July 26, 1927. 1,637,112

C. C. HULL ET AL

AUTOMOBILE TOP

Filed March 22, 1920 4 Sheets-Sheet 1

Fig. 1.

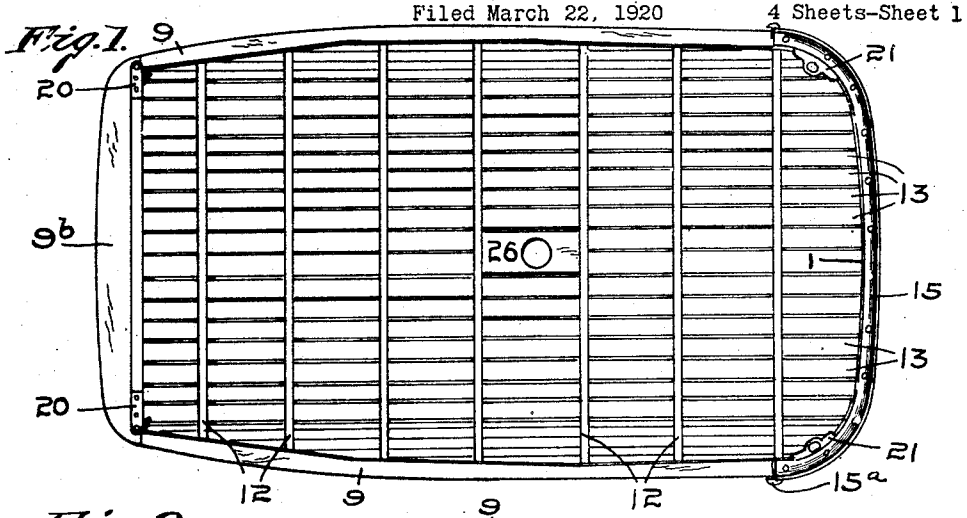


Fig. 2.

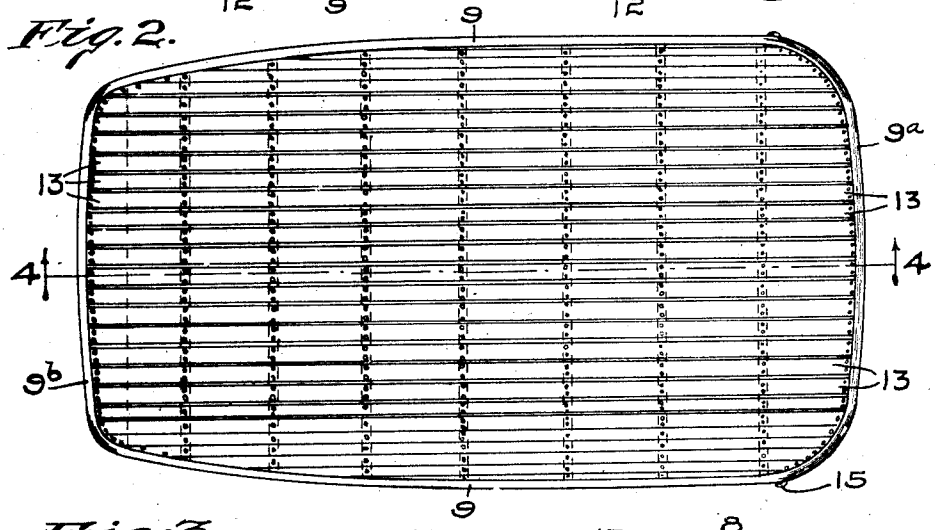
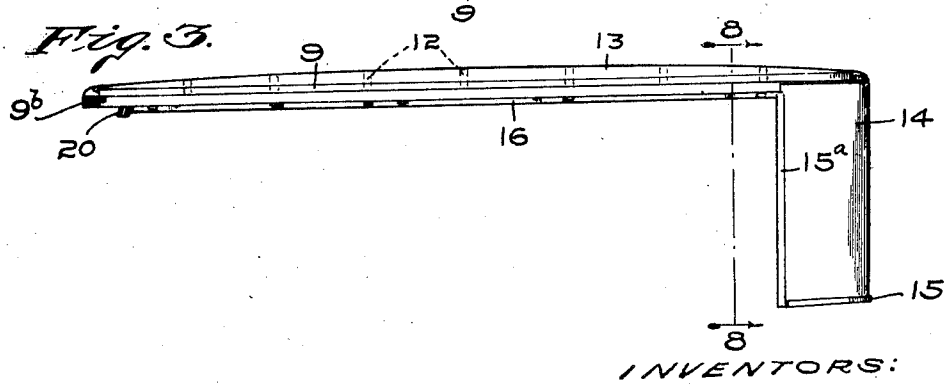


Fig. 3.



