No. 856,111. PATENTED JUNE 4, 1907.

W. E. SYMONS.

CAR TRUCK.

APPLICATION FILED SEPT. 7, 1906.

4 SHEETS—SHEET 1.

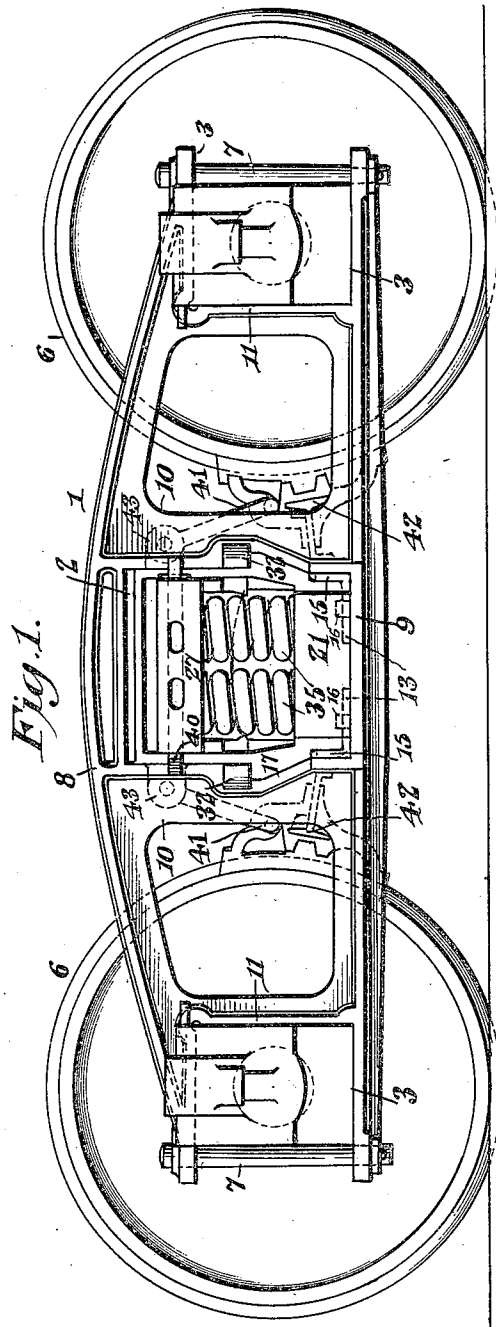


Fig. 1.

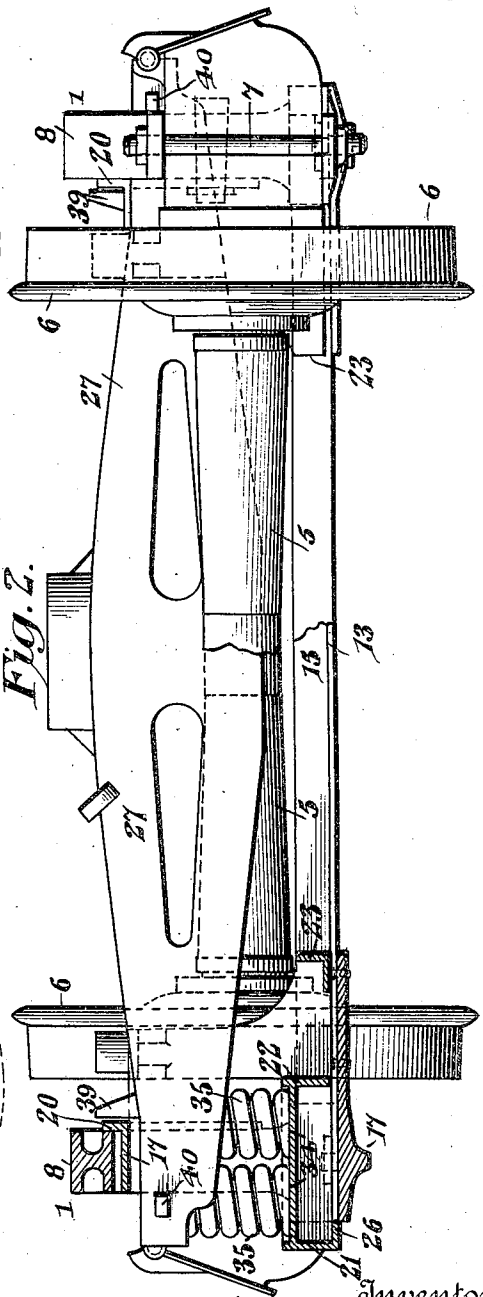


Fig. 2.

