Oct. 3, 1939. G. C. R. KUIPER 2,174,922

VEHICLE FRAME

Filed Feb. 11, 1937

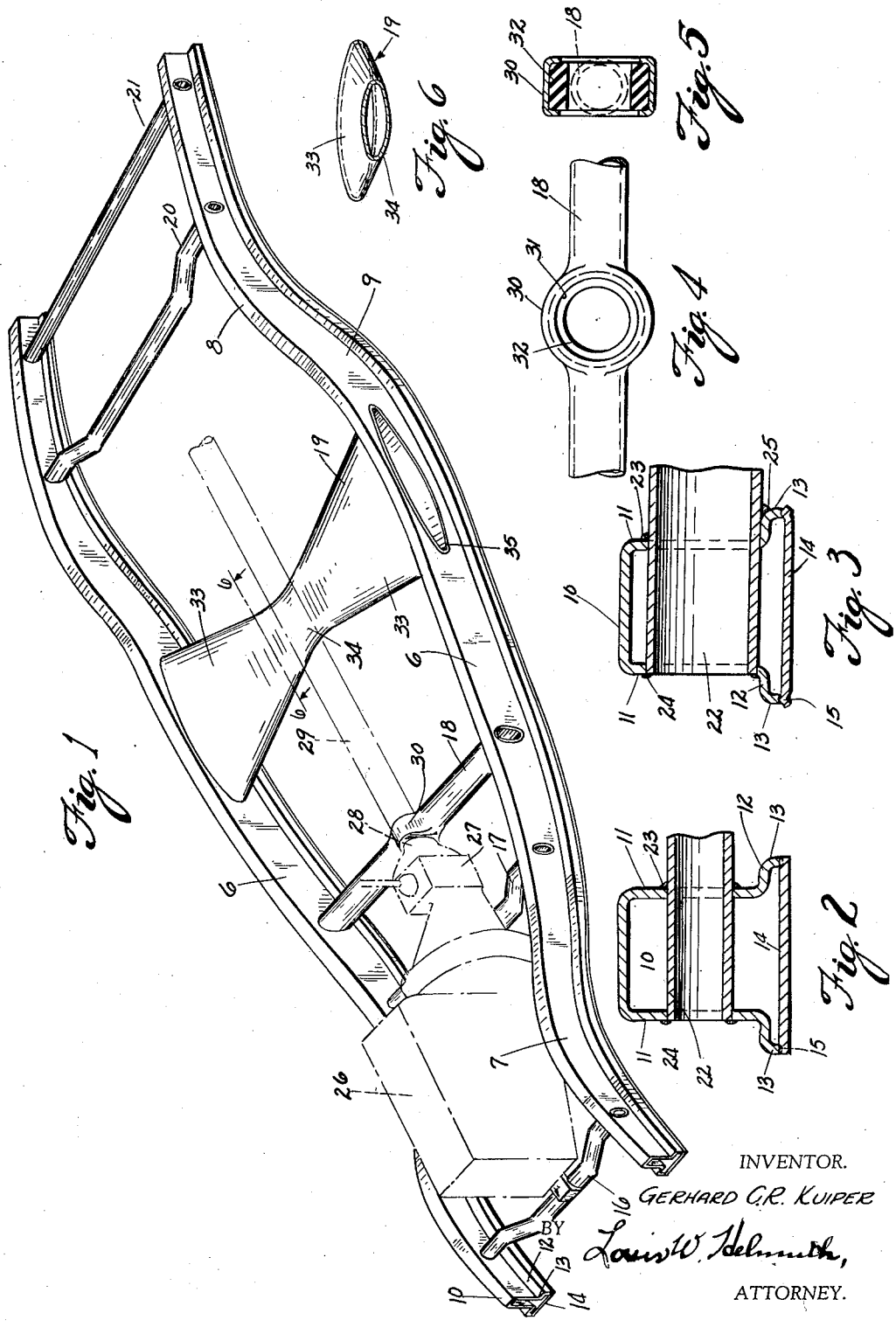


Fig. 1

Fig. 6

Fig. 5

Fig. 4

Fig. 3

Fig. 2

INVENTOR.
GERHARD G.R. KUIPER
BY Louis W. Helmuth,
ATTORNEY.

