Jan. 12, 1926. 1,569,725

H. H. DOEHLER ET AL.

VEHICLE DOOR

Filed Jan. 3, 1923 2 Sheets-Sheet 1

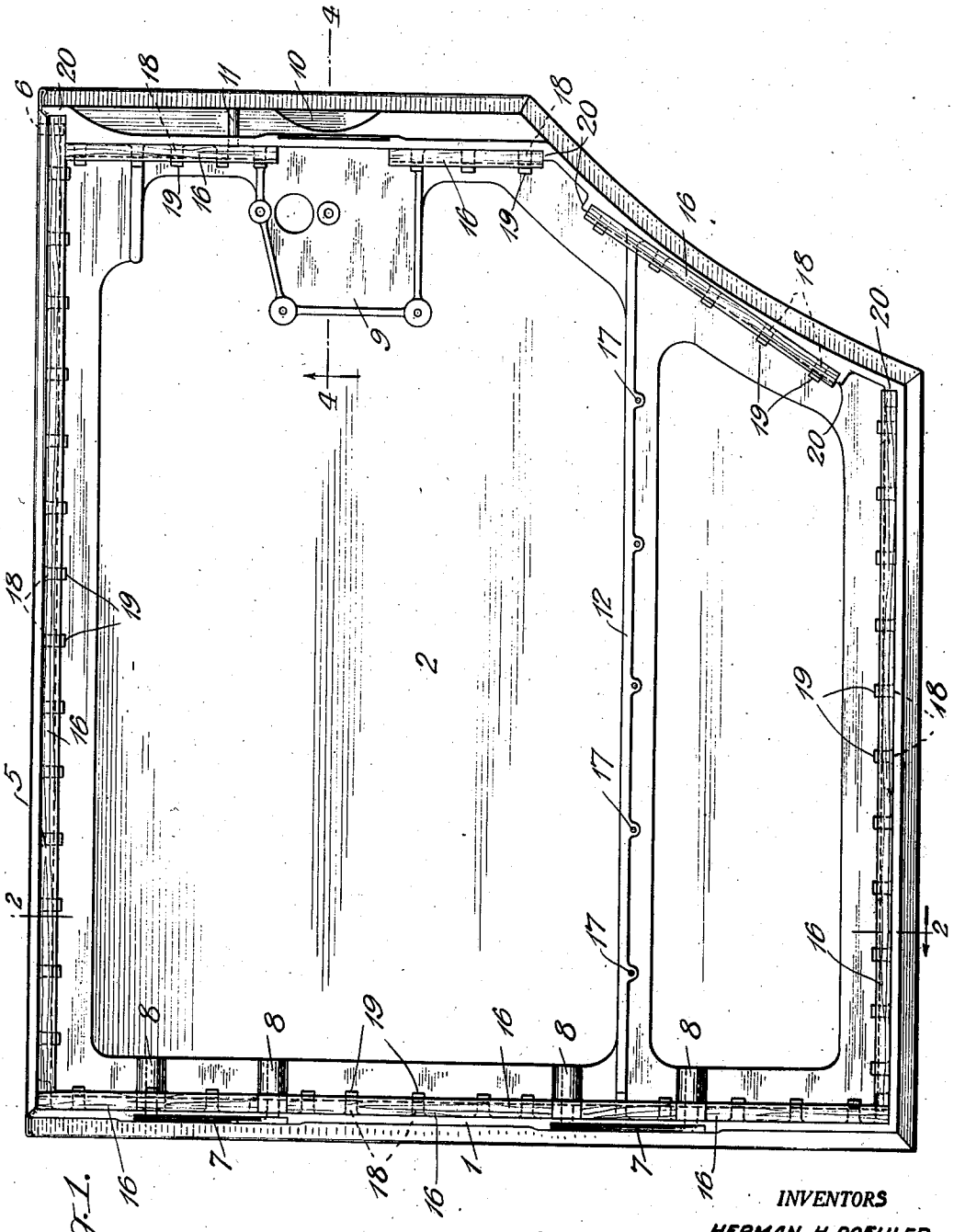


Fig. 1.

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Fig. 2.

