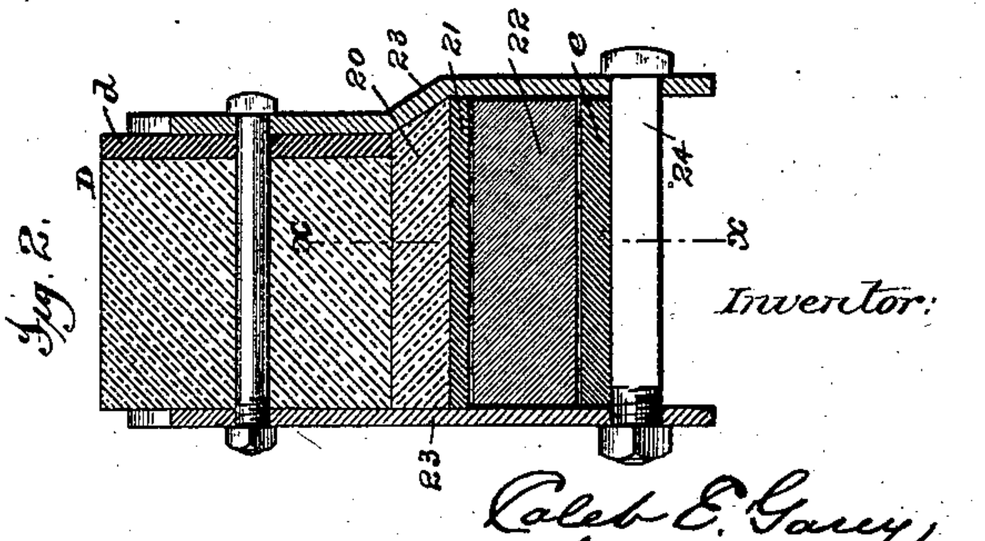

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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CAR SPRING.

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Fig. 6.

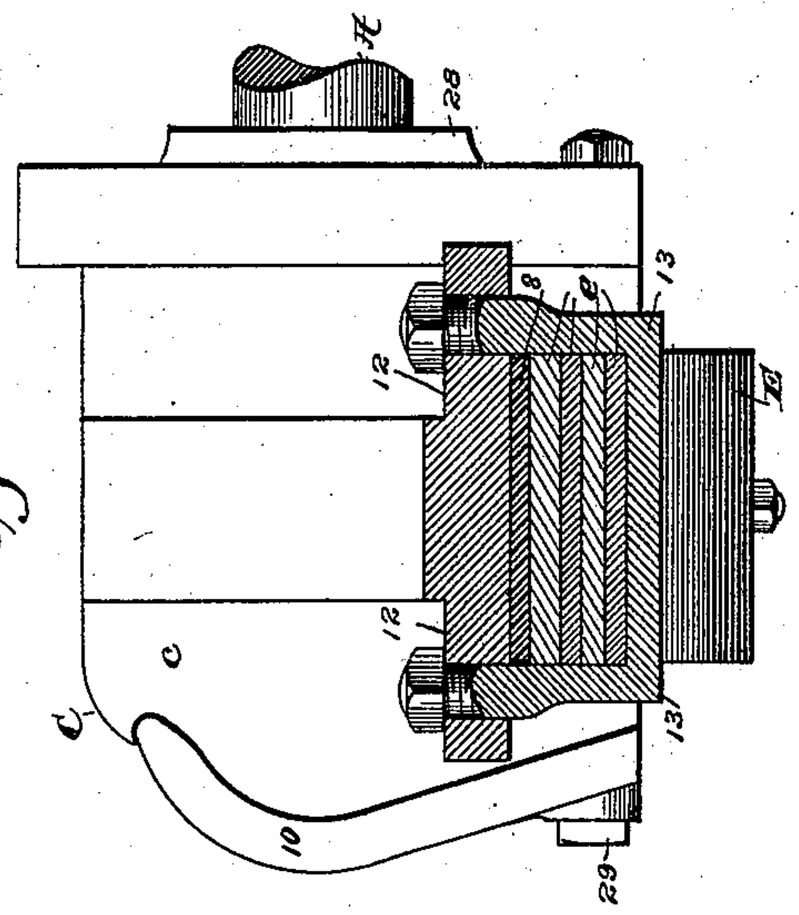


Fig. 9.

