(No Model.)

5 Sheets—Sheet 1.

J. L. LEVY.

CAR TRUCK.

No. 502,522.

Patented Aug. 1, 1893.

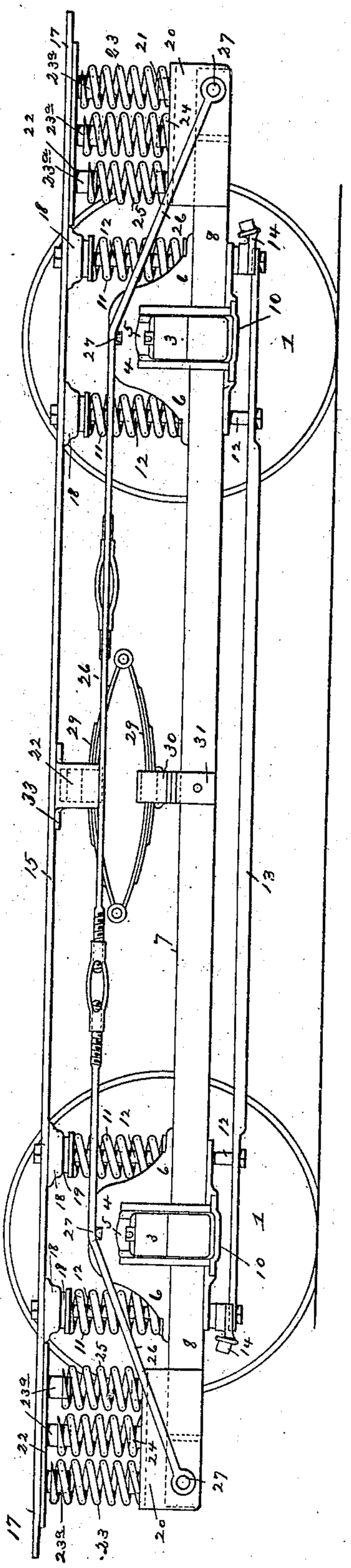

Fig. 1.

Attest,
C. W. Benjamin.
H. F. Durbin.

Inventor;
Joseph L. Levy

(No Model.)

5 Sheets—Sheet 2.

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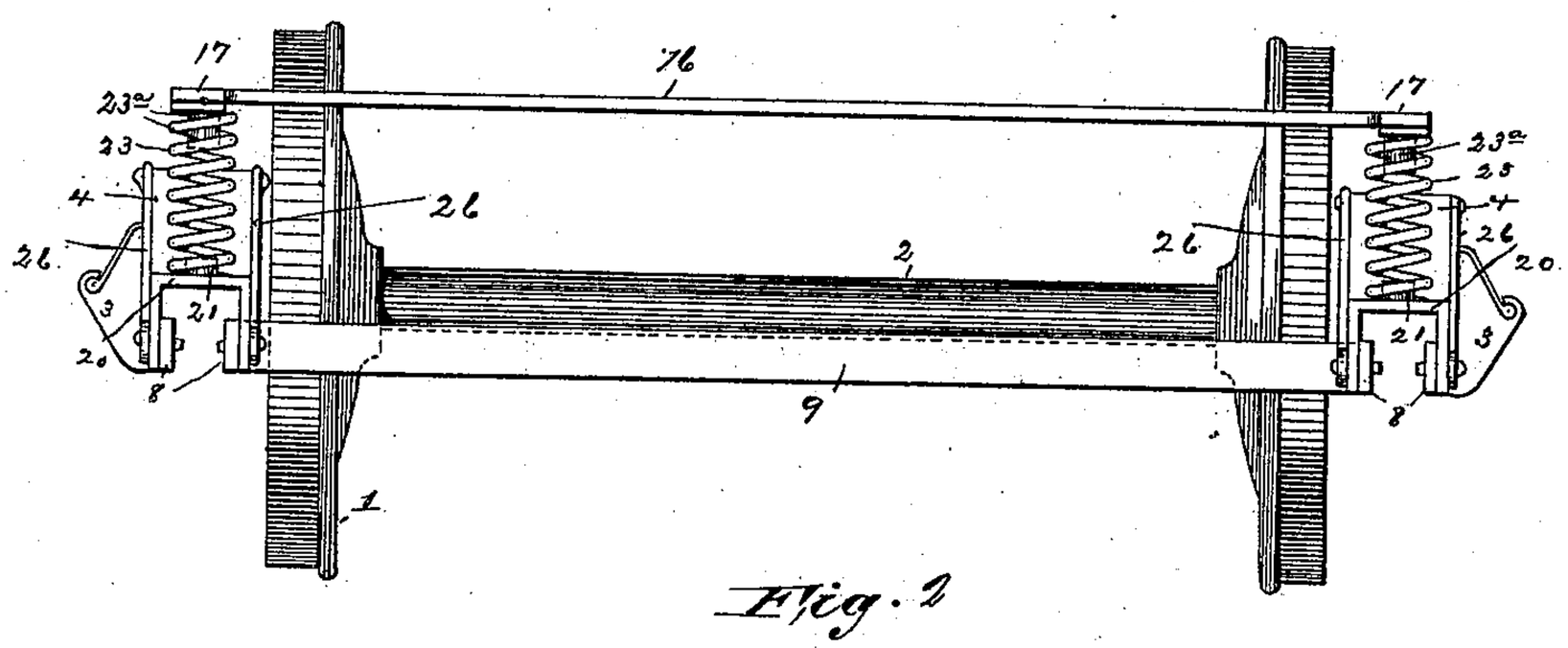