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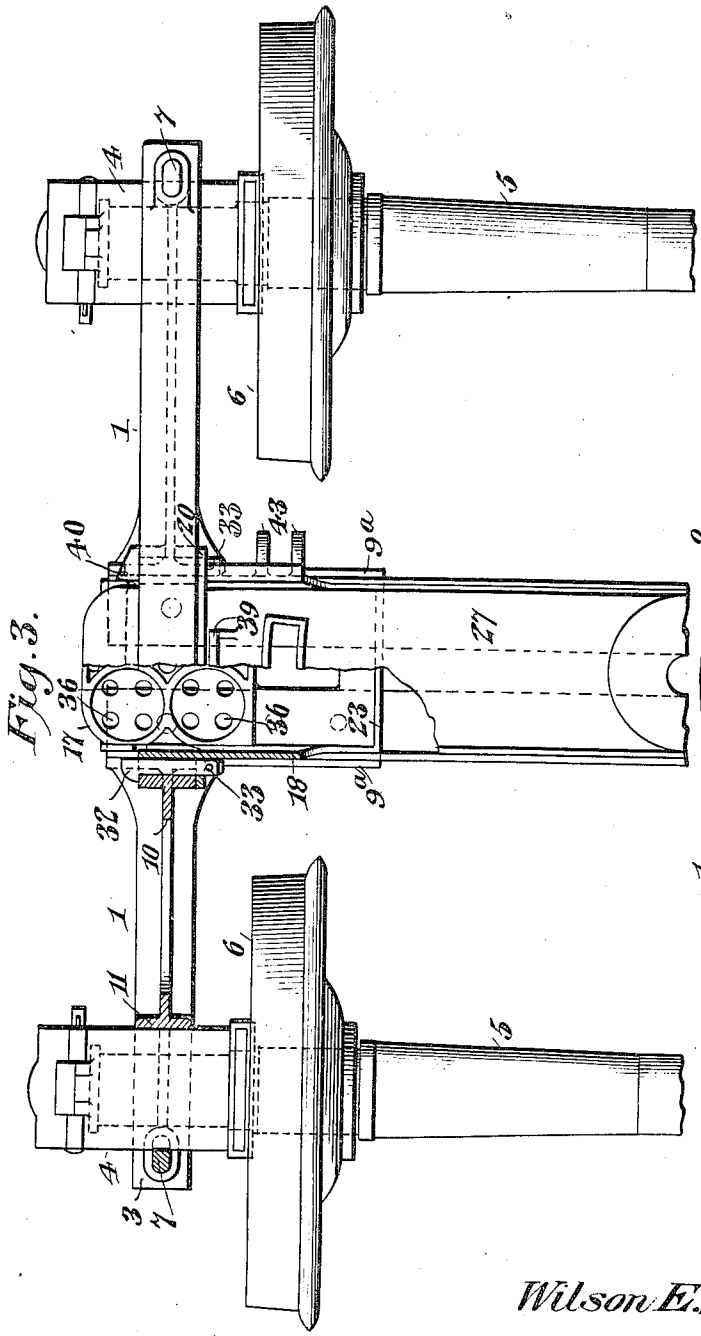


Fig. 3.

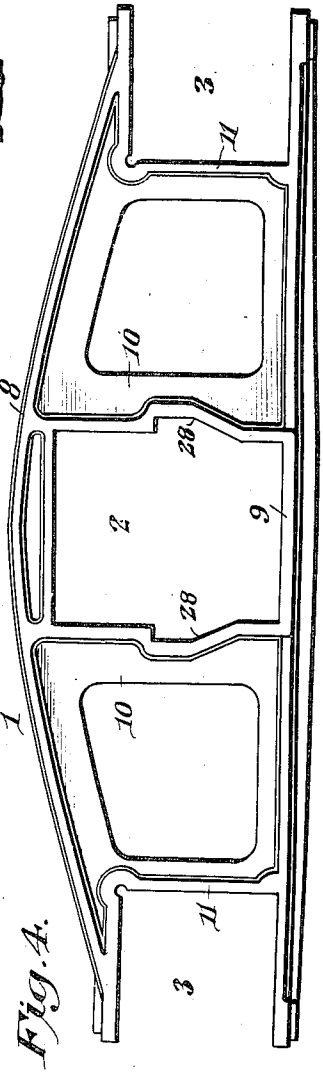


Fig. 4.

