Jan. 30, 1934. J. H. CROWE 1,945,505

AUTOMOBILE CHASSIS FRAME AND METHOD OF MAKING SAME

Filed Sept. 19, 1931

Fig. 1.

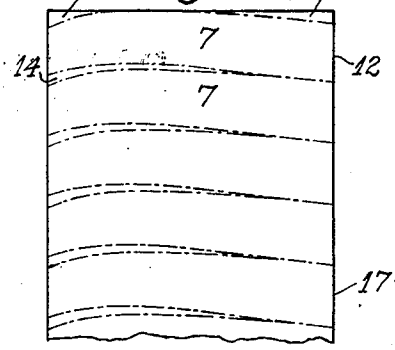


Fig. 2.

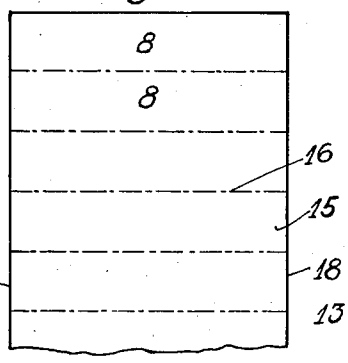
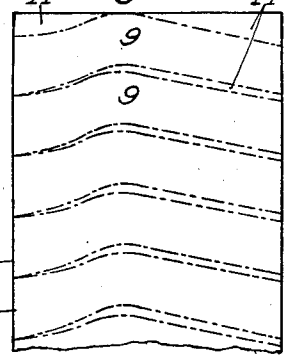


Fig. 3.



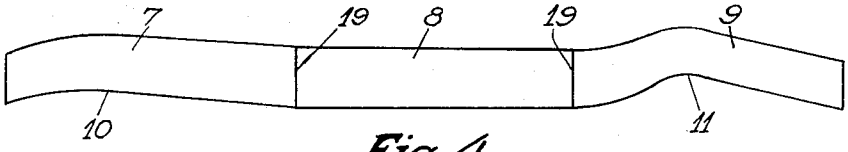


Fig. 4.

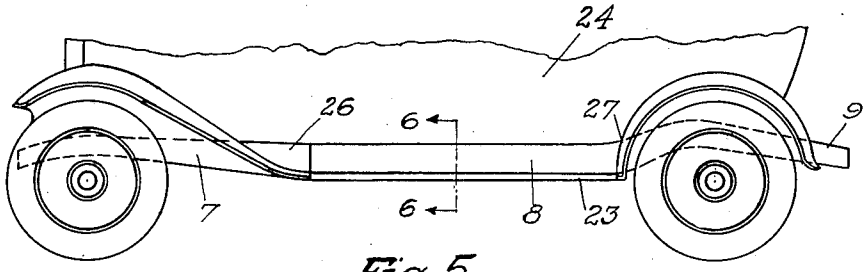


Fig. 5.

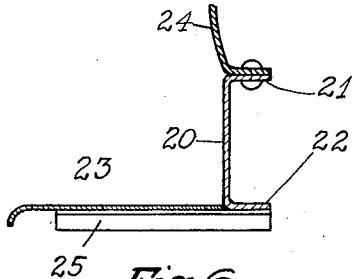


Fig. 6.

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UNITED STATES PATENT OFFICE

1,945,505

AUTOMOBILE CHASSIS FRAME AND METHOD OF MAKING SAME

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REISSUED

Application September 19, 1931
Serial No. 563,773

10 Claims. (Cl. 280—106)

This invention relates to new and useful improvements in automobile chassis frames.

An important object of the invention is to provide a chassis frame of requisite strength and elastic limit having a portion thereof capable of having a body finish and polish imparted thereto by the usual methods employed for imparting finish and polish to the metal body plates constituting the shell of an automobile body, whereby these portions of the chassis frame can be exposed to view as part of the exterior body appearance to take the place of adjuncts of the body such as the dust shields above the running boards; thus eliminating the usual expense of such separate parts.

Another important object is to provide a chassis frame having side rails provided with kick-ups or offsets at the ends thereof and which can be manufactured without the usual waste of material represented in scrap or the necessity of edgewise bending to produce the kicked-up portions.

Another object of the invention is to provide a side rail including a cold rolled section to which may be imparted the requisite finish by usual finishing methods.

