

No. 657,635.

Patented Sept. 11, 1900.

J. C. BARBER.  
PASSENGER CAR TRUCK.

(Application filed Sept. 14, 1899.)

(No Model.)

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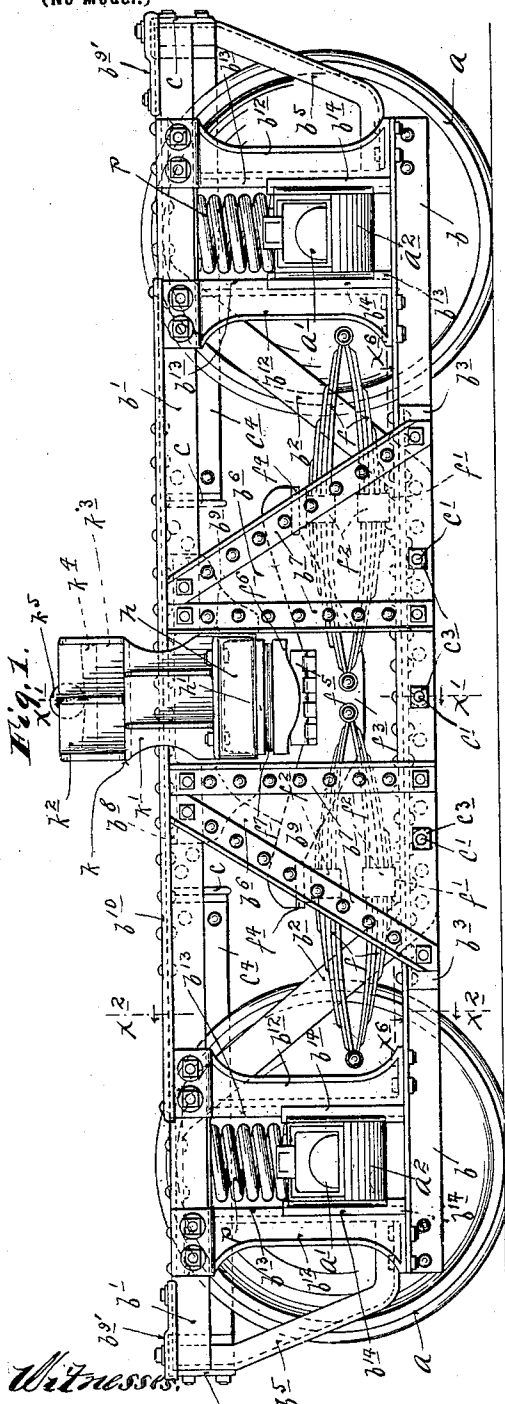
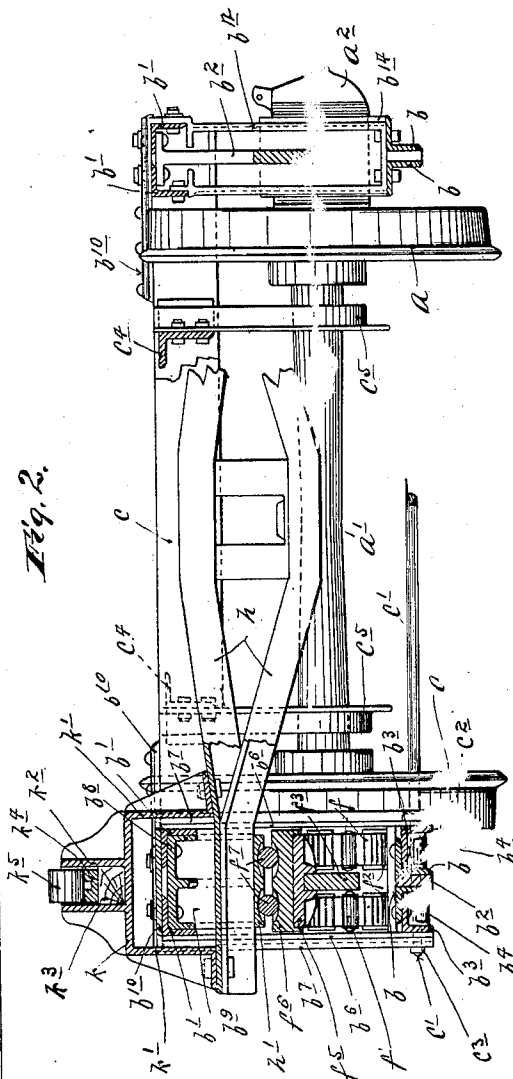


Fig. 2.