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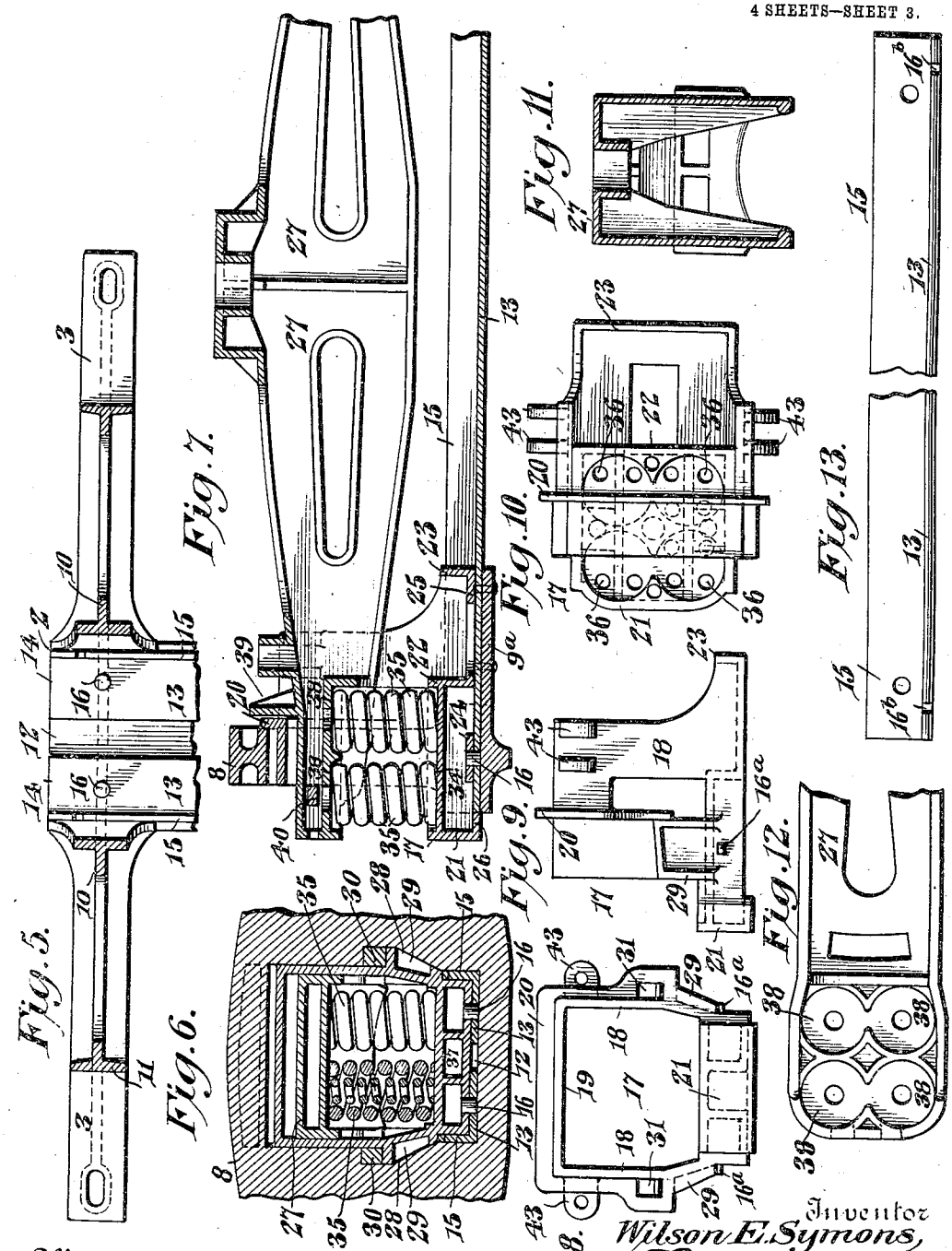
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 15.

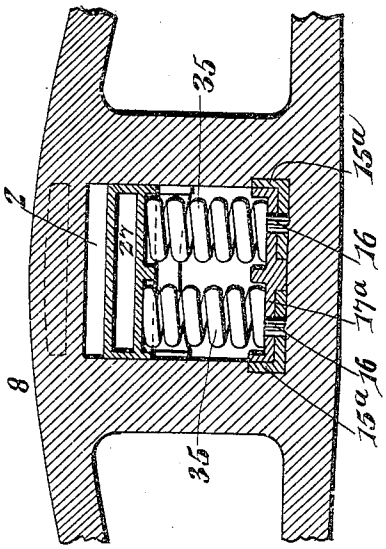


Fig. 17.

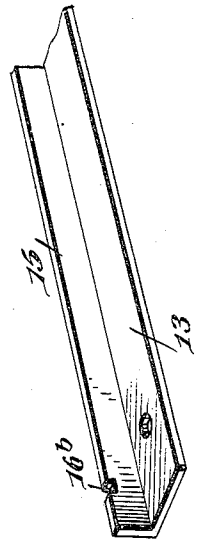


Fig. 14.