Fig. 2

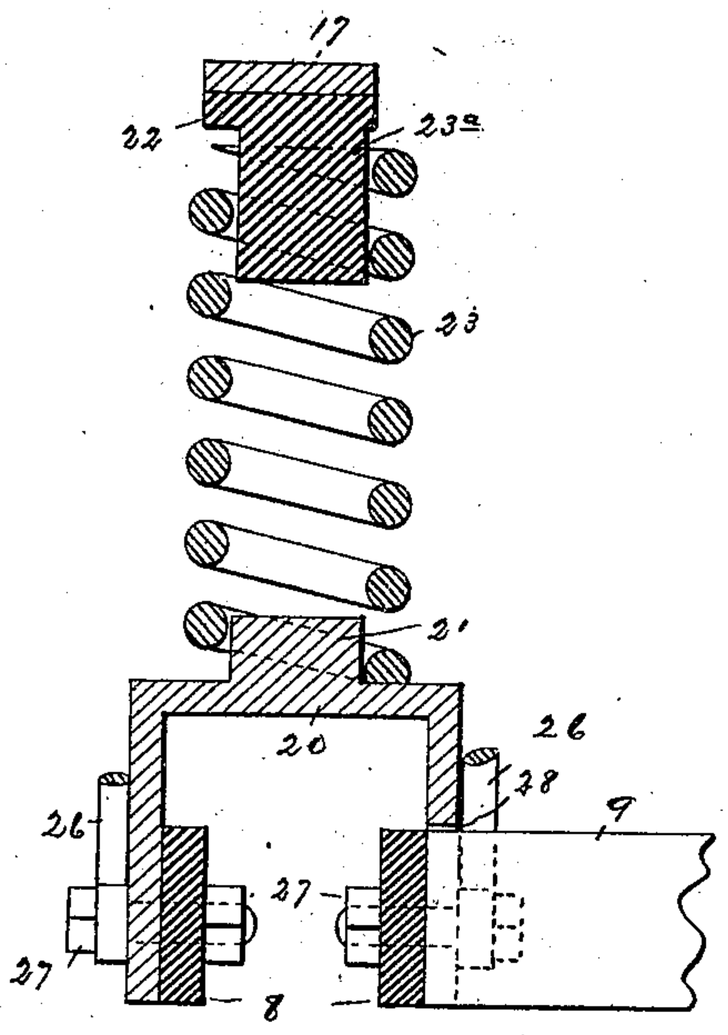

Fig. 3

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(No Model.) 5 Sheets—Sheet 3.

