

Jan. 23, 1940.

J. LEDWINKA ET AL

2,188,267

COMBINED BODY AND CHASSIS UNDERFRAME

Original Filed April 20, 1936 2 Sheets-Sheet 1

FIG.1

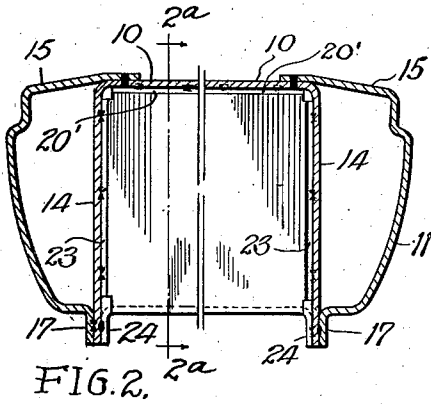
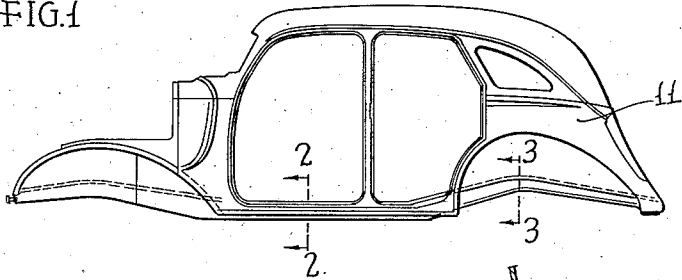


FIG.2.

