(No Model.) 2 Sheets—Sheet 1.

C. T. SCHOEN.

PRESSED STEEL TRUCK FRAME FOR CARS.

No. 542,427. **Patented July 9, 1895.**

Fig. 1

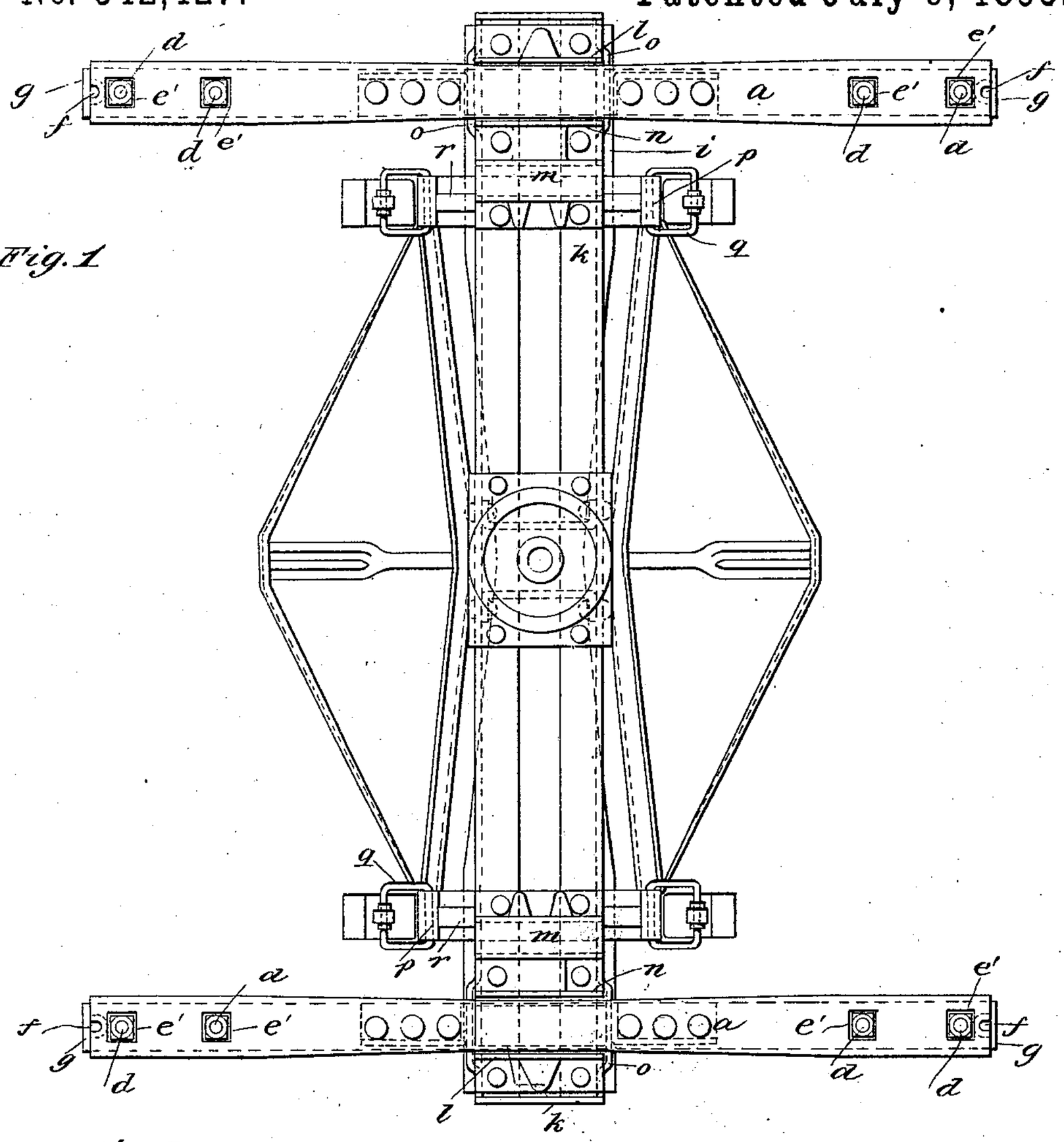
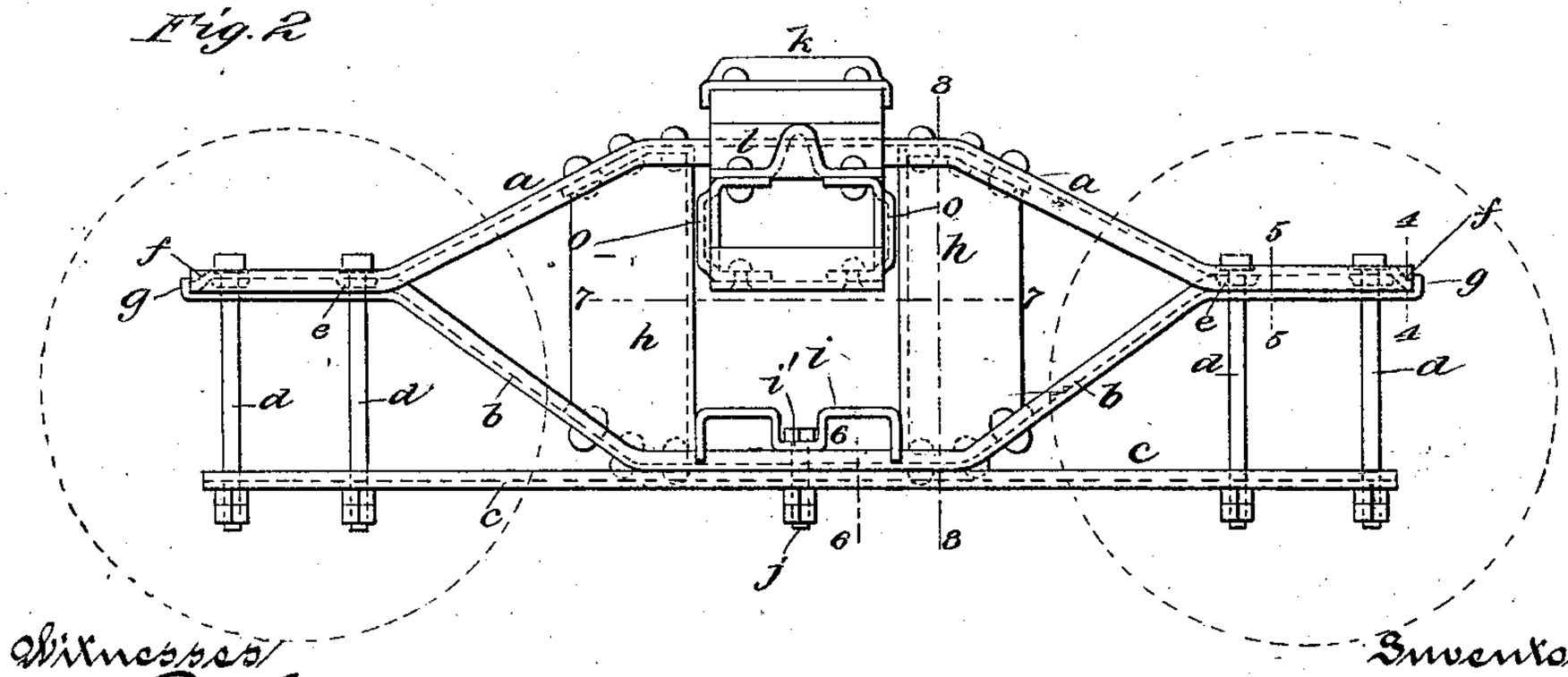