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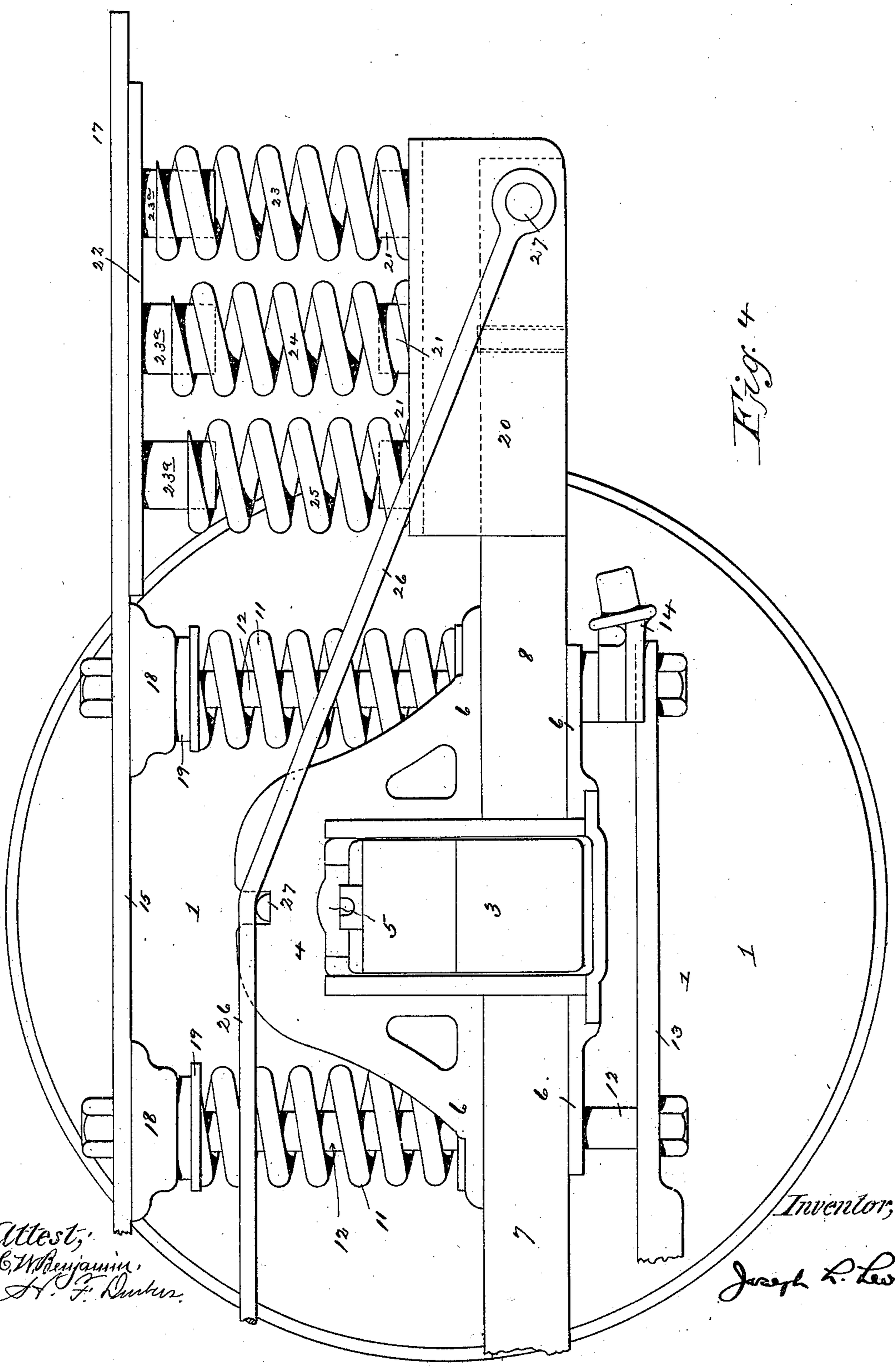

Fig. 4.

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(No Model.) 5 Sheets—Sheet 4

