May 10, 1938. R. C. JACOBS 2,116,758

DOOR HINGE

Filed Sept. 30, 1935 2 Sheets-Sheet 1

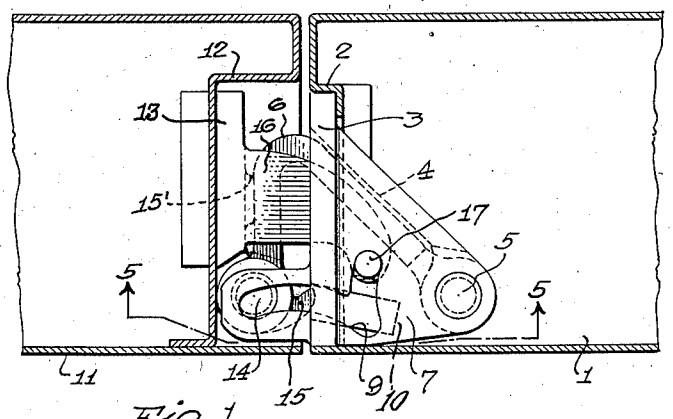


Fig. 1.

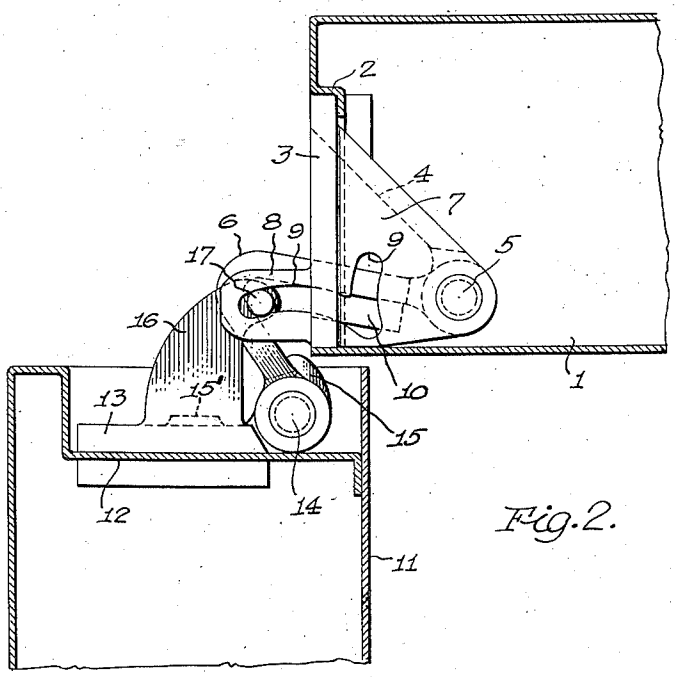


Fig. 2.

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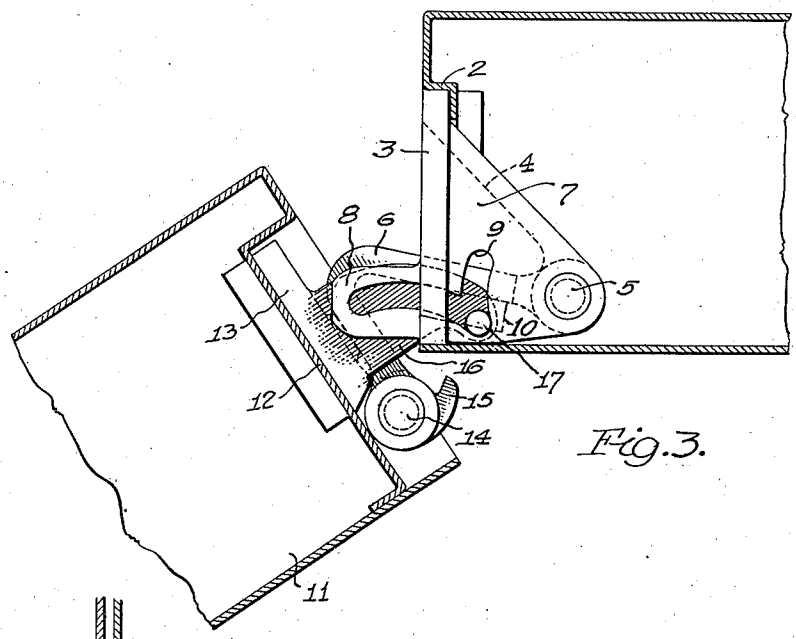


Fig. 3.