Fig. 2



Witnesses:
J. F. Coleman
Harry G. Davis

Inventor
Charles T. Schoen
by Wm. Pinkney
Attys

(No Model.) 2 Sheets—Sheet 2.

C. T. SCHOEN.

PRESSED STEEL TRUCK FRAME FOR CARS.

No. 542,427. Patented July 9, 1895.

Fig. 3

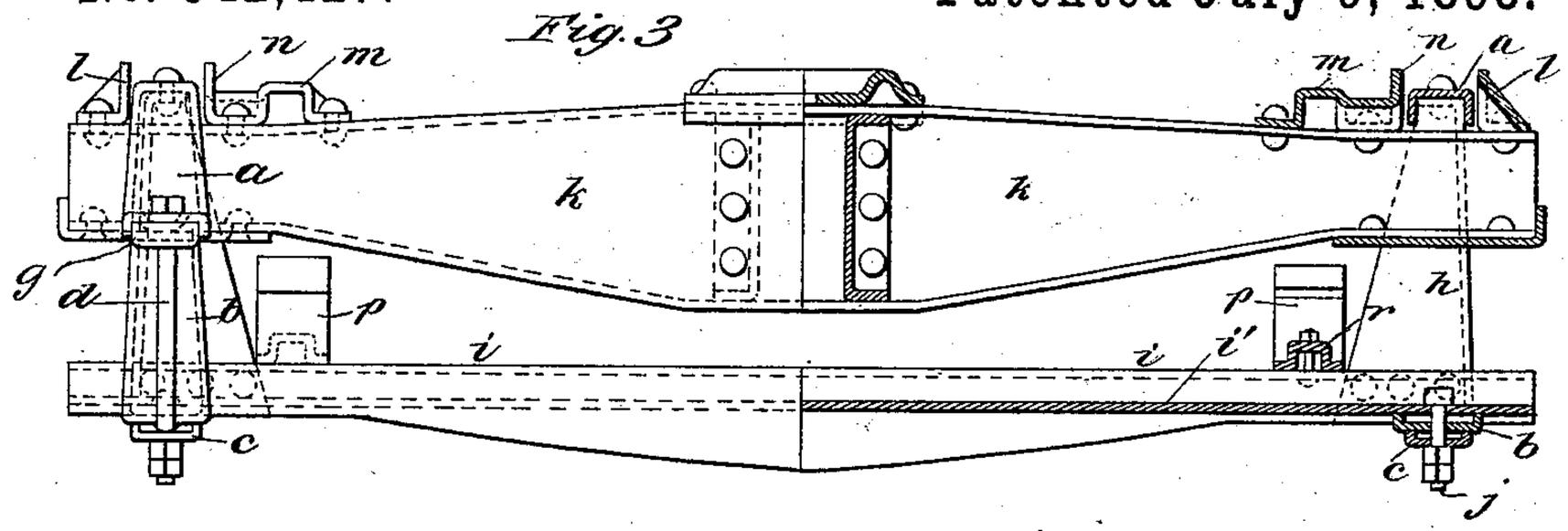


Fig. 4

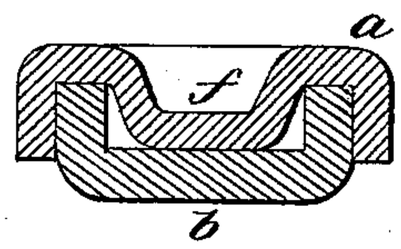


Fig. 5

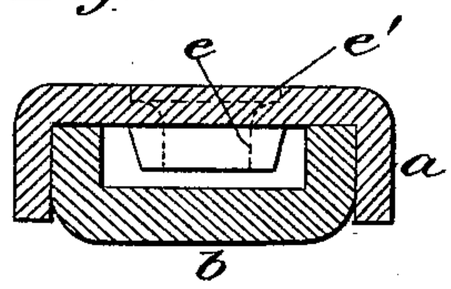


Fig. 6

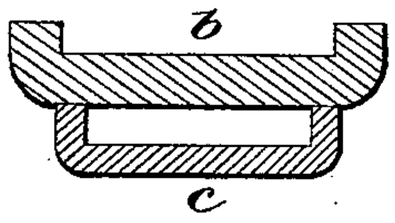


Fig. 7

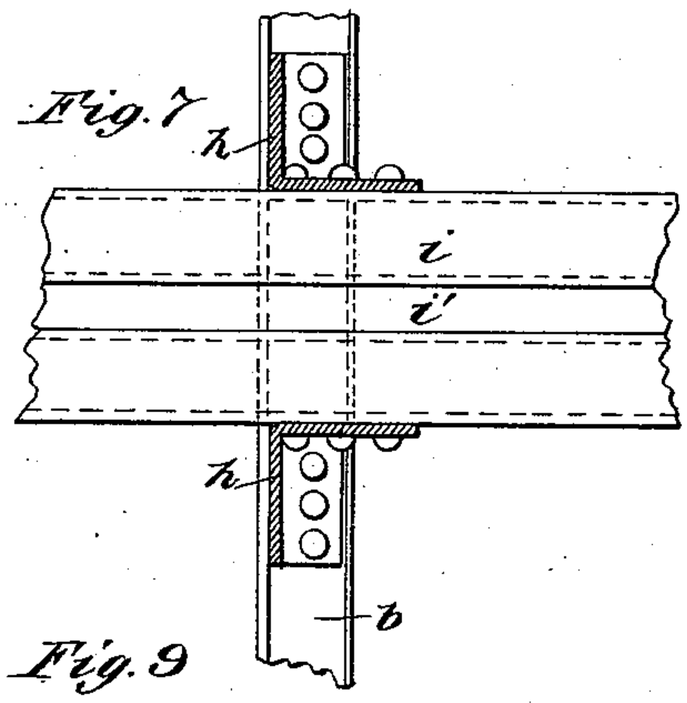


Fig. 8

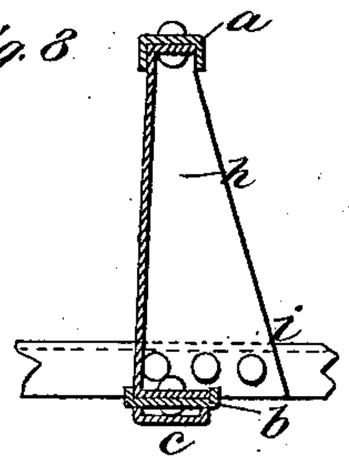


Fig. 9

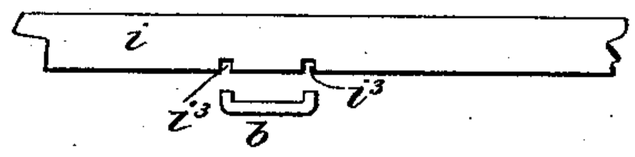


Fig. 10

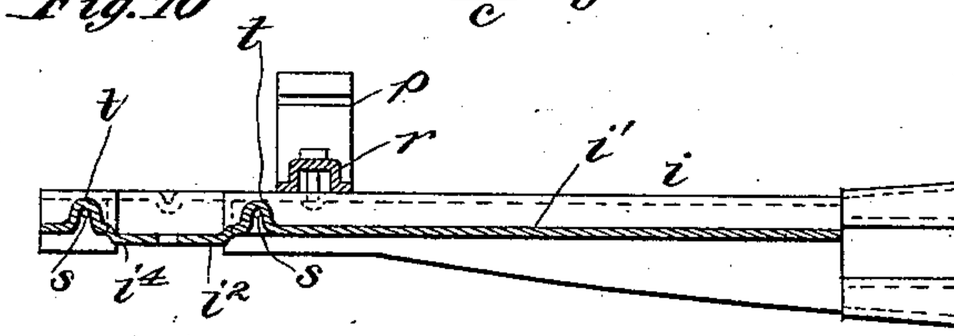


Fig. 11

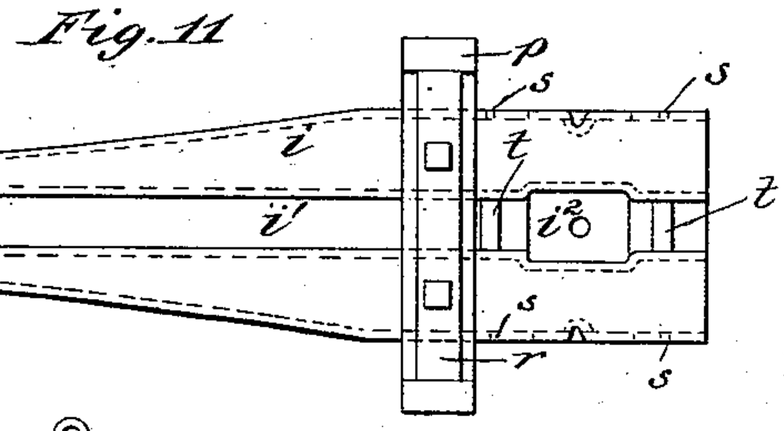
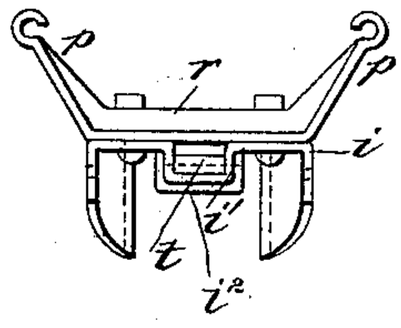


Fig. 12



Witnesses/
J. F. Bleman
Harry G. Davis.

Inventor
Charles T. Schoen
by Wm. H. Fuchsel
Attys.

UNITED STATES PATENT OFFICE.

CHARLES T. SCHOEN, OF ALLEGHENY, PENNSYLVANIA.

PRESSED-STEEL TRUCK-FRAME FOR CARS.

SPECIFICATION forming part of Letters Patent No. 542,427, dated July 9, 1895.

Application filed April 8, 1895. Serial No. 544,917. (No model.)

To all whom it may concern:

Be it known that I, CHARLES T. SCHOEN, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Pressed-Steel Truck-Frames for Cars, of which the following is a full, clear, and exact description.

The object of this invention is to construct a railway-car truck wholly or in some of its main parts of pressed steel or other equivalent light and strong wrought metal capable of being shaped in dies or by similar processes or apparatus.