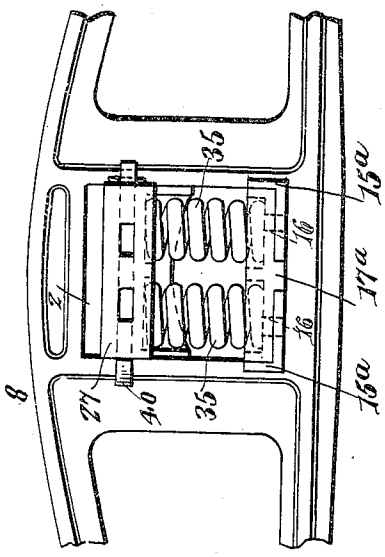
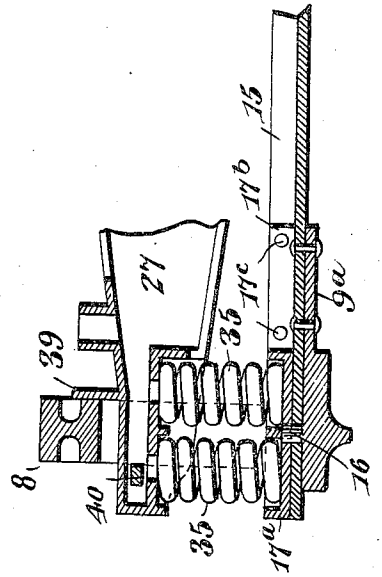


Fig. 16.



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UNITED STATES PATENT OFFICE.

WILSON E. SYMONS, OF CHICAGO, ILLINOIS.

CAR-TRUCK.

No. 856,111. Specification of Letters Patent. Patented June 4, 1907.

Application filed September 7, 1906. Serial No. 333,675.

To all whom it may concern:

Be it known that I, WILSON E. SYMONS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Car-Truck, of which the following is a specification.

This invention relates to car trucks of that general type disclosed in my former patents Nos. 649,183, dated May 8, 1900, and 700,992, dated May 27, 1902. The truck possesses, in common with the former constructions, extraordinary strength and durability, notwithstanding its extreme simplicity of construction and light weight.

The object of the present invention is to produce a truck possessing all of the desirable characteristics of my former constructions, but having greater elasticity in the connection between the side frames, so that torsional and other strains due to undulating or imperfect track will be absorbed by the connection without injury to either the side or cross members of the truck frame.

A further object of the invention is to eliminate from the truck the rigid cast steel transom heretofore extended between and keyed to the side frames, and to substitute in lieu thereof one or more comparatively elastic cross members and two metal end members extended through the side members and interlocked with the side and cross members, the side, cross and end members being combined and related in a manner to facilitate the assembling of the truck structure or the disorganization thereof for purposes of repair.

A further object is to so construct the end members that they will serve not only as retaining devices for the cross members, but also as combined supports for the brake-beam-hangers and seats for the bolster supporting springs.

A further object of the invention is to combine with the elastic connection between the bottom portions of the side members, a holding means engaging the upper portions of the side members to prevent spreading thereof and serving to assist in guiding the bolster in its vertical movement.

To the accomplishment of the foregoing objects, and others subordinate thereto, the present embodiment of the invention resides in that construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and succinctly defined in the appended claims.

In said drawings—Figure 1 is a side elevation of the complete truck. Fig. 2 is an end elevation of the truck, showing one side thereof in section and certain parts broken away. Fig. 3 is a plan view of one side of the truck with parts broken away and one end shown in section. Fig. 4 is an elevation of one of the side frames. Fig. 5 is a horizontal section through one of the side frames with portions of the cross members attached thereto. Fig. 6 is a vertical longitudinal section through the middle portion of one of the side frames and the associated parts. Fig. 7 is a vertical transverse section through a portion of the truck. Fig. 8 is an outer end view of one of the end members. Fig. 9 is a side elevation thereof. Fig. 10 is a top plan view of the end member. Fig. 11 is a sectional view of the bolster. Fig. 12 is an inverted plan view of one end of the bolster. Fig. 13 is a plan view of one of the cross members. Fig. 14 is a side elevation of the middle portion of one of the side members, showing a modified arrangement of the cross and end members. Fig. 15 is a section of the arrangement shown in Fig. 14. Fig. 16 is a sectional view of the same subject-matter taken on a line at right angles to the line in Fig. 15, and Fig. 17 is a detail view of the end portion of a cross member.

Each part is indicated by the same reference character in all of the views.

The side frames 1 are generally similar to those shown in my Patent No. 700,992, being steel castings each having a central opening 2, and open jaws 3 at its opposite ends, the latter being adapted for the reception of the journal boxes 4 of the axles 5, supported by the truck wheels 6 in the usual manner. The boxes 4 are retained in the jaws 3 by keys 7 having semicircular outer faces and passed vertically through the outer ends of the upper and lower members of the side frame between which the jaws are defined.

