J. F. STREBERGER.

CONCEALED HINGE.

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1,075,130. Patented Oct. 7, 1913.

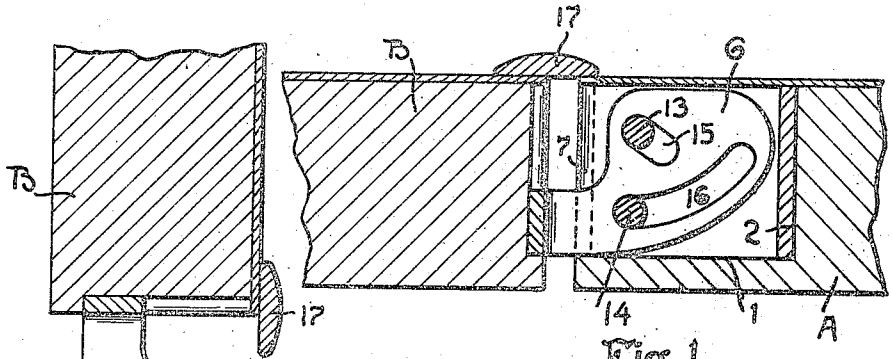


Fig. 1

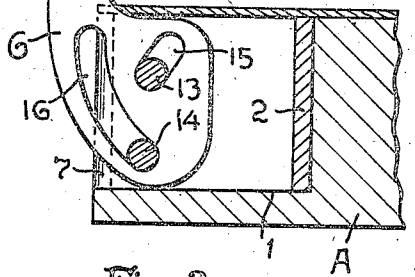


Fig. 3

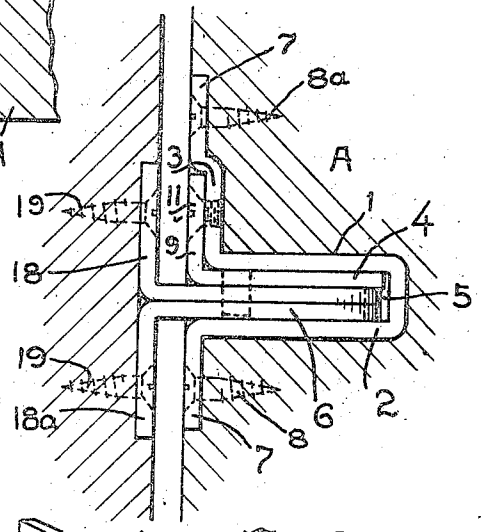


Fig. 2

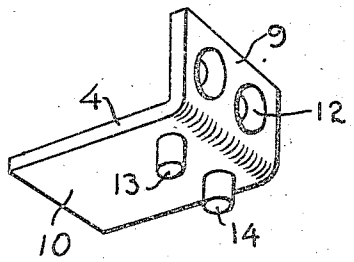


Fig. 5

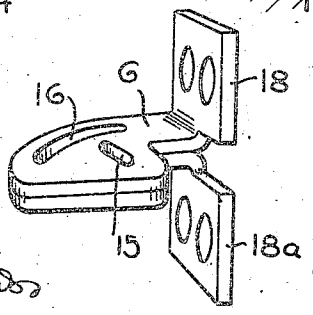


Fig. 4

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CONCEALED HINGE.

1,075,130. Specification of Letters Patent. Patented Oct. 7, 1913.

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To all whom it may concern:

Be it known that I, JOHN F. STREBERGER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Concealed Hinges, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to concealed hinges and is especially adapted for hanging automobile doors.

It has for its object a hinge of which the mortise casing can be set in the frame once for all and if it is desired to move the hinge parts, this may be done by unscrewing the knuckle-pin plate which is attached to the mortise casing. The knuckle-pin plate and the hinge arm then slide out of the mortise without any other disengagements.

A peculiar feature of this invention is the double knuckle-pin arrangement which provides extra throw-out of the door from the body as it swings outward. This insures a clearance of the molding from the body.

In the drawings: Figure 1 is a horizontal section of a hinge showing the door closed. Fig. 2, is a section vertically through the door and body, showing a side elevation of the assembled hinge. Fig. 3, is a section similar to that shown in Fig. 1, but with the door open. Fig. 4, is a perspective of a swinging arm of the hinge. Fig. 5, is a perspective of the knuckle-pin plate.

A, is a section of the body of an automobile in which is cut a suitable mortise 1, that has a contour to receive the mortise casing.

The mortise casing is indicated at 2 and comprises simply a strip of stamped metal that is bent in the curve shown in Fig. 2. The bend at 3 serves to form a countersunk portion for the reception of the knuckle-pin plate 4 which will be hereinafter described. The main bend or recess 5 is for the reception of the web of the knuckle-pin plate and also the hinge arm 6. At 7, the strip of metal returns to the plane at which the sinuosities start and forms a face plate through which the screw 8 may be driven into the body to hold the mortise casing in place. A second screw 8^a is shown driven through the face plate portion at the top. Only two screws are shown in the illustration of Fig. 2, but, of course, any number may be arranged in line, or otherwise, to afford firmness.