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AUTOMOBILE TOP

Filed March 22, 1920 4 Sheets-Sheet 2

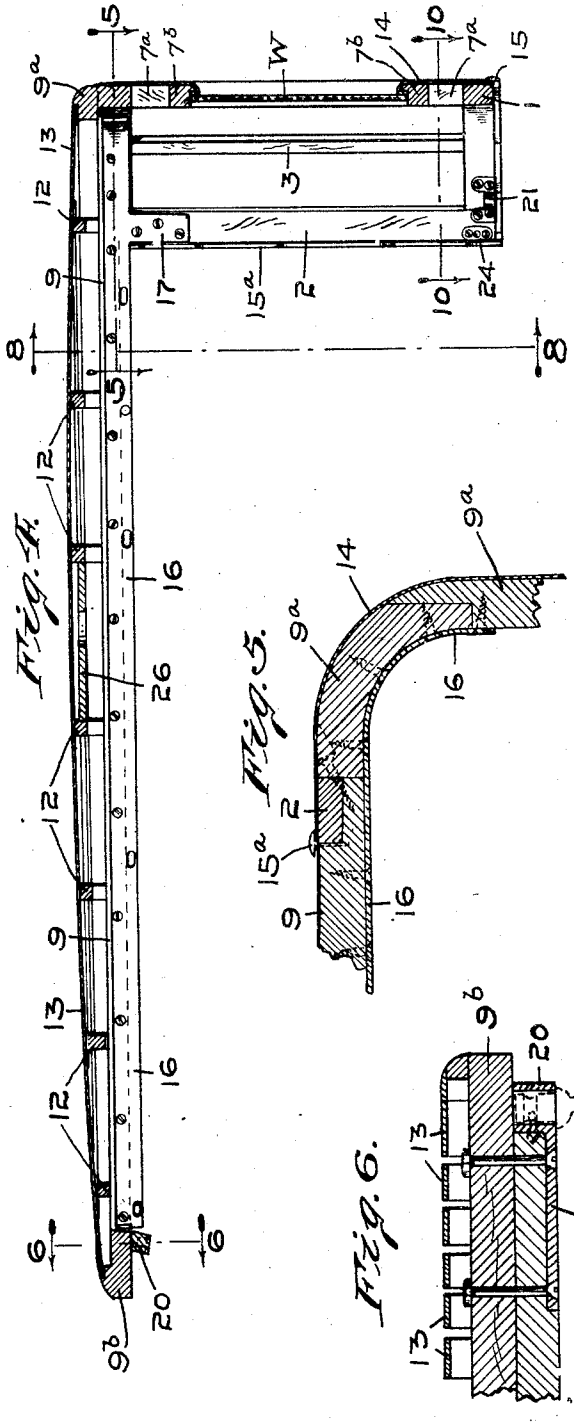

Fig. 4.

Fig. 5.

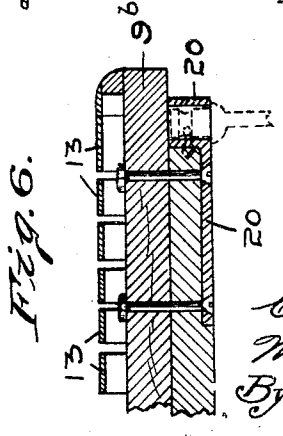

Fig. 6.

Fig. 7.

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C. C. HULL ET AL.

AUTOMOBILE TOP

Filed March 22, 1920 4 Sheets-Sheet 3

Fig. 8.

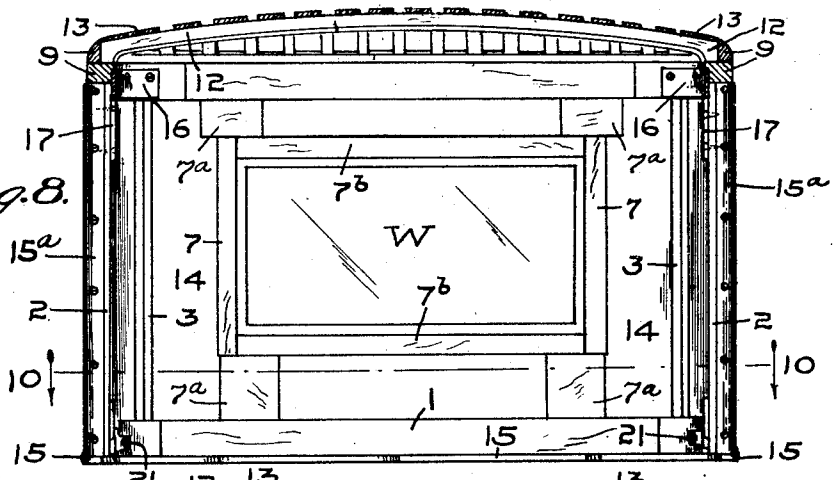


Fig. 9.