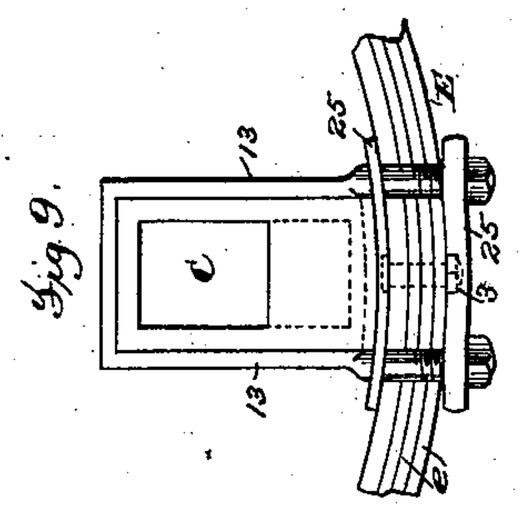


Fig. 8.

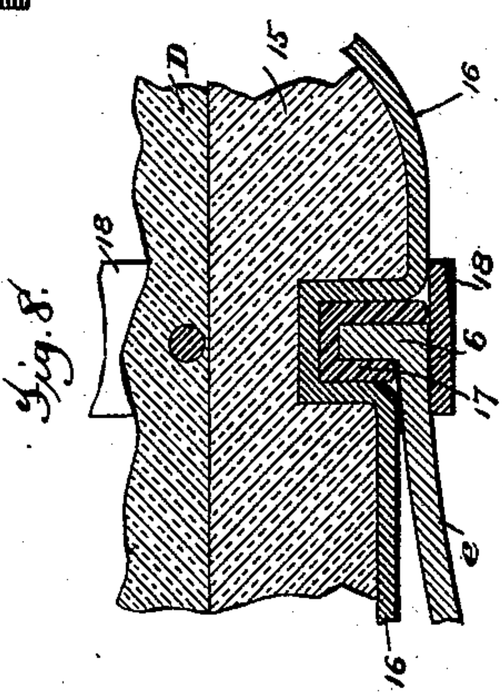


Fig. 5.