The present invention comprises the side frames and the spring-plank or channel and brake-beam-hanger brackets, all as I will proceed now more particularly to set forth, and finally claim.

In the accompanying drawings illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is a plan view of a truck-frame and the brake-beams. Fig. 2 is a side elevation. Fig. 3 is a transverse vertical half-section and elevation. Fig. 4 is a transverse section on a larger scale taken in the plane of line 4 4, Fig. 2. Fig. 5 is a transverse section on a larger scale taken in the plane of line 5 5, Fig. 2. Fig. 6 is a transverse section on a larger scale taken in the plane of line 6 6, Fig. 2. Fig. 7 is a section taken in the plane of line 7 7, Fig. 2. Fig. 8 is a section taken in the plane of line 8 8, Fig. 2. Fig. 9 is a detail of the joint between the lower arch-bar and the channel or spring-plank. Fig. 10 is a vertical section of one half of a modified form of spring-plank, and Fig. 11 is a plan view of the other half of such spring-plank, and Fig. 12 is an end elevation of the spring-plank shown in Figs. 10 and 11.

I have illustrated my invention as embodied in a diamond or truss frame, *a* being the upper arch-bar, *b* the lower arch-bar, and *c* the tie bar or strap. As shown more particularly in Figs. 4, 5, and 6, these various members of the frame are made as channels, and the upper member *a* is made at its ends sufficiently wider than the lower member to receive the flanges of the said lower member within it and between its flanges in order to stiffen and reinforce the parts. Moreover, and as shown in Fig. 1 more particularly, the