

A. L. HASTINGS.
SIDE FRAME FOR CAR TRUCKS.
APPLICATION FILED JAN. 12, 1912.

Patented May 13, 1913.

3 SHEETS-SHEET 1.

1,061,611.

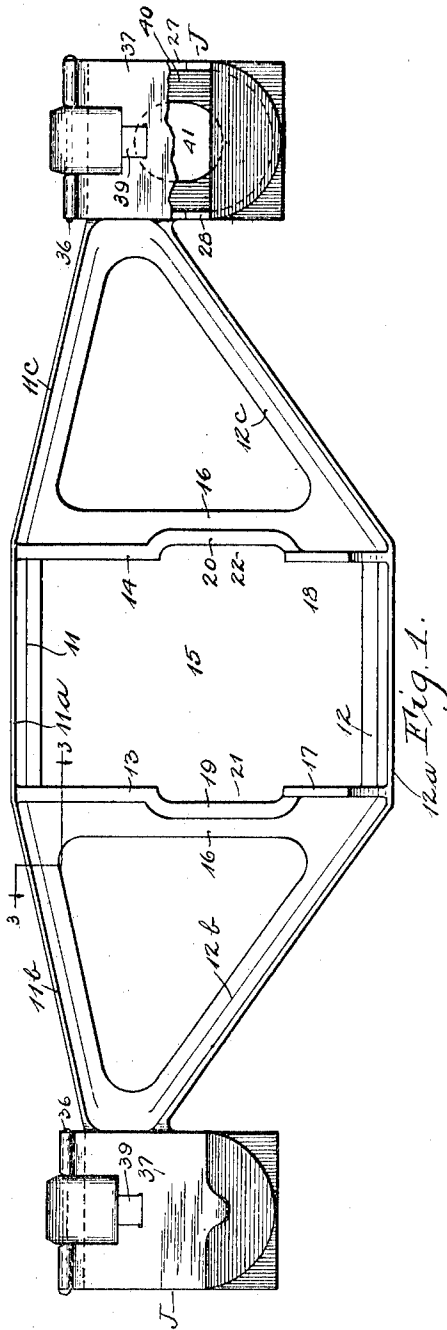


Fig. 1.

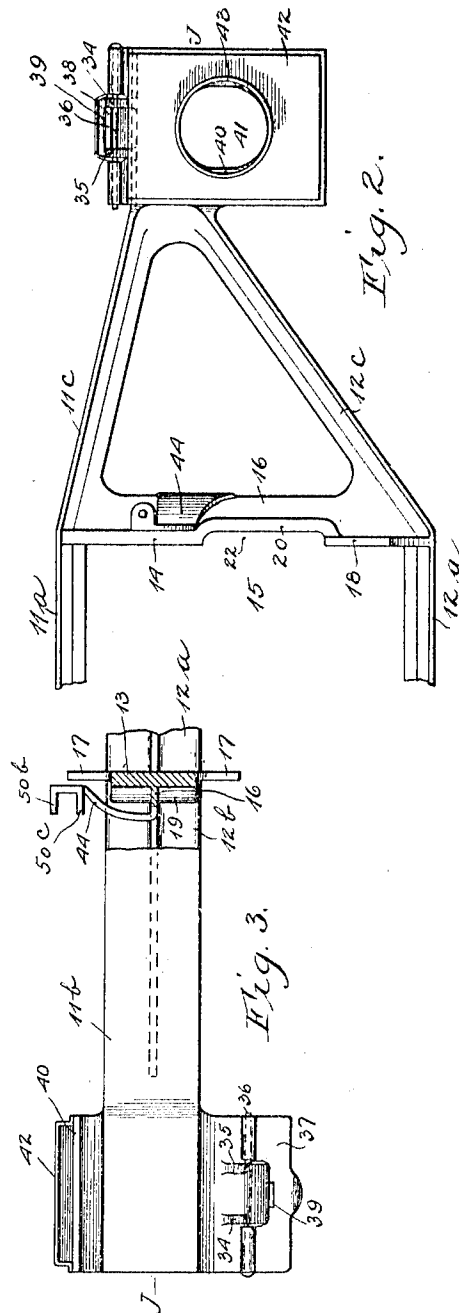


Fig. 2.