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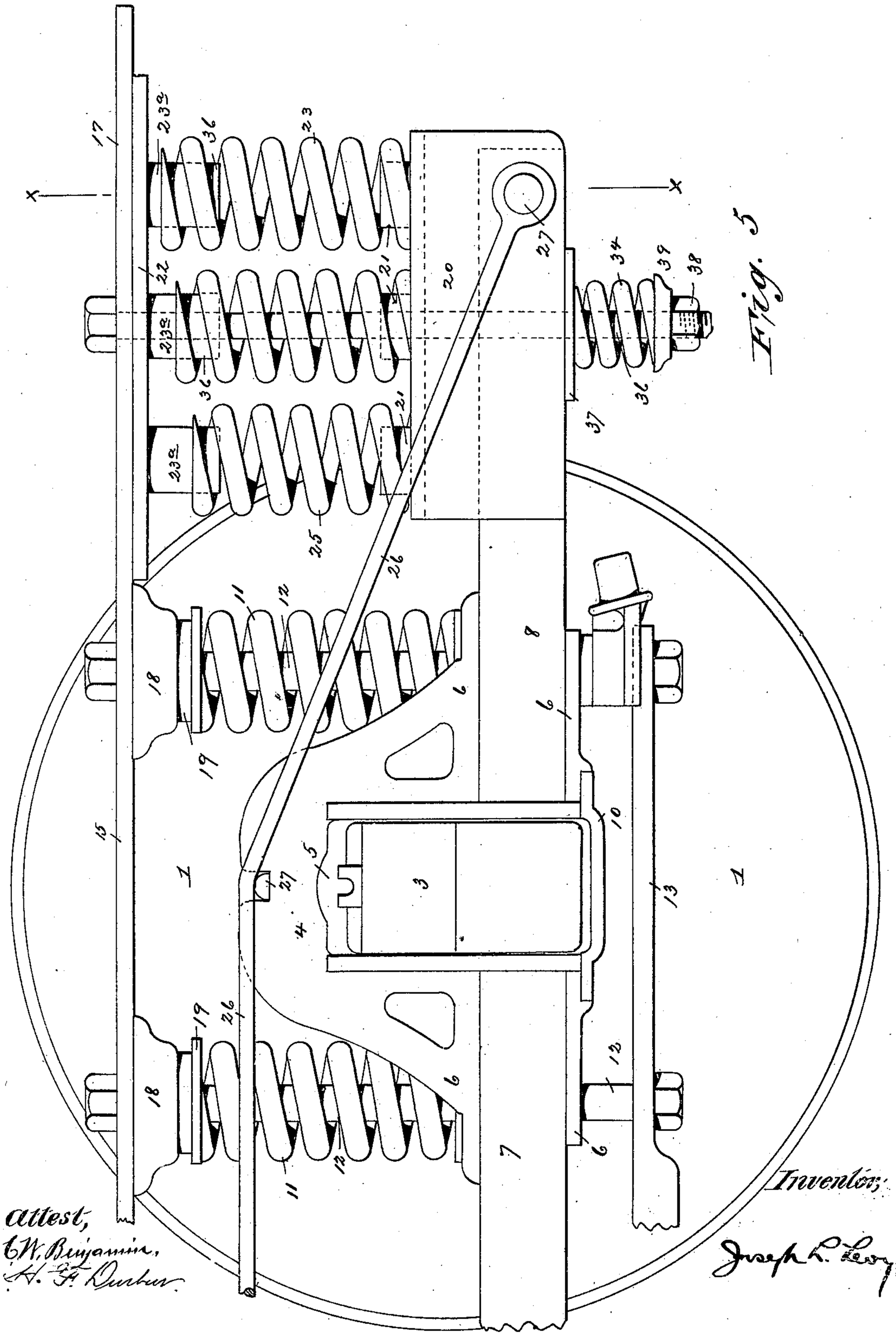

Fig. 5

Attest,
C. W. Benjamin,
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(No Model.)

5 Sheets—Sheet 5.

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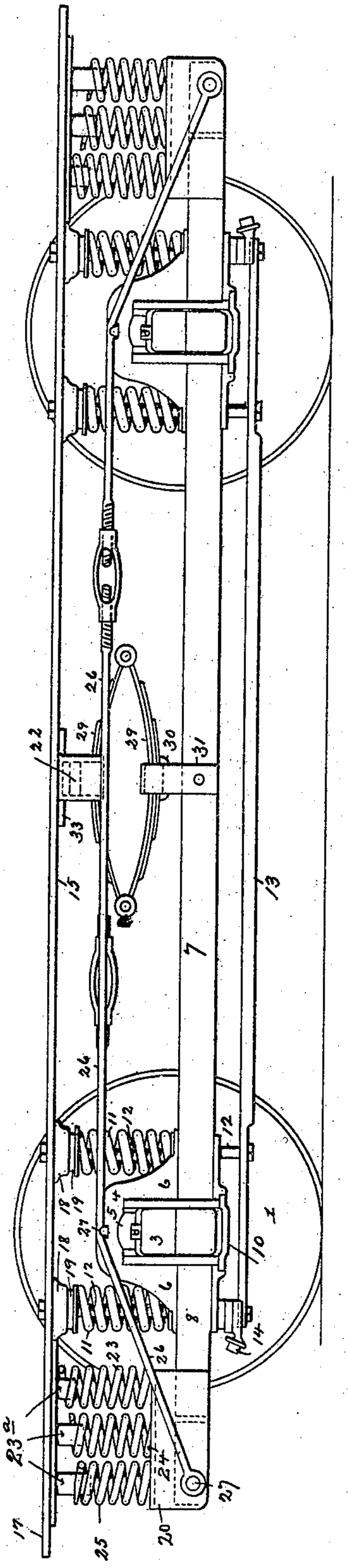

Fig. 6.

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Inventor:
Joseph L. Levy

UNITED STATES PATENT OFFICE.

JOSEPH L. LEVY, OF NEW YORK, N. Y.

CAR-TRUCK.

SPECIFICATION forming part of Letters Patent No. 502,522, dated August 1, 1893.

Application filed April 11, 1893. Serial No. 469,963. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH L. LEVY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have made certain new and useful Improvements in Car-Trucks, of which the following is a specification.

My invention has primary reference to a certain class of trucks as illustrated in the patent to George M. Brill, No. 478,218, dated July 15, 1892, and my invention consists in improvements thereon.