Each side frame comprises an upper member or arch bar 8, a lower member or binder 9, central struts 10, and end struts 11, which elements, being in an integral structure, combine to form a strong, rigid, light-weight side member of comparatively inexpensive construction. The side frames differ somewhat

from those shown in the patent above identified. One variation consists in a more pronounced widening of the bottom members or binders 9 between the central struts 10, as indicated at 12, see Fig. 5, in order to secure a substantial bearing for the ends of a pair of parallel cross members 13 in the form of angle bars extending between the side members 1 and through the central openings therein and comprising horizontal flanges 14 the ends of which rest upon the widened portions 12 of the binders 9 and vertical flanges 15 opposed to the inner faces of the central struts 10 and extended, like the flanges 14, to the outer edges of the side members. An interlocked connection between the cross members 13 and the side members 1 is effected by dowels 16 preferably cast integral with the bottom members of the side frames and engaged in openings in the horizontal flanges 14 of the cross members, as shown in Figs. 5, 6 and 7.

It will be noted, by reference to Figs. 3 and 7, that that portion of the side member constituting the bottom or sill of the opening 22 is not only widened, but is formed at the inner side of the member with a material extension 9^a forming an extended bearing or support for the cross members 13 which, in addition to being interlocked with the side members through the medium of the dowels, may be additionally secured, if desired, by riveting the flanges 14 of the cross members to the extensions 9^a of the side members, as indicated in Fig. 7. It should be understood, however, that while certain conditions of service make it desirable to utilize the extensions 9^a and to rivet these extensions to the cross members, both of these features may be omitted under some conditions and under others the extensions may be employed but the rivets omitted.

The engagement of the cross members with the dowels 16 and the abutment of the end portions of the flanges 15 with the struts 10 insures a rigid connection of the side and cross members, but facilitates their disconnection by the simple act of lifting the cross members above the dowels and withdrawing said members endwise from the side frames, after having first removed keys and combination end casting. These angle bars or cross members 13 constitute in effect a sand board or spring plank, since they perform the functions of the lower portion of the transom eliminated from this construction. These cross members or angle bars 13 are sufficiently elastic to absorb the torsional strains due to undulating track without danger of injury to any portion of the truck structure. In order to secure the greatest possible elasticity consistent with strength and durability, said bars are constructed of wrought iron or mild steel, preferably the latter, and it will of course be understood that the exact form and dimensions of these bars may be varied in accordance with the type and capacity of the truck in which this particular feature of the invention is incorporated.

Extended through the central opening 2 of each side member 1 is an end member 17 constructed as shown in Figs. 6, 7, 8, 9 and 10, and formed in a single casting, preferably of steel or malleable iron. These end members assist in the retention of the cross members 13 and constitute combined spring seats and brake-beam-hanger supports, since they are constructed, in a manner to be described, to be interlocked with the side and cross members, and are provided with seats for the bolster supporting springs and with lugs or ears for the attachment of the brake beam hangers.

As best shown in Figs. 8 to 10 inclusive, each end member 17 comprises side walls 18 of considerably greater width than the side member, but having their outer edges coincident with the outer edges of the side members, so that the major portions of said walls extend inwardly from the side members, as shown in Fig. 7. The walls 18 are connected by a top member 19, which is disposed below the upper member of the side frame, being substantially the same width as said member and provided at its front edge with an abutment flange 20 abutted against the inner face of the side member, as shown in Fig. 7, and extended upon the side walls 18, as shown in Fig. 8. The bottoms of the side walls 18 are widened, as best shown in Fig. 9, and are connected by vertical walls 21, 22 and 23 of inconsiderable height and by bottom walls 24 and 25, which latter rest upon the horizontal flanges 14 of the cross members. The wall 25 extends between the vertical walls 22 and 23 and is preferably cut out for lightness, as shown in Fig. 10, while the bottom wall 24 is in the form of a narrow plate disposed longitudinally of the truck midway of the walls 21 and 22 and provided with openings for the reception of the dowels 16, see Figs. 6 and 7. The lower portion of the end member extends beyond the outer side of the widened portion 12 of the side member, see Fig. 7, and the bottom 26 of this extended portion is dropped below the plane of the bottom walls 24 and 25 to bring it in abutting relation with the end faces of the cross members 13. It will thus be seen that a rigid interlocked relation is established between the end, side, and cross members, since the cross members rest directly upon the binders of the side members and engage the central struts and dowels thereof, while the end member extends through the side member, engages the central struts and dowels thereof, and imposes its weight upon the cross members and is disposed in abutting relation with the outer ends of said members, which assemblage and relation of parts effectually resists the strains in all directions.

An additional interlocked connection between the cross members 13 and the end members 17 is secured by providing horizontal projections or dowels 16[a] extending from the opposite side walls of the end members, see Fig. 9, and arranged to engage notches 16[b] formed in the upper edges of the vertical flanges 15 of the cross members, see Figs. 5 and 13, these notches being cut out of line with the openings which receive the dowels 16 to minimize the liability of a transverse connecting fracture. It will also be noted, by reference to Figs. 6 and 7, that while the lower portion of each end member is widened transversely of the truck, such portion is somewhat narrowed longitudinally of the truck in order to permit such portion to fit between the vertical flanges 15 of the cross members. Attention is further directed to the fact that the lower ends of the openings 2 in the side members 1 are slightly narrower than the upper ends thereof for the purpose of bringing the vertical flanges of the cross members in proper relation to the bolster 27, which must be of such width as to permit its ends to pass between the side walls of the end member, as will be presently described.