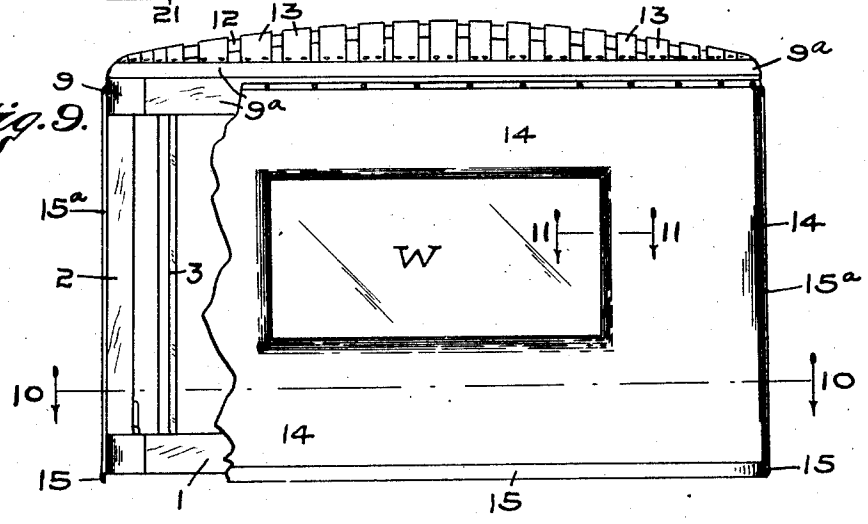


Fig. 10.

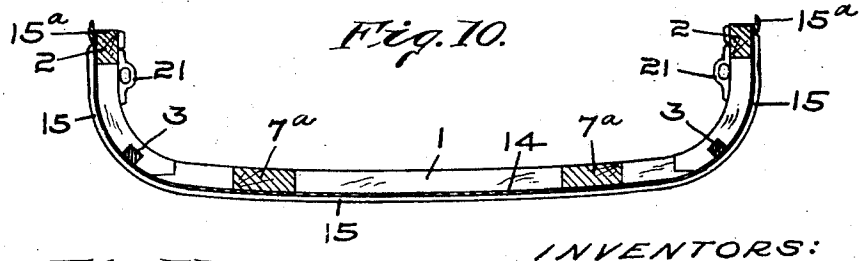
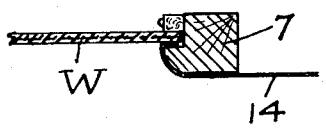


Fig. 11.



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AUTOMOBILE TOP

Filed March 22, 1920 4 Sheets-Sheet 4

Fig. 13.

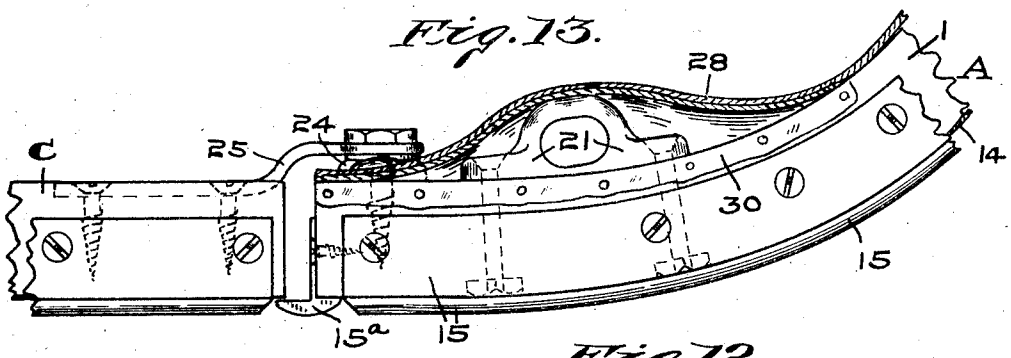


Fig. 12.

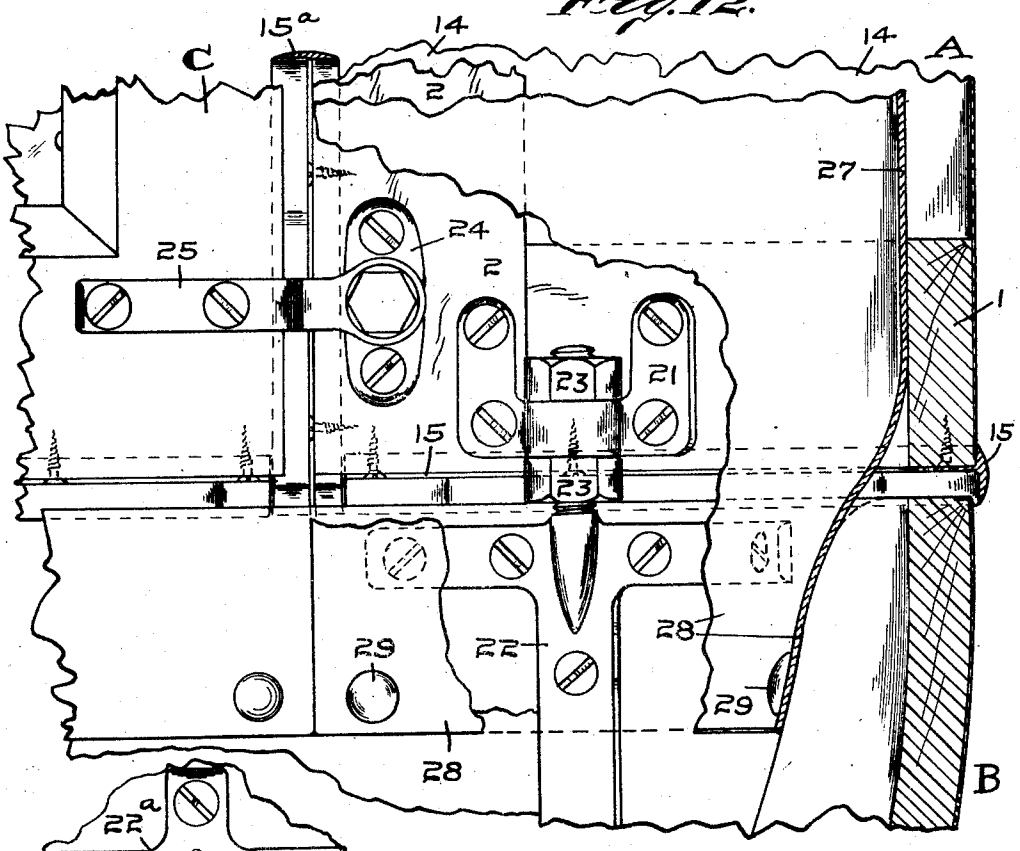
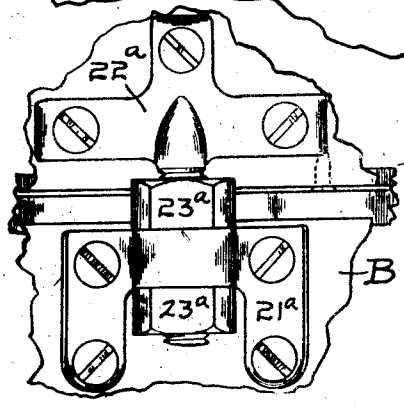


