Nov. 7, 1939. F. G. BATES 2,179,113

HINGE

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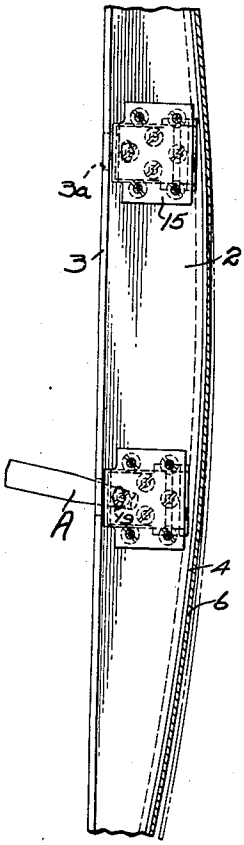


FIG. 2.

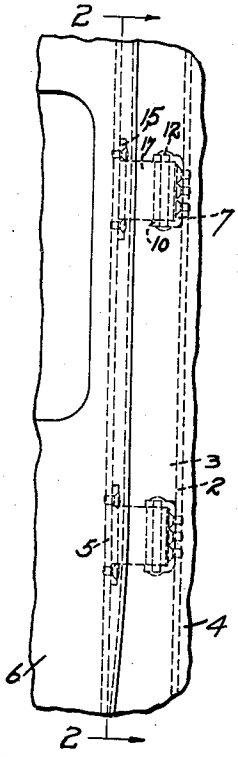


FIG. 1.

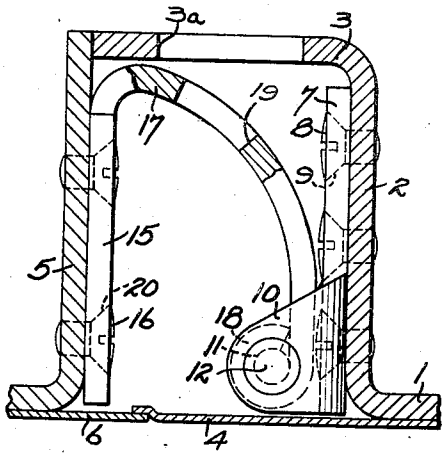


FIG. 3.

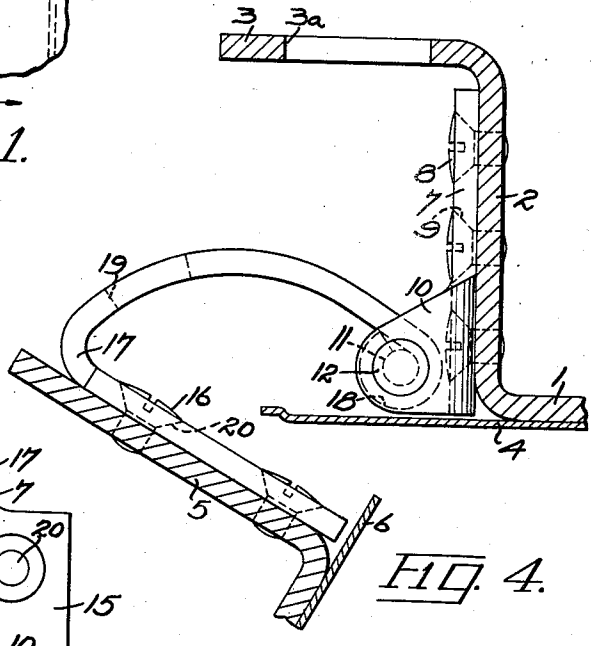


FIG. 4.

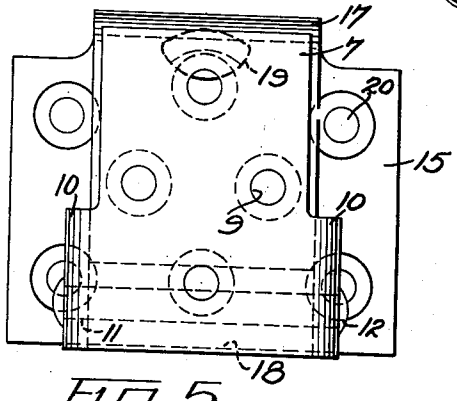


FIG. 5.

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HINGE

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3 Claims. (Cl. 16—135)

This invention relates to improvements in hinges, and refers to a simple form of two-piece hinge which may be mounted partly upon a door frame and partly upon a door in such a manner that it is completely concealed when the door is closed, and is primarily intended for use upon automobiles and other objects wherein the doors and their frames are not truly vertical throughout their height.

It is an object of the invention to provide a hinge consisting of a flat plate for attachment to a door frame the said plate having opposed apertured lugs, and a second flat plate having an integral extension member thereon which is rearwardly folded behind its plate and terminates in a knuckle to receive a pin which also passes through the apertured lugs.

A further object of the invention is to provide such a hinge wherein the rearwardly folded extension member is apertured to receive a bar by which the member may be flexed to adjust the setting of the door mounted thereon so that it swings properly in its frame, as some adjustment is usually necessary particularly where the door and frame are longitudinally curved. Thus I aim to provide a hinge which may be readily adjusted to obtain proper alignment of the door.

Yet another object of the invention is to provide a hinge of the concealed type which may be very cheaply manufactured and easily installed.

Having thus stated some of the objects and advantages of the invention I will now describe an embodiment thereof with the aid of the accompanying drawing, in which:

Figure 1 illustrates a side elevation of a portion of a door mounted in its frame by my hinges.

Figure 2 is a sectional view on the line 2—2 of Figure 1.