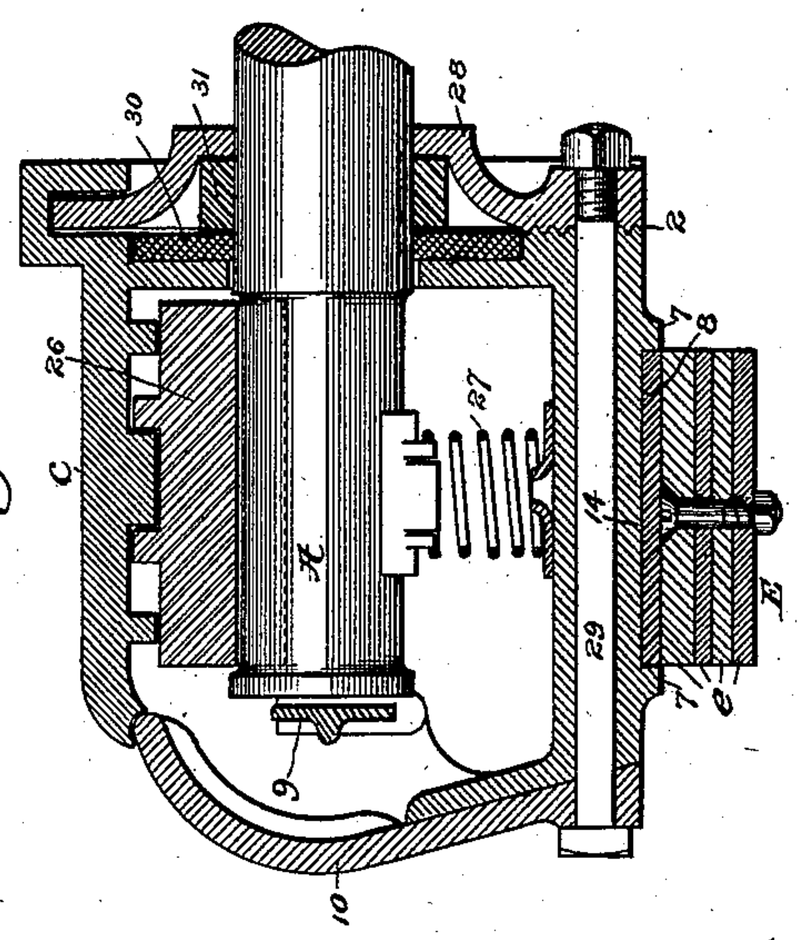
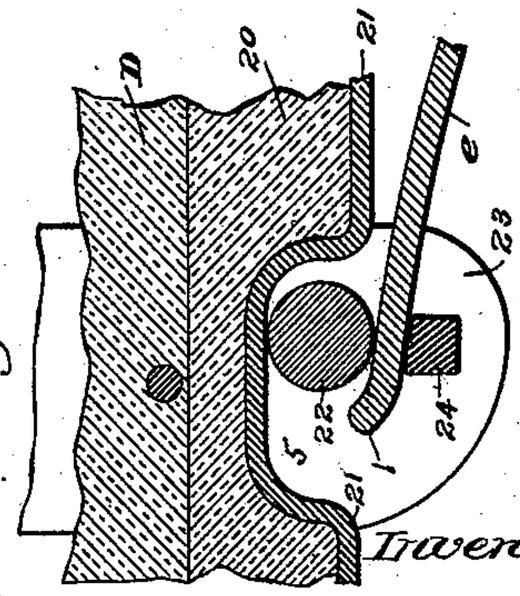


Fig. 7.



Attest:
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W. J. Kennedy

Inventor
Caleb E. Garey
by Munson & Philipp
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UNITED STATES PATENT OFFICE.

CALEB E. GAREY, OF NEW YORK, N. Y.

CAR-SPRING.

SPECIFICATION forming part of Letters Patent No. 364,008, dated May 31, 1887.

Application filed January 14, 1887. Serial No. 224,316. (No model.)

To all whom it may concern:

Be it known that I, CALEB E. GAREY, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Car-Springs, which are fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates particularly to a spring which is especially adapted for use upon street-cars and other similar vehicles and to the manner of connecting the spring to the car and to the axle-box, it being the object of the invention to employ flat metal springs of the half-elliptic form, instead of the spiral or rubber springs which have heretofore been used upon this class of cars.

As a full understanding of the invention can only be given by an illustration and a detailed description of the spring and its connections, all preliminary description will be omitted and a full description given, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of an ordinary street-car, showing the improvements constituting the present invention applied thereto. Figs. 2, 3, 4, 5, and 6 are enlarged cross-sections taken, respectively, on the lines *v v*, *w w*, *x x*, *y y*, and *z z* of Fig. 1. Figs. 7 and 8 are sectional views upon a like scale, taken on the line *x x* of Figs. 2 and 3, respectively; and Fig. 9 illustrates a modification which will be hereinafter explained.

Referring to said figures, it is to be understood that A represents one of the axles, B one of the wheels, C the axle-box at one end of the axle A, and D one of the side sills, of an ordinary street-car. The axle-box C in the preferred form, which is shown in Figs. 1, 5, and 6, is of substantially the same general construction as the box shown and described in United States Letters Patent No. 288,780, granted November 20, 1883, to William Don, and therefore a brief description of this part of the construction will suffice.

