Fig. 4

Fig. 5

Fig. 6

Inventor

Stephen De Orlow

By Beaman Langford
The present invention relates to improvements in hinge construction for hoods, rear deck, rear truck lid of automobiles and the like where the contours of the hinged part as well as the question of appearance renders the use of conventional hinges impractical.

Recent changes in body design of automobiles have disclosed the conventional type of hinge hinged. It has been proposed to use a lid type of hinge having its hinge line transversely disposed to the longitudinal axis of the chassis and adjacent the cowl. Because of the weight and the curvature of this type of hood it is not practical to use a conventional hinge.

It is desirable that the hinge be firmly supported in either raised or lowered position and at the same time the hinge should be inconspicuous and of a construction permitting the hinge line to be located between the crown of the curvature of the hood without interference between the edge of the hood adjacent the hinge line and the cowl.

Thus one object of the invention is to provide a hinge for the aforesaid purposes which is inexpensive, sturdy, and capable of supporting the hinge part firmly in both opened and closed positions.

Another object is to provide a concealed hinge which is particularly adapted to be used in connection with a hinged sheet metal part of curved contour.

A further object is to provide a pantograph type of hinge in which a pivotal point for the hinged part swings through an arc during the hinge movement.

A still further object is to provide a hinge of the aforesaid construction of a design supporting the hinged part in an open position without the necessity of auxiliary props.

These and other objects and advantages residing in the specific details of construction and combination of parts will be more fully set forth hereinafter and will be understood when considered in connection with the accompanying drawings wherein several different embodiments of the invention are disclosed.

Fig. 1 is a side elevation view of the hood structure of an automobile, parts of which have been broken away showing one type of hinge structure located at the sides of the hinged part.

Fig. 2 is a cross-sectional view showing another form of hinge structure adapted to be used intermediate the opposite sides of the hinge part.

Fig. 3 is a side elevation view of a further modified form of hinge structure shown in open and closed positions and disassociated from the fixed and hinged parts.

Fig. 4 is a view similar to Fig. 2 of another form of hinge structure capable of supporting the hinge part in open position.

Fig. 5 is a cross-sectional view through the hood structure showing one possible arrangement of the hinge structure shown in Fig. 2.

Fig. 6 is a view similar to Fig. 3 of a further modified form of hinge structure designed to be resiliently urged to both open and closed position, and

Figs. 7 and 8 are views similar to Fig. 2 of further modified forms of hinge structure embodying the present invention.

In Fig. 1 is shown a side elevation view of an automobile having a lid type of hood. The lid 10 as shown is equipped at the forward end with a handle 12 in the form of an ornament which may be rotated to lock and unlock the lid in the position shown in full line. The handle 12 is shown rotated through 180° preparatory to lifting the lid 10 to the dotted line position. The lower edge of the lid 10 is indicated at 14 and the rear edge at 16; the rear edge 16 with the lid 10 closed overlies a cushioned ledge 18 in the cowl structure generally designated 20 in the manner of the conventional hood. Pivotedally supported to a suitable base 22 bolted, welded or otherwise attached to the dash 24 of the cowl structure at opposite sides thereof upon pins 25 and 30 are arms 32 and 34 of different lengths which are pivotally connected to the inner side of the lid 10 by pins 35 and 38 anchored on the inner side of the lid 10. In most covers the pins 35 and 38 will be carried by a suitable reinforced member welded to the inner side of the lid 10 upon opposite sides thereof adjacent the edge 14.

It will be noted from a consideration of Fig. 1 that the hinge line is materially below the crown 40. This necessitates bodily lifting of the entire lid 10 and forward movement so that the edge 16 will clear the ledge 18 of the cowl. From the dotted line representation in Fig. 1 it will appear that the pins 35 upon opposite sides of the lid 10 constitute the pivotal axis of the lid 10 and that this axis swings through an arc scribed by the arms 32. The shorter arms 34 define and control the pivotal movement of the lid 10 as it is raised and lowered. It is to be understood, however, that the pins 35 might be just as accurately considered the pivotal axis of the lid 10 and the longer arms 32 as in control of pivotal movement for the reason that pivotal movement of the lid 10 takes place about both the pins 35 and 38.

A modified form of the invention is illustrated in Fig. 2. This hinge is particularly disposed to be used in either single or double units and to be supported upon an upper surface of the cowl structure rather than at opposite sides thereof as shown in Fig. 1. With a single unit the hinge would be supported centrally of the cowl and with a double unit in the manner shown in Fig. 5. The lid 10 in Fig. 2 is shown transversely reinforced by a channel 42 welded to the
inside. The rear edge 16 is shown flush with the cowl 20 and resting upon an anti-rattle and seal- ing strip 44. The hinge construction takes the form of four strips of sheet metal 46, 48, 50 and 52 with the ends of each strip curled in a well known manner in hinge constructions to form eyes through which pins 54 are passed to form pivot connections. The strips 46 and 50 are welded, bolted or otherwise suitably attached to the dash 24 and reinforcement 42, respectively. As in the hinge construction shown in Fig. 1, the strip 48 is longer than the strip 52 with the same movement being imparted to the lid 10 upon raising, namely, the lid 10 is bodily raised and moved forward and at the same time pivots clockwise about the axis of the pins 54 at opposite ends of the strip 50.