A still further object of the invention is to provide a method of making a chassis side rail consisting of cutting a plurality of separate blanked-out strips of any desired shape from strips of stock widths and butt-welding the same end to end to provide a blank of requisite shape which is then formed into a channel section possessing the necessary elastic limit and a portion of which will take a finish or polish equivalent to that of the body shell by methods now employed for finishing the latter.

A further object of the invention is to produce a chassis frame which will possess, in addition to the foregoing characteristics, an elastic limit of at least 40,000 pounds per square inch as economically as possible, using for the major part thereof, mild carbon steel of the formula S. A. E. 1025 and a lower carbon steel for certain sections thereof.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the accompanying drawing forming a part of the descriptive matter and wherein like numerals are employed to designate like parts throughout the several views.

Fig. 1 is a plan of a stock size width of steel strip as it comes from the mill, the dotted lines indicating the manner of blanking out suitably shaped blanks used in the formation of the front portions of side rails.

Fig. 2 is a similar view of a strip of pickled cold-rolled steel having a carbon content in the range of .10%–.25% as it comes from the mill, the dotted line showing the manner of blanking out the intermediate sections of the side rails.

Fig. 3 is a similar view of a strip of steel as it comes from the mill, the dotted lines indicating the manner of blanking out the sections forming the rear ends of the side rails with the minimum amount of scrap.

Fig. 4 is a plan of a flat blank composed of a blanked out section from each of the three preceding figures, the meeting end edges of the three blanks being integrally united preferably by butt-welding.

Fig. 5 is a side elevation of a portion of an automobile showing the improved chassis frame construction forming a part thereof.

Fig. 6 is an enlarged transverse section of the same taken on the line 6—6 of Fig. 5.

Heretofore it has been the general practice to form each side rail of an automobile chassis frame from a single blank of sheet steel integral throughout its entire length. When such frames are to possess a double drop or kick-up, portions are to be disposed above the front and rear axles of the vehicle for the purpose of lowering the center of gravity of the vehicle, it is necessary to either cut the single blank forming the side rail to the requisite shape, resulting in severe waste by reason of the scrap incident thereto, or by the process known as edgewise bending of the straight flat blank prior to its formation into the customary channel cross section. This latter procedure of edgewise bending is unsuitable for the purposes of this invention inasmuch as it results, in some instances, in producing ripples or waves in the regions where the laterally offset portions to produce the kick-ups, merge into the intermediate portion of the side rail, and moreover, subjects the blanks to two series of stresses acting substantially at right angles to each other, the first resulting from the edgewise bending and the second stresses resulting from the formation of the flat blank into channel section resulting frequently in the rupture or cracking of the side rails and a material weakening of the same at the points of greatest stress. As indicated previously, such edgewise bending would be unsuited for the purposes of this invention inasmuch as it would be apt to produce ripples or cracks in the intermediate portion of the side rail which it is proposed to

employ under this invention as an exteriorly exposed part of the usual body finish. Obviously the first method mentioned of blanking the strip to shape is unsuitable as it is not economical and results in substantial waste by reason of the resulting scrap.

In order to reduce the cost of manufacture of these chassis frames and to utilize portions thereof as component exteriorly exposed parts of the usual automobile body, such as the dust shields or aprons disposed above the running boards, each side rail is composed of three component parts or sections butt-welded or secured in any other suitable manner to form an integral whole. Such a blank or strip, prior to formation into a channel section, is illustrated in Fig. 4, as composed of a front section or blank 7, an intermediate blank 8 and a rear blank or section 9. The front and rear blanks 7 and 9 are blanked to shape to provide the kicked-up portions 10 and 11 respectively from stock-width blanks 12 and 13 respectively, shown in Figs. 1 and 3. These strips 12 and 13 are steel strips of requisite gauge as it comes from the mill manufactured under any suitable formula but preferably under the formula S. A. E. 1025 possessing carbon in the amount of from .20%–.30%. Steel of this character in an untreated condition will allow for an elastic limit of at least 40,000 pounds per square inch as required by the automotive manufacturers. These strips of stock material are of sufficient width to permit of the sections 7 and 9 being blanked from the same, transversely thereof and indicated in Figs. 1 and 3 with very little scrap loss indicated by the portions marked 14. As will be obvious, the maximum scrap results from the production of the first and last blanks cut from the strip and only a small amount of scrap results from the production of the intermediate blanks or sections 7 and 9. However, untreated stock material of the foregoing character ordinarily used in the construction of automobile chassis frames cannot be given a body finish and polish substantially equivalent to the exterior body finish of the ordinary automobile without the use of expensive grinding and polishing equipment and the use of special fillers and lacquers, thereby running the cost of production of a chassis frame from the usual materials and the aforesaid equipment so high as to be practically prohibitive.