Among the specific improvements embodied in the present invention is a nest, or series, of springs located between an extension of the truck frame and the car body, or a like extension of the upper chord (if one is used), which nest of springs comprises those which are adapted to come into play successively as the car body sinks down; that is to say, these nests of graduated springs are intended to supplement the usual car springs which are generally located about the axle boxes so as to permit of a car extending beyond the truck frame or overhanging the truck, being used, the nest of springs also acting in a measure as a buffer to retard the oscillation, or end vibration, of the car upon the truck.

My invention also includes the location of a leaf, or elliptical, spring between the ordinary and usual car springs, which spring preferably is adapted to come into play after the car springs (or what I shall hereinafter term the "axle box springs") have begun to be compressed, at which time the elliptical spring begins to assist the axle box frames in resisting the downward movement of the car. So far as this part of my invention is concerned, I do not limit myself to the combination, with the elliptical spring between the axle box springs and preferably semi-distant between the axles, of the nests of graduated springs adapted to come into successive operation, located beyond the axle box springs, or, in other words, outside of the wheel base. The elliptic spring being slower in its action than the spiral, or axle box, springs, assists the said springs materially in resisting the load and the raising of the car body, and softens the motion of the same. I, therefore, prefer to divide my invention into several important parts, to wit: first, the resilient base, or support, for the car body formed of the axle box springs and the nest, or set, of graduated springs adapted to come into successive play or operation; second, a resilient base, or support, for the car body comprising the axle box springs and a spring, or elastic medium, differing in its load carrying capacity or pressure resisting characteristic from the axle box springs, said springs being located between the axles and preferably semi-distant therefrom, either when the same is adapted to come into operation contemporaneously with the initial compression of the axle box springs, or when the same is so arranged as to permit of a partial compression of the axle box springs before bringing the said resilient element into play; third, a resilient base, or support, for a truck formed of the axle box springs, the nest or series of graduated springs outside of the wheel base adapted to be brought into successive operation, and the resilient element located between the axle box springs and preferably semi-distant between the axles, either when the intermediate resilient element is adapted to come into play at the same time with the axle box springs or subsequent thereto, or when the said intermediate spring is adapted to come into operation at the same time with that one of the graduated springs which comes last into operation, or not; fourth, the combination with the graduated set of springs of a spring auxiliary to said graduated set, or to one of them, which is adapted to assist the graduated springs at the opposite end of the truck in resisting the downward tendency of the truck; that is to say, the auxiliary spring, (as the same shall be termed) when the car body is lowered at one end, resists the same by assisting the springs compressed at the other end by acting upon the opposite end of the truck, all of which will be hereinafter pointed out.

My invention further consists in the details of structure hereinafter set forth and further pointed out in the claims.

In the drawings forming part of this specification—Figure 1 is a side elevation of a complete truck showing my improvements attached thereto; Fig. 2, an end elevation; Fig. 3, a sectional elevation on the line *x x;* Fig. 4, an enlarged side elevation of the end of the truck; and Fig. 5, a like view showing

the auxiliary spring; Fig. 6, a side elevation of a complete truck showing my improvements attached thereto, the graduated springs at the end being in the reverse order to that shown in Fig. 1.

The same numerals have reference to like parts throughout the several views.

I shall first describe the truck, and then my improvements thereon.

At 1 are shown the wheels; at 2 the axles, which have bearings in the axle boxes 3, upon which lie the yokes 4 having a resilient support upon the axle boxes by means of the cushion 5, the yokes having ears 6, to which are secured between the axles the sections 7 of the side bars of the axle box frame, and without the axles and to the ears 6, the extensions 8 of the side bars of the axle box frame, the extensions 8 being united laterally by a cross bar 9, which is secured to the extensions in any desirable way, making with the sections 7 and 8 of the side bars on both sides of the truck, the frame which depends from the axle boxes, which frame is known in the art as an axle box frame. A short bar 10 braces the lower portions of the ears 6 in the usual way.

The axle box springs 11 are shown as spiral in form, and rest upon the ears 6 of the yokes, and surround spring posts 12, which pass through the ears, they being united beneath the side bars by a pedestal tie bar 13, the outer spring posts having a casting 14 which can be used for the purpose of supporting a diagonal brace extending between the casting and the overhanging ends of the superposed car body in the usual way. The upper portions of the spring posts are secured to the side bars 15 of the upper chord, the side bars being united by the cross bars 16 at each end, forming a rectangular frame, the side bars having extensions 17 (Fig. 2). Instead of the spring posts being secured to the upper chord, they can be secured to one of the longitudinal sills of the car body on each side of the truck, and wherever the upper chord is mentioned it is intended to include either that or the sill of the car body. Between the side bars of the upper chord and the springs 11 lie spring plates or risers 18 and washers and cushions 19, in the usual way.