Fig. 14.



INVENTORS:
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Patented July 26, 1927. 1,637,112

UNITED STATES PATENT OFFICE.

CHARLES C. HULL AND MATTHEW R. HULL, OF CONNERSVILLE, INDIANA.

AUTOMOBILE TOP.

Application filed March 22, 1920. Serial No. 367,771.

This invention relates to the design and construction of a rigid, or non-collapsible, vehicle-top as a finished and complete article of manufacture, that may be subsequently used, either alone or in conjunction with other separately constructed elements, to form a cover for the vehicle body; and the general objects and purposes of our improvements are to produce an article of this kind; which will be of a substantially integral character, and will be easily handled as a unitary structure, both in the process of fabrication and in subsequent use; which will be light in weight and therefore readily manipulated in the various framing, painting, covering, trimming, finishing and packing operations to which it is subjected in passing through the different departments of the factory; which will be sufficiently firm and unyielding in form to not only sustain itself, but also withstand any stresses or shocks it may receive either during the course of manufacture or in subsequent shipping and assembling operations; which will be capable of quick and convenient attachment to, or detachment from, the tonneau or main body of the vehicle, without the use of any loose fixtures that are liable to become misplaced or lost; and which also possesses when in place on the vehicle body, a degree of inherent resiliency, and of elastic relationship to its support, that will enable it to yieldingly resist the severe torsional strain imposed upon the connected body and top members, and elastically absorb the violent shocks and jars to which they are subject when the car is driven over rough roads or is turning corners at a high speed. The manner in which these various results are attained by the use of our improvements,—and various other advantages that may be secured by such use—will be made clear to those skilled in this art, by the following description of the preferred form of organization which is illustrated in the accompanying drawings where:

Fig. 1 is a plan view—from below—of the general frame work of the structure. Fig. 2 is a corresponding plan view—from above—of the same organization. Fig. 3 is a side elevation of the completed top. Fig. 4 is a longitudinal sectional view on the plane 4—4 of Fig. 2 looking in the direction of the arrow. Fig. 5 is a partial horizontal section on the plane 5—5 of Fig. 4; Fig. 6 is a partial section on the plane 6—6 of Fig. 4. Fig. 7 is a perspective view of one of the important elements of our rigid unitary construction. Fig. 8 is a sectional elevation on the plane 8—8 of Figs. 3 and 4. Fig. 9 is a rear elevation of the top before the deck covering has been applied. Fig. 10 is a longitudinal section on the plane 10—10 of Figs. 4, 8 and 9. Fig. 11 is a partial horizontal section on the plane 11—11 of Fig. 9. Fig. 12 is a partial inside elevation (on an enlarged scale) of the rear portion of the construction shown in Fig. 4, and illustrates the manner of attaching the top unit to the tonneau and side units of an assembled closed body combination; Fig. 13 is a plan view—from below—of those portions of the top and side units that are shown in Fig. 12, and Fig. 14 is a detail view of a modified form of one of the attachment fixtures illustrated in Figs. 12 and 13.