upper member *a* is made narrower between its ends, so that its side flanges will be of greater depth at the point of greatest strain, thereby to reinforce it. The ends of the lower member *b* are of a width adapted to fit between the flanges on top of the Master Car Builder's standard journal-box. Ordinary bolts *d* are used to connect the meeting ends of the upper and lower members and the tie plate or bar *c*, and between the bolts the journal-boxes are arranged as usual. Flanged holes *e* are made in the upper member for the reception of the bolts *d*, and cavities or countersinks *e'* are made at the upper outer edges of these flanged holes in order to receive the heads of the bolts to give said bolts a better bearing and to restrain the said bolts from rotating. The ends of the top members *a* are bent down or countersunk within the lower member, as shown at *f* in Figs. 2 and 4, and the outer ends of the lower members are turned up, as at *g*, so as to interlock these members and take the shearing strain from the bolts. The truss-members *a* and *b* are united vertically by means of L-shaped columns *h*, which are boxed in at their ends and their ends fitted between the flanges of the upper and lower members, as more fully shown in detail, Figs. 7 and 8. These columns are riveted to the members *a* and *b*, sufficient surface being retained to permit the use of preferably at least three rivets at each end. Furthermore, these columns are also riveted to the side flanges of the spring-channel or spring-plank *i*, three rivets preferably again being used for this union.