The box consists of a shell or casing, *c*, provided at its rear or inside with an opening through which the end of the axle is introduced, and open at its front to permit the introduction of the journal-bearing 26 and the lubricating apparatus 27. The front of the box is closed by a removable plate, 10, and its rear by a removable plate, 28, having an opening through which the axle passes. The upper edges of these plates fit into recesses formed in the upper part of the shell *c*, and they are held in position by a bolt, 29, which passes through the lower edges of the plates and the lower part of the shell, as shown in Fig. 5. The lower edge of the plate 28 and the lower edge of the shell *c* are provided with interlocking corrugations, as shown at 2, which serve to hold the plate very firmly in place when the nut on the bolt 29 is tightened up. The axle is provided with washers 30 31, made of leather and rubber or similar material, and interposed between the plate 28 and the shell *c*, by which dust is prevented from entering and the oil from escaping from the box. The front of the box is also provided with a removable plate, 9, which serves to receive the thrust of the axle when the bearing 26 becomes worn. It is to be remarked that in Fig. 1 the box is shown with the plates 9 10 removed.

The axle-box is provided at its lower edges with side projections, 12, having openings to receive the ends of a pair of clips, 13, by which the spring is made fast to the box. The box may be flat upon its under side, or may be slightly curved; but it will preferably be provided with a rounded shoulder or projection, 14, as shown, which will fit into a corresponding bend in the spring. The purpose of this is to aid the clips in preventing the spring from moving bodily endwise along the box.

The spring E is of the ordinary flat half-elliptic form, and is composed of a number of leaves, *e*, of different lengths, arranged one upon another in the usual manner, and suitably bent to conform to the shape of the under side of the axle-box. The spring thus constructed is secured to the box by means of the clips 13, as shown in Figs. 1 and 6. In order to prevent the clips from becoming loosened by the jarring of the car when in motion, and also to permit the spring to yield slightly against the box and thus reduce the liability of its becoming broken when subjected to a sudden concussion, there is interposed between the spring and the box a plate, 8, of rubber, which will yield sufficiently for these purposes.

This rubber plate also performs another important function in reducing or deadening the noise made by the running of the car-wheels on the rails, in that it prevents the vibrations of the wheels from being communicated to the spring and thence to the car. To hold this rubber plate in position, the axle-box is provided at its edges with downwardly-projecting flanges 7, (see Fig. 5,) which embrace the sides of the plate 8, and not only prevent it from spreading laterally, but also prevent it from shifting and becoming displaced.

The spring E is provided at one end with an upwardly-turned flange, 6, (see Fig. 8,) which enters a recess formed in the under side of a block, 15, which is secured to the under side of the sill D. The block 15 is covered by what I term a "graduating-plate," 16, and the block and plate are of such form, as shown, that as the end of the spring is pressed downward by the increasing load the plate is brought to bear upon the spring at points nearer and nearer to the axle, thus gradually increasing the strength of the spring as it is compressed, and vice versa. The flange 6 of the spring is made to fit loosely into the recess in the block 15 and plate 16, but is surrounded by a rubber cushion or packing, 17, as best shown in Fig. 8, which serves to prevent the flange 6 from rattling in the recess and yet permits the connection between the spring and the car to yield slightly and thus avoid sudden shocks and strains when the car is started and stopped or the wheel meets an obstruction on the track. The packing 17 will also yield sufficiently to avoid danger of breaking the flange 6 as the spring is compressed and expanded. The flange 6 and packing 17 are held securely in the recess by means of a clip, 18, (see Figs. 3 and 8,) which passes around the sill, including its panel or face-plate *d* and the block 15, and beneath the end of the spring. The opposite end of the spring E is loosely connected to the sill D in such manner as to be capable of a longitudinal movement in the direction of the length of the sill as it expands or is compressed. For this purpose the sill is provided upon its under side with a second block, 20, having a recess, 5, of considerable extent. (See Fig. 7.) The block 20 is of substantially the same shape as the block 15, and is provided with a graduating-plate, 21, similar to the plate 16, and for the same purpose.