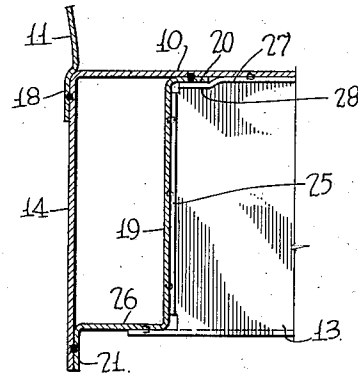


FIG.3

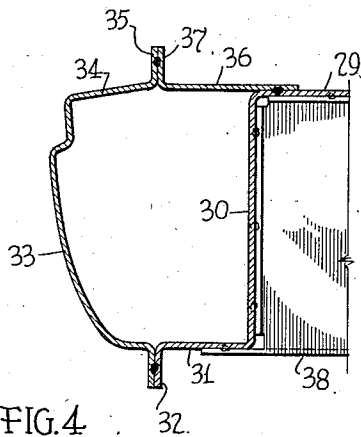


FIG.4

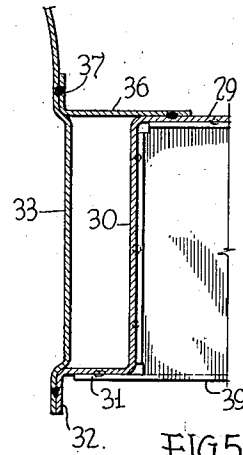


FIG.5

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FIG. 6

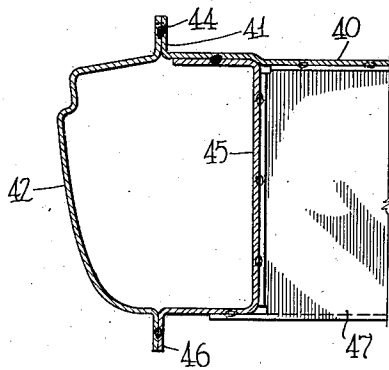


FIG. 7

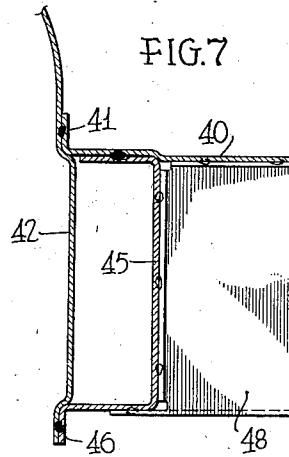


FIG. 8

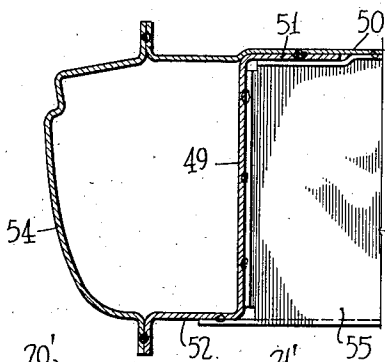


FIG. 9

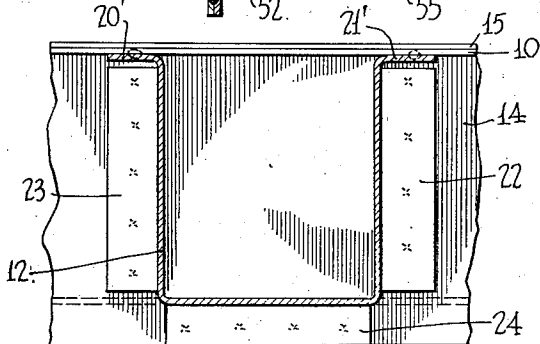
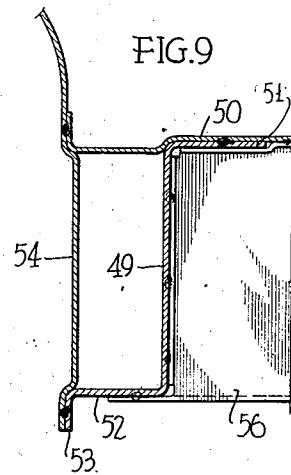


FIG. 2a.

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2,188,267

COMBINED BODY AND CHASSIS
UNDERFRAME

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poration of Pennsylvania

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7 Claims. (Cl. 296—28)

The invention relates to combined body and chassis construction and particularly to that type of combined body and chassis construction in which the combined underframe is coordinated with the body superstructure to provide box section side sills extending from end to end of the combined structure.

It is an object of the invention to simplify the construction of such structures and to lighten their weight without materially affecting their strength.

A further object of the invention is to provide a construction which permits the use of light gauge stock and to so arrange the joints entering into the structure as to facilitate their attachment by spot welding.

Other and further objects and advantages and the manner in which they are attained will become apparent from the following detailed description when read in connection with the drawings forming a part thereof.

In the drawings,

Fig. 1 represents in side elevation a sedan type of combined body and chassis structure in accordance with the invention.

Fig. 2 is an enlarged detailed sectional view through the threshold substantially on the line indicated by the line 2—2 of Fig. 1.

Fig. 2a is a detail sectional view through a cross member taken substantially on the line 2a—2a of Fig. 2.

Fig. 3 is a detail sectional view on an enlarged scale taken substantially on the line 3—3 of Fig. 1 and looking in the direction of the arrows.

Figs. 4 and 5 are sections corresponding to Figs. 2 and 3 showing a modified form of the invention.

Figs. 6 and 7 are sectional views corresponding to Figs. 2 and 3 showing a further modification of the invention; and

Figs. 8 and 9 are sectional views corresponding to Figs. 2 and 3 showing a still further modification of the invention.

According to the invention the sheet metal body floor panel comprises a main element of the combined underframe structure and may extend from the extreme rear of the combined structure to the extreme front and from side to side of the structure. This floor panel is designated generally by the numeral 10 in Figs. 2 and 3. At the front it may be cut away in the central portion to accommodate the motor and at each side of this central opening it may be suitably reinforced by a marginal reinforce extending around the opening. Alternatively the floor panel may end at the front in the region

of the cowl and suitable separate forward extensions for supporting the motor and the front wheel suspension may be provided, such extensions being secured to the reinforced box section side sills of the underframe rearwardly thereof by a telescoping or other suitable joint. The present invention is concerned more particularly with utilization of this floor panel to form elements of the combined body and chassis side sills of box section, and the sheet metal body side panel indicated generally by the numeral 11 and extending from extreme front to extreme rear of the structure cooperates with the floor panel in forming these box section side sill structures. In this way the combined structure may be built up with the minimum number of parts and the marginal portions of the parts entering into the structure are so shaped as to facilitate their joinder by spot welding.