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No. 657,635.

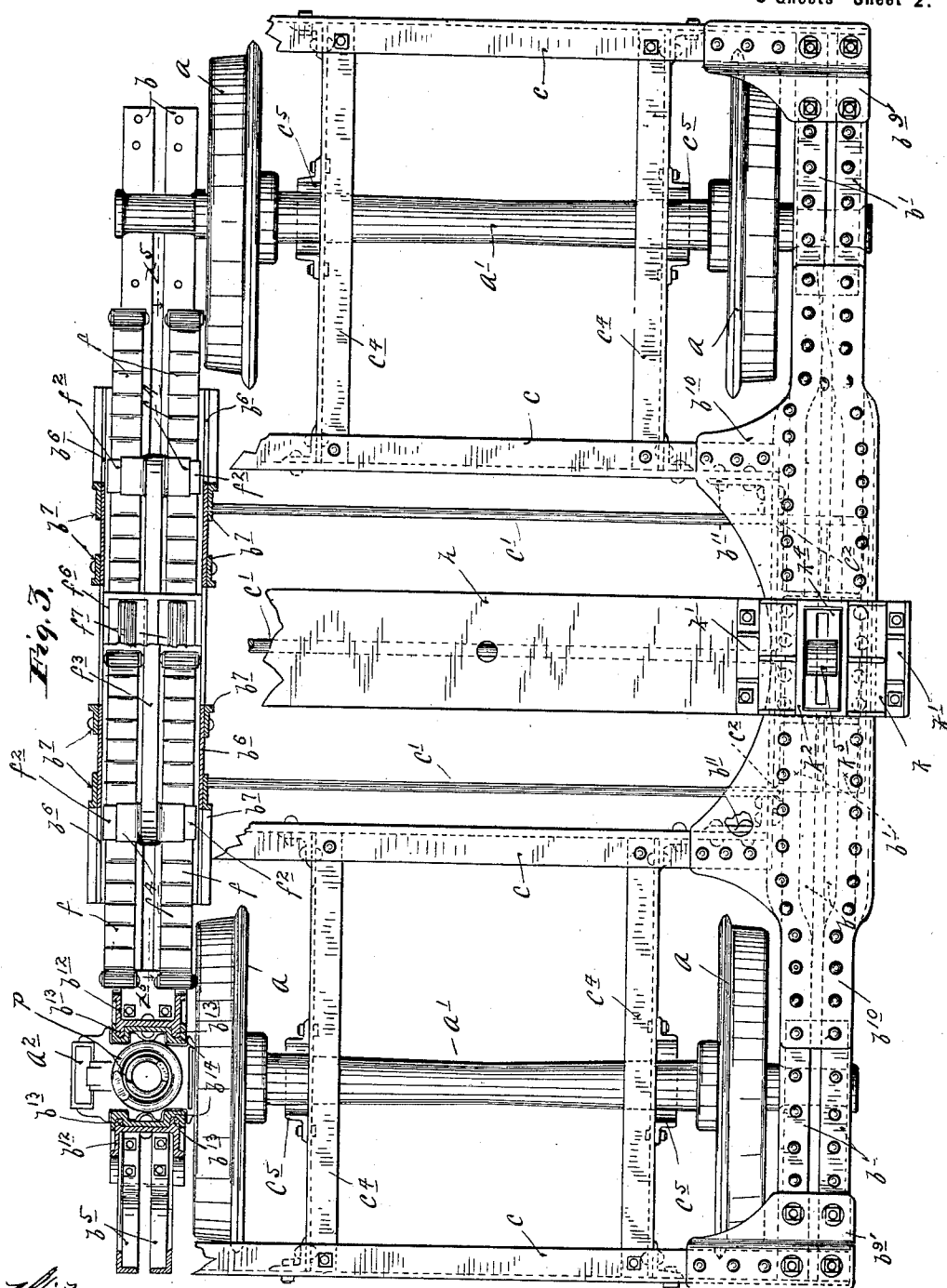
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3 Sheets—Sheet 2.