The skeleton frame of our improved organization is made of wood and comprises the curved lower sill 1; the vertical side and back posts 2, 2, 3, 3, and 7, 7^a; the upper deck rails or stringers 9—9—9^a; the front bill board 9^b; and the transverse arched roof struts 12, 12, 12, etc., all of which are mortised and tenoned (or scarfed and lapped) and then glued and screwed together, at their joints, so as to form a substantially integral, unitary construction, that possesses per se, a high degree of stiffness and rigidity of form. The upper deck portion of this L shaped framework is further strengthened and stiffened by the longitudinally arched sheathing strips 13, 13, 13, etc., which are securely fastened to each of the arched cross struts 12, 12, 12 etc., to form a flat dome shaped roof that will carry very heavy load stresses without collapsing or becoming permanently distorted.

The vertical leg portions of the frame work are all rigidly bound together by a continuous metal sheathing 14 which entirely covers the exterior side and back surfaces of the structure except where it is cut away to form the rear window, W, of the top; and at this point the edges of the sheathing are rolled inward and bent around the jointed sash members 7—7, 7^b—7^b,—(as shown bent in Figs. 9 and 11)—so as to effectually prevent any racking or twisting of the window frame that might tend to break the glass pane. The lower edge, and

the two side edges of this leg or foot of our unitary top organization are further reinforced by T shaped metal rails or mouldings 15, 15a which overlap the adjacent edges of the metal sheathing 14; and which serve, not only as additional stiffening elements, but also as finishing and covering beads that overlap and conceal the jonits between the finished top unit and the complementary body and side units with which it is to be associated (see Figs. 12 and 13) in the manner hereafter described.

Any rigid or non-collapsible structure, which has the general L shaped form that characterizes our unitary top organization, is usually sensitive to any distortion stresses which tend to vary the angular relationship between the arms of the L, or which tend to rupture or loosen the framing connections at the juncture of these two arms. In order to efficiently resist the effects of such strains on our improved construction we provide special means for reinforcing the joints between the dome shaped deck and the vertical side members of the unitary top framework. The particular means which we prefer to employ for this purpose are most fully and clearly illustrated in Figs. 4, 5, 7, 8 and 9. As there shown we provide each side of the deck portion with a T shaped bar or plate 16—17 (shown separately in Fig. 7) the head (16) of which is rigidly secured to the inner face of each side rail 9 and the vertical leg (17) of which is secured to the corresponding face of a vertical side post 2. The rear arms of the bars 16 are carried around the curved side portions of the upright part of the structure; and the upper edge of the exterior sheathing, 14, overlaps, and is securely fastened to, the outer face of the overlying deck rails 9—9a. The framework connections between the roof portion and the side portion of the complete top unit, are, therefore, rigidly bonded together by the over-lapping portions of the metal reinforcement elements 14—16 and 17; and the relative arrangement and disposition of the assembled parts are such that the interconnected deck and upright members constitute, as a whole, a cantilever suspension system—in which the parts 2—17 correspond to the pier supports therefor—that is exceedingly effective and efficient in supporting any load or external stress that may be imposed on the upper deck; and in also resisting any bending or torsional or twisting strains that may tend to distort the general form of the complete structure and to thus rupture or loosen the connections between its individual elements.

The composite wood-metal construction above described constitutes a substantially integral unitary organization that is relatively light in weight, but which is exceedingly stiff and rigid in character and form, so that it may be readily handled as a self-supporting unit in all of the subsequent factory operations of painting, covering, finishing, trimming and upholstering the exterior and interior surfaces of the skeleton framework and thus producing the completed article of manufacture. The production of this light rigidly bonded unit combination of wood and metal members, as the base of the finished construction, is the fundamental, or initial, feature of our present improvements, and the subsequent treatment to which this basic combination is subjected, in order to adapt it to use on various forms of body, may be varied widely, without essentially modifying the character of the said improvements. The succeeding description of other detail features of construction which are depicted in our accompanying drawings, are, therefore to be regarded as only illustrative of one exemplary embodiment of our complete invention.

In order to attach the completed top to an automobile body of the usual form, means must be provided for connecting the front end of the deck with the upper portion of the wind shield frame, and for supporting the lower edge of the top frame on the rear part of the tonneau body. In the construction herein illustrated, the first mentioned connection is provided for by attaching two socket plates 20—20, to the under face of the front bill board 9b at points adjacent to the forward ends of the reinforcement plates 16—16; the parts being so arranged (as shown in Figs. 1 and 6) that the metal elements 16—20 overlap the joints between the side rails 9 and the front bill board 9b and thus serve to securely bind together and strongly reinforce the interconnected portions of these wooden members. The body support for the rear part of the top unit is provided for by attaching a pair of U shaped lugs 21, 21 to the bottom sill 1, at points adjacent to the juncture of that member with the uprights 2, 2,—the said lugs being preferably so formed and attached to the members 1 and 2 as to overlap the joints between the latter and thus serve also as additional reinforcement means for these parts of the wooden framework (see Figs. 4, 10, 12 and 13). The projecting cross legs of the U shaped lugs 21 are slotted to engage with the upper ends of the support arms, 22—22, on the tonneau body B (Fig. 12); and may be flexibly coupled thereto by means of adjustable nuts 23—23. An additional attachment plate 24 is screwed to the lower part of each side post 2, for the purpose of receiving and supporting the end of a metal strip 25 that is secured to a side window panel C (see Figs. 12 and 13), when it is desired to form a completely closed, or partially closed, body organiza-

tion such as is described in our pending application, Serial No. 350,871.