I have thus far described the truck substantially similar to that shown in the patent before cited, and the composition of the truck shall be hereinafter known as one involving two frames, one substantially stationary, to wit, the axle frame, for the reason that it is not affected by the play of the car upon either of the sets of springs hereinafter described; nor does it have the same amplitude of movement as the car supporting springs; the other is the movable frame, which comprises either the upper chord or car sill, the spring posts and bracing therefor, so that when the phrase "stationary frame" is used it will be understood to include a frame supported upon the running gear and substantially immovable in relation to the motion of the car body and the movable frame, which latter is influenced by all of the motions of the car body up and down upon the car springs.

It will be noticed by reference to Fig. 1 that the upper chord and axle box frame are extended out beyond the axle, or the wheel base, and upon the extensions 8 of the axle box frame I secure an inverted U shaped saddle, or yoke, 20 having studs 21. To the extended portion (or that part extending beyond the axle) of the upper chord I secure a plate 22 having the downwardly extending lugs, or bosses, 23, and between the lugs or bosses on the saddle 20 and plate 22 I locate spiral springs 23, 24, 25. It will be noticed that the outer spring 23 is higher than the spring 24, and that the spring 25 is shorter than any one of them, none of them while at rest touching the upper chord. It will also be noticed that the shorter spring is located nearest the axle box springs 12. The position that the upper chord occupies in Fig. 1 is one where the parts are at rest; in other words, the springs are only supporting the weight of the upper chord, or the normal weight of the car body, and have not begun to be compressed by the added weight given to the car body while in use, nor by the motions of the car body in operation. During use the car body will sink down upon the springs, compressing them, first acting upon the axle box springs, then successively upon each one of the nests of graduated springs 23, 24, 25, acting as to the nest of springs first upon the outer one, which being located near to the outer line of oscillation of the end of the car begins to check the oscillation nearer to that point; then the second spring 24 begins to act, and then the third spring 25, bringing each spring successively into operation and checking the oscillation at that end by a successive introduction into the resilient resistance of each member of the nest or series of springs.

In all of the drawings I have shown the outer spring 23 as being adapted to be brought into play subsequent to the commencement of the compression of the axle box springs; but I do not limit myself to this, as it may be found desirable to bring one of the successively acting springs into operation contemporaneously with the commencement of the compression of the axle box springs. Nor do I limit myself to the inwardly extending graduation as shown; that is to say, causing the last of the series to come into operation last, as the shortest of the springs (as 25) can be located farthest from the axle box, or nearer to the outer line of motion of the car body; or, in other words, to the end of the platform, as I consider my invention broad enough to include a nest, or series, of graduated springs adapted to come into successive operation, or action, or to offer a graduated resistance located between a portion of the truck frame which lies or extends outside of the wheel base, and the car body or upper chord. This

reverse arrangement of the graduated springs is shown in Fig. 6, in which the highest spring 23 is located nearest the axles, and the smallest 25 farthest away. This change can be accomplished without any difficulty whatsoever as the parts are so arranged as to be readily detachable from both the extensions of the side bars and from the upper chord or car sill, reversed, and again secured in place, and this can be accomplished without removing any of the springs from their original positions on the yokes and restraining lugs.

Under certain conditions it may be found extremely advantageous to arrange the graduated springs as in the manner illustrated in Fig. 6, and especially when the truck is used upon uneven roads, or when it is subjected to heavy and uneven loading. In this case the oscillation will be comparatively greater than on smooth roads and with ordinary use. The inner spring or one closest to the axle will come into action the first, the others, after, or contemporaneously with the initial compression of the axle-box springs, leaving the outer spring, which is the last to come into action, as a reserve of resilient resistance at the time when the others have substantially ceased in assisting in resisting the downward movement of the car, and at which time the heaviest load and strain will be present, due to the greater speed at the extreme end of the car than that nearer to the truck center. For these reasons it may be advantageous to use the springs in their reverse form, so I do not, as I have before stated, limit myself to the order of their graduation. A modification of this portion of my invention may be made by using springs of varying size, or carrying capacity, and including them in a nest, or series, so that the resistance given to the load or movement of the car will be gradual, as the weakest or strongest, or quickest or slowest, of such modified form can be brought into action first or last, and the successive steps in the resilient resistance be accomplished by bringing into play the successively stronger or weaker springs; and I therefore include such modifications within my present invention in whatever form they may be used.