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**No. 657,635.**

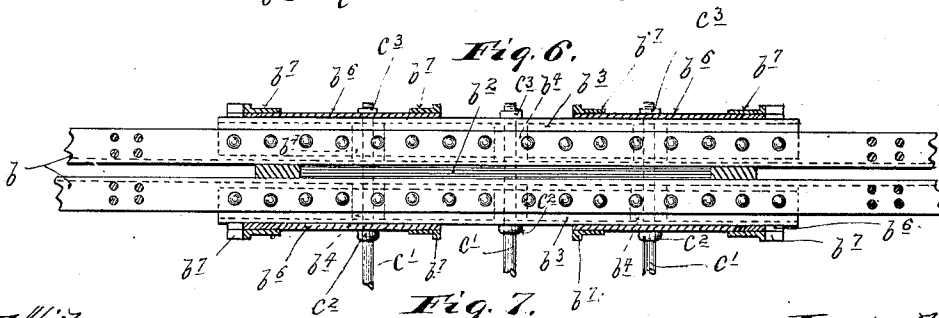
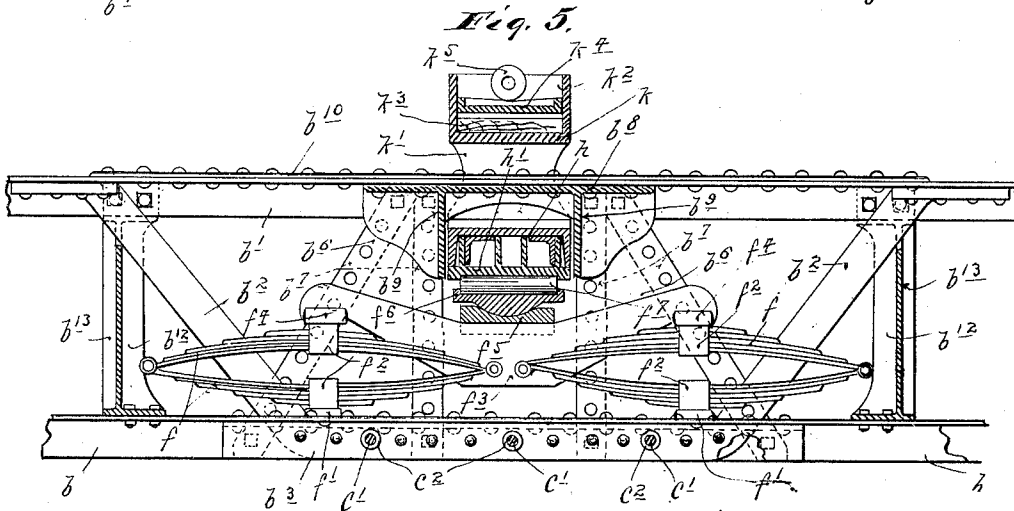
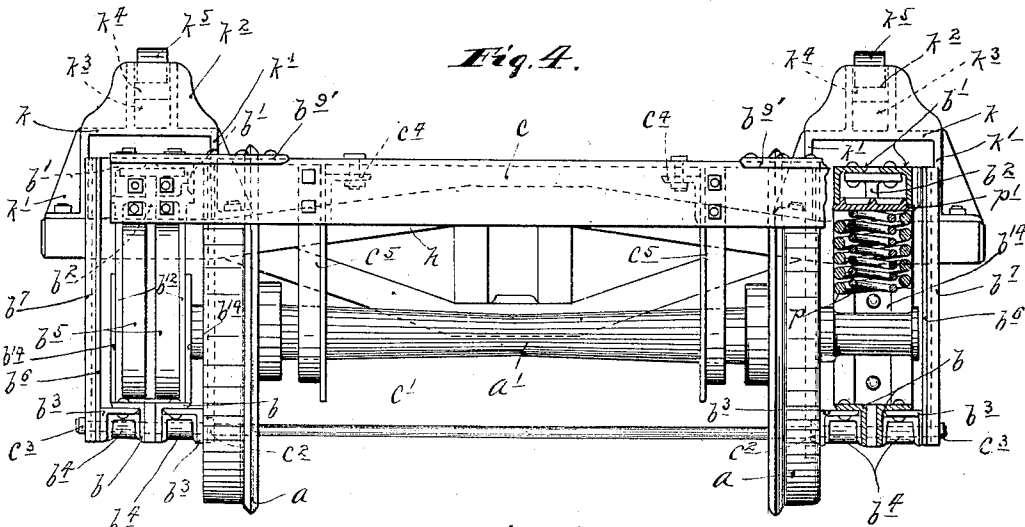
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**PASSENGER CAR TRUCK.**

(Application filed Sept. 14, 1899.)