After the composite wood-metal framework of the top has been built up and firmly bonded together into an integral unitary and substantially rigid skeleton—and the latter has been additionally reinforced by the special attachment fixtures required to connect it to other parts of the vehicle body—the said skeleton unit is completed and converted into a finished individual article of manufacture by covering the exterior of the roof sheathing 13 (and the adjacent exposed edges of the deck elements 9—9^a—9^b) with a suitable waterproof fabric; and lining the interior surfaces of the framework with tapestry or leather, or such other upholstering material as may be desired; and in the construction illustrated in the drawings we have made special provision for the attachment of a large dome light to a central portion, 26, of the roof structure. Other side lighting fixtures may be attached, as desired, to the uprights 3—3 or 7—7, and the bases of all these fixtures—as well as the switch connections therefor—are covered and concealed by the interior linings of the completed top.

In order to avoid undue complexity in the drawings—and in order to more clearly show the character of the skeleton framework of our improved construction—the inner upholstery covering has been omitted from all the accompanying illustrations except those of Figs. 12 and 13; but the general manner in which this lining is applied and attached to the unitary top structure will be readily understood by those skilled in the art, without further description. In our new article of manufacture we preferably provide this lining 27, with a depending skirt 28 that is adapted to extend down over the joint between the top unit A and the body unit B, and to be buttoned or secured to the back seat cushions and in the inner lining of the tonneau by means of glove or curtain fasteners 29, 29, (or by any other suitable means), when the said units are assembled. This depending skirt also covers and conceals the attachment fixtures, 21, 22, 23 of the connected units; and for the purpose of preventing wear,—and in order to avoid wrinkling and creasing, the portions of the skirt that overlie the projecting parts of the coupling elements may be reinforced by an additional thickness of leather or other suitable material, as shown in the lower edge view of Fig. 13. This reinforcement flap may be stitched or otherwise secured to the main lining 27 on either the interior or exterior surface of the latter; and may be so arranged as to cover only the fixtures 21—22—23, or to cover both these fixtures and the auxiliary side panel attachment 24 as well. In order to cover that portion of the top framework that is beneath the loose portion of the skirt 28, we preferably provide a supplemental lining strip 30 which is permanently secured to the inner faces of the lower sill 1 and the adjacent portion of the front posts 2—2, and serves to conceal the unfinished surfaces of those parts when the skirt is lifted to secure access to the attachment fixtures 21—22—23 and 24.

Instead of forming the straight portion of the lining as an integral part of the interior covering, we may, if desired, make this skirt as a separate portion that is attached at both its upper and lower edges to the adjacent portions of the linings of the top and tonneau members of the vehicle. In such a case the skirt is made relatively narrow; being only of such width as is necessary to properly cover and conceal the attachment fixtures between the upper and lower units. This separate skirt may be furnished as a part of our completed article of manufacture—in which case it constitutes a part of the entire combination—or it may be furnished as a separate piece that can be attached at any time to the parts with which it is associated, suitable provision being made in such case for the proper fastening devices on the top and body linings.

Our improved unitary top construction is also preferably provided, at suitable points in the deck lining, with recessed pockets—formed between the skeleton framework and the inner upholstery covering therefor—for the reception of flexible weather curtains that may be readily unfolded and applied to the connected body and top units, for the purpose of closing the open sides of the assembled organization. We have not deemed it necessary to illustrate and describe, in detail, the form and arrangement of these curtain pockets, for the reason that this feature of construction has been made the subject of a separate application for Letters Patent, Serial No. 158,455, by one of the applicants herein; and it does not constitute a part of our present joint invention. We have also omitted all description of various minor or auxiliary features of construction—such as the provision of window shades for the rear window W, the provision of weather guards or water gutters along the edge of the deck member, etc.,—on the understanding that these, or other, special fittings, can be provided, as required, by those skilled in this art.

It will be readily recognized that many of the specific details of the organization, which we have hereinbefore illustrated and described as one embodiment of our present improvements, may be varied, as required to meet special conditions of manufacture or use, without departing from the spirit of our invention, or without sacrificing any of the characteristic advantages to be attained

thereby. For example: Instead of using the form and arrangement of attachment of fixtures indicated by the reference characters 21—22—23 in Figs. 1 to 13, we may, in certain cases, use an invert of this fixture arrangement such as is shown in Fig. 14; in which the female socket member 21^a is secured to the tonneau framework, and the male threaded member 22^a is screwed to the adjoining portions of the wooden members 1 and 2. One advantage of this alternate arrangement of parts is that the socket plate 21^a may be inset in the tonneau framework and covered by a detachable flap of the tonneau lining, thus reducing the "bulge" or projection of those parts of the skirt 28 that overlie these main attachment fixtures.