As an additional security, the inner faces of the central struts 10 of each side member are formed, either during the casting of the member or subsequently, with notches or key seats 28 into which are extended from the side walls of the end member a pair of lugs 29 preferably having their outer faces inclined, as shown, and formed for the sake of lightness by casting a rectangular flange or rib on each side of the end member. The key seats 28 are of sufficient length to permit the end member to be passed into the side member at a sufficient height to clear the dowels 16 and to be then dropped down into engagement with the dowels and retained in such position by the insertion of keys 30 through the key seats 28 above the lugs 29 and through key openings 31 in the side portions of the abutment flange 20 of the end member, see Figs. 3, 6 and 8. The keys 30 may be of any suitable form or material, but are preferably headed, as indicated at 32, see Fig. 3, to engage the outer edge of the adjacent strut, and are provided at their inner ends with removable pins 33 passed through the key adjacent to the inner face of the flange 20.

As heretofore stated, each member 17, in addition to its function as a retainer for the cross members, also affords a seat for the bolster supporting springs. To this end the end casting is formed with a horizontal wall or spring seat 34 extending between the side walls 18 and also between the short vertical walls 21 and 22 adjacent to the upper edges of the latter, as shown in Fig. 7. The seat 34 is thus elevated somewhat above the bottom of the end member, and its upper surface is formed to receive four sets of bolster supporting springs 35. The seat 34 is also provided with sand holes 36, as usual. Since the weight of the bolster and the car structure supported thereby is sustained by the spring seats 34, the latter are preferably stiffened by vertical walls or webs 37 disposed below the seat and extending between the walls 21 and 22 in spaced relation to each other and to the side walls 18, and formed integral with the walls 21 and 22 and with the spring seat 34 and the bottom wall 24 of the end casting.

The bolster 27, see Figs. 2 and 7, is of sufficient length to be extended through the end members, so as to dispose the spring seats 38 of the bolster above the seats 34 of the end members, it being understood that the seats 38 rest upon the springs 35 and are formed by diaphragms cast as integral parts of the bolster structure and extended between the side walls thereof in a plane above the lower edges of said walls, the construction being similar to that disclosed in my former patent. The bolster is also provided with the usual thrust flanges 39, which, however, instead of being opposed to the side member of the truck in the ordinary manner, are opposed to the abutment flanges 20 of the adjacent end members, as shown in Fig. 7. By reason of this relation the end thrust of the bolster is sustained by the end members and it follows as the inverse of this proposition that the thrust flanges 39 of the bolster furnish additional resistance to any tendency of the end members to move inwardly. It is also intended that the bolster shall constitute means for resisting any tendency of the end members or side frames to move outwardly. To this end headed keys 40 are passed horizontally through the outer ends of the bolster just beyond the outer edges of the end and side members, as shown in Figs. 1, 2, and 7, and retained by pins 41. It will be obvious that these keys 40 not only constitute outer guides or thrust members for the bolster, but that they also serve to hold the upper portions of the side frames and end members in proper position, since they resist any tendency of the upper portions of the side and end members to spread.

We have now seen that the end members 17 assist in retaining the cross members 13 and that they constitute seats for the bolster supporting springs 35. They also serve, as heretofore stated, as supports for the hangers 41 of the brake beams 42, each end member being formed with lugs or ears 43 extending outwardly from the side walls thereof at points between the side frames for the attachment of the hangers 41, see Figs. 1, 8, 9 and 10.

In Figs. 14 to 16 I have illustrated a somewhat modified construction. In this form of the invention the end members 17[a], in-

stead of being in the form of open frames inclosing the ends of the bolster, are in the form of comparatively light spring-seat castings or pressed steel forms which rest upon the cross members and engage the dowels, as in that form of the invention previously described, the weight of the car structure being imposed upon these castings and thus causing the latter to hold the end members securely in the side frames. A further variation resides in cutting out the side walls of the opening 2 of the side frames to accommodate the vertical flanges 15 of the cross members, these cut-out portions or notches being indicated by 15^a in Fig. 15. It will be seen that by this arrangement vertical movement of the cross members in the side frames is prevented by the walls of the seats or cut-out portions of the latter, while the interposition of the end members between the cross members prevent the latter from moving inwardly. Under some conditions the side walls of the spring seat castings or end members 17^a are provided with extensions 17^b secured to the vertical flanges 15 of the cross members in any suitable manner, as for instance by rivets 17^c, see Fig. 16.