(No Model.)

**3 Sheets—Sheet 3.**



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# UNITED STATES PATENT OFFICE.

JOHN CHILD BARBER, OF ST. PAUL, MINNESOTA.

## PASSENGER-CAR TRUCK.

SPECIFICATION forming part of Letters Patent No. 657,635, dated September 11, 1900.

Application filed September 14, 1899. Serial No. 730,403. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN CHILD BARBER, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Passenger-Car Trucks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to car-trucks, and has for its especial object to improve the construction of four-wheel passenger-trucks, with a view of securing increased efficiency.

To this end my invention consists of the novel devices and combinations of devices which are hereinafter described, and defined in the claims.

My invention is illustrated in the accompanying drawings, wherein, like notations referring to like parts throughout the several views, Figure 1 is a side elevation of my improved truck. Fig. 2 is a view in vertical section with some portions broken away, the left side being in section on the line  $x'x'$  of Fig. 1 and the right side on the line  $x^2x^2$  of Fig. 1. Fig. 3 is a plan view with some portions broken away and others shown in horizontal section. Fig. 4 is a view chiefly in end elevation, but partly in vertical section, through one of the journal-boxes and connected parts. Fig. 5 is a view in longitudinal section through a part of one of the side frames on the line  $x^5x^5$  of Fig. 3 with some portions broken away. Fig. 6 is a detail in horizontal section through one of the side frames, approximately on the line  $x^6x^6$  of Fig. 1, with some portions broken away and some of the parts removed; and Fig. 7 is a detail in section, showing the relation of one of the bottom cross tie-rods to the lower chords of the side frame.

The reference-letters  $a$ ,  $a'$ , and  $a^2$  represent, respectively, the wheels, the axles, and the journal-boxes.

The truck is composed entirely of metal. Rolled steel in commercial shapes or forms is chiefly employed.

Having regard to the side frames, the lower or bottom chord of each side frame is made up of a pair of angle-bars  $b$ , set with their ver-

tical flanges adjacent and their horizontal flanges facing outward or apart from each other. The upper or top chord of each side frame is made up of a corresponding pair of angle-bars  $b'$ , set with their vertical flanges remote from each other and their horizontal flanges facing inward or toward each other. The angle-bars  $b$ , forming the lower chord, are straight throughout their entire length; but the angle-bars  $b'$ , forming the upper chord, are pressed laterally or outward at the central portions thereof lengthwise of the truck in opposite directions, so as to afford clearance between the same at that portion of their length for purposes which will later appear.

The truss-bar  $b^2$  is a plain bar of the proper shape for the purposes had in view. Said truss-bar  $b^2$  has horizontal laterally-expanded ends, which are anchored by rivets or otherwise to the upper chord, directly over the journal-boxes, and its lower or horizontal portion is embraced by and riveted to the angle-bars  $b$ , forming the lower chord. This horizontal portion of the truss member  $b^2$  is of sufficient length to underreach that portion of the lower chord which supports the bolster-carrying springs, as will later more clearly appear. The members  $b$  of the lower chord are reinforced at their central portions by angle-bars  $b^3$ , which are set with their horizontal flanges underlying the horizontal flanges of the angle-bars  $b$  and are riveted or otherwise rigidly secured thereto, as best shown in Fig. 2. These reinforcing angle-bars  $b^3$  are of a length somewhat greater than the horizontal portion of the truss-bar  $b^2$  and, in addition to adding strength, serve to build outward the bottom chord at the central portion thereof. The parts are so proportioned that the outer faces of the reinforcing-bars  $b^3$  will be in the same vertical plane with the outer faces of the members  $b'$  of the upper chord at that portion of the latter's length where they are pressed outward or laterally, as hitherto noted. Suitable spacing-blocks  $b^4$  are placed between the vertical flanges of the angle-bars  $b$  and  $b^3$  and serve to hold the same apart at the lower edges and to resist angular strains thereon. The said spacing-blocks  $b^4$  are perforated or provided with suitable thimbles for the passage of the con-