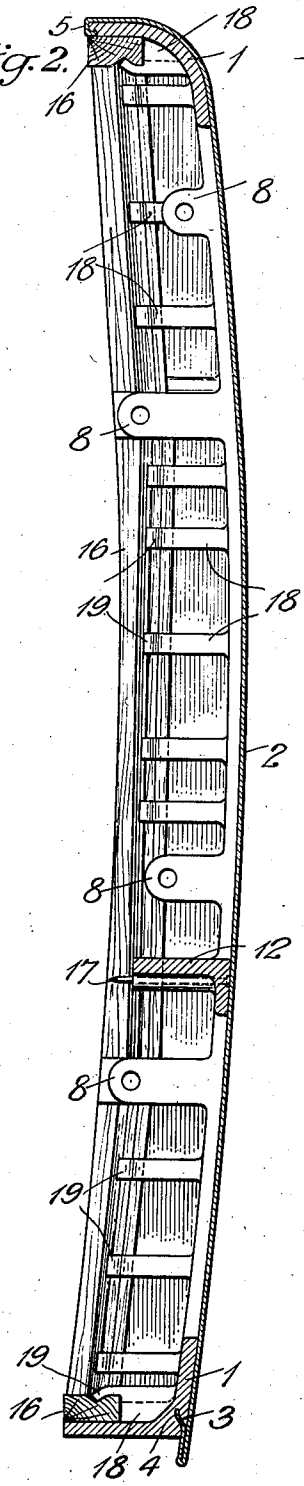


Fig. 3.

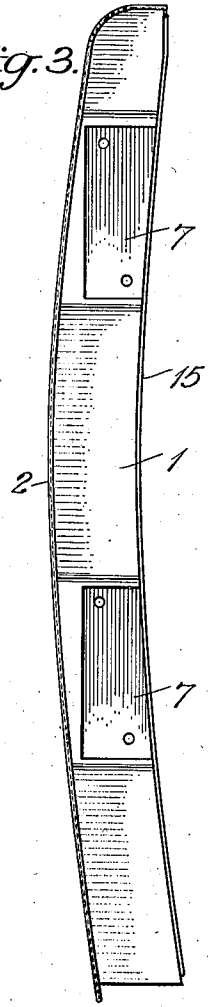


Fig. 5.

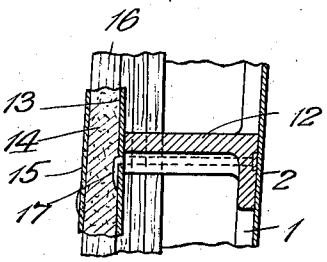
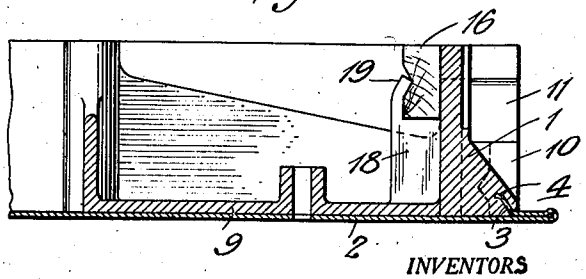


Fig. 4.



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UNITED STATES PATENT OFFICE.

HERMAN H. DOEHLER, OF NEW ROCHELLE, AND MARC STERN, OF BROOKLYN, NEW YORK, ASSIGNORS TO DOEHLER DIE-CASTING CO., A COPORATION OF NEW YORK.

VEHICLE DOOR.

Application filed January 3, 1923. Serial No. 610,422.

To all whom it may concern:

Be it known that we, HERMAN H. DOEHLER and MARC STERN, citizens of the United States, residing at New Rochelle, county of Westchester, State of New York, and borough of Brooklyn, county of Kings, city and State of New York, respectively, have invented certain new and useful Improvements in Vehicle Doors, of which the following is a full, clear, and exact description.

Our invention relates to vehicle doors and particularly to automobile doors of the open body type. These doors as heretofore constructed, have an interior skeleton frame of the proper outline made up from several pieces of wood, including the outside members, a cross brace and a plate for the lock, fitted and secured together, and the outside sheet metal covering and the inside upholstery are nailed to this frame. As a result of the labor and skill required in fabricating the frame, the manufacturing cost of such doors is considerable. Furthermore the wooden frames are relatively fragile and tend to expand or contract in different weather conditions, but nevertheless their use has persisted because of the facility of attachment of the side covering.

Our invention comprehends a door having an all-metal frame which, while substantially as light as a wooden frame door, is much more rigid and durable, which materially reduces the time and cost of manufacture, and to which the side coverings are attached as easily as to wooden frames. In accordance with our invention we cast the frame in one piece under pressure of a suitable die-casting alloy, such as an aluminum-copper alloy. Such a frame is light and strong and, by reason of the saving in time is much more cheaply produced than a wooden frame. In its preferred form, we provide recesses, such as either continuous or discontinuous depressed shoulders along the inner edges of the outside frame members, on which wooden strips are secured for the attachment of the side coverings. These strips may be secured in place in various ways, but we prefer to cast integral fingers upstanding along the inner edge of the shoulders which may be bent in at their outer ends into locking engagement with longitudinal grooves in the wooden strips. Furthermore our invention lends itself conveniently to casting the frame upon the outside metal sheet as an insert, and in the preferred embodiment of our invention the sheet metal has its edge turned up with its inner extremity bent or offset, and the frame is cast directly upon this edge so that the frame and metal sheet are an integral unit. We are also able to cast the bracket or supporting plate for the lock integral with the frame, and it is evident that the hinge members may also be cast integral with the side frame member, although generally the hinge members will be separately attached to facilitate their adjustment, recesses being provided in the side member to receive them, and reinforcing bosses being provided on the side opposite the recesses for the hinge bolts, the bolt holes either being cored or subsequently drilled.