Patented Oct. 3, 1939 2,174,922

UNITED STATES PATENT OFFICE

2,174,922

VEHICLE FRAME

Gerhard C. R. Kuiper, Cleveland, Ohio, assignor to The Midland Steel Products Company, Cleveland, Ohio, a corporation of Ohio

Application February 11, 1937, Serial No. 125,227

7 Claims. (Cl. 280—106)

This invention relates to new and useful improvements in motor vehicle frames and has as its primary object, the provision of a frame having transverse cross members which is as rigid as the present type frame incorporating an X-shaped member at substantially the center thereof.

Another important object of the invention is to provide means for increasing the section modulus of certain of its component parts.

Another object of the invention is to provide a connecting member for the two side rails to take the place of the usual X-shaped member.

A further object of the invention is to provide a special form of transverse cross member having means for avoiding interference with the transmission casing and drive shaft.

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 specification and wherein like numerals are employed to designate like parts throughout the several views:

Fig. 1 is a perspective view of the improved type of frame,

Fig. 2 is a transverse section of one of the longitudinal members thereof showing the manner of connecting one of the transverse cross members,

Fig. 3 is a similar view showing another manner of connecting another transverse cross member,

Fig. 4 is an enlarged elevation of the central portion of the third cross member, which yieldably supports the transmission,

Fig. 5 is a transverse section taken on the vertical diameter of the portion 30 of Fig. 4, and,

Fig. 6 is a section of the fourth cross member and taken on a line 6—6 of Fig. 1.

Referring now more particularly to the drawings for a detailed description of the improved frame, the numeral 6 designates a pair of longitudinally extending members or side rails of the frame, both of which are substantially identical and therefore a description of one will suffice for both. Each side rail is provided with a front kickup or vertically bent portion 7 and a rear one 8 of usually greater degree to clear the axles and lower the center of gravity of the vehicle. Between these kickups and substantially at the mid-section of each rail, there is an outwardly bowed section 9, of greater depth than the ends of the rail.

As best appreciated in Figs. 2 and 3, each side rail is hollow or tubular from one end thereof to the other and of substantially inverted T-shape with both the arms and stem of the T possessing hollow section. Each rail is formed from an inverted U-shaped stamping with a top 10 and a pair of parallel depending sides 11. In previous rails of this type, the tubular or box section for the rail has been provided by securing a plate to the longitudinal edges of the side walls 11 or to outwardly extending flanges thereof. In order to increase the tubular or hollow section over and above the usual section, the outwardly extending horizontal flange portions 12 are given an additional bend to cause the edge portions 13 of the flanges to be arranged normal to the flanges 12 and parallel with the side walls 11.

In order to completely box in each side rail and to form it into completely closed box section, a flat plate in one piece or in sections throughout the length of the rail is secured to the edge portions 13 in any suitable manner, but preferably by welding. Either the free edges of the edge portions 13 or the margins of the plates 14 may be provided with integral projections at intervals throughout the length of the rail for projection welding the two together. Fig. 3 shows the flat plate 14 as possessing integral welding projections 15 along the marginal edges. This construction forms, the flanges 12 as well as the main body portion of the side rail into hollow or tubular section and performs an important part in increasing the rigidity of the member. A pair of such rails are arranged in spaced relationship as usual and are connected in such relationship by transverse tubular cross members 16, 17, 18, 19, 20 and 21 in such order from the front to the rear of the frame. The ends 22 of these tubular cross members are better shown in Figs. 2 and 3 as extending through apertures in both side walls 11 of each side rail and welded thereto as at 23 and 24. These tubular ends may be spaced above the flanges 12 of the side rails or have their lowermost portions rest on the upper surfaces thereof to be welded thereto as at 25 and shown in Fig. 3.

