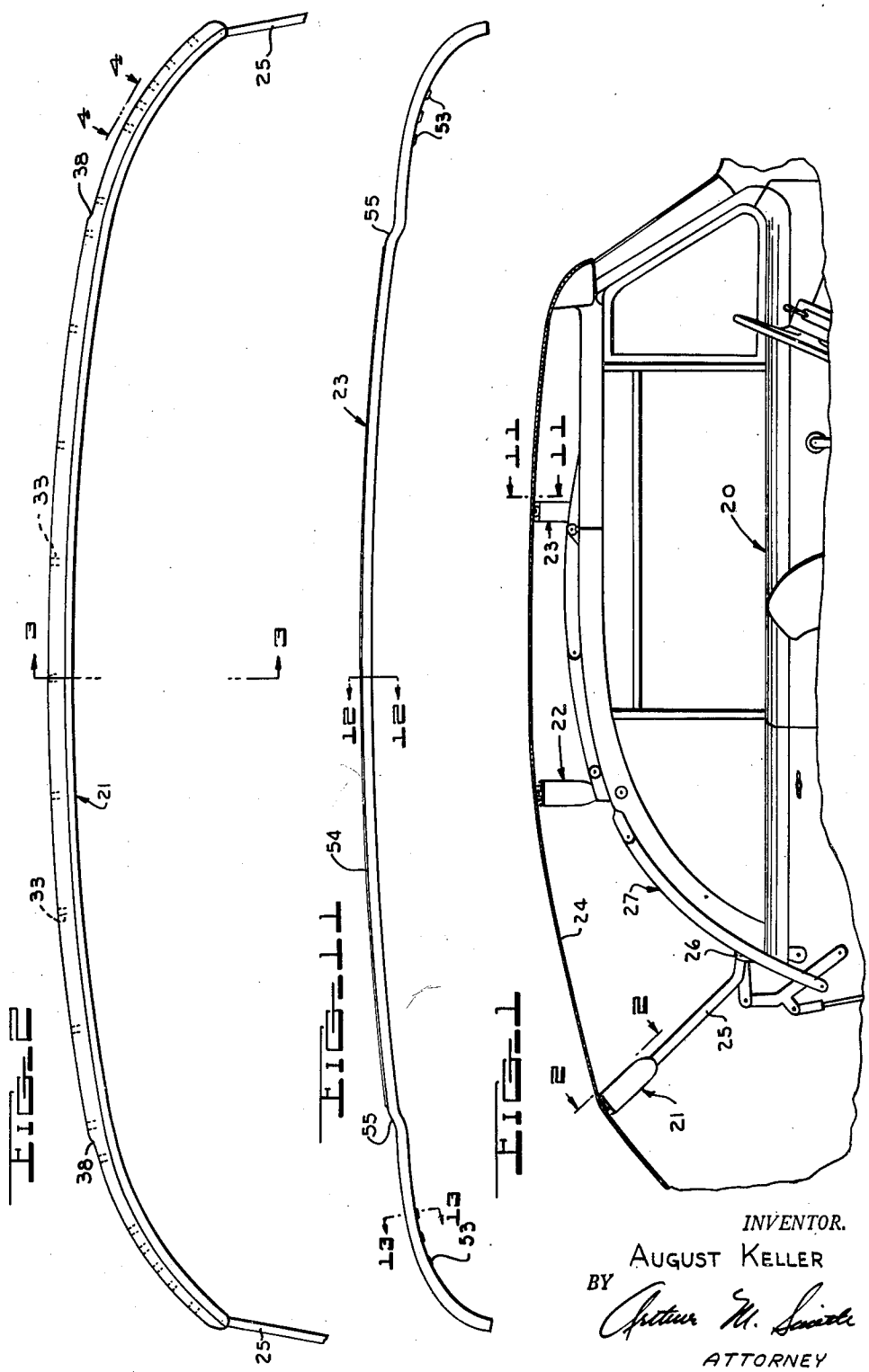
March 21, 1950 A. KELLER 2,501,392

TRANSVERSE BOW CONSTRUCTION

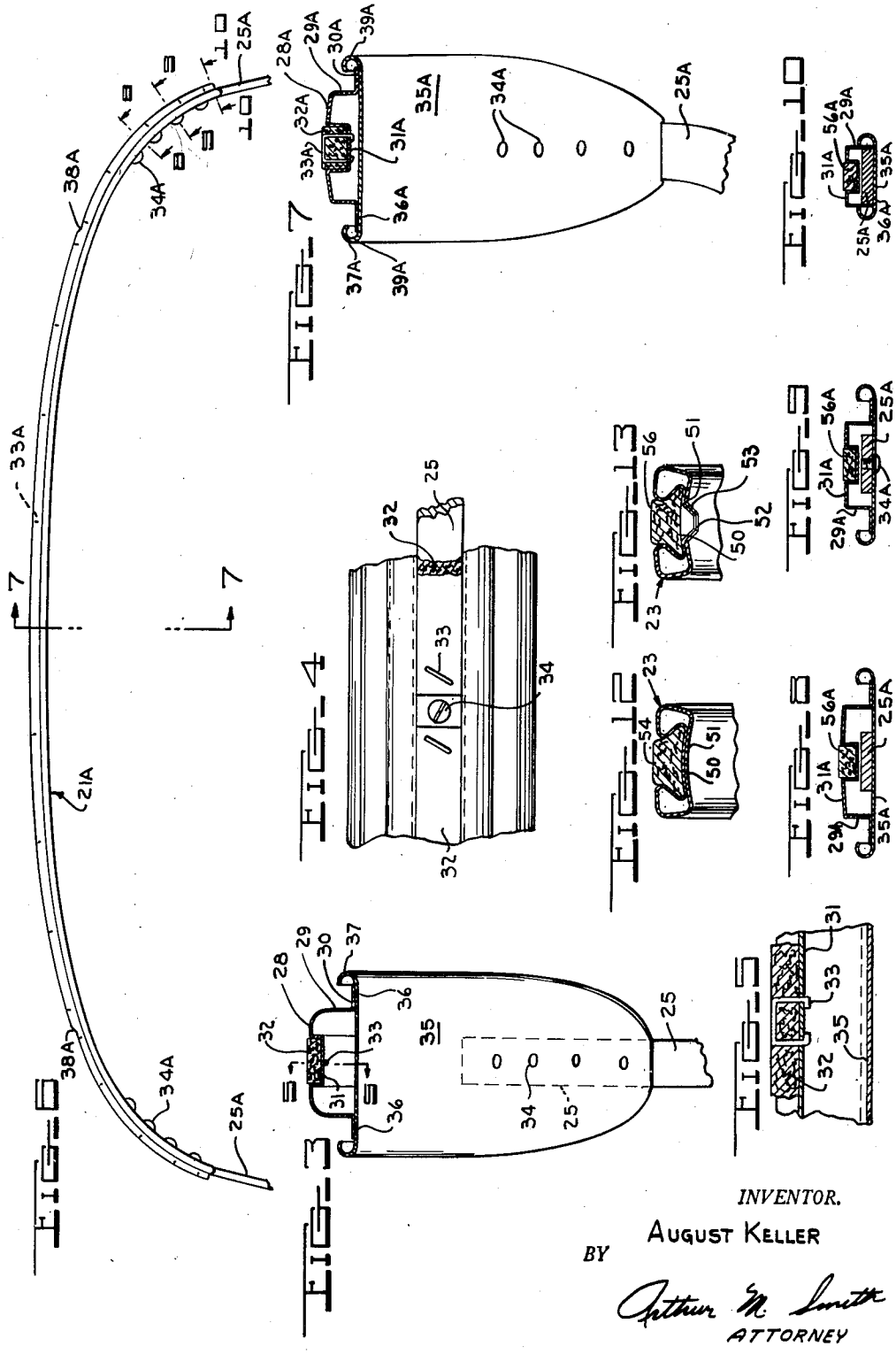
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TRANSVERSE BOW CONSTRUCTION

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TRANSVERSE BOW CONSTRUCTION

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5 Claims. (Cl. 296—118)

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The present invention relates to improvement in the transverse bow construction utilized to support the material of the flexible top of the conventional convertible type automobile.