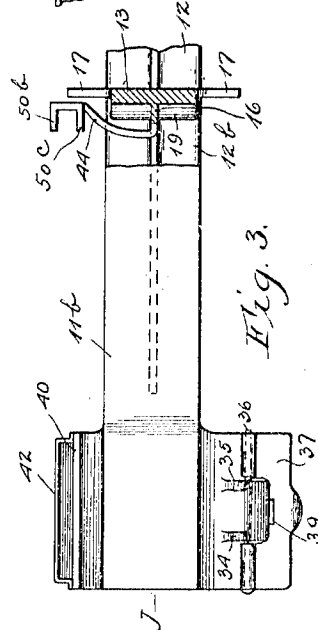


Fig. 3.

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Charles J. Schmidt,
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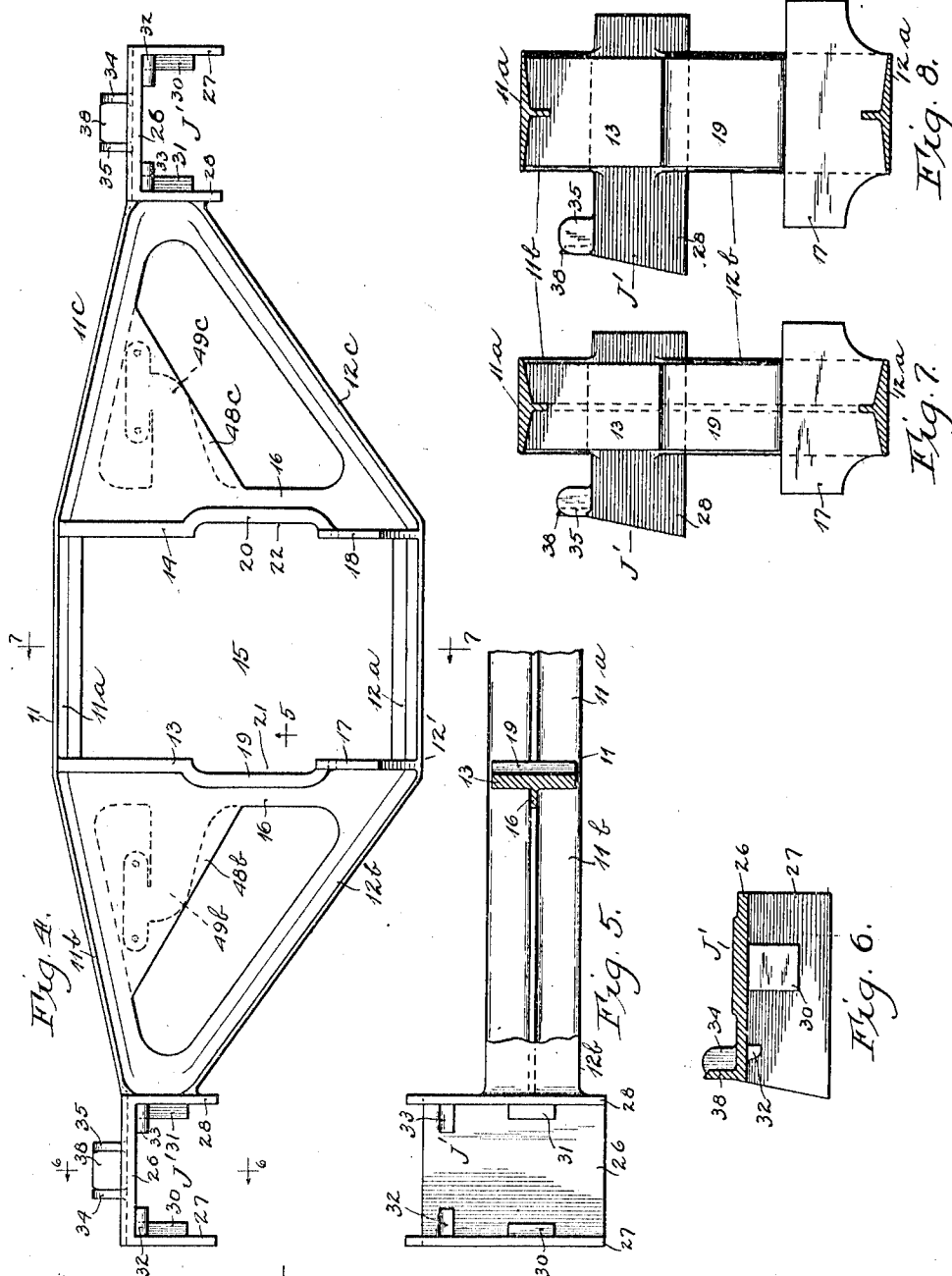
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3 SHEETS—SHEET 2.