It is thought that from the foregoing, the novel construction and arrangement of the elements of my truck will be clearly comprehended, but while the illustrated embodiment of the invention is thought at this time to be preferable, I desire to reserve the right to make such changes, modifications, and variations of the illustrated structure as may come fairly within the scope of the protection prayed, and to construct the various parts of such materials and to effect their manufacture in such manner as may be deemed desirable.

What I claim is:—

1. A truck, including side members, a connecting cross member, and end members, the cross and end members having interlocked connection with each other, and means for securing the end members to the side members, whereby each contributes to the retention of the other in its proper relative position.

2. A truck including side members having openings, cross members extended into said openings, and end members located in said openings in the side members, each end member being interlocked with the adjacent ends of the cross members and secured to the adjacent side member.

3. A truck including side members having openings, cross members having their ends located in the openings and constituting spring seats, end members having interlocked engagements with the cross members, and means for securing the end members to the side members.

4. A truck including side members having openings, a cross member, and end members engaging the side and cross members and interlocked with the latter, said end members being provided with seats for the bolster supporting springs.

5. A truck including side members, angle bars engaged with the side members, and end members secured to the side members and interlocked with the angle bars.

6. A truck including side members, angle bars engaged with the side members, and end members secured to the side members and interlocked with the angle bars, said end members having seats for the bolster supporting springs.

7. A truck including a side member having an opening provided with a substantially upright side wall, an end member located in the opening and having a substantially upright side wall, a cross member having its end fitted between said upright walls and having an interlocking engagement with one of the same.

8. A truck including a side member having an opening provided with a bottom and a side wall, an end member located in the opening and having a side wall, a cross bar comprising an angle iron fitted upon the bottom of the opening and between the said side walls, the side wall of the end member being interlocked with the flange that is fitted between said side walls.

9. A truck comprising spaced side members having openings, upstanding dowels projecting from the bottom of the openings, cross members connecting the side members and comprising angle bars engaged in the openings, the horizontal flanges of the angle bars having sockets that receive the dowels, end members located in the openings and constituting spring seats, and interlocking connections between the end members and the upright flanges of the cross member.

10. A truck including side members, a connecting cross member, and end members connecting the side and cross members.

11. A truck including side members, a connecting cross member, and end members, the side, cross and end members having interlocked connection, whereby each contributes to the retention of the other in its proper relative position.

12. A truck including side members, a plurality of cross members interlocked with the same, and end members each associated with a side member and engaging the cross members to maintain the said interlocked engagement.

13. A truck including side members having openings, cross members extended into said openings, and end members located in the openings in the side members and interlocked with the adjacent ends of the cross members to maintain their position in the side members.

14. A truck including side members hav-

ing openings, angle bars connecting the side members and extended into the openings thereof, and end members retained in said openings and having their lower portions located between the vertical flanges of the angle bars, and interlocked therewith said members constituting retaining means for the angle bars.

15. A truck including side members having openings, cross members extended into said openings and interlocked with the side members, and end members retained in the openings and imposed upon the cross members to retain the latter in interlocked relation with the side members.

16. A truck including side members having openings, cross members extended into said openings, and end members located in said openings in the side members, each side member and the adjacent end member being interlocked with each other and with the adjacent ends of the cross members.

17. A truck including side members having openings, a cross member extended into the openings, end members located in the openings and constituting retaining means for the cross member, and means for keying the end members to the side members.

18. A truck including side members having openings, a cross member extended into said openings, and spring seats located above the cross member and adapted to support the bolster supporting springs, said seats having means for retaining the cross member in the openings.

19. A truck including side members having openings, a cross member, and end members engaging the side and cross members and interlocked with both, being provided with seats for the bolster supporting springs.

20. A truck including side members having openings, a cross member extended into said openings and having direct connection with the side members, and end members located in the openings and constituting seats for the bolster supporting springs, said seats being interlocked with the cross member.

21. A truck including side members having openings, a cross member extended into said openings and having direct interlocking engagement with the side members, and end members retained in the openings in the side members and constituting retaining means for the cross member and also constituting seats for the bolster supporting springs.

22. A truck including side members having spaced struts, forming openings, parallel cross members extended into said openings between them, and end members each located between the struts of one of the side members to constitute a spring seat and interlocked with the adjacent ends of the cross members.

23. A truck including side members, angle bars detachably engaged with the side members, and spring seats supported by said bars and maintaining their engagement with the side members.

24. A truck including side members, angle bars extending between said members, and end members supported by said bars and keyed to the side members and provided with seats for the bolster supporting springs.

25. A truck including side members having openings, angle bars extended into said openings, and end members provided with spring seats, said angle bars and end members having interlocking engagement with the side members.

26. A truck including side members having openings and dowels extending therein, angle bars extended into said openings and engaging the dowels, and end members located in the openings in the side members and imposed upon the angle bars, said end members likewise engaging the dowels.