As the extended spring base, which the axle box frame extension and springs located thereon are called, is subjected to considerable strain, I prefer for the purpose of bracing such extension two trusses 26, which lie upon lugs 27 on the yokes 5, and extend outwardly to the yokes 20 on each side thereof (see Fig. 2), the ends of the trusses being secured to the extensions by means of the pins, or bolts, 27, which in turn secure the saddle to the side bars.

By referring to Fig. 3 it will be seen that the cross bar 9 enters within a slot 28 formed in the inner leg of the yoke 20, which assists in keeping the yoke in its place on the side bars.

As to the second portion of my invention, the axle box springs 12 are primarily the car supporting springs, but I propose to supplement them in the resistance to the downward movements of the car body, and in their lifting the car body during its upward movement, by an intermediate resilient member, or spring, which is preferably slower in its action than the axle box springs. For this form of spring I have selected for use a leaf, or elliptical, spring 29, which lies between the upper chord of the car body and the side bars of the axle box frame. This spring is securely fixed, and rests upon the side bars 7 by means of the saddle 30, the legs 31 of which are secured to the side bars. The upper portion of the spring is confined in a vertical position by a yoke 32 secured by its ears 33 to the side bars of the upper chord, or directly to the car sill, as desired, the inner portion of the yoke 32 lying above the top of the spring, so as to permit of a downward motion of the car body on the axle box springs for some distance before the elliptical spring begins to be compressed. It will be seen that I have located this spring semi-distant between the axles, it being designed solely to supplement and assist the axle box springs in resisting the normal movements of the car body up and down thereon, but not for the purpose of assisting the axle box springs in resisting the end vibration or oscillation, of the car body on the truck. So far as this part of my invention is concerned, I do not limit myself to the form of intermediate or elliptical spring, nor whether it comes into compression prior or subsequent to the axle-box springs, but I prefer the elliptical form and that such spring should come into play after the axle-box springs have begun to be compressed; as I consider myself to be the first to have located a resilient element (in this class of truck) between the axle-box springs, which element or spring differs as to the time of action from that of the axle-box springs, as the same can be brought into action, or in other words, compression, prior to the axle-box springs, or subsequently, without departing from the spirit of my invention. I, however, prefer to bring the intermediate spring into action subsequently to the commencement of the compression of the axle box springs, for which purpose it is adapted in the present structure.

The third portion of my invention comprises the conjoint use of all of the resilient elements shown in Fig. 1, or their equivalents, the axle box springs 12 primarily taking the load of the car; the nest, or series, of graduated springs forming the extended spring base; and the intermediate spring between the axle box springs; the series of graduated springs coming into play as before described, and the intermediate spring, as 29, coming into play at the same time with the beginning of the compression of the axle box springs, or coming into play after the beginning of the compression of the axle box springs and be-

fore the last of the graduated set; or coming into play after the compression of the axle box springs and contemporaneously with the compression of the last of the graduated set, or contemporaneously with the compression of the first of the graduated set when said first set begins to be compressed at the same time with the axle box springs. It will be seen that the variations are numerous, and I consider it unnecessary to detail all of the variations as to time of action, and as to character or amount of resistance given to the motions of the car by each of the series of springs, or resilient elements herein shown.

The fourth part of my invention includes the use of what I call an auxiliary spring, such as 34, Fig. 5. In this case a long bolt 36 passes through the upper chord down through one of the bosses 23, which is apertured for this purpose; through a like aperture formed in the boss 21 and in the top of the yoke 20, and through a plate 37 which lies beneath the legs of the yoke and bears against the bottom thereof, the end of the bolt being provided with a nut 38 and movable plate 39, the spring 34 extending between the plates 37, 39, and surrounding the bolt. For the sake of description it is assumed that Fig. 5 represents the right hand portion of Fig. 1. Now, assuming that the left hand portion of the truck has been vibrated, moving that portion down and lifting the right hand portion, the resistance given to the lift at the right hand portion will be by the graduated set of springs at the left hand side, and by the compression of the spring 34 at the right hand side; so that it will be seen that the auxiliary spring 34 comes into play at the end opposite to that which is compressed, or at the end which is lifted, assisting the graduated springs in resisting the oscillation, or end vibration, of the car.

I have shown the location of the spring 34 under the spring 24 for the purpose of clearness of illustration only, and so as to avoid the nuts or bolts 27, but it is plain that the spring 34 can be located beneath the outer or springs 23, 25 as well. The apertures made for the passage of the bolt 36 should preferably be a little larger than the diameter of the bolt, for the purpose of permitting a longitudinal movement to a slight extent of the car upon the truck.

As both sides of the truck are constructed alike I have referred to but one side herein.