Prior to the present invention, the transverse bows utilized to support the weatherproof fabric or other flexible material of the convertible automobile top when the latter is in the raised position, particularly the rear bow which is subjected to the greatest force in holding the top in the raised position, were made of curved wood sections. Such wood sections are not only slow and costly to manufacture in the ordinary case, but at present are very difficult to obtain because of the shortage of hard wood products. Furthermore, in order to adapt the shape of the bow to various artistic designs in the contour of the top, special expensive shaping and construction of the wood bow sections are required, thereby restricting the commercial feasibility of wood bows to a few conventional and relatively economically manufactured designs.

Accordingly, an important object of the present invention is to provide a sturdy essentially all-metal bow construction of suitable rigidity for the purpose described, which may be readily and economically manufactured by mass production methods, and which provides means for tacking the flexible material of the automobile top to the bow where desired and for holding a soft felt-like material in position between the top and the adjacent surface of the bow to prevent chafing of the flexible top material.

Another object of the present invention is to provide such a bow which readily lends itself to economical construction in various desired shapes so as to conform to the contour of the top material when the top is in the raised position, thereby permitting increased versatility in the design and artistry of the top.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

Fig. 1 is essentially a fragmentary vertical section along the longitudinal median of an automobile having a convertible top, showing several top supporting bows in section embodying the present invention.

Fig. 2 is a fragmentary view taken essentially in the direction of the arrows along the line 2—2 of Fig. 1, showing an elevation of the rear bow and

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fragmentary portions of the bow supporting posts, the fabric top being removed.

Fig. 3 is an enlarged fragmentary vertical section through the rear bow taken in the direction of the arrows essentially along the line 3—3 of Fig. 2.

Fig. 4 is an enlarged fragmentary elevation with portions broken away, showing the connection between the bow and supporting posts and taken essentially in the direction of the arrows along the line 4—4 of Fig. 2.

Fig. 5 is an enlarged fragmentary section through the tacking strip, taken essentially in the direction of the arrows along the line 5—5 of Fig. 3.

Fig. 6 is essentially an elevation of another rear bow embodying the present invention, showing fragmentary portions of the supporting posts therefor.

Fig. 7 is an enlarged fragmentary sectional view taken essentially in the direction of the arrows along the line 7—7 of Fig. 6.

Fig. 8 is essentially an enlarged section taken in the direction of the arrows along the line 8—8 of Fig. 6.

Fig. 9 is essentially an enlarged section taken in the direction of the arrows along the line 9—9 of Fig. 6, showing the connection between the supporting post and the bow.

Fig. 10 is essentially an enlarged section near the end of the bow, taken in the direction of the arrows along the line 10—10 of Fig. 6.

Fig. 11 is essentially an elevation of the forward bow, taken in the direction of the arrows along the line 11—11 of Fig. 1, the flexible top being removed.

Fig. 12 is essentially an enlarged fragmentary sectional view taken in the direction of the arrows along the line 12—12 of Fig. 11.

Fig. 13 is essentially an enlarged fragmentary sectional view taken in the direction of the arrows along the line 13—13 of Fig. 11.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Fig. 1 shows an idealized vertical section through a convertible type automobile, indicated generally by the numeral 20, employing three

top supporting bows, indicated generally by the numerals 21, 22, and 23, embodying the present invention, and adapted to support the flexible top 24 when the latter is in the raised position. Opposite ends of the bow 21 are supported by the pair of bow supporting posts 25, Fig. 1, which latter are pivotally secured at 26 to the top frame, indicated generally by the numeral 27. The posts 25 may be suitably constructed from metal or hard wood. Bow supporting posts for the bows 22 and 23 may similarly be employed where required, although such posts are relatively short because of the shorter distance between the ends of the bows 22 and 23 and the frame 27, and may be entirely eliminated where it is feasible to attach the end of the bows 22 and 23 directly to the supporting frame 27.

The bowed construction of the rear bow 21, which extends transverse to the longitudinal lines of the automobile and is curved downward at its opposite ends, is shown in the elevation, Fig. 2. Details of the construction are shown in Fig. 3 wherein a longitudinal upper metal bow panel 28 extends essentially the length of the bow 21 and comprises an inverted bowed channel structure having the lateral downward extending sides 29 which provide the lateral outwardly extending flanges 30 at opposite sides of the channel mouth. A tacking groove 31 is provided in the upper surface of the channel base of the upper bow panel 28 for tacking material 32 comprising strips of twisted paper, cardboard, or the like, to which the flexible top 24 is tacked.