I have found that the purposes of this invention can be accomplished by the use of special material for the intermediate sections 8 which will take on a body finish from the usual methods of finishing body plates for the body shell of the automobile and at the same time will possess the requisite elastic limit to anticipate manufacturers' specifications and requirements. While not desiring to be limited to any particular material for this purpose it has been found that the object of this invention can be admirably accomplished by the use of pickled, cold rolled, or rustless steel having a carbon content somewhere close to the range of .10% up to possibly .25%. Such quality of material is represented in a strip of stock width designated by the numeral 15 in Fig. 2 which may be blanked to shape to form the individual blanks or sections 8 by cutting the strip along the dotted lines 16 transversely of the longitudinal dimensions of the strip. Preferably, however, these straight sections are produced from a roll of cold-rolled strip carried in stock and having a width equal to the width of the blank 8. In this manner, the blanks 8 can be produced by simply cutting the strip transversely of its length in lengths equal to the length of such blanks. The shape of the intermediate blanks is such that there is no waste by scrap, or very little if requirements call for the blanks having slightly deflected longitudinal edges.

After the blanks 7, 8 and 9 have been blanked to any desired shape they are placed in longitudinal alignment in the order named with their transverse end edges 17 and 18 arranged in abutting relationship to be united, preferably by butt-welding to form the welded seams 19 which tend to increase the strength of the side rail against tension and compression as well as to have a tendency to minimize torsional stresses. The union of these three separate and independent blanks forms substantially a one piece blank or strip of the requisite shape possessing the necessary characteristics hereinbefore mentioned. In case butt-welding is used, the flash is removed from the exterior surface of the blank comprising the united sections 7, 8 and 9, after which it is then cold formed into a channel section having throughout its entire length a web portion 20 and upper and lower inwardly extending horizontal flanges 21 and 22 respectively. If desired, each of the individual blanks 7, 8 and 9, prior to their being united into a single blank, may be formed into individual channel sections and subsequently united by butt-welding or otherwise, the meeting edges of the webs and horizontal flanges of the individual sections along the vertical seams 19. However, it is more economical to unite the individual blanks 7, 8 and 9 prior to their formation into a channel side rail. The exterior surface of the web of the section 8 may be subsequently provided with a body finish and polish equal to that of the exterior finish of an automobile body by the usual methods of finishing and polishing the body plates or shell.

By reason of the foregoing, the usual dust shield or apron heretofore employed in automobile body construction above the running board 23, may be dispensed with, since the exposed exterior surfaces of the web of the intermediate section 8 of the side rail may be provided with a finish equivalent to that of the exterior surface of the automobile body 24. The running boards may be secured to the chassis frame in any suitable manner, although as here shown, they are attached to the side rails by means of step hangers or the angle bars 25. Portions 26 and 27, respectively of the front and rear mud guards cover the seams between the sections 7, 8 and 9 of the side rails thereby presenting a finished surface with no exposed rivets or other form of fastening means. By reason of the foregoing construction and arrangement of parts, two of the heretofore necessary adjuncts of the automobile body have been eliminated without sacrificing the elastic limits of the chassis frame, and the scrap incident to the manufacture of this invention has been reduced to the very minimum. While the invention has been illustrated in connection with the intermediate portions of the side rails forming dust shields, it is to be understood, that I do not limit the invention to this particular adjunct, other than in the appended claims, since parts of the frame, other than the intermediate section 8, may be provided with such body finish to be exposed exteriorly of the automobile body to take the place of other adjuncts or to present a more finished appearance for the portions of

the frame which are exposed to view in the finished automobile.