The many important advantages of our invention—as exemplified in a complete finished unitary article of manufacture such as has been hereinbefore described—will now be readily understood and appreciated by engineers and others who are familiar with the problems involved in vehicle body construction. Some of the more important features and advantages of our improved unitary top structure may be briefly summarized as follows:

I. It presents the combination of an interbonded wooden framework and a system of longitudinal and transverse metal reinforcements, which are rigidly secured to the principal horizontal and vertical members of the said frame, and which are so formed and arranged as to both individually and mutually overlap the joints, or other portions, of the wooden base that are subjected to the maximum load stresses. We thus obtain a substantially integral skeleton top construction which is relatively light—because the major portion of it is wood—and which is also very rigid and unyielding in form because it is securely braced and stiffened and reinforced by metal elements so designed and disposed as to most effectually resist the bending and twisting strains that would tend to rack and warp, and ultimately loosen and distort, the interjoined wooden members of the organization.

II. The general structural character of our new top—and the relative disposition of the wood and metal elements therein—is such that the composite skeleton framework constitutes, in form and effect, a cantilever support system, in which the main wooden members are under compression and the principal metal reinforcements are under tension—each set of members being thus utilized to carry the elastic strains to which they offer the most effective resistance.

III. The combination of lightness and rigidity of form, which we secure in the above described manner, makes it possible to readily manipulate the self sustaining skeleton top framework—and turn it on its side or back or end or in any other desired position—in its successive passage to and through, the various factory operations in which it is painted, trimmed, covered, lined and finished as hereinbefore described. This expedites the progress of the work in each department—particularly in upholstering the interior surfaces of the unit—thereby increasing the output and reducing the labor cost of manufacture.

IV. The self contained integral character of our finished article of manufacture permits of the storage and shipment of these tops as complete interchangeable stock units; and the L shaped form of the units also enables them to be packed in "nests" thereby greatly increasing the number of tops that may be placed in a given warehouse or box car space. This effects a further important saving in storage and shipping charges.

V. The metal reinforcement and attachment elements, at the base, or lower sill, portion of our improved top structure, are so designed and arranged that, when the top is assembled in position on the tonneau of the car, the open joint between the assembled units is masked and concealed on both the exterior and interior surfaces; and the attachment fixtures may also be covered and hidden from view. This feature of our construction not only adds to the artistic appearance of the body and top combination, but also serves to prevent the passage of rain, snow, dust or dirt through the said joint between the lower and upper parts.

VI. The specific form of T rail section which we employ for covering the lower and front edges of our unitary top framework has, in itself, peculiar advantages, in that it possesses great rigidity for a given weight of metal—and therefore constitutes a very effective reinforcement for the lower sill and side post members of the combination—and also because it can be attached to its assembled parts by means of concealed screws passing through the flange portion of the T rail section, and when so attached it constitutes an artistic and close fitting element of the external surface finish, and one that cannot be accidentally separated or detached therefrom by the various stresses and strains to which the article is subjected.

VII. The connective or coupling fixtures, which we provide for flexibly attaching our complete unitary top member of the vehicle are so positioned that the main points of support for the integral top unit are only a short distance from the transverse plane through the center of gravity thereof; and are substantially in line with the "pier" points of the cantilever support system of the structure. The rigid integral top is, therefore, to a certain extent, "balanced" on the most rigid and unyielding part of its support—i. e. on the rear portion of the ton-

neau frame,—and is free to yield, as a whole, with respect to the lower portion of the body.

VIII. The open flexible character of the coupling connections, between our substantially rigid integral top and its body support, permits the two assembled units to move slightly with respect to each other, and to thus resiliently readjust themselves to varying stress and strain conditions without any permanent distortion of either unit. This resiliency of support protects our rigid top against the effects of severe twisting or buckling strains or of violent jars and shocks to which the body of the vehicle may be subjected in traveling over rough roads, or in turning corners at high speeds, etc.;—the major portion of these effects being effectively cushioned and absorbed by the elastic yielding of the aforesaid flexible connective fixtures. This feature of our improved construction is of marked importance; not only because it reduces the chances of injury to the top, but also because it tends to check the side sway and pitching of the lower part of the vehicle body, and thereby supplements the action of the spring suspension system in stabilizing the movement of the tonneau and in enhancing the comfort and safety of the occupants of the car.

IX. The light and self-supporting nature of our new rigid top and the means which we provide for flexibly attaching it to the car at four points only, makes it very easy to connect or disconnect the said top—as occasion may require—without the aid of skilled labor and without the use of any special appliances or the attachment or detachment of extraneous loose parts; and when the upper unit is removed from the car it may be stowed away as a self-contained entirety that does not require any large amount of space or any particular protection against such rough handling as might injure the deck covering or the collapsible tripod supports of an ordinary cape or canopy top; and when our improved top has been removed from the body of the car the latter does not present any protruding fixtures which detract from the external finish of the tonneau unit or which might tend to catch or tear the clothing of the users of the car when they are entering or alighting from the vehicle.