The spring-plank, of which two forms are shown, is pressed up of plate metal, such as steel, with a longitudinal depression *i'*, which serves as a bead to strengthen and reinforce the device and also affords countersinks for the reception of bolts, as *j*, by which the tie-plate *c* and said spring-plank are united. To adapt the spring-plank to the use of brake-beams arranged between the wheels, as shown in Fig. 1, the said spring-plank may have its sides bowed or curved inwardly, as therein indicated, the metal displaced by such inward bowing being retained in the flanges, and thereby preserving the strength, as well as increasing the rigidity of the spring-planks. As shown in Figs. 10, 11, and 12, the central

depression i' may be provided with end pockets i^2 of greater depth than the central depression and of substantially equal depth to the flanges or those portions of the flanges which are notched to receive the lower arch-bar, so that the said spring-plank shall have a more extended bearing upon the said lower arch-bar. However, I do not limit my invention in pressed-steel side frames to any particular kind of spring-plank or truck-channel; but I do esteem it as an essential factor in the construction of such truck-frames that the spring-plank shall extend continuously and rigidly from one side frame to the opposite side frame, and that such side frames shall be rigidly connected with the spring-plank, for example, as they are shown in Figs. 1, 2, and 3, not only by the union of the lower member b with such spring-plank, but also by the riveting to said spring-plank of the columns h. As shown in Fig. 9, notches i^3 may be made in the flanges of the spring-plank, in order to receive the upturned sides or flanges of the lower truss-member b, or, as shown in Fig. 10, a portion of the flanges may be cut out, as at i^4.

The bolster k may be constructed of pressed steel, in accordance with inventions of mine patented May 17, 1892, No. 475,023, and November 27, 1894, No. 529,809, and April 9, 1895, No. 537,076; but in so far as the present invention is concerned the bolster may profitably be modified in two particulars: First, it may have its ends outside of the frames. The right-angle brackets l and the side bearings m may be made with a bracket extension n, arranged parallel to the bracket l, and serving as abutments against the truck-frames, in order to prevent longitudinal displacement and undue longitudinal play of the bolster. The side bearing m and the bracket n may be struck up of one piece or may otherwise be made. Second, in order to provide for the easy removal of the bolster there may be an inch, more or less, of play between the top surface of the bolster and the bottom surface of the upper truss-member, so that the springs may be removed from beneath the bolster and the bolster then drawn out from between the columns h, and in order to provide for such removal and at the same time prevent undue play of the ends of the bolster between said columns the said bolster may be swelled out, as at o, at points where it comes next the said columns, these out-swellings being slightly in excess of the width of the bolster at its widest part. Obviously when the springs are removed the bolster is free to drop onto the spring-plank, and, the distance between the top of the spring-plank and the bottom of the upper truss-member being greater than the height of the bolster at its highest point, it is obvious that the bolster may be pulled out from the truck laterally of the truck.

It is to be observed that the tie plate or bar c, which frequently has to be removed, is so united with the other parts of the frame that to effect such removal it is only necessary to remove the nuts of the various bolts, and thereafter the remainder of the frame is left undisturbed.