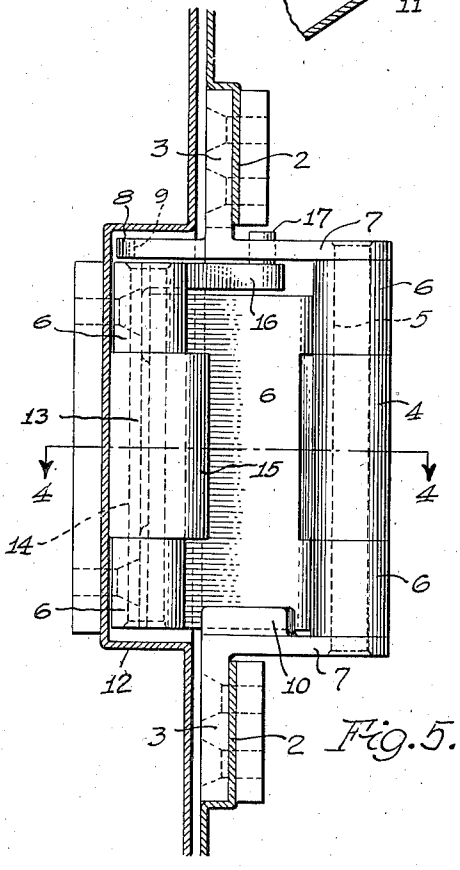


Fig. 5.

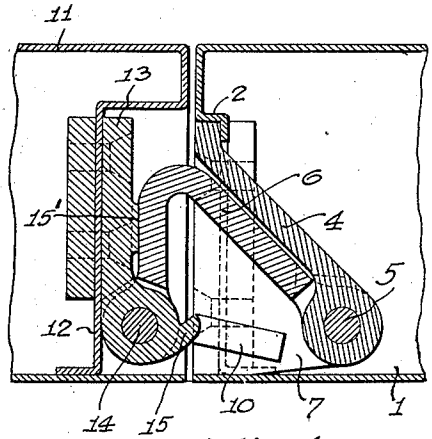


Fig. 4.

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Patented May 10, 1938 2,116,758

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2,116,758

DOOR HINGE

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Application September 30, 1935, Serial No. 42,764

3 Claims. (Cl. 16—164)

The present invention relates to door hinges of the type commonly known as concealed hinges or, in other words, hinges which are completely concealed from view when the door upon which they are mounted is closed.

The primary object of the present invention is to provide a concealed hinge which is suitable for automobile use, particularly in combination with automobile bodies having walls of hollow sheet metal construction. The present hinge includes a plate adapted for attachment to the side wall of the door opening, the plate being formed with an angularly extending arm which projects into the hollow wall to provide a pivot within the wall for an angularly shaped element. One end of the angularly shaped element is pivotally connected to the extended arm so that it extends outwardly beyond the front face of the plate at which point it is hingedly connected to a second plate which is adapted to be secured to the edge of the door. Two centers of pivotal movement are thus provided for the door inasmuch as the angular element may pivot relative to the wall and the door may pivot relative to the angular element. In moving the door from the closed to the open position it is necessary that the first pivotal movement take place around the angular element with respect to the projecting arm and after a predetermined amount of such movement that the door should pivot with respect to the angular element, and that the reverse of such movement should take place when the door is being moved from its open to its closed position. Accordingly it is another object of the present invention to provide means for restricting and defining the pivotal movements around the two axes according to the direction of movement of the door and this is accomplished by providing guide means on one plate and means on the other plate which cooperates with said guide means. This means comprises a wall integral with one plate and having a substantially L-shaped slot into which extends a pin carried by a projecting element on the other plate, the walls of the slot engaging the pin to prevent movement of the door plate relative to the angular element at all times excepting when the angular element is at its outermost limit of pivotal movement with respect to the projecting arm which supports the same.

Another object of the present invention is to provide means for limiting movement of the means which provides the double hinge action, the limiting means being separate from the guiding means which defines the relationship of movements with respect to the two axes.

With the above and other ends in view the invention consists in the matters hereinafter more particularly pointed out with reference to the accompanying drawings, in which

Figs. 1, 2 and 3 are plan views of the hinge, each illustrating different stages in the operation of the hinge;

Fig. 4 is a section taken on the line 4—4 of Fig. 5, and

Fig. 5 is a view taken on the line 5—5 of Fig. 1.

Like characters of reference are employed throughout to designate corresponding parts.