Witnesses: 5+
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Ellie Fay Dearborn

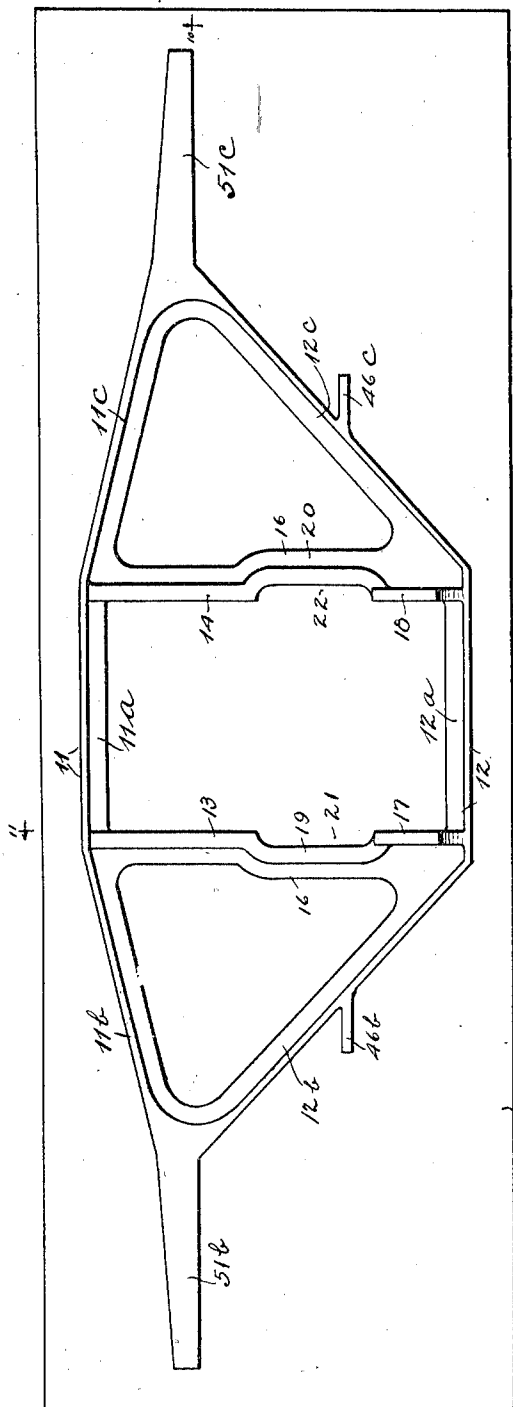
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3 SHEETS—SHEET 3.

1,061,611.



Witnesses:
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Fig. 9.

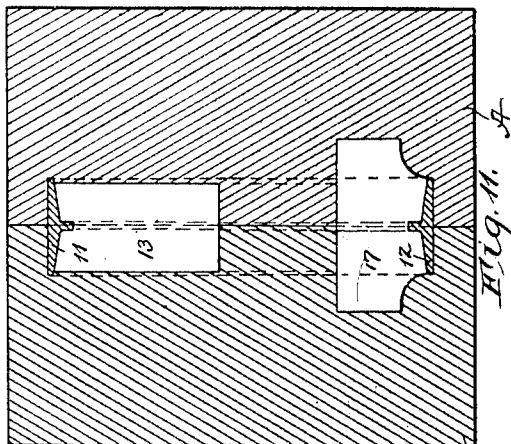


Fig. 11. A

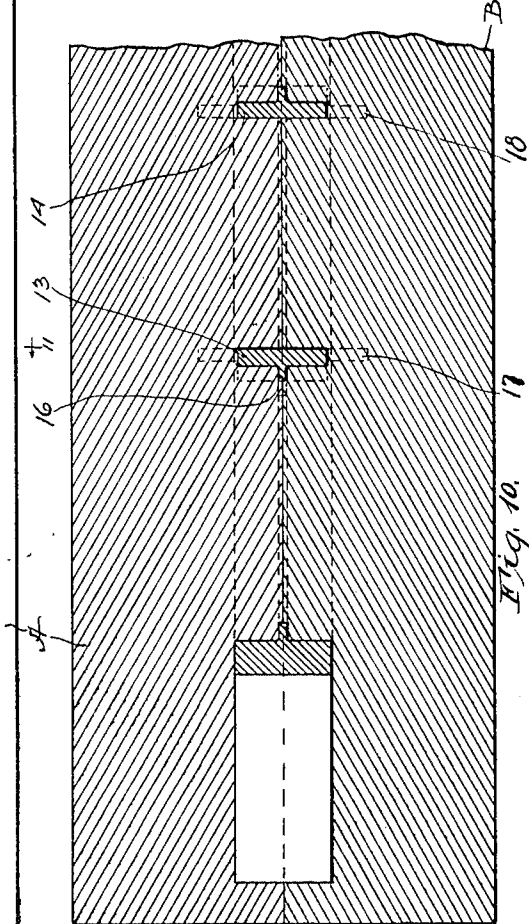


Fig. 10. B

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UNITED STATES PATENT OFFICE.