As has been already stated, the top member a of the truss is narrower at the center than at the points where it rests upon the journal-boxes, and this construction is adopted because it is desirable to have this top arch-bar wide enough to permit its flanges to embrace the lower member at their points of junction, and it is also, for economical reasons, desirable to manufacture these members or bars of plates of metal of uniform width. Such manufacture is possible by narrowing between the ends, and, inasmuch as such narrowing in width increases the depth of the flanges, the arch-bar as a whole is increased in strength to resist compression. In the bottom member a reverse construction occurs by reason of the reversed conditions of strain; and, moreover, the increased width of the lower member between its ends is taken advantage of to receive between its flanges a very considerable width of the bottom h and permit the use of sufficient rivets to make a rigid union.

Some of the advantages accruing from my construction are that I can make a stronger frame with less metal than by the ordinary practice of making the arch-bars of flat metal, or even by the use of rolled channels. The ordinary practice is to use for the top member a bar of metal one and a quarter inches by four inches. The top and bottom arch-bars are connected by means of one-and-a-quarter-inch bolts passing through the column. This necessitates drilling a one-and-five-sixteenth-inch hole through the bar, leaving three and one-tenth square inches of metal adjacent thereto in the bar. I use a half-inch bar in the shape of a channel and punch therein three seven-eighths-inch holes in line, so that the amount of metal taken out is equal only to one seven-eighths-inch hole, and this is through half-inch metal, instead of through one-and-a-quarter-inch metal, so that I have about three and three-quarters square inches of metal remaining, thus making a very large percentage of gain in favor of the thinner metal. Again, the increase in the depth of the flanges makes the frame very much stiffer. Again, in the tensile or bottom member I have an amount of strength equal to that existing in the flat bar with the advantage of shaping it in its making in the matter of width with such variations as are required to suit the construction called for. At present estimates the pressed-steel frames effect a saving of from twenty to twenty-five per cent. in weight without any diminution in strength, but, on the contrary, with a decided increase in strength over the old construction.

Double-armed brackets p, Figs. 1, 3, and 10 to 12, which may also be of pressed steel, are bolted to the channel or spring-plank at points

convenient to receive the suspensory links *q* of the brake-beams. These brackets *p* are made with the mid-rib *r* to stiffen them.

A common practice in car construction is to bolt the columns on the truck to the channel by means of bolts extending clear across the channel, the columns being thus bolted on each side of the channel by through-bolts. In a truck-channel employing the depressed mid-rib, as herein described, it would be necessary in order to adapt it to this construction to drill holes through the said depression for the passage of these through-bolts, and hence to provide for the use of these through-bolts in connection with this form of channel and at the same time avoid the necessity of drilling holes through it, I punch the holes *s*, Fig. 10, in the side flanges, and in the mid-rib *i'* I make the elevations *t* for the passage of such through-bolts.

The end depressions i^2 are of sufficient depth to be on a line with the notched-out portions i^4, as already indicated, so as to rest upon the arch-bars and thereby give a central support—a construction whose importance will be perceived when it is remembered that the whole weight or load of the car rests on the springs and is in turn borne by the arch-bars at these points. These end depressions are broader than the mid-rib of channel, so as to obtain bearings upon the arch-bars of as great extent as possible, the more uniformly to distribute the weight. It is not necessary to make this mid-rib of channel as deep throughout as the end depressions, and consequently there is considerable saving in the steel required for the truck-channel by following the construction indicated.

It is customary in hanging the brake-beams between the wheels to cock the beams above or below the channel in order to obtain sufficient room for a brake-beam of considerable arch or chamber; but the better practice is to have the beams arranged to lie as flat or horizontally as possible. By bowing the truck-channel, as hereinbefore described, I am enabled to use a brake-beam of considerable arch or chamber in its compression member, and also at the same time arrange it flat or horizontally between the wheels.

Ordinarily the brake-beams are hung from the bolster above; but inasmuch as the bolster vibrates up and down, more or less, according to the depression of the springs, a corresponding movement is imparted to the brake-beams, which necessarily shifts the shoes when applied against the wheels to the detriment of the setting of the brakes. By the provision of the brackets upon the stationary and immovable truck-channel or spring-plank I am enabled to obtain fixed supports for the brake-beams and thus overcome the defects just noted.