Our invention also includes other features of construction as will hereinafter more fully appear. We will now describe the illustrated embodiment of our invention and will thereafter point out our invention in claims.

Fig. 1 is an inside elevation of a door embodying our invention, with the inside or upholstery covering removed;

Fig. 2 is a vertical section of the door on the line 2—2 of Figure 1;

Fig. 3 is an elevation of the hinge end of the complete door;

Fig. 4 is a sectional inverted plan of the side frame member on the lock side of the door, taken on line 4—4 of Figure 1; and

Fig. 5 is an enlarged fragmentary section along the line 2—2 of Figure 1 of the portion of the finished complete door including the transverse face.

The interior frame member 1 is of an outline of a door opening, being generally rectangular and oblong, except where the lower corner at the lock edge of the door is concaved, as is often the case with the rear or tonneau doors of automobiles. The frame members are generally angular or L-shape in cross section, the outer flange providing an adequate bearing surface for the sheet metal covering 2, and the top frame member being rounded off at its outer edge to provide the usual rounded top edge of the door.

As above explained, the sheet metal outside covering 2 is set in the die and becomes an insert in the cast article, the frame being cast upon the upturned edge of the insert, so that the upturned edge of the insert is embedded in the outer corners of the frame, as shown. While there is sufficient metal at these corners to provide a good anchor, the two flanges may be made as thin as requirements will permit in order to minimize the weight. In the form shown, the member 2 has its margin turned back upon itself on the two ends and bottom, and is so proportioned in size as to extend past the periphery of the frame on these three sides and thereby provide the usual overlap or weather strip to seal the crack around the door when the door is closed. This overlap, being of double thickness, has the requisite strength and rigidity to withstand the usage to which it is likely to be subjected.

The inner edge 3 of the margin of the member 2 which is folded back, is turned up, as shown, and the extreme edge 4 is again turned down substantially parallel with the outer face of the door. Preferably the angle which the edge 3 makes with the outer face of the door is less than 90°, and it is evident that when the frame is cast upon this upstanding edge, the two members are securely locked together. The member 2 is flanged inwardly at its top, as shown in Figure 2, the outer corner being rounded off and the width of the flange being the same as the thickness of the frame 1. The extreme top edge of the member 2 is turned down to the plane of the inner face of the door to provide a lip 5, the extreme edge of which may again be inwardly offset, as shown, and the metal of the frame is flowed underneath this lip and within the rounded top of the member 2, thereby anchoring the top edge of the sheet metal covering 2 and causing the top face of the frame to be covered by the sheet metal. If desired, the usual sockets or recesses 6 for the curtain rods may be cored in the top of the door at the time of casting.

In the form shown, recesses 7 are formed in the outer face of one of the end members of the frame for the reception of the usual hinges, and opposite these recesses 7 suitable bosses 8, are formed, through which the holes for the hinge bolts pass. On the inner face of the opposite side member, the supporting plate or flange 9 for a lock is cast integral with the frame in proper disposition relative to the recess 10 for the strike. A suitable anti-rattling stud or projection 11 on the face of the door may be set into the mold as an insert and cast integrally with the frame, as shown.

A cross brace 12 between the two end members of the frame is cast as an integral part of the frame, being disposed toward the bottom of the frame so as not to interfere with the usual pocket in the upholstery cover. This cross brace is also shown as an angle member, the outer flange of which merges into that of the frame, while the transverse flange integrally joins those of the end frame members.

The upholstery covering for the inner face of the door is shown as composed of an inner layer 13 of cardboard, or the like, an internal filling 14 of felt or similar material, and an outside cover 15 of leather or its equivalent. To provide convenient means for the attachment of this upholstery covering there are facilities for securing wooden strips 16 to the outside frame members, the edge of the leather covering 15 being tacked or otherwise secured to these strips, and the cross brace 12 also has nails 17 cast therein as inserts which project inwardly beyond the inner face of the brace, as shown in Figure 2, and are clinched over the inner layer 13 of cardboard, as shown in Figure 5, thereby affording intermediate securing means for the upholstery.