At suitable points the floor panel which itself forms a cross connection between the side sills is further reinforced by transverse members of channel section, as indicated at 12 and 13 which are preferably formed of upwardly facing channel members secured to the floor panel to form a strong box section transverse reinforce between the sills.

According to a preferred form of the invention shown in Figs. 2 and 3, the floor panel 10 is formed in each lateral margin with a deep vertical web 14 forming in the threshold region the inner side wall of the box section combined body and chassis side sill. In the wheel housing region as shown in Fig. 3, because of the lateral inset relation of this to the side wall of the body forwardly thereof, this vertical web 14 forms the outer side wall of the box section sill. In the final assembly of the body side panel 11 with the lateral marginal portion of the floor panel 10 the inwardly extending threshold portion 15 of the body side panel 11 overlaps the top of the side portions of the body 10 of the floor panel and is secured thereto by spot welding. In its lower margin the body side panel is flanged inwardly as at 16, thus forming with the threshold flange and the outer face of the panel a generally inwardly facing channel, the lower side wall 16 of which is flanged downwardly at 17 to overlap the bottom margin of the vertical web 15 of the floor plate and secured thereto preferably by spot welding.

Thus these two panels, the floor panel and the body side panel form in final assembly in the threshold region at least, a complete box cross section of the combined body and chassis side

sill members. In the region of the wheel housing, particularly the rear wheel housing as shown in Fig. 3, the body side panel 11 is formed with a slight offset 18 along its lower margin, which offset overlaps the angle formed by the horizontal top of the floor plate and the vertical web 14 and is secured to this angular portion of the floor plate by spot welding. To continue the box section in this region an angular inner reinforce 19 may be provided, this angular member having an upper edge flange 20 overlapping and spot welded to the floor plate and a lower edge flange 21 overlapping and spot welded to the lower margin of the vertical web of the floor plate to form the box section structure which clearly appears in Fig. 3. In the region of the thresholds as shown in Figs. 2 and 2a, the upwardly-facing channel cross member 12 extending from side sill to side sill is formed at the top with the laterally extending flanges 20' and 21' from its side walls, which flanges are welded to the floor plate 10 to form therewith box section cross members between the sills.

To further strengthen the connection between these cross members and the side sills, the laterally extending flanges 20' and 21' are welded not merely to the single sheet of the floor panel but are extended underneath the inwardly extending double thickness of metal formed by the joinder between the threshold 15 and the floor plate 10 and spot welded to this double thickness extension from the inner side of the box section sills. To still further strengthen the joinder between the cross members and the side sills the side walls of the cross member 12 are laterally flanged at their ends as indicated at 22 and 23, see Figs. 2 and 2a, and these lateral flanges overlap the vertical web of the floor panel forming the inner wall of the box section and are secured thereto by spot welding. Similarly, the bottom wall of the channel 12 is extended and spot welded to the lower edge of this box section side sill. In this form of the invention it is shown provided with an extension which is flanged downwardly and indicated by the numeral 24 which is spot welded to the double thickness formed by the lap joint between the outer body side panel and the vertical web 14 of the floor plate.

In the region of the wheel housing the cross member 13 forms in similar manner a box section cross member with the floor plate 10 and is secured to the box section side sill extending through this region in substantially the same manner as in the form shown in Fig. 2. However, in this region the lateral flanges as 25 from the side walls of the cross member are secured to the vertical arm of the angular member 19 which forms the inner side wall of the box section in this region and the bottom wall is extended outwardly in rectilinear continuation to overlap the horizontal arm 26 of the angle member 19 and secured to it by spot welding. Where the lateral flanges from the side walls as 27 overlap the double thickness of the metal of the flange 20 and the floor plate 10, they are downwardly offset as at 28.