As shown, the columns *h* are widened out toward their bases on those wings which extend parallel to the spring-plank, such widened-out wings tapering from top to bottom, so as to gain a greater width for the use of two or, preferably, three and even more rivets for connecting each column to the spring-plank, thereby not only increasing the strength of the union of these parts, but also stiffening and bracing the frames throughout. In this construction the boxed-in ends fit in between the flanges of the top and bottom arch-bars, and the laterally-extended wings may be notched out or cut away to fit over the flanges of the bottom arch-bars.

What I claim is—

1. A side for car trucks constructed of channel bars of pressed steel having their flanges or sides arranged adjacent and having their meeting ends telescoped or interlapped, combined with connecting vertical columns rigidly united to them, substantially as described.

2. A truck frame comprising an upper arch bar made as a channel with its flanges deepest between its ends, a lower arch bar widest between its ends and having its ends narrowed and fitted within the flanges of the upper arch bar, and connecting columns, substantially as described.

3. In a truck frame, the combination of two sides, each comprising upper and lower channel arch bars having their flanges arranged adjacent and interlapping at their ends, a spring plank extending from one side to the other, a tie-bar, and vertical columns rigidly united to the arch bars and to the spring plank and connecting them, substantially as described.

4. A side frame for trucks composed of upper and lower arch bars formed as channels, combined with vertical columns of L-shape in cross-section and boxed in at their ends and rigidly united, as by riveting, to the upper and lower arch bars, substantially as described.

5. In combination with the arch bars and their connecting columns, of a bolster having lateral swells adapted to fit between said columns and having top brackets to engage the upper arch bar, thereby to prevent lateral and endwise displacement of the bolster, and permit its withdrawal endwise from the truck, substantially as described.

6. A truck channel or spring plank provided with a central longitudinal depression having enlarged and deeper depressions at those points that come adjacent to the arch-bars of the truck, so as to extend to the said arch-bars and be supported thereupon, substantially as and for the purpose described.

7. A truck channel, or spring plank, of metal, bowed or contracted in its sides between its ends and adjacent to the plane of the brake beams, thereby to admit of the horizontal arrangement of the brake beams between the wheels of the truck, substantially as described.

8. The combination with a spring plank or truck channel, of double or two-armed pressed-

steel brackets arranged transversely thereof and adapted to sustain the brake beams, substantially as described.

9. In a truck frame, vertical columns of L-shape in cross-section, boxed in at their ends and riveted to the arch-bars and having one of their wings wider at the bottom than at the top thereby affording material for the reception of two or more rivets and serving to stiffen and brace the frame, substantially as described.

10. In a truck frame, the combination of top and bottom arch-bars, a truck channel or spring plank and vertical columns of L-shape in cross-section having one of their wings widened or extended laterally along the spring plank and riveted to such spring plank and having their ends boxed in and riveted to the top and bottom arch-bars, substantially as described.

In testimony whereof I have hereunto set my hand this 6th day of April, A. D. 1895.

CHARLES T. SCHOEN.

Witnesses:
WM. H. FINCKEL,
E. A. FINCKEL.

Corrections in Letters Patent No. 542,427.

It is hereby certified that in Letters Patent No. 542,427, granted July 9, 1895, upon the application of Charles T. Schoen, of Allegheny, Pennsylvania, for an improvement in "Pressed-Steel Truck-Frames for Cars," errors appear in the printed specification requiring correction, as follows: In line 34, page 2, the word *at* should be inserted after the word "have," a comma should be inserted after the word "ends," a comma should be substituted for the period after the word "frames," and the following word "The" should commence with a small t, making a continuous sentence; in line 35, same page, a comma should be inserted after the reference letter "*l*"; in line 93, same page, the word "bottom" should read *column*, and in lines 43 and 48, page 3, the words "chamber" should read *camber;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 16th day of July, A. D. 1895.

[SEAL.]

JNO. M. REYNOLDS,
Assistant Secretary of the Interior.

Countersigned:

JOHN S. SEYMOUR,
Commissioner of Patents.