Figure 3 is a plan view of the hinge closed and mounted in position;

Figure 4 is a similar view showing the hinge open.

Figure 5 is a side elevation of the hinge alone when closed.

Referring first to a conventional automobile body construction to which my hinge is applied; 1 designates a portion of a door frame which is inwardly stepped at 2 and terminates in a flange 3 which is apertured at 3*a*. The flange 3 is parallel with a sheet metal wall 4 secured outwardly of the frame 1 and projecting laterally beyond the stepped frame portion 2. 5 denotes one edge face of the door the rear extremity of which, when closed, lies substantially contiguous to the outer extremity of the flange 3, and 6 is the outer wall of the door one lateral margin of which extends beyond the edge face 5 and rests against the adjacent vertical margin of the wall 4 when the door is shut. Thus a substantially rectangular space, between the edge face 5 of the door and the stepped portions 2 and 3 and the wall 4, is enclosed when the door is shut.

Referring now to my hinge, 7 denotes a flat plate which is suitably attached to the inwardly stepped portion 2 of the door frame, in the present instance by screws 8 which pass through plate openings 9.

10 denotes two opposed laterally extending lugs integral with the plate 7. These lugs project from opposite margins of the plate and have aligned openings 11 formed therethrough to receive the opposite extremities of a hinge pin 12.

A second plate 15 is suitably apertured at 20 for the passage of screws 16 by which it is secured to the edge face 5 of the door. Integral with this plate 15 is an extension member 17 which is rearwardly folded behind the said plate and spaced therefrom. This extension member extends laterally behind the second plate 15 throughout substantially its entire width. Formed across the outer extremity of the member 17 is a knuckle 18 which rests between the lugs 10 and through which the hinge pin 12 passes. In order to facilitate the insertion and removal of the screws 16 the height of the plate 15 is greater than that of the member 17 as is clearly shown in Figure 5.

The extension member 17 is folded to bridge the distance between the edge face 5 of the door and the adjacent face of the plate 7 secured to the stepped portion 2 of the door frame when the door is shut. The member is also so arched as to provide the desired sweep as the door is opened. Formed in the intermediate portion of the extension member 17 is an aperture 19 to receive one end of a bar A by which the said member may be flexed to adjust the door swing after the latter has been mounted in position. This is of particular importance in the case of hinges mounted on parts of stepped door frame portions 2 which are not absolutely vertical because in such cases slight adjustments are usually needed in order to obtain accurate alignment of the door with the frame. Consequently the material of which the plate 15 and its extension member 17 are made must be such that these adjustments may be made. In the door frame flange 3 opposite the hinge is an opening 3*a* to provide access to the aperture 19 so that the member 17 may be flexed to bring the door into its correct position when closed by use of the bar A. Subsequently of

course the opening 3a is covered by the body upholstery—not shown.

As is apparent from the drawing the member 17 constitutes a link of double curvature joining the two plates 15 and 7. By the expression "double curvature" is meant that curves of two distinct and separate radii compose the link member 17. One curved portion of relatively great radius bridges substantially the entire gap between plates 7 and 15 and a second curve of relatively small radius, which might insofar as the invention is concerned comprise an angle, connects one extremity of the bridging curve to plate 15.

It is to be noted that the curves are in the same direction and that the curve bridging the gap between the plates forms an arc not exceeding ninety degrees and is substantially continuous throughout. In cross-section the arrangement is very much like a deformed V wherein one leg is straight and the other curved to meet the straight leg at one extremity thereof.

By virtue of this arrangement it will be apparent that pressure exerted laterally on plate 15 will result in two distinct deformations depending upon the direction in which the pressure is exerted. If plate 15 is urged toward plate 7 the radius of the curve of that portion of member 17 bridging the gap between the plates will be reduced and the acute angle formed at the juncture of the member 17 and plate 15 will become greater, i. e., the radius of the small curve will become greater. If plate 15 is urged away from plate 7, that portion of member 17 bridging the gap will acquire a curvature of greater radius, while the aforesaid acute angle or curve of small radius will become smaller or aquire a smaller radius. In either instance the distance between the plates 15 and 7 is altered and the plates 15 and 7 remain parallel to one another, thus insuring proper operation of the door in opening and closing about the hinge pintle.

While in the foregoing the preferred construction of the invention has been described and shown it is understood that the structure is susceptible to such alterations and modifications as fall within the scope of the appended claims.

What I claim as my invention and desire to secure by Letters Patent is:

1. A hinge comprising two substantially flat plates which are parallel and in opposed spaced relation when the hinge is closed, aligned lugs formed on one plate adjacent one extremity, a member having a knuckle across its outer extremity and extending freely between the plates, and a pin extending through said lugs and knuckle, said member being curved substantially continuously away from said knuckle throughout an arc not exceeding ninety degrees and joining the side of the other plate remote from said knuckle to form an included angle of not more than ninety degrees.

2. Hinge mechanism comprising two substantially flat plates adapted to be secured in face-to-face contact throughout substantially their entire expanse with a door and door frame respectively, said plates being parallel and in opposed spaced relation when the hinge is closed, aligned lugs formed on the frame plate adjacent one extremity, a member having a knuckle across its outer extremity and extending freely between the plates, and a pin extending through said lugs and knuckle, said member being curved substantially continuously away from said knuckle throughout an arc not exceeding ninety degrees and joining that side of the door plate remote from said knuckle to form an included angle of not more than ninety degrees.

3. Mechanism as described in claim 1 wherein the curved member is apertured at a point remote from said knuckle to receive a prying tool whereby access may be had to the inside of said curved member from a point opposite the door and frame when said door is closed.

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