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SIDE FRAME FOR CAR-TRUCKS.

1,061,611.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed January 12, 1912. Serial No. 670,775.

To all whom it may concern:

Be it known that I, ALONZO L. HASTINGS, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Side Frames for Car-Trucks, of which the following is a full, clear, and precise specification.

My invention relates to side frames for car trucks, and its object is to provide an improved side frame which is more reliable, efficient and more desirable, and a further object is to provide an improved process for constructing such side frame.

Side frames for railway trucks have been cast from iron or steel, but in such cast frames blow holes and other weak spots and flaws are likely to be present which are invisible and which therefore render the frame unreliable and consequently inefficient and undesirable. As disclosed in my Patents No. 936,626, and No. 1,006,549, dated respectively Oct. 12, 1909 and Oct. 24, 1911, side frames have also been formed up of blanks resulting from punching web sections from I-beam lengths, the ends of the flanges being bent together and welded together, and chafing frames being secured to vertical web sections adjacent a central opening. In such construction the journal boxes are separate structures and must be secured to the frame ends by means of bolts, and such bolts are of course liable to loosen during service of the drum.

One important feature of my invention is to combine the desirable features of cast side frames and side frames built up from I-beam lengths to thus produce a frame in which all the parts are an integral structure of a single piece of metal and in which the metal is free of blow holes or other weaknesses or flaws.

Another important feature of my invention relates to the process for producing such one-piece side frame, such process consisting in forging suitable metal in suitable dies, the metal during its treatment in the dies being worked into homogeneous consistency so that the finished side frame is free from such weaknesses and flaws as are liable to be present where the frame is formed by the ordinary casting process, and so that the frame, after passing through the dies, is one piece of metal.

The product and process of my invention will be more clearly and fully understood

by reference to the accompanying drawings, in which—

Figure 1 is a side elevational view of a preferred form of finished frame, Fig. 2 is a view showing the structure looking from the opposite side of the frame, Fig. 3 is a top view, part thereof being in section along plane 3—3, Fig. 1, Fig. 4 shows the frame after it has left the last die and before brake hanger brackets are struck up from portions thereof and before the journal boxes are fully completed, Fig. 5 is a sectional view looking from plane 5—5, Fig. 4, Fig. 6 is a sectional view taken from plane 6—6, Fig. 4, Fig. 7 is a section looking from plane 7—7, Fig. 4, showing the width and thickness of the finished frame after leaving the last set of dies, Fig. 8 is a sectional view taken from plane 7—7, Fig. 4 and showing the embryo width after the frame leaves the first set of dies, Fig. 9 is a plan view of one die member, showing a side frame therein of modified structure, Fig. 10 is a sectional view taken from plane 10—10, Fig. 9, and Fig. 11 is a sectional view taken from plane 11—11, Fig. 9.

Figs. 1 to 3 show the preferred form of finished side frame which is substantially a single piece of metal, and Figs. 4 to 6 show the structure formed in the dies and to which the lower parts of the journal boxes are added to produce the finished structure shown in Figs. 1 to 3. This finished structure has substantially the same shape and outlines as the finished side frames resulting from the construction disclosed in my patents referred to above, in which the side frames are formed up from I-beam lengths, from which sections have been punched. In the structure of Figs. 1 to 3 the top and bottom walls 11 and 12 are of T-cross-section, and of the same shape as an I-beam flange with web stubs remaining thereon. The middle sections 11^a and 12^a of the upper and lower walls respectively are horizontal and parallel, the end sections 11^b and 11^c of the upper wall sloping downwardly, and the end sections 12^b and 12^c of the lower wall sloping upwardly, the outer ends of these upper and lower end sections merging into each other. Connecting between the ends of the horizontal sections 11^a and 12^a are the vertical walls 13 and 14 which, together with these horizontal sections, form the rectangular central opening 15 for receiving spring plank and bolster mechanism. At

its outsides each of the vertical walls 13 and 14 has a central strengthening web 16 forming a continuation of the web stubs of the upper and lower walls 11 and 12. The walls 13 and 14 at their lower ends have the lateral wings 17 and 18 respectively which extend downwardly to the lower wall section 12^a and which serve to support the spring plank which in practice will be suitably mounted on the lower wall section 12^a, the wings being perforated for receiving bolts by means of which the spring plank may be secured. Directly above these lateral extensions or wings the walls 13 and 14 are deflected outwardly at 19 and 20 to leave the opposed pockets or passageways 21 and 22 through which the bolster may be inserted to be eventually raised into engagement with the sections of the walls 13 and 14 above the passageways 21 and 22.