In the modification shown in Fig. 4, the floor plate designated generally by numeral 29 is again formed with a deep vertical web 30 which in turn is formed with a horizontally extending bottom flange 31 terminating in a downwardly extending edge flange 32. In this case the body side panel 33 is joined at the bottom to the flange 32 in identically the manner in which it is joined in

Figs. 2 and 3 but at the top the threshold portion 34 terminates in an upwardly extending flange 35 which is joined to the top of the floor plate 29 by a longitudinally extending bridging strip closing the box and designated 36, this bridging strip being formed with an upwardly extending flange 37 overlapping and spot welded to the flange 35 of the outer body panel, its inner margin overlapping the top of the floor plate 29 and being spot welded thereto. In the wheel housing where the outer panel 33 extends upwardly to form the upper part of the wheel housing, the flange 37 seats in an offset provided in the outer panel and is spot welded thereto in the offset. To space the top and bottom walls of the box in this region the outer panel 33 is offset slightly between the top bridging plate 36 and the bottom outwardly extending flange 31 of the floor plate as clearly appears in Fig. 5. The cross members 38 and 39 are connected to the floor plate 29, the vertically extending inner wall 30 of the sill and the bottom wall 31 in identically the same manner as that shown in connection with Fig. 3.

In the modification shown in Figs. 6 and 7, the floor plate 40 is extended straight out to the body side panel except for a slight upward offset in the region of the side sills and is flanged upwardly at its margin at 41 and secured to the body side panel indicated in these figures by numeral 42 in identically the manner in which the bridging strip 36 is secured to the side panel, in the modification of Figs. 4 and 5. The outer panel 42 in this case forms the outer wall of the box section sill in the same manner as in the form shown in Figs. 4 and 5, but the inner wall of the box section and at least part of the bottom wall of the box section are in this case formed by a separate sill element 45 of outwardly facing channel section, the top wall of the channel overlapping the floor plate 40 in the offset and being secured thereto by spot welding while the bottom wall of the channel is flanged downwardly at 46 and secured through this flange to the lower margin of the body side panel 42 in the same manner as that indicated in Figs. 4 and 5. The cross members 47 and 48 are again secured to the floor plate and to the box section side sills in substantially the same manner as that shown in the earlier figures.

In the modification shown in Figs. 8 and 9 the construction is very similar to that shown in Figs. 6 and 7 except that a Z member 49 has been substituted for the channel member 45 and the outer margin of the floor plate 50 is offset downwardly to form a shoulder against which the top of the Z member may seat, the top arm 51 of the Z member being secured to the floor plate as shown and the bottom arm 52 being flanged in its margin at 53 and secured to the outer panel designated 54 in identical the manner shown in Figs. 6 and 7.

The cross members 55 and 56 shown respectively in Figs. 8 and 9 are secured to the side sills again in identically the manner shown in Figs. 4, 5, 6 and 7.

In both these latter forms shown in Figs. 6, 7, 8 and 9 the floor plate combines with the outer side wall panel just as it does in the form shown in Figs. 2, 3, 4 and 5 to form elements of the box section side sill structure. In the construction shown in Fig. 2, however, the floor plate and the side wall panel, particularly in the threshold regions, together form a complete box section, whereas in Figs. 4, 5, 6, 7, 8 and 9

a third member cooperates with the floor plate and the side panel to form the complete box section.

All of the modifications described lend themselves very readily to manufacture out of light gauge metal, although in some cases, as in the construction shown in Figs. 6, 7, 8 and 9, the separate side sill elements 45 and 49 may be made of heavier gauge than the floor plating and the side paneling if desired for greater strength, and in all of these constructions use is made of both the side paneling and the floor plating to form elements of the box section side sill structure and the parts are so formed as to facilitate their joinder by simple spot welding operations. Other modifications of the invention may occur to those skilled in the art, and it is desired in the following claims to include such modifications within the purview thereof.

What we claim is:

1. A sheet metal combined body and chassis underframe for automobile vehicles having box section longitudinal side sills, said box section side sills including, in the threshold region, as elements of the box section structure, a vertically extending integrally formed part of a floor panel stamping and an integrally formed part of a separately formed outer side wall panel stamping, the main body of said floor panel stamping extending from side to side of the underframe and lying substantially in the plane of the top of the threshold, in which underframe an upwardly facing channel section cross member connects the box section side sills at the opposite sides of the underframe and is connected through laterally extending flanges from its side walls to the body floor panel to form a box section threshold, the ends of the side walls of said channel being laterally flanged and secured through said lateral flanges to the vertical inner walls of the box section sills and through an extension of the bottom wall of the channel with the bottom of the box section sills.