The motor 26 is supported between the two forward ends of the side rails and may be partially or wholly supported on the first and second cross members 16 and 17. A transmission housing 27 is located rearwardly of the motor and is provided with an extension 28 to which the drive shaft torque tube 29 is connected. In order to space the side rails adjacent the dash portion which is in proximity to the transmission, a special form of cross member 18 is provided. This cross member as stated previously is of tubular section with its central portions 30 enlarged and

provided with an enlarged central opening 31 therethrough, by suitably slitting or slotting the middle of the tube at diametrically opposite points and stamping and forming the same to enclose the extension 28 of the transmission. This extension of the transmission may be rigidly secured to the central portion of the cross member or a yieldable or resilient supporting ring 32 may be enclosed in the enlarged circular channel-shaped portion of the cross member to yieldingly engage the extension 28 of the transmission which extends therethrough.

The fourth cross member 19 which takes the place of the usual X-shaped member in the present frame, is a rather unique member in frame construction and is preferably made from a single piece of sheet metal rolled, formed and welded with a single seam into a tubular member. It has a general contour, shaped somewhat like an hour-glass. The section of the entire member is substantially elliptical or oval instead of circular, with its major axis horizontal. The two ends 33 of this cross member are much enlarged over the central restricted portion 34 and have their front and rear sides arranged in inwardly converging relationship. These tapering ends of the cross member also are inclined downwardly toward the constricted center 34 so that the drive shaft tube 29 may extend thereabove without interference, or if preferred, this cross member may be bowed upwardly and disposed above the drive shaft tube 29. The extreme ends of this cross member which extend through the two sides of each rail 9, are about 12 to 18 inches or more wide and may or may not taper on out to the extreme end, as desired. It will be particularly noted that the cross member 19 is extremely wide where it joins with the two side rails, and from tests, has been found to render the frame substantially as strong as an X-member frame.

It is to be understood that various changes in the shape, size and relationship of parts may be resorted to without departing from the scope of the appended claims.

I claim:

1. A motor vehicle frame including a member of substantially T shaped cross section with the arms and stem of the T being hollow, and a cross member extending through said stem and lying in a plane parallel with said arms.

2. A motor vehicle frame including a hollow member composed of a U-section having horizontal flange portions terminating in vertical flange portions substantially parallel to the sides of the U-section, and a plate spaced from said horizontal flanged portions and secured to said edges of the vertical flange portions to form said member into substantially hollow T shaped cross-section.

3. A motor vehicle frame including a hollow member composed of a U-section having horizontal flange portions terminating in vertical flange portions substantially parallel to the sides of the U-section, and a plate spaced from said horizontal flanged portions and having edge portions, and one of said edge portions having welding projections projection welded to the other edge portion and forming said member into substantially hollow T shaped cross-section.

4. A motor vehicle frame including a pair of longitudinal rails bowed outwardly at their central portion and a transverse hollow member of substantially hour-glass contour with elliptic cross section having relatively wide ends secured to the outwardly bowed portions of the rails and substantially co-extensive with the intermediate parts of said bowed portions.

5. A motor vehicle frame including a pair of longitudinal rails composed of a U-shaped section having horizontal flange portions terminating in vertical flanges parallel to the sides of the U-section, a plate secured to the edges of the vertical flanges to form the rail into hollow T-shaped cross section, and a transverse cross member having its ends supported upon both horizontal flange portions of each rail and extending through the spaced apart sides of the U-section.

6. A motor vehicle frame including a pair of spaced longitudinal members and a hollow tubular transverse member extending between said longitudinal members and having a substantially elliptical cross section, said member having its free ends attached to the opposite longitudinal members and converging gradually from opposite ends toward the longitudinal center of the frame, with the area of greatest restriction lying at substantially the longitudinal center of said frame.

7. A motor vehicle frame including a pair of spaced longitudinal members and a hollow tubular transverse member extending between said longitudinal members and having a substantially elliptical cross section, said member having its free ends attached to the opposite longitudinal members and converging gradually from opposite ends towards the longitudinal center of the frame, with the area of greatest restriction lying at substantially the longitudinal center of said frame and being offset from the horizontal plane of the two ends of the cross member.

GERHARD C. R. KUIPER.