necting cross tie-rods  $c'$ , which connect the two side frames, as will later more fully appear. Said spacing-blocks  $b^4$  may therefore be held up in place by said cross tie-rods  $c'$ , which pass through the same. Pairs of end braces  $b^5$ , of angle form in cross-section, are anchored below, preferably by bolts, to the members  $b$  of the lower chord and above to the members  $b'$  of the upper chord. The members of the upper chord—to wit, the angle-bars  $b'$ —are connected to the reinforcing-bars  $b^3$  of the lower chord by brace-panels  $b^6$   $b^7$ , of which parts  $b^6$  represents the body of the panel, and  $b^7$  half-T marginal strips riveted to the plate  $b^6$ . These brace-panels are bolted below to the reinforcing-bars  $b^3$  and above to the outer faces of the angle-bars  $b'$  of the top chord. These reinforcing-panels  $b^6$   $b^7$  are applied both to the outer and the inner faces of the side frames, as best shown in Fig. 6, and the two sets are spaced apart from each other at the longitudinal center of the truck to afford the necessary clearance for the truck-bolster, as will later more fully appear. These brace-panels  $b^6$   $b^7$  greatly strengthen the side frames at that portion of the same which is subject to the direct action of the load. They are secured to the upper and lower chords by bolts rather than rivets for convenience of removal when desired for placing the springs in position or other purposes, as will later more fully appear. These panels  $b^6$   $b^7$  are counterbraces connecting the top and bottom chords and greatly strengthening the side frames at those portions thereof subject to the direct action of the load. A suitable bracket-like block  $b^8$  is riveted or otherwise rigidly secured to the members  $b'$  of the top chord, and is provided with downwardly-extended flanges  $b^9$ , suitably spaced apart to pass the bolster, and serve as the chafing and guiding surfaces for the same, under the backward-and-forward thrusts on the truck. This chafing-block  $b^8$   $b^9$  is of the proper shape to afford great strength in proportion to mass and reinforces the side frame at the central portions thereof and serves also as a spacing-block between the members  $b'$  of the top chord at the central portion of their length.

The top chords of the two side frames are connected by four cross tie-bars  $c$ , of angular form in cross-section, and the lower chords of the two side frames are connected by the bottom tie-rods  $c'$ , which, as shown, are three in number. The tie-bars  $c$ , connecting the top chords, are rigidly secured thereto by bolts or rivets, and the connections are reinforced by lap-plates, which will now be noted and treated for purposes of reference as parts of the side frames. The outer cross tie-bars  $c$  and the ends of the top chords are reinforced by corner lap-plates  $b^9$ , shown as riveted to the tie-bars and as bolted to the top chords. The central members of the tie-bars  $c$  and the top chords are reinforced by lap-plates  $b^{10}$ , which are shown as riveted to

the said parts. The central lap-plates  $b^{10}$  are of a length to cover the top chord throughout the entire central portion thereof and to points directly over the inner pedestals of the journal-boxes, thereby bracing in both directions and adding great strength to this part of the truck-frame. The joints between the central members of the cross tie-bars  $c$  and the top chords are further reinforced by vertical angle-irons  $b^{11}$ , shown as riveted to said parts.

The bottom cross tie-rods  $c'$  are provided with shoulder-collars  $c^2$ , properly placed for abutting against the inner members of the reinforcing angle-bars  $b^3$  of the bottom chords, and are screw-threaded at their outer ends for the application of nuts  $c^3$ , which draw against the outer surfaces of the brace-panels  $b^6$   $b^7$  or the outer member of the reinforcing angle-bars  $b^3$ , as the case may be. Longitudinal bars  $c^4$ , shown as of angle form in cross-section, connect the outermost and the next innermost members of the cross-bars  $c$ , and besides strengthening the frame serve as means for supporting safety-stirrups  $c^5$ , depending therefrom and embracing the truck-axle  $a$  to prevent the axle from falling on the track in case the same should become broken.

The journal-boxes  $a^2$  work between pedestals  $b^{12}$ , which are bolted or otherwise rigidly secured to the upper and lower chords of the side frames. As shown, these pedestals  $b^{12}$  are of stirrup-like form, with their lower ends or the base of the stirrup resting on the angle-bars  $b$  of the lower chord and the upper ends of their vertical arms bolted one to each of the angle-bars  $b'$  of the upper chord. The side flanges of these stirrup-like pedestals  $b^{12}$  are connected by a cross-web for affording the requisite strength, and the cross-webs of the inner members of said pedestals  $b^{12}$  are slotted or cut away near the upper end of the pedestals to afford clearance for the upward passage of the inclined portions of the truss-bar  $b^2$ . The pedestals  $b^{12}$  are provided with flanges  $b^{13}$  at their box-facing corners for cooperation with reversely-shaped seats or grooves in wearing-shoes  $b^{14}$ , constructed to fit the same, as best shown in Fig. 3, and to be held thereby for taking the wear and tear in the movement of the frame relative to the journal-box.