In the form shown, the frame members are shouldered or longitudinally recessed along their inside corners on the inside face of the frame. These shoulders are shown as discontinuous, although manifestly they could be made continuous. In the construction illustrated integral spaced transverse ribs 18 are formed in the angle on the inside face of the frame member at such frequent intervals as may be necessary, which ribs terminate short of the inner edge of the frame members, thereby providing depressed shoulders for the reception of the wooden strip 16. These ribs also serve to reinforce or strengthen the frame.

The wooden strips or inserts 16 are of such a height that they are just flush with the inner face of the frame. To secure these wooden inserts, upstanding fingers 19 are cast integrally with the inner edges of most of the ribs 18 so that their inner faces oppose the inner faces of the wooden inserts 16. These inserts or strips have their inner faces longitudinally grooved, as shown, and the upper ends of the fingers 19 are turned or bent into these grooves, thereby locking the wooden strips against outward escapement. Likewise where required, end stops 20 may be cast integrally with the frame to further secure the wooden inserts.

Doors having wooden frames would require that these frames be protected by a covering of metal on the two edges and bottom where the frame would otherwise be exposed, but since our frame is of metal no such additional protection is needed.

It is obvious that various modifications may be made in the construction shown in

the drawings and above particularly described within the principle and scope of our invention.

We claim:

1. A vehicle door comprising a sheet metal cover member having a marginal portion turned up at an angle to the sheet member with its extremity bent substantially parallel to the sheet member, and a metallic frame cast against the side of the cover member upon the said marginal portion.

2. A vehicle door comprising a sheet metal cover member having its margin doubled back upon itself and the inner edge of said margin upturned, and a metallic frame member cast upon the said upturned edge within the boundary of the cover member.

3. A vehicle door comprising a sheet metal cover member having its margin doubled back against one face so as to bring the edge within the periphery and having the edge turned up at an acute angle with the extremity of the turned up portion offset, and a metallic frame member cast wholly against said face upon the said upturned edge.

4. A vehicle door comprising a sheet metal cover member having its margin doubled back against one face so as to bring the edge within the periphery and having the edge turned up at an acute angle with the extremity of the turned up portion bent inwardly, and a metallic frame having the outline of the periphery of the cover member cast wholly against said face upon the said upturned edge, the frame being somewhat smaller than the facing member so that the margin of the facing member protrudes beyond the frame.

5. For vehicle doors, an interior metallic skeleton frame cast in one piece and having the outline of a door opening, the members of the frame being shouldered along the inner edge of one face, wooden strips disposed on said shoulders flush with the face of the frame, and locking fingers integral with the frame and extending in front of said shoulders in locking relation to the wooden strips.

6. A vehicle door comprising an outside metal cover sheet having its edge turned in, a metallic skeleton frame member having the outline of a door opening and cast in one piece upon said turned in edge and having a plurality of recesses in its inner face, bendable securing members cast integral with the frame adjacent said recesses, wooden inserts set in said recesses and secured therein by the said securing members, and an upholstery covering secured to said wooden inserts.

7. A vehicle door comprising an outside metal cover sheet having its margin doubled back and having the edge of the turned back portion bent up at an acute angle, a metallic skeleton frame having the outline of a door opening cast in one piece upon said bent up edge, the members of the frame being shouldered along the inner edge of their inside face, wooden strips disposed on said shoulders flush with the face of the frame, and locking fingers integral with the frame and extending in front of said shoulders in locking relation to the wooden strips.

8. For vehicle doors an interior metallic outline frame having integral spaced, transverse ribs on the inside faces of the members of the frame terminating short of the inner edges of the members to form depressed shoulders, and retaining fingers integral with the ribs extending inwardly beyond the shoulders at the inner edge thereof.

9. For vehicle doors an interior metallic outline frame the members of which are substantially L-shape in cross section and which have on their inside faces within the angle integral transverse ribs terminating short of the inner edges of the members to form depressed shoulders, and retaining fingers integral with the ribs extending inwardly beyond the shoulders at the inner edge thereof.

10. For vehicle doors an interior metallic skeleton frame cast in one piece and having the outline of a door opening, and including an integral cross brace, the inside face of the outer members of the frame having longitudinal shoulders and integral fingers extending transversely beyond said shoulders, and nails cast integrally with the cross brace and having their pointed ends protruding beyond the face of the frame.

11. A vehicle door comprising a sheet metal side covering having its margin on three sides bent back against one face and the edges of the said three margins bent up from said face and having its top portion rounded over and its top edge bent down and back to form an overhanging lip, and a skeleton frame cast in one piece upon said face of the side covering about the said bent up edges and within the rounded over top underneath the overhanging lip.

In witness whereof, we hereunto subscribe our signatures.

HERMAN H. DOEHLER.
MARC STERN.