In Fig. 3 is shown a hinge unit which may be conveniently attached between a fixed and hinge part, as for example, in the manner of the hinge in Fig. 2, or in connection with rear deck or rear truck cover of automobiles or other similar purposes. Upper and lower attachment plates 56 and 58 are shown with ears 60 serving as bearings for the pins 52 which connect the arms 64 and 66 to the plates. As shown, a latch member 68 is freely pivoted from the same pin 62 as the upper end of the lever 66 and is provided with a notched out portion 68 which is adapted to receive the pin 62 at the lower end of the lever 66 when the hinge is in the raised position shown in dotted outline. In this manner the member 68 is capable of locking the hinge in an open position and necessitating the lifting of the member 68 to collapse the hinge into closed position. A further modification of the invention is shown in Fig. 4 in which the hinge itself is so designed as to make it unnecessary for any auxiliary means to be provided for holding the hinge part in a fully opened position. In this form of the invention the hinge may be substantially identical with that shown in Fig. 3 with the exception that the shorter arm 10 is L-shaped, suitably curved or otherwise shaped to accomplish the following described results. Referring to the dotted line representation of the lid 10 in fully opened position, it will be noted that the shape of the arm 70 provides clearance of the overhanging of the edge 16 beyond the pivotal connections 76 and 78. Moreover, in fully opened position the connection 76 is positioned to the left of the center line between the pivotal connections 76 and 78. From this it will appear that the weight of the lid 10 as supported by the pivotal connections 76 and 78 is tending to hold the lid 10 in the dotted line position. In order to close the lid 10 it is necessary to first raise the lid 10 bodily by a forward and upward movement bringing the connection 76 to the right of the center line between the connections 74 and 78 from which position the lid 10 can then be pivoted above the connections 74 and 78 to a closed position. With the foregoing arrangement the weight of the lid 10 is acting to lock the same in a fully opened position and the locking action will be stable as long as the cantilever weight of the lid 10 is held to insufficient value to effect a bodily lifting of the lid 10 to a point permitting pivoting of the lid about the connections 74 and 76. Obviously the stability of the locking feature is increased by a design which positions the lid 10 when fully opened closely approaching the vertical.

In Fig. 5 one satisfactory arrangement of the hinge shown in Figs. 2, 3 and 4 is illustrated. The hinges illustrated correspond in specific construction to the hinge of Fig. 2 and are shown as fixedly supported in specially shaped recesses in the cowl construction providing horizontal portions 80 and 82 for placing the pivot connections of the hinges in horizontal alignment. Attention is directed to the fact that the pivotal connections at 84 and 86 with the fixed bases of the hinges are substantially below the crown 40 of the lid 10.

An arrangement is shown in Fig. 6 for resiliently holding the hinge construction in fully opened and fully closed positions. The hinge illustrated is similar to that shown in Fig. 1 enabling the fixed base 88 thereof to be welded, bolted or otherwise secured to the opposite sides of the cowl construction. The shorter of the arms 90 and 92 is provided with an ear 94 offset to one side of a center line between the pivotal connections 96 and 98. A C-shaped arm 100 is pivotally connected to the ear 94 by a pin connection at 102. A spring 104 is connected at 106 to the arm 100 and at 108 to the base 88. With the upper plate 110 to which the hinged part is attached in the position shown, the hinge is closed. In this position the pull of the spring 104 through the connection 102 is below the connection 88 and the spring acts to hold the hinge closed. When the hinge is opened up the arm 90 will be moved anti-clockwise and the center line between the connections 102 and 108 will be above the connection 98 whereby the pull of the spring will hold the hinge in an opened position. Thus by proper selection of the spring 104, the hinged part attached to the upper plate 110 can be supported in an opened position without any auxiliary props.

In Figs. 7 and 8 are illustrated embodiments in which the arm members of the hinge are in crossed relation in lazy tong manner with the exception that the effective hinging length of the associated members is unequal. For example in Fig. 7 the member 122 is shorter than the member 124, the ends of the members having pivotal connections with the upper and lower attachment plates 126 and 128 in the manner of the embodiment of Fig. 3. The reinforcement 130 is shown extended to provide a channel 132 underlapping the forward edge 134 of the cowl 136 and carrying a sealing strip 138. Upon lifting movement of the hood part 140 the distance in length of the members 122 and 124 will pull the hinge part to the position shown in dotted line. In Fig. 8 the members 142 and 144 are crossed as in the embodiment of Fig. 7. However, an action similar to the constructions of Fig. 1 through Fig. 6 has been accomplished through a pin and slot connection at the end of the longer of the two members. As shown the member 144 has an angular end 146 which is slotted at 148 to receive the pin 150. Upon an initial opening movement of the hood part 142 a forward pull will result in the hood part being bodily lifted as the member 142 is swung counterclockwise and moved forward so that the edge 154 will clear the ledge 156 of the cowl 158. During such movement the pin 150 which is carried by the upper plate 160 will be moving the slot 152. When the edge 154 has cleared the ledge 156, the hood part may then be hinged about the pin 150 and the pivotal connection 162 in the manner similar to the construction of Fig. 7. It will be understood that suitable stops or rests may be used in connection with the embodiment shown in Figs. 7 and 8 for supporting the hinged part in raised
position. This is also true with the construction shown in Figs. 1 and 2.