Between the journal-boxes  $a^2$  and the top chords of the side frames are located coiled springs  $p$ , which react between the journal-boxes and spring-caps  $p'$ , as best shown in Fig. 4. On the bottom chords of the two side frames are located two sets of twin elliptic springs  $f$ , disposed lengthwise of the side frames, and the twin members of each set, as shown, are spaced apart laterally a short distance from each other. Said springs  $f$  rest on suitable bases  $f'$ , which are rigidly secured to the angle-bars  $b$  of the bottom chord and are provided with suitable caps  $f^2$ . Equalizers  $f^3$  extend lengthwise of the side

frames and rest on the two sets of springs. As shown, the equalizers extend between the twin members of the facing ends of the two sets of springs and are provided at their extremities with short cross-bars  $f^4$ , formed integral therewith, which rest on the cap-plates  $f^2$  of the springs  $f$ . The twin members of the sets of springs may, however, be set close together and the equalizers be constructed to embrace the said springs in case this arrangement should be desirable for economy of space or other reason. On the said equalizers  $f^3$  are mounted saddles or saddle-plates  $f^5$ , which are of such shape as to embrace the central portion of the equalizer, and the equalizers are of such shape as to afford a horizontal central section thereof for receiving the saddle  $f^5$ , as best shown in Fig. 5. From the said horizontal central portion of the equalizers to the outer ends of the same the top surfaces thereof extend on an upward incline, thereby preventing longitudinal motion of said saddle-plates  $f^5$  on the equalizers. The said saddle-plates  $f^5$  are shown as provided with concave surfaces on their faces, with which cooperate, as shown, the convex surface of a roller bearing-plate  $f^6$ . Otherwise stated, the roller bearing-plate  $f^6$  is mounted on the saddle  $f^5$  for permitting a limited tilting or rocking motion of the saddle-plates and equalizers in respect to the bottom members  $f^6$  of the roller bearing-plates and the bolster carried thereby. Otherwise stated, the equalizers may rock while the bolster remains horizontal. On the bearing-plates  $f^6$  are mounted plain cylindrical rollers  $f^7$  in suitable concave seats for a limited travel crosswise of the truck. The truck-bolster  $h$  is provided on its outer end portions with bearing-plates  $h'$ , having suitable concave bearing-surfaces resting on the cylindrical rollers  $f^7$  for cooperation therewith and the corresponding surfaces of the bearing-plate  $f^6$  to permit a limited lateral travel to the bolster  $h$  in substantially the same manner as that illustrated in numerous of my prior patents. The bolster  $h$  may be of any suitable form, and the details thereof do not require notice for the purposes of this case. It should be noted, however, that the bolster ends are extended outward beyond the chords of the side frame for a purpose which will immediately appear.

A suitable bracket-like casting  $k$  is provided, with downward projections or legs  $k'$ , which straddle the top chord of the side frame and are bolted or otherwise rigidly secured to the bolster  $h$  on opposite sides of the said top chord embraced thereby. The space between the legs  $k'$  of the bracket  $k$  is greater than the cross-section of the top chord of the side frame in order to afford sufficient clearance for the desired limited lateral travel of the bolster  $h$  in respect to the side frames of the truck. Otherwise stated, the brackets  $k$ , carried by the bolster  $h$ , with their legs embracing the top chords of the side frames,

serve as the end stops to limit the lateral travel of the truck-bolster. The brackets  $k$  are also provided with box-like upper heads or projections  $k^2$  of the proper shape to receive and hold shimming-blocks  $k^3$ , bearing-blocks  $k^4$ , and side bearing-rollers  $k^5$ . Hence the brackets  $k$  serve both as the end stops and the supports for the side bearings.

All the different parts of the truck have now been specified. It remains to call attention to some of the special features of improvement in the resulting actions from the construction described.