At the ends of the frame thus far described journal boxes J are provided, each having an upper wall 26, sidewalls 27 and 28, and a bottom 29, the side walls 27 and 28 having respectively the side stop lugs 30 and 31, and the top wall in front of these lugs having the front stop lugs 32 and 33. The top wall at its front edge has also upstanding bearing lugs 34 and 35 for pivoting a shaft 36 carrying the lid 37 for closing the front end of the journal box, a web 38 extending between the bearing lugs serving to cooperate with a spring 39 on the lid to hold the lid either in its opened or closed position. At the rear end of each journal box is a rear inner wall 40 having the vertical elongated opening 41, and the outer wall 42 spaced from the inner wall and having the circular opening 43, the walls being connected at their sides and bottom and open at their top to thus form a pocket for receiving a dust guard, as is well understood in the art. The frame also has a brake hanger supporting bracket 44 extending rearwardly from each of the walls 13 and 14.

In Figs. 4 to 7 is shown the one-piece construction from which the finished frame just described is built up. The structure of Figs. 4 to 7 has everything of the finished structure shown in Figs. 1 to 3, with the exception of the lower halves or bottoms of the journal boxes and the lids and dust guard walls of the journal boxes. The structure has the upper halves J' of the journal boxes, which upper halves have the side stop lugs and the front stop lugs thereon, and also the pivot lugs for the lids. As shown in Figs. 1 to 3, the lower sections or bottoms of the journal boxes have been welded to the top sections J', and the dust guard walls have been welded to the rear ends of the upper and lower sections of the journal boxes, and the lids have been pivoted to the pivot lugs. Instead of welding the various parts together it is of course understood that they

could be secured together as by means of rivets or bolts.

Coming now to the process for producing the structure of Figs. 4 to 7 on which the finished structure is built up, the various forms assumed during formation of the structure are illustrated in Figs. 7 and 8. Suitable metal, preferably steel, is poured directly from the crucible between the members of a die, the form of the die being such that after the metal has sufficiently cooled to be self-supporting it will have substantially the outlines of the finished frame, but transversely it will be wider and thinner than in the finished frame, as shown in Fig. 8. The frame is removed from the first die as soon as the metal becomes self-supporting, and is then transferred immediately to a second die or set of dies, in which the hot metal is worked and compressed transversely toward substantially the final width. After this treatment some of the metal will of course have squeezed out between the die members to form burs and irregular projections. After treatment in the second die or set of dies the metal, if not sufficiently hot, is re-heated and then the structure placed in a third die or set of dies in which it is worked and compressed to final shape and the burs and irregular projections at the same time trimmed off and all the corners well filled in and rounded out, and we then have the structure of Figs. 4 to 7. Parts of the web sections 48^b and 48^c are now punched out to leave the blank extensions 49^b and 49^c (see dotted lines Fig. 4) on the ribs 16 of the bolster retaining walls 13 and 14, and these blanks are deflected inwardly at substantially right angles to the ribs 16, and the end sections of the blanks deflected to form the parallel pivot lugs or wings 50^b and 50^c, between which brake hanger mechanisms are pivoted when the frames are put into service. The structure of Figs. 4 to 7 is therefore in the form of a single piece of metal which, after having been worked in the various dies, is homogeneous and of uniform strength and free from blow holes and other weaknesses which are so liable to be present in cast frames. All the parts of the side frame which are actually put to strain during operation of a truck form part of this single metal piece structure, and the parts which are added thereto to form the finished structure of Figs. 1 to 3 are such as do not take any strain whatever during operation of the truck, the bottoms of the journal boxes added to the structure of Figs. 4 to 7 serving only to receive oil and waste, the lid serving merely to close the journal boxes, and the dust guard walls serving merely to retain between them the dust guards which are mounted on the wheel axles which extend into the journal boxes. The side stop lugs and the front stop lugs which support

the journal brasses and the wedges for securing the brasses in place are parts of the one-piece metal structure. When the bottoms of the journal boxes are welded to the upper parts we will have a substantially one-piece metal finished structure, barring of course the lids which are pivoted to the journal boxes. The product of my invention therefore possesses the greatest reliability and efficiency features.