Located in the recess 5, and interposed between the free end of the spring and the block 20, is an anti-friction roll, 22, (see Figs. 1, 2, and 7,) which, as the spring expands and is compressed, rolls between the end of the spring and the block, and thus reduces the friction between the two. The recess 5 and roll 22 may be omitted, and the end of the spring allowed to bear directly against the plate 21; but it is preferable to provide the roll, as by that means the friction between the parts is greatly reduced. The roll 22 is retained in its position in the recess by means of plates 23, which are bolted to the sides of the sill and extend downward past the ends of the recess, and the end of the spring is held in position against the roll by means of a bolt, 24, which passes through the plates beneath the end of the spring. The end of the spring is bent upward slightly, as shown at 1, so as to prevent it from being withdrawn from between the roll and the bolt 24. This will prevent the end of the spring from being withdrawn from between the roll and bolt in case the wheel B is raised from the track-rail or the ground.

The springs E, of which there will be four—one for each axle-box—will be made of such strength that under ordinary conditions they will bear the full weight of the car and load; but, in order to prevent the sills D from striking violently against the tops of the axle-boxes in case the car should be overloaded or in case of an unusual jar, the sills or the tops of the boxes—preferably the sills—will be provided with rubber buffers F, (see Figs. 1 and 4,) located in such positions as to be interposed between the boxes and sills, so as to take the load whenever the springs E are compressed to an unusual extent.

The axle-boxes C will, as before stated, preferably be of the form shown in Figs. 1, 5, and 6; but they may be of other forms, if preferred. For example, they may be of the form shown in Fig. 9. In this case the clips 13, instead of passing around the spring and through openings in flanges projecting from the sides of the axle-box, pass around the box and through plates 25 upon opposite sides of the spring, which clamp the spring and hold it against the under side of the box. A rubber plate may also in this case be interposed between the spring and the box. In this case, also, the projection 14 is omitted from the box, and the longitudinal movement of the spring is prevented by the bolt 3, the ends of which fit into recesses formed in the plates 25.

The present invention, although especially designed for street-cars, is applicable to other similar cars and vehicles.

What I claim is—

1. The combination, with the car and the axle-box, of the spring E, of the half-elliptic form, connected to the box and having one of its ends connected immovably to the car, whereby the draft is transmitted to the axle-box through the spring, substantially as described.

2. The combination, with the car and the axle-box, of the spring E, of the half-elliptic form, the graduating-plate 16, and the rubber packing 17, substantially as described.

3. The combination, with the car and the axle-box, of the spring E, of the half-elliptic form, connected to the axle-box and having one end connected immovably to the car and connected to the axle-box, whereby the draft is transmitted to the box through the spring, and the rubber plate 8, interposed between the box and spring, to prevent jarring and noise, substantially as described.

4. The combination, with the car and the axle-box, of the spring E, of the half-elliptic form, the graduating-plate 16, the rubber packing 17, and the rubber plate 8, substantially as described.

5. The combination, with the car and the axle-box, of the spring E, of the half-elliptic form, connected to the axle-box, and having one end connected movably and the other immovably to the car, and the graduating-plates 16 21, substantially as described.

6. The combination, with the car and the axle-box, of the spring E, of the half-elliptic form, connected to the axle-box and having one end connected movably and the other immovably to the car, the graduating-plates 16 21, and the roll 22, substantially as described.

7. The combination, with the car and the axle-boxes, of springs E, of the half-elliptic form, connected at their middles to the axle-boxes and at their ends to the car, whereby the draft is transmitted to the boxes through the springs and the wheels and axles are maintained in their proper relation to each other and to the car, and the lateral thrust of the car resisted wholly by the springs, substantially as described.

8. The combination, with the car and the axle-box having the rounded shoulder 14, of the springs E, of the half-elliptic form, bent to conform to said shoulder and secured firmly to the under side of the axle-box, and connected at one end movably and at the other end immovably to the car, substantially as described.

9. The combination, with the car and the axle-box, of the spring E, of the half-elliptic form, connected to the axle-box, and having one of its ends connected movably and the other immovably to the car, and the rubber buffer F, interposed between the car-sill and the axle-box, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CALEB E. GAREY.

Witnesses:
J. A. HOVEY,
JAMES J. KENNEDY.