It will be noted that the side frames are extremely rigid and strong; that the springs and equalizers are directly in the center line of the journal-bearings; that the ends of the side frames project short distances only outward of the axles; that the load is taken on a single central bolster, which is mounted not only for a limited lateral travel on rollers, as in my prior patents, but with freedom for a slight rocking motion crosswise of the truck in virtue of the fact that it is not in anywise tied to bolster-columns or any equivalent devices; that the connection between the bottom bearing-plate for the rollers and the saddle-bars permits a limited oscillating or rocking motion of the equalizers in respect to the bolster; that the elliptic springs are disposed lengthwise of the side frames at equidistant points on opposite sides of the bolster; that the truss-bar  $b^2$  underreaches the bolster-supporting springs and overreaches the journal-boxes and is permanently and independently anchored to the top chord over the journal-boxes and to the bottom chord throughout that portion of the same which underlies the springs, and that the triangular removable panels  $b^6$   $b^7$  counterbrace and connect the upper and lower chords from the trussed portion of the lower chord to that portion of the upper chord which receives the most violent strains, thereby affording the greatest strength at the points most needed. When it is said that the truss-bar is independently anchored to the chords, it is meant that the truss-bar is permanently connected to the upper and lower chords independently of the end braces, counterbraces, or bolster-pedestals.

It may be further noted that this truck has no "bolster-columns" in the ordinary accepted sense of that term. When bolster-columns are used, the bolster is usually held by guides of some sort for right-line vertical movement in respect to the columns, and hence more or less cramping actions occur if there be any tilting action of the bolster crosswise of the truck, or, in other words, at angles to its column-guides. In this truck the forward and backward thrusts are taken on the chafing-surfaces  $b^9$  of the combined chafing and guiding block  $b^8$ , as hitherto noted. Respecting the said block  $b^8$ , attention is called to the fact that the same is anchored to the top chord only of the side frame, thereby throwing the

forward and backward thrusts from the bolster onto the side frames at the points thereof having the greatest strength. Moreover, the use of this combined chafing and guide block  $b^8$ , anchored to the top part only of the side frame and having vertical walls  $b^9$ , which serve the functions named, without extending far down from the top chord, is of special advantage in this truck for the reason that it affords the necessary clearance underneath for the application and the desired action of the equalizers and the springs and facilitates the inspection, insertion, and removal of said parts.

From the fact that the side frames are themselves spring-cushioned on the journal-boxes, from points near the ends of the frames, while the load from the car is taken on a single central bolster, which is spring-cushioned on the side frames, affords independent spring actions to the side frames and the bolster. From this fact and the further fact that the bolster is carried on equalizers supported by springs on opposite sides of the center of the truck and that the bolster-bearing plates rest on saddles carried by equalizers, which permit the equalizers to rock in the respect to the bolster, it follows that an equalizing action is secured which is of great efficiency in its effect on the bolster and the car-body which may be carried thereby. The ends of the side frames may drop or rise on the axles without necessarily imparting any great degree of vertical motion to the bolster. Likewise the bolster may rise and fall under its load from the car without imparting any sudden or violent vertical motion to the side frames. Otherwise and briefly stated, jars and vibrations, whether from inequalities of the rail, shifting of the load, swing of the car-body, or other causes, are reduced to the minimum.

The short ends to the side frames outward of the axles is an important improvement for reducing the leverage from the brake-shoes on the truck-frames, thereby greatly decreasing the tilting action which is so commonly caused from the brakes. When truck-frames project far outward beyond the axles, a bucking action is produced on the truck and the car when the brakes are set by the pull from the wheels on the brake-shoes. This is of course something very disagreeable and undesirable in passenger-trucks and is reduced to a minimum by the construction of truck-frame herein disclosed.

As a further detail it may be noted that the side bearings are supported from points far outward on the truck-bolster, which is considered a desirable thing in modern practice.

It is well known to those familiar with the business that the service demanded from a passenger-truck is materially different from that required of a freight-car truck. On comparing the passenger-truck herein disclosed with any other passenger-truck now in general use, so far as known to me, it will be

found that this truck is extremely simple in construction, while at the same time better meeting the working requirements of the service. For example, a great number of the many parts ordinarily employed in the so-called "swing beam" or spring-plank passenger-trucks are entirely dispensed with.

Having regard to the broad features of the invention, it will be understood that many of the details of construction might be changed without departing from the spirit of the invention.

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

1. In a car-truck, the combination with rigid side frames and a single central bolster, of two sets of springs on each side frame, located one set on each side of the bolster, on a base forming a part of the rigid side frame, and equalizers resting on said sets of springs and supporting said central bolster, substantially as described.

2. In a car-truck, the combination with rigid side frames, of a central bolster, two sets of springs on each side frame located one on each side of said bolster, and equalizers resting on said sets of springs and supporting said bolster, which equalizers are free for a limited rocking motion with respect to said bolster, substantially as described.