In the construction of the bow 21, the tacking filler 32 is first inserted within the groove 31 therefor and is securely stapled in place by the plurality of staples 33, which extend through the tacking material 32 and the bottom of the tacking groove 31, to which latter they are clinched and securely held in position as shown in Fig. 5. The lower bow panel 35, bowed to conform to the bowed contour of the upper bow panel 28, is secured across the mouth of the channel of the latter to the flanges 30, as by spot welding at 36 for example.

It is to be noted, particularly in Fig. 3, that the space at opposite ends of the bow 21, between the underside of the groove 31 and the upper side of the lower bow panel 35, is adapted for insertion of the upper portions of the posts 25, which latter are preferably secured to the ends of the upper bow panel 28, as for example by the screws 34. A degree of adjustability of the screws 34 is permitted during installation by the employment of slightly oversized screw holes within either the overlapping ends of the posts 25 or the upper bow panel 28. Discontinuities in the tacking 32 are provided at the region of the screws 34, Fig. 4, to permit tightening of the posts 25 to the base of the groove 31.

The longitudinal lateral edges 37 of the lower bow panel 35 are rolled upward and inward to ornament and reinforce the assembled bow construction and also to dispose the abrupt cut edges of the lower bow panel 35 from view. The panel 35 serves as an ornamental cover plate which hides the crimped ends of the staples 33 and the under structure of the upper bow panel 28.

The construction shown permits the use of sheet steel or light gage metal for the bow and forms a particularly rigid construction suitable for use with the rear bow which must be adapted to withstand the major portion of the force exerted by the flexible top 24 as a result of the greater curvature at the rear of the top when the latter is in the unfolded or raised position. The tubular or box structure formed between the upper and lower bow panels 28 and 35 results in a rugged bow construction which is further reinforced by the rolled lateral edges 37, the longitudinal convolutions which comprise the channel 31, and the double thickness between the panel 35 and flanges 30 along the weld line 36.

The offsets at 38 near the ends of the bow 21 are provided as a design feature to effect a longitudinally ribbed appearance to the flexible top material 24 when the latter is unfolded. It is apparent that the formed light gage metal bow construction disclosed herein is readily adaptable to a wide and versatile range in design without appreciable additional cost.

Figs. 6 through 10 show a slightly modified form of the rear bow 21A wherein the channel sides 29A, the flanges 30A, and the tacking groove 31A of the upper panel 28A are similar in construction and purpose to the corresponding features of the aforementioned upper panel 28. A tacking material 32A is held within the tacking groove 31A by the plurality of staples 33A clinched beneath the base of the tacking groove 31A. The lower panel 35A is similar in construction and purpose to the aforementioned panel 35 and covers the channel mouth of the panel 28A, being welded to the flanges 30A thereof at the spot welds 36A, and being provided with the lateral rolled edges 37A. The overall design of the bow 21A is similar to the design of the bow 21 and provides the offset 38A.

An additional feature of the bow 21A is provided by the reinforcing wires 39A which extend longitudinally of the bow 21A within each of the upward rolled lateral edges 37A. The opposite ends of the wires 39A are suitably secured at the opposite ends of the bow construction. The open ends of the bow 21A are adapted to receive the ends of the posts 25A between the base of the groove 31A and the lower bow panel 35A, Figs. 8, 9, and 10. The overlapping ends of the posts 25A are secured in place by the plurality of screws 34A after the panel 35A is welded to the upper panel 28A. It is to be noted that the screws 34A extend through the underside of the lower panel 35A, Fig. 7, rather than through the base of the groove 31A. Thus discontinuities in the tacking strip 32A are avoided.

Figs. 8, 9, and 10 show the gradual diminution of the flange 30A, until as shown in Fig. 10, at the downward extremity of the bow 21A, the flange 30A is virtually eliminated and the lower edges of the sides 29A are welded directly to the lower bow panel 35A at the spot weld line 36A.