2. A sheet metal combined body and chassis underframe for automobile vehicles having box section longitudinal side sills, said box section side sills including, in the threshold region, as elements of the box section structure, a vertically extending integrally formed part of a floor panel stamping and an integrally formed part of a separately formed outer side wall panel stamping, the main body of said floor panel stamping extending from side to side of the underframe and lying substantially in the plane of the top of the threshold, in which underframe the elements of the box section structure including the body floor panel provide an inward extension from the top of the box of double thickness metal, a cross member extending between and interconnecting the side sills on opposite sides of the underframe, said cross member being of upwardly facing channel section having laterally extending flanges from its side walls overlapping and secured to said double thickness inward extensions and to the single sheet floor panel inwardly of said double thickness extensions.

3. A combined body and chassis underframe having hollow section side sills including a deep vertical web, and horizontal extensions at top and bottom of said web and a box section cross member of substantially the depth of said vertical web interconnecting the hollow section side sills at opposite sides of the underframe, the box section cross member being connected at its

ends to the vertical web and the top and bottom horizontal extensions from said side sills, said cross member comprising a floor panel interconnecting the top horizontal extensions of the sills, and an upwardly facing channel having its side walls flanged laterally and secured to the floor panel.

4. In a combined body and chassis structure, a box sectional sill being arranged along the lower side margin of the body, said sill comprising a threshold section and an adjacent wheel housing section, the wheel housing section being bodily laterally inset relative to said threshold section, a member having a substantially vertical web and extending continuously through said threshold section and said wheel housing section, a hollow section reinforcement facing inwardly and being applied to the outer side of said web and being co-extensive with the threshold section only as to form together with said web the closed box sectional threshold section of the sill, a second hollow section reinforcement facing outwardly and being applied to the inner side of said web, said second reinforcement extending substantially through said wheel housing section only and forming together with said web the box sectional sill in the wheel housing region, the arrangement of said reinforcements on different sides and in different sections of said web providing for the inward offset of the wheel housing section relative to said threshold section without the use of a correspondingly sharply offset stamping.

5. In a combined body and chassis structure, a box sectional sill being arranged along the lower side margin of the body, said sill comprising a threshold section and an adjacent wheel housing section, the wheel housing section being bodily laterally inset relative to said threshold section, a floor panel extending over the entire width of the body and being provided along its lateral margin with a vertically bent off flange, said flange extending continuously through said threshold section and said wheel housing section, a hollow section reinforcement facing inwardly and being applied to the outer side of said flange and being co-extensive with the threshold section only as to form together with said flange the closed box sectional threshold section of the sill, a second hollow section reinforcement facing outwardly and being applied to the inner side of said flange, said second reinforcement extending substantially through said wheel housing section only and forming together with said flange the box sectional wheel housing section of the sill, the arrangement of said reinforcements on different sides and in different sections of said flange providing for the inward offset of the wheel housing section relative to said threshold section without a correspondingly sharp offset in said flange.

6. In a vehicle underframe structure, a pair of longitudinal side sill portions, said sill portions being spaced from each other and interconnected by a transverse brace portion; each of said sill portions having one upstanding inner wall and an outwardly extending lower wall as to present a section member, said brace portion being an upwardly presenting open hollow-section member, a floor panel overlying the openings of said sill and brace portions and being fastened to these portions along the margins of said openings as to form after final assembly a framework comprising closed box-sectional longitudinal and transverse members.

7. In a vehicle underframe structure, a pair of longitudinal side sill portions, said sill portions being spaced from each other and interconnected by a transverse brace portion; said sill portions being angle shaped in cross section, each having one upstanding inner wall and an outwardly extending lower wall as to present a section member; said transverse portion being U-shaped in cross section, having upstanding side walls and a substantially horizontal bottom wall as to form an upwardly facing channel; a floor panel having a substantially horizontal body portion and downwardly extending portions along its side margins; the floor panel having its body portion fastened to the free margins of said upstanding walls of said sill and brace portions and its downwardly extending portions fastened to the free margins of said outwardly extending sill portion walls as to form after final assembly a framework comprising closed box-sectional longitudinal and transverse members.

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