3. In a car-truck, the combination with side frames spring-cushioned on the journal-boxes, of a single, central bolster, two sets of elliptic springs on each side frame disposed lengthwise thereof and located one set on each side of the bolster, and equalizers disposed lengthwise of the side frames with their ends resting on said sets of springs, for supporting said bolster, substantially as described.

4. In a car-truck, the combination with side frames spring-cushioned on the journal-boxes, of a single central bolster, two sets of twin elliptic springs on each side frame, disposed lengthwise thereof and located, one set on each side of the bolster, equalizers, for supporting said bolster, disposed lengthwise of the side frames between the facing ends of the twin members of said sets of springs and having cross-bars resting on the spring-caps, substantially as and for the purposes set forth.

5. In a car-truck, the combination with rigid side frames and a central bolster, of columns or vertical guides forming part of said side frames and between which the ends of the bolster work vertically, two sets of springs on each side frame located one on each side of said bolster, equalizers resting on said sets of springs and supporting said bolster, which equalizers are fulcrumed for limited rocking movements below said bolster, substantially as described.

6. In a car-truck, the combination with side frames spring-cushioned on the journal-boxes, of the single central bolster, two sets of springs located one set on each side of the bolster, lengthwise of the side frames, equalizers dis-

posed lengthwise of the side frames with their ends resting on said sets of springs, saddle-plates resting on the equalizers, bottom roller-bearing plates resting on said saddles, bearing-plates on the bolster, rollers between said bottom and bolster-carried bearing-plates, with said saddle-plates and said bottom bearing-plates constructed and related to permit a rocking motion of the equalizers in respect to the bolster, substantially as described.

7. In a car-truck, the combination with the side frames having top and bottom chords arranged in pairs side by side, of truss-bars permanently anchored to the top chords, over the journal-boxes and between the bottom chords, throughout that portion which underlies the bolster-supporting springs, substantially as described.

8. In a car-truck, side frames wherein the top and bottom chords are composed of angle-bars, the truss-bar is independently and permanently anchored to the top chord over the journal-boxes and to the bottom chord throughout that portion thereof which underlies the bolster-supporting springs, and said upper and lower chords are also connected by end braces and the journal-box pedestals, substantially as described.

9. In a truck, the combination with rigid side frames having top and bottom chords, of twin springs seated on the bottom chords, with the members of the twins spaced apart laterally, and truss bars anchored at their ends to said top chords, passed between the members of the twin springs and connected to said bottom chords at their intermediate portions, substantially as described.

10. In a car-truck, side frames wherein the top and bottom chords are each composed of pairs of angle-bars, the truss-bar is independently and permanently anchored to the top chord over the journal-boxes and to the bottom chord throughout that portion thereof which underlies the bolster-supporting springs, the said upper and lower chords are connected by sets of removable counterbraces on opposite sides of the bolster-space and are also connected by end braces and the journal-

box pedestals, all substantially as and for the purposes set forth.

11. In a car-truck, the combination with side frames each composed of upper and lower chords connected by truss-bars, counterbraces, the bolster-pedestals and end braces, of top cross-bars connecting the top chords of the two side frames and lap-plates covering, connecting and reinforcing the said chords and tie-bars at the jointing portions thereof, substantially as and for the purposes set forth.

12. In a car-truck, the combination with side frames and a bolster, of a combined bolster-chafing and guide block independent or separable from the bolster-columns anchored to the top portion of the side frame, substantially as and for the purposes set forth.

13. In a car-truck, the combination with a bolster and side frames having top and bottom chords connected by truss-bars and counterbraces, with the counterbraces applied on opposite sides of the bolster-space, of a bracket or block independent or separable from the bolster-columns anchored to the top chord over the bolster-space and constructed with vertical walls spaced apart to pass the bolster and serve as chafing-surfaces and guides for the same, substantially as described.

14. In a car-truck, the combination with side frames and a bolster, of springs and equalizers for supporting said bolster disposed lengthwise of the frames and brackets or blocks anchored to the upper portions of the side frames and provided with vertical side walls embracing the bolster and serving as chafing-surfaces and guides for the same, but extending a short distance only below the top chords of the side frames, whereby clearance is afforded for the parts which support the bolster, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN CHILD BARBER.

Witnesses:

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KATE L. BLADE.