The numeral 1 designates a hollow sheet metal wall formed according to the usual practice in constructing automobile bodies. Permanently secured in a depression 2 in the end of said wall is a hinge plate 3 having an angularly extending integral arm 4 projecting into the space between the side members which form the wall 1. In the outer extremity of the angular arm 4 is mounted a pivot 5 receiving one end of a substantially V-shaped element 6 to pivotally support it with respect to the arm 4. At the top and bottom the arm 4 is reinforced with transverse walls 7, one of which extends outwardly beyond the front face of the plate 3 forming wall 8. A substantially L-shaped slot 9 is formed in the upper wall 7 and extends into the wall 8. On the lower wall 7 is provided a lug 10 which restricts pivotal movement of the element 6 in one direction, it being noted that the arm 4 acts as means for restricting pivotal movement of the element 6 in the other direction.

The numeral 11 designates a door of hollow sheet metal construction and having its end wall 12 depressed. In the depressed portion of the end wall 12 is mounted a hinge plate 13 pivotally connected through means of a pin 14 to the other end of the V-shaped element 6. A lug 15 is formed integral with the hinge plate 13 and is adapted to engage the element 6 to restrict pivotal movement of the plate 13 in one direction relative thereto, the plate 13 having a boss 15' adapted to engage the V-shaped element 6 to restrict the pivotal movement in the opposite direction. Integral with the hinge plate 13 is a projecting element 16 supporting a pin 17 so that it projects into the L-shaped slot 9.

Referring to Figure 1 it will be seen that the pin 17 is held by the projecting element 16 at the end of one of the legs of the slot 9. Therefore when manual pressure is applied against the

door tending to open the same the pin 17 engages the side wall of the slot 9 and prevents pivotal movement of the plate 13 with respect to the V-shaped element 6. The pressure on the door therefore moves the angular element 6 around its pivot 5 and in so doing the projecting element 16 carries the pin 17 to the apex of the slot 9, as shown in Fig. 3. At the time the pin 17 reaches the apex of the slot 9 the angular element 6 is moved into engagement with the lug 10 which positively prevents further pivotal movement thereof.

With the parts of the hinge in the position shown in Fig. 3, pressure tending to move the door 11 toward an open position causes the plate 13 to pivot around the pin 14 and this movement is accompanied by movement of the pin 17 from the apex of the slot 9 into the other leg thereof. At the time the door 11 reaches its fully opened position the lug 15 will engage the surface of the V-shaped element 6 as shown in Fig. 2, to prevent further pivotal movement of the plate 13 relative to the pin 14. The door is shown in its fully opened position in Fig. 2.

When pressure is applied upon the door tending to move the same from the position shown in Fig. 2 to that shown in Fig. 1, the pin 17, being at this time disposed in the other leg of the slot 9, acts to prevent pivotal movement of the V-shaped element 6 with respect to its pivot 5. The pressure therefore moves the plate 13 pivotally with respect to the pin 14 and the pin 17 is moved to the apex of the slot 9. At the time the pin 17 reaches the apex of the slot 9 the boss 15' will be in engagement with a surface of the V-shaped element 6 and will limit the pivotal movement of the plate 13 relative to the element 6. Continued pressure therefore tends to pivot the element 6 and such movement is permitted because at this time the pin 17 is disposed in the apex of the slot 9.

Although a specific embodiment has been illustrated and described, it will be understood that various changes may be made within the scope of the claims without departing from the spirit of the invention and such changes are contemplated.

What I claim is:—

1. A concealed hinge of the class described comprising a housing butt part and a hook arm butt part, said arm being pivotally mounted within the housing and adapted to swing inwardly and outwardly with respect thereto on said pivot, said arm including a supplemental arm part movable with and independently of the first named arm, and means for guiding the supplemental arm in the butt housing in its respective movements.

2. A concealed hinge of the class described comprising a housing butt part and a hook arm butt part, said arm being pivotally mounted within the housing and adapted to swing inwardly and outwardly with respect thereto on said pivot, said arm including a supplemental arm part movable with and independently of the first named arm, means for guiding the supplemental arm in the butt housing in its respective movements, and the free end portions of the first named and supplemental arms having interengaging pintle bearings with a common pintle mounted in said bearings to provide relative hinge movement between said arms.

3. A concealed hinge of the class described comprising a housing butt part and a hook arm butt part, said arm being pivotally mounted within the housing and adapted to swing inwardly and outwardly with respect thereto on said pivot, said arm including a supplemental arm part movable with and independently of the first named arm, means for guiding the supplemental arm in the butt housing in its respective movement, the free end portions of the first named and supplemental arms having interengaging pintle bearings with a common pintle mounted in said bear ings to provide relative hinge movement between said arms, and the means for guiding the supplemental arm in its movement with respect to said housing comprising a pin on the supplemental arm operating in curved channels having two distinct axes.

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