When the sealing members 44 and 165 are of relatively soft rubber, sufficient yieldability is present to take care of any excessive closing action that may take place upon moving the hinged part to fully closed position. When the sealing members for the hinged part is relatively unyielding as in the case of the usual woven web, the lower plate 166 of the hinge structure illustrated in Fig. 4 may be yieldingly anchored to the cowl structure through bolts 170 having springs 172 surrounding the shank thereof and against which the nuts 174 are drawn up. Such an arrangement will enable the plate 168 to yield slightly to avoid distortion of the cowl or hinge structure if in the course of manufacture there should be such discrepancies as to offer resistance to a complete closing of the hinge. It should be understood that where the soft rubber sealing member is used or the spring structure shown in Fig. 4 that under proper design the hinge structure when fully closed will be held under sufficient tension to eliminate all rattle and looseness of the pivotal connections of the hinge structure.

In addition to the features heretofore mentioned the present improvement in hinge construction has the inherent characteristic of firmly holding that portion of the hinge part to its seat adjacent the hinge line when the hinge part is fully closed as shown, for example, in full line in Fig. 1. In concealed hinges heretofore proposed and used commercially in connection with hinged hood parts of the type shown in Fig. 1, the hinge part adjacent its hinge line is merely held to its seat by spring tension and a certain looseness of structure is always present.

From the foregoing description it should become apparent that I have provided a principle in constructing marine automobile hoods and rugged concealed hinges particularly adapted for hinged parts curvilinear in contour and requiring bodily as well as pivotal movement in order to clear associated structure.

For the reason that one of the major fields of application is in connection with automobile hoods, the several illustrated forms of the invention have been disclosed and described with reference to the so-called lid type of hood. It is to be understood, however, that the herein described hinge construction has wide application and for this reason I do not wish to be restricted by the foregoing disclosure except as appears from the appended claims.

I claim:

1. In an automobile, the combination with a cowl having a hood supporting ledge and a part extending forward of said ledge, a hood part in closed position having the rear edge thereof disposed upon said ledge, of a hinge structure fixedly supported from said part defining pivotal connections below a portion of said ledge, said structure being attached to and having pivotal connections with the underside of said hood part forward of said rear edge, said structure comprising means including said pivotal connections for bodily supporting and guiding said hood part forward to clear said ledge upon initial opening movement and for pivotal movement thereafter.

2. In an automobile, the combination with a cowl having a hood supporting ledge and a part extending forward of said ledge, a hood part in closed position having the rear edge thereof disposed upon said ledge, of a hinge structure comprising a pair of members of unequal length having the opposite ends thereof pivotally supported from said cowl part and from said hood part adjacent the rear edge thereof, these members being disposed between said other member and said rear edge, said members upon initial opening movement of said hood part supporting the same for bodily forward movement and for pivotal movement about an axis scribing an arc upon opening movement of said hood part.

3. In an automobile, the combination with a cowl having a hood supporting ledge and a part extending forward of said ledge, a hood part in closed position having the rear edge thereof disposed upon said ledge, of a hinge structure comprising a pair of members of unequal length pivotally connected to said cowl part and to said hood part, the shorter of said members having its pivotal connection with said parts disposed between the pivotal connections of said longer member and the rear edge of said hood part, said members and pivotal connections with said parts being so proportioned and positioned as to support said hood part for bodily forward movement upon initial opening movement of said hood part to clear said leade, and for pivotal movement about an axis scribing an arc.

4. In an automobile, the combination with a cowl having a hood supporting ledge and a part extending forward of said ledge, a hood part in closed position having the rear edge thereof resting upon said ledge, said ledge and rear edge being curvilinear of a hinge structure comprising a pair of members of unequal length located upon one side of said hood part, a similar pair of members of unequal length located upon the opposite side of said hood part, said members having the lower ends thereof pivotally supported for swinging movement from said forward extending part, the upper ends of said members having pivotal connection with the underside of said hood at opposite sides thereof, the shorter member of each of said pairs of members having its connection with said hood part forward of said rear edge and said ledge forward, and its pivotal connection with said forwardly extending part located still further forward, whereby upon opening movement of said hood part, the upper end of said shorter members swinging upwardly and forwardly causing said rear edge to clear said ledge and to be positioned forwardly of said ledge when the hood part is in a raised position.

STEPHEN DE ORLOW.
DISCLAIMER


Hereby disclaims from the scope of claims 1 and 2 of said Letters Patent all systems except those wherein the hinge line is below the crown of the cowl, and wherein the hinge structure comprises a pair of links spaced from each other longitudinally of the hood, one end of each whereof is pivotally connected to the hood and the other end of each whereof is pivotally connected to the cowl.

[Official Gazette December 10, 1940.]