Another embodiment of the present invention is shown in the bow 23 of Figs. 11, 12, and 13 and is preferably adapted for use as either the center bow 22 or the forward bow 23, which in the usual situation are not subjected to as much stress as the rear bow 21. In this situation, as shown in Fig. 12, the bow 23 is preferably fabricated from a one piece section of light gage metal tubular stock which is rolled to provide the dove-tail groove 50 having the reinforced double walled base 51. However, the bow 23 may also be conveniently rolled from longitudinal strips of light gage sheet steel or other metal alloy to form essentially the same construction as shown in Figs. 12 and 13. The double walled base 51 is arched upwardly to provide the concavo-convex surface as shown in Fig. 12. At opposite ends of the bow 23, a plurality of screw holes 52 are formed in the double walled base 51.

Thereafter, the region around each screw hole **52** is reinforced by a conical upset portion **53**. The reinforced screw holes permit attachment of the bow **23** to supporting posts similar to the posts **25** and **25A**.

As usually employed to support the flexible top **24**, the central and forward bows **22** and **23** respectively are preferably not tacked to the top **24** throughout the major central portions of these bows. Accordingly, a felt filler strip **54** is interlocked within the dove-tail groove **50** essentially along the portion thereof between the offsets **55**, Fig. 11. The upper portion of the felt filler **54** extends slightly above the top of the bow **23** in contact with the cover **24** to provide a soft pad therefor and to prevent the latter from chafing on the bow's upper surface. A tacking material **56**, similar to the tacking material **32**, is inserted within the groove **50** essentially laterally to the offsets **55**. In this situation, the tacking **56** is held in place by the dove-tailed cross section of the groove **50** and permits tacking of the top **24** to the end portions of the bow **23**.

From the foregoing, an improved, sturdy, all-metal bow structure has been provided which may be readily and economically manufactured by mass production methods in a wide range of designs from light gage sheet metal or tubular stock, and which provides means for holding strips of tacking material or felt-like material in place to permit either tacking of the flexible top to the bow where desired or to prevent chafing of the top against the metal portions of the bow.

I claim:

1. In a formed metal bow construction for an automobile convertible top having lateral bow supporting posts, the combination of a longitudinally bowed upper bow panel, a longitudinal lower bow panel disposed below said upper bow panel and bowed to conform essentially to the bowed contour thereof, said upper bow panel including lateral spacer panels secured to said lower panel to provide a tubular opening extending longitudinally of said bow for receiving said supporting post within opposite ends of said bow, said lower bow panel having upwardly rolled lateral edges extending beyond the attachment of said lower bow panel with said lateral spacer panels, and a tacking groove within the upper surface of said upper bow panel and extending longitudinally thereof.

2. The combination in a bow as claimed in claim 1 and being further characterized in that a reinforcing wire, secured at opposite ends of said bow, extends longitudinally of said bow within each of said upwardly rolled lateral edges of said lower bow panel.

3. In a bow of metal construction for an automobile convertible top having lateral bow supporting posts, the combination of a metal upper bow panel comprising a longitudinal bowed inverted channel having depending channel sides and flanges extending outwardly from said depending channel sides, a longitudinal metal lower bow panel disposed below said upper bow panel across the channel mouth thereof and secured to said flanges, and a tacking groove within the upper surface of the channel base of said upper bow panel.

4. In a bow of metal construction for an automobile convertible top having lateral bow supporting posts, the combination of a metal upper bow panel comprising a longitudinal bowed inverted channel having depending channel sides, and flanges extending outwardly from said depending channel sides, a longitudinal metal lower bow panel disposed below said upper bow panel across the channel mouth thereof and secured to said flanges, said lower bow panel having upwardly turned lateral edges extending beyond the outer edges of said flanges, and a tacking groove within the upper surface of the channel base of said upper bow panel.

5. In a bow of metal construction for an automobile convertible top having lateral bow supporting posts, the combination of a metal upper bow panel comprising a longitudinal bowed inverted channel having depending channel sides and flanges extending outwardly from said depending channel sides, a longitudinal metal lower bow panel disposed below said upper bow panel across the channel mouth thereof and secured to said flanges, said lower bow panel having upwardly turned lateral edges extending beyond the outer edges of said flanges, a tacking groove within the upper surface of the channel base of said upper bow panel, and a tacking strip secured in said tacking groove.

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