In Figs. 9 to 11 die members A and B are shown, between which a modified form of side frame body has just been worked into final shape. This modified construction, although in a single piece of metal, does not include any journal box parts, the journal boxes being subsequently either bolted or welded to the arms 51^b and 51^c. In order to further strengthen such structures where separate journal boxes are secured to the ends, straps usually connect between the lower ends of the journal boxes and the frame body, and on the form shown in Fig. 9 I have shown brackets 46^b and 46^c which are formed integral with the structure and to which the inner ends of suitable straps (not shown) are welded or otherwise secured, the outer ends of the straps being in practice either welded or otherwise secured to the under sides of the journal boxes. In the form of Fig. 9 the brake hanger brackets can of course be an integral part of the one-piece structure punched and formed from a web, just as in the arrangement of Figs. 1 to 7. In both the forms of Fig. 9 and Figs. 1 to 7 the brake hanger brackets and of course the separate pieces are preferably securely welded to the wall structures 13 and 14.

The walls of the dies are of course so constructed that the formed structures can readily be withdrawn therefrom, it being necessary only that the inner faces of the upper sections of the bolster guide walls 13 and 14 be straight and parallel and that the inner faces of the wings 17 and 18 be straight to fit securely against the sides of the spring plank. The outer faces of these parts mentioned can of course be tapered properly, so that the structure can be readily withdrawn from the dies. I thus produce a one-piece side frame structure including all such parts as will be subjected to actual strains during operation, and after the lower journal box halves and other parts are intimately welded to the structure we will have substantially a one-piece finished side frame. The embryo side structure being formed by pouring metal of suitable quality direct from the crucible into dies and the subsequent transverse working of the embryo structure in other dies or sets of dies produces a final structure in which the metal is homogeneous throughout and entirely free from blow

holes or other flaws, such transverse compression and working treatment giving the metal substantially the same consistency and homogeneity as in metal beams which have been rolled.

My improved process, besides producing a superior product, also produces such product at much less expense than the process used in constructing the side frames from I-beam structures, as in my patents referred to.

I do not, of course, desire to be limited to the precise form, construction, and treatment referred to, as changes and modifications are possible which would still come within the scope of my invention, and

I therefore claim the following:

1. As a new article of manufacture, a side frame structure for railway trucks comprising upper and lower walls secured together at their outer ends and spaced apart between such ends, adjacent vertical walls connecting between said upper and lower walls and forming with the middle sections of said walls a central opening for receiving bolster and spring plank mechanism, lateral extensions from the lower ends of said vertical walls for supporting spring plank mechanism within said central opening, and brake hanger brackets extending laterally from said vertical walls, said walls, extensions, and brake hanger brackets forming part of a single-piece drop forging.

2. As a new article of manufacture, a side frame structure for railway trucks comprising a main frame part having a central opening for receiving spring plank and bolster mechanism and having journal box structures at its ends, said main frame and journal box structures being a single-piece drop forging.

3. As a new article of manufacture, a single-piece drop forged side frame structure comprising a main frame part having a central opening for receiving bolster and spring plank mechanism, brake hanger brackets extending laterally from said main frame part, and a journal box structure at each end of the main body part.

4. As a new article of manufacture, a side frame for railway trucks comprising a main body part, upper halves of journal boxes at the ends of said body part, said body part and journal box upper halves being in the form of a single-piece drop forging, and lower journal box halves secured to the upper journal box halves.

5. As a new article of manufacture, a side frame for railway trucks comprising a main body part, upper halves of journal boxes at the ends of said body part, said body part and journal box upper halves being in the form of a single-piece drop forging, and lower journal box halves welded to the upper journal box halves.

6. As a new article of manufacture, a side
frame for railway trucks comprising upper
and lower walls connected together at their
outer ends, adjacent intermediate vertical
5 walls between said upper and lower walls,
a web section between each of said vertical
walls and the adjacent upper and lower
walls, and brake hanger brackets cut in
blank from said webs and then deflected to
10 extend at right angles from said vertical

walls, all said parts being a single piece drop
forging.

In witness whereof, I hereunto subscribe
my name this 6th day of January A. D.,
1912.

ALONZO L. HASTINGS.

Witnesses:

CHARLES J. SCHMIDT,
NELLIE BOYD DEARBORN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."