27. A truck including side members having openings and dowels extended therein, angle bars extended into said openings and engaging the dowels, and end members located in the openings in the side members and imposed upon the angle bars, said end members likewise engaging the dowels and having seats for the bolster supporting springs.

28. A truck including a side member having an opening and an end member detachably interlocked in said opening and constituting a combined spring seat and brake-beam-hanger support.

29. A truck including a side member, a cross member, and a combined spring seat and brake-beam-hanger support engaging the side and cross members and interlocked with both.

30. A truck including side members having openings, cross members extended into said openings and interlocked with the side members, and end members located in said openings in the side members and each having lugs for the attachment of brake-beam-hangers and a seat for the bolster supporting springs, said end members constituting securing means for the cross members.

31. A truck including side members, a cross member, end members interlocked both with the side and cross members and having spring seats, springs supported by said seats, and a bolster extended through the end members and carried by the springs.

32. A truck including a side member having an opening, a cross member interlocked with the side member, and an end member located in the opening and engaging the side member at both the top and bottom of the opening, said end member being interlocked with the side member, and constituting retaining means for the cross member, springs supported by the end member, and a bolster having its end extended through the end member and carried by the springs.

33. A truck including a side member having an opening, a cross member, an end member located in the opening, bolster supporting springs mounted in the end member, and a bolster having its end extended through the side member and provided with a thrust flange engaging the end member.

34. A truck including side members having openings, a cross member connecting the bottom portions of the side members, a bolster extended through the side members, and means carried by the bolster to prevent spreading of the upper portions of the side members.

35. A truck including side members, a cross member connecting the bottom portions thereof, a bolster extended through the side members and provided with thrust flanges at the inner sides of said members, and means carried by the bolster at the outer sides of the side members to prevent spreading of the upper portions of the latter.

36. A truck including side members having openings, a cross member, end members located in said openings and constituting seats for the bolster supporting springs, a bolster extended through the end members and having thrust flanges engaging the same, and keys carried by the ends of the bolster to prevent spreading of the upper portions of the side members.

37. A truck including a side frame and a cross member adapted to be brought into interlocking engagement by relative movement of said members in a vertical direction, and means including a key for opposing relative vertical movement of the side and cross members to prevent the same from moving out of interlocking relation.

38. A truck including a side member and a cross member one of which is movable in a vertical direction to engage the other, the engagement being such as to prevent relative movement of said members in a horizontal direction, and a member keyed to the side member and disposed to prevent the disengagement of the side and cross members.

39. A truck including a side member, an end member movable vertically into interlocking engagement with the side member, and a key coöperating with the side and end members to prevent disengagement thereof.

40. A truck including side and cross members having interlocking engagement, an end member also having interlocking engagement with the side member and serving to prevent disengagement of the side and cross members, and means including a key for preventing disengagement of the side and end members.

41. A truck including a side member, a cross member movable vertically into interlocking engagement with the side member, an end member movable vertically into interlocking engagement with the side member and disposed to prevent disengagement of the side and cross members, and means including a key for preventing the end member from moving vertically out of interlocking engagement with the side member.

42. A truck including a side member having an opening provided with a notch, an end member having a projection extended into the notch, and a key extended into the notch to prevent relative movement of the side and end members in a vertical direction.

43. A side member having an opening provided with a notch in one side wall thereof, a vertical projection extending upwardly from the bottom of the opening, an end member movable vertically to engage the projection of the side member and having a lug extended into the notch in said side member, and a key inserted in the notch above the lug to prevent the end member from moving vertically out of engagement with the projection of the side member.

44. A truck including a side member having an opening, dowels extended vertically into the opening from the lower side thereof, and notches in the opposite side walls of the opening, angle bars extended into the opening in the side member and engaging the dowels, an end member located in the opening in the side member above the angle bars and likewise engaging the dowels, lugs extending in opposite directions from the end member, and keys inserted in the notches in the side member above the lugs of the end member to prevent said end member from rising out of engagement with the dowels.

45. A truck including a side member, a cross member, and an end member, the cross and end members being interlocked with each other and with the side member.

46. A truck including a side member having a dowel, a cross member engaging said dowel, and an end member imposed upon the cross member and provided with a projection engaging an opening in the cross member.

47. A truck including a side member, cross members supported thereby, and an end member having oppositely extending projections engaging said cross members.

48. A truck including a side member, a pair of angle bars constituting cross members and supported by the side member, and means for securing the cross members to the side member including a spring seat interposed between the vertical flanges of the angle bars and interlocked with said flanges.

49. A truck including a side member, a cross member interlocked with the same, and an end member secured to the side member and engaging the cross member to maintain the said interlocked relation between the members.

50. A truck including a side member, a cross member engaged therewith, and means for securing the cross member to the side member, including a spring seat interlocked with the cross member and secured to the side member.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILSON E. SYMONS.

Witnesses:
E. M. HADLEY,
H. A. JOHNSON.