Having described my invention, I claim—

1. The combination in a truck, of the stationary and movable frames, and springs for resiliently supporting a car comprising a series adapted to primarily support the car, and an additional series adapted to offer a successive resistance to the downward movement of the car, substantially as described.

2. The combination of a truck frame having an element thereof for supporting the car springs, and a resilient or spring support for the car comprising the usual springs about or adjacent to the axle boxes, and a set of springs independent of the axle box springs adapted to be successively compressed, substantially as described.

3. The combination in a truck, of the movable and stationary frames, the axle box springs supporting the movable frame on the stationary frame, and a nest of graduated springs extending between portions of the movable and stationary frames, which portions lie outside of the axles of the truck at both ends thereof, substantially as described.

4. The combination in a car truck, of a stationary frame and a movable frame or car body, and car supporting springs located about or adjacent to the axle boxes, and an additional set or series of graduated springs located between the stationary and movable frames and outside of the axles of the truck, said additional set of graduated springs being adapted to be successively compressed by the motion of the car body thereon, substantially as described.

5. The combination in a truck, of the movable and stationary frames, the axle box springs supporting the movable frame on the stationary frame, and a nest or series of graduated springs extending between the movable and stationary frames and lying outside of the axles, the axle box springs being adapted to be compressed by the downward movement of the car body prior to the compression of any one of the said nest of graduated springs, each single spring of each series or nest being successively compressed by said motion of the car body, substantially as described.

6. The combination of the movable and stationary frames, of the axle box springs about or adjacent to the axle boxes, and an additional set or series of springs grouped together for successive action, each spring of said set or series being adapted to offer a varying resistance to the downward movement of the car body thereon, substantially as described.

7. In a truck, the combination of the movable and stationary frames, axle box springs about or adjacent to the axle extending between the stationary and movable frames, and an intermediate spring lying between the axle box springs and extending between the stationary and movable frames, said spring being adapted to offer a resistance to the downward movement of the car body and varying as to its time of co-action with the axle box springs, substantially as described.

8. The combination in a truck, of the movable and stationary frames, the axle box springs located adjacent to or about the axle box and extending between the movable and stationary frames, and a spring auxiliary to said springs extending between the frames and lying between the innermost of said axle box springs, said auxiliary spring being adapted to be compressed subsequent to the compression of the axle box springs, substantially as described.

9. The combination in a truck, of the sta-

tionary and movable frames, the axle box springs extending between said frames, an additional spring lying between said frames, differing in character from the axle box springs, and a nest of springs adapted to be brought into successive compression extending between said movable and stationary frames, substantially as described.

10. The combination of a truck having a movable and stationary frame, of the axle box springs extending between the same, a spring intermediate of the axle box springs and extending between said frames, and a nest or series of springs adapted to be brought into successive compression extending between the movable and stationary frames and lying outside of the wheel base of the truck, substantially as described.

11. The combination in a truck, of the stationary and movable frames, the axle box springs extending between both frames, an additional spring intermediate of the axle box springs and extending between both frames, the said intermediate spring being adapted to be compressed subsequent to the compression of the axle box springs, and a series or nest of springs adapted to be brought into successive compression extending between the extended portions of the stationary frame and the movable frame or car body, substantially as described.

12. The combination in a truck, of the movable and stationary frames, the axle box springs, the spring intermediate of the axle box spring adapted to be compressed subsequent to the compression of the axle box springs, and a nest or series of springs extending between the extended portion of the stationary frame and the movable frame or car body, the said nest of springs being adapted to be brought into compression subsequent to the compression of the axle box springs, the compression of all of said nest or series taking place prior to or contemporaneously with the compression of the said intermediate springs, substantially as described.

13. In a truck, the combination of the movable and stationary frames, the axle box springs extending between said frames, additional resilient elements adapted to offer successive resistance to the downward movement of the car extending between the extended portions of the stationary frame and the movable frame or car body, and a resilient element auxiliary to the said last mentioned springs which is adapted to be compressed to resist the unequal compression and elevation of the car on its supporting springs, substantially as described.

14. The combination in a truck, of the movable and stationary frames, the axle box springs, and a nest or series of springs adapted to be brought into successive compression, said nest extending between the movable and stationary frames outside of the wheel base of the truck, and a spring auxiliary to said nest or series of springs adapted to be compressed by the unequal depression of the movable frame at the opposite end of the truck, substantially as described.

15. In a truck, the combination with the car springs, of the additional springs 24, the upper chord or car body, the springs 34, and an abutment therefor, and means for connecting the springs 34 with the upper chord, substantially as described.

Signed at the city, county, and State of New York this 5th day of April, 1893.

JOSEPH L. LEVY.

Witnesses:
B. S. WISE,
H. F. DURBUR.