With the foregoing disclosure as a guide it will be possible for those skilled in this art to vary the construction herein described so as to utilize our improvements in many different forms of rigid unitary top organizations, and we have not therefore considered it necessary to illustrate more than one complete exemplary embodiment of our invention. We do not therefore limit ourselves to the specific details of structure that have been heretofore set forth as generally characteristic of our present developments. But what we claim is:

1. A new article of manufacture consisting of a demountable L shaped wooden frame made up of longitudinal and transverse roof struts and vertical side struts abutting against said longitudinal struts and rigidly and permanently joined thereto, and T shaped metal reinforcements overlapping the joints between the roof and the side struts and cooperating therewith to resist distortion of the frame.

2. As a new article of manufacture—a self supporting top for vehicles consisting of a combination of wooden struts rigidly and permanently joined to form an L shaped frame, and a system of metal reinforcement strips extending along the side bars of the roof and the base of the L frame, said strips concealing the joints between adjacent parts and adapted to stiffen the top and assist in the attachment thereof to the tonneau member of the vehicle.

3. As a new article of manufacture—a composite framework, comprising wooden compression members, and metal tension members, rigidly interconnected with each other to form a cantilever support system for the internal and external coverings and linings of an integral unitary top, and flexibly supported at isolated points on the body members of a vehicle.

4. As a new article of manufacture—a composite wood-metal combination of compression and tension members which are rigidly interconnected with each other to form a cantilever support system for the deck and side coverings of an integral unitary top unit, with means for flexibly supporting the said unit at points adjacent to the pier members of the said system.

5. As a new article of manufacture, the combination of overlapping and interlocked wood and metal members constituting a rigid unitary framework for a non-collapsible vehicle top, with an external waterproof covering for the deck and side portions thereof, and means for flexibly supporting the completed structure at points adjacent to the transverse plane through the center of gravity thereof.

6. A new article of manufacture—comprising the combination of overlapping wood and metal members rigidly interconnected to form an integral unitary top frame, a waterproof covering for the exterior surface thereof, a pair of attachment fixtures for flexibly connecting the said frame to the body of the car, and an interior lining extending below the lower edge of the top and adapted to cover and conceal the joint between the flexibly connected parts.

7. A new article of manufacture which comprises the combination of a composite framework of wooden compression members

and metal tension members, rigidly interconnected with each other to form a cantilever support system, for the outer and inner coverings of a complete unitary vehicle top, with means for flexibly supporting the top on the body of the car and means for covering and concealing the said supporting means.

8. A new article of manufacture which comprises the combination of a rigidly joined system of wooden struts and an overlapping system of metal reinforcements interconnected thereto to form an integral unitary framework for a vehicle top with external and internal coverings therefor, and four symmetrically disposed attachment fixtures arranged in pairs at opposite ends of the top frame for flexibly connecting the latter to the body of the vehicle.

9. A new article of manufacture consisting of a composite framework of wooden compression members and metal tension members rigidly interconnected with each other to form an L shaped cantilever support system for the external and internal coverings of an integral unitary vehicle top, with a pair of attachment fixtures secured thereto at points adjacent to the pier centers of the cantilever frame, and a second pair of attachment fixtures fixed on the said frame at the extreme forward end thereof.

10. A demountable rigid top for automobiles comprising a vertical rear end portion, an elongated upper portion integral therewith, and means flexibly connecting said rear end to the body of the automobile, said means including vertical pivots at opposite sides of said rear portion, substantially as set forth.

11. A demountable rigid top for automobiles comprising a vertical rear end portion, an elongated upper portion integral therewith, and vertical pivots adjacent the four corners of the automobile body flexibly connecting the demountable top thereto, substantially as set forth.

12. A demountable rigid top for automobiles comprising relatively light spaced-apart longitudinal and transverse members rigidly united to form a frame having a vertical rear part and a horizontal upper part, and a pair of vertical pivots flexibly connecting said rear part to the body of the automobile, substantially as set forth.

13. A demountable rigid top for automobiles comprising relatively light spaced-apart longitudinal and transverse members rigidly united to form a frame having a vertical rear part anl a horizontal upper part, and a pair of vertical pivots at the extreme front of the upper part flexibly connecting it to the windshield, substantially as set forth.

14. A demountable rigid top for automobiles comprising relatively light spaced-apart longitudinal and transverse bars rigidly united to form a frame having a vertical rear part and a horizontal upper part and a vertical pivot adjacent each of the four corners of the automobile and flexibly connecting the demountable top to the body of the automobile, substantially as set forth.

15. An automobile having an open permanent body, a demountable top adapted to be superposed thereon, means for connecting the top and body flexibly comprising brackets on the sides of the car having upwardly directed threaded extensions, brackets on the demountable top having oblong holes to receive said extensions, and nuts on said extensions, substantially as set forth.

16. A demountable top for automobiles having an upper frame comprising side and end sills and spaced longitudinal and transverse members providing a lattice connecting the sills and plates overlapping the joints at the front corners of the frame said plates having sockets to receive pivots on the windshield supports and flexibly connect the frame thereto, substantially as set forth.

In witness whereof, we have hereunto set our hands at Connersville, Indiana, this sixteenth day of March, A. D. one thousand nine hundred and twenty.

CHARLES C. HULL.
MATTHEW R. HULL.