Due to the fact that the side rails are composed of a plurality of sections, one or more of such sections can be made of different gauge material, i. e. the intermediate section 8 where the greater portion of the body loads are imposed may be of heavier gauge than the end sections 7 and 9, or the latter may be of thicker gauge than the intermediate section. Likewise, these component sections of the rails may be of different metallurgical analysis and of various cross-sectional shapes than that illustrated. Also, the component parts of each side rail may be of different cross sectional shape. For instance the intermediate section 8 may be of tubular or box cross-section while the end sections may be channel shape or vice versa. As stated previously, the component sections or any one of them may be constructed from stainless or rustless steel. Furthermore, the frame including both side rails may be manufactured in three sparate assemblies, i. e. the complementary sections 7, 8 or 9 of two side rails may be connected together by suitable cross members as a unit after which the various component sections of both rails can be united to form the complete chassis frame. By this alternative construction, the intermediate sections 8 of two side rails joined by cross braces or the like to form a unit, may be carried in stock, for subsequent assembly with complementary pairs of sections 7 and 9 of various shapes also joined by cross braces or the like. In this manner, varying shapes of side rails with different degrees of kick-ups and different metallurgical analysis can be built up from a more or less stock or standardized intermediate unit.

I claim:

1. An automobile chassis frame including side rails having portions thereof composed of metal possessing metallurgical structure capable of taking a body finish from the usual method for finishing body plates and possessing the requisite elastic limits to be serviceable as a frame element, the remaining portions of the chassis rails being of different metallurgical structure.

2. An automobile chassis frame including side rails each composed of a longitudinal member divided transversely into component parts, said parts possessing different metallurgical structure and united to form an integral whole, some of said parts being capable of taking a body finish from the usual method for finishing body plates.

3. An automobile chassis frame including side rails each composed of a longitudinal member, comprising component blanks one of which is pickled cold rolled stainless steel and others of steel of higher carbon content united to the others by butt-welding the meeting edges of the blanks to form an integral whole.

4. An automobile chassis frame including side rails having kick-ups at the ends thereof, said kicked-up portions being formed from separate blanked-to-shape sections, the intermediate portion of each rail being a separate section of cold rolled steel and the other sections being of steel of a higher carbon content, all of said sections of each rail being arranged in alignment and united by butt-welding the meeting edges of the sections together to form an integral whole.

5. The combination with an automobile body possessing the usual body finish; of a chassis frame having the outer surface of the web of a U-shaped channel portion thereof possessing a body finish substantially equal to that of the body and exposed exteriorally thereof to form a part of the exterior of the body, the remaining portions of the chassis frame being of different metallurgical structure.

6. An automobile chassis frame including a side rail composed of a pair of separate blanked-to-shape end strips having longitudinally curved longitudinal edges, and an intermediate substantially straight edged strip of cold-rolled steel having its ends corresponding in width to the ends of the end strips and having a lower carbon content than the end strips butt-welded at its transverse edges to the corresponding transverse edges of the end strips to form a unitary side rail blank, said blank being formed into a channel section to produce a rail having a kick-up at each end thereof.

7. The method of making automobile chassis side rails consisting of cutting a stock-strip transversely of its length to provide end sections having their longitudinal edges curved, cutting a second stock-strip transversely of its length to provide intermediate sections, arranging a pair of end sections in alignment with an intermediate section with their end edges in abutment, butt-welding said end edges together to provide a continuous blank with contoured longitudinal edges, and then cold forming such blank into a channel section to provide a side rail having kick-ups at its ends.

8. The combination with an automobile body having running boards; of a chassis frame having side rails, each composed of component channel sections welded end to end with their flanges in longitudinal alignment, the intermediate sections only of the rail being disposed in back of the running boards and having a metallurgical structure capable of receiving a body finish substantially equal to that of the exterior of the body, and fenders secured to the body and arranged to cover the welded joints between the chassis sections.

9. The combination with an automobile body having running boards, of a chassis frame having side rails each composed of component channel sections welded end to end with their flanges in longitudinal alignment, the intermediate sections only of the rail being disposed in back of the running boards and having a metallurgical structure capable of receiving a body finish substantially equal to that of the exterior of the body, horizontal hangers secured to the lower flange of the intermediate sections, and running boards supported upon said hangers and having their inner longitudinal edges abutting the finished webs of the intermediate sections.

10. The method of making automobile chassis side rails consisting of cutting a sheet transversely of its length to provide end sections having their longitudinal edges curved, cutting a second sheet along substantially straight parallel lines, transversely of its length to provide intermediate sections possessing ends having width corresponding to the width of the end sections, arranging a pair of end sections in alignment with an intermediate section with their transverse edges in abutment and their longitudinal edges in alignment, welding said transverse edges together to provide a substantially integral blank with contoured longitudinal edges, and then forming said blank into channel section to provide a side rail having kickups at its ends.

JAMES H. CROWE.