Referring to Figs. 4 and 5, the two members of the unit, which enters the mortise casing, will be seen. These are the knuckle-pin plate 4 and the swinging arm 6. The knuckle plate 4 is an angle iron comprising a face portion 9 and a web portion 10. The face portion 9 is perforated and is adapted to lie in the countersunk portion 3 of the mortise casing. This is also perforated and threaded so that screws 11 may be passed through the perforations 12 of the knuckle pin plate and that member be secured to the mortise casing 2. However, before it is so secured, the pins 13 and 14 are dropped into the slots 15 and 16, respectively, of the swinging arm 6. This assembles the unit and inasmuch as the spacing between the upper wall and the lower wall of the main recess of the mortise casing is just the width of the knuckle-pin plate and the length of the knuckle pins 13 and 14, the unit rests securely in its position of final assembly. The length of the pins 13 and 14 is calculated to just give the swinging arm 6 freedom to swing between the lower face of the knuckle-pin plate and the upper face of the lower wall of the main recess of the mortise casing.

The slots 15 and 16 are so calculated with respect to each other as to give the arm 6 freedom in swinging. In Fig. 1 the position of the pins with respect to the slots, when the door is closed, is shown. In Fig. 3, the position of the pins with respect to the slots, when the door is opened, is shown. It will be seen that in opening, the arm travels with respect to the pins so that the opposite ends of the slots engage with the pins. If the swinging arm 6 is pivoted on a single pin, it obviously could not throw out the door from the body as occurs in the structure that I have shown, for the reason that the radius of swinging would always be the same, but with the arrangement of slots and two pins in the structure shown in Figs. 1 and 2, it will be seen that pin 13, which is the real swinging center of the arm 6, moves, while the door is swinging outward, toward the end of the arm 6 that is farthest removed from the door B which is carried by this arm. This,

therefore, results in the extension of the radius of this swinging arm, which is gradual as the door opens out and the pin 13 is brought closer to the opposite end of the slot and the rear of the swinging arm 6. The slot 16 and the pin 14 serve as guides to require the travel of the pin 13 from one end of the slot 15 to the other to be gradual and positive, otherwise, this extension of the swinging arm could be secured at all points of the swing, but there would be nothing to maintain it at such position or to secure it, the door would be merely upon a loose hinge.

Referring to Fig. 3 it will be noted that by either extending the slot 15 or by disposing it with respect to the hinge arm 6, in the position there shown, at more nearly a vertical line, the radius would be still further extended in swinging out and hence the out-throw from the body of the car would be greater. The position of the segmental slot 16 will then have to be slightly changed so that the slot will slide upon the pin 14 with a minimum of friction. This is merely a matter of calculation. By comparing the clearance spaces between the door and body, in Figs. 1 and 3, the throw-out of the arm will be discerned. This is especially an advantage in insuring the clearance of a molding 17 of the door B. It will be seen by Fig. 3 that this molding 17 is by reason of the throw-out of the swinging arm 6, kept somewhat distant from the body of the car.

The swinging arm 6 is shown in Fig. 4 as constructed of two pieces of stamping bent into angle iron shape and welded together. The face plate portions 18 and 18ª of these angle irons are perforated for the passage of screws 19 which may be driven into the door B. When it is desired to remove the door or remove the hinge unit all that is necessary is to remove the screws 11, whereupon the knuckle-pin plate 4 is freed from the mortise casing 2 and may be pulled out together with the swinging arm 6. The swinging arm 6 will then drop out of engagement with the pins 12 and 14 and the whole hinge will be disassembled.

A noteworthy feature of this hinge, in addition to the features already named, is the fact that the whole may be made out of stamped metal. The hinge arm 6 is formed by a pair of angle-irons whose face portions 18 and 18ª are screwed to the door and whose perpendicular web portions are welded together as shown in Fig. 4. This makes a cheap and efficient way of constructing the hinge arm.

The above description of the arrangement of the two slots is a preferred form of my invention, but it will be obvious that my structure can be used without the two slot arrangement and still embody a number of the features that I deem novel and useful. I do not, therefore, want to be understood as limiting myself to a hinge structure in which the slots are as above specified.

What I claim is:—

1. The combination with a door-post provided with a mortise and a door provided with a molding on and protruding over the edge of the door adjacent the door-post, of a hinge-arm attached to the door and provided with a segmental slot, the said hinge-arm adapted to hold the edge of the door adjacent the face of the door post when the door is closed, a pin in said mortise and protruding through the segmental slot, and means for compelling the hinge-arm to take a course with respect to the pin which is prescribed so as to cause the hinge-arm to gradually thrust the door out from the door-post during the entire opening of the door, whereby the clearance of the molding in relation to the side of the door-post is gradually increased, substantially as described.

2. A concealed hinge, having in combination with a frame provided with a mortise, a knuckle-pin plate provided with a pair of pins adapted to be located in said mortise, a swinging arm provided with a pair of slots in which the pins engage and adapted to be held in said mortise by the knuckle-pins, the said slots being arranged with respect to each other so that when the swinging arm swings out upon the pins, the radius of the arm is extended, whereby a door or other member swinging on said arm is thrust out with respect to the frame, substantially as described.

3. A concealed hinge, having in combination, a frame provided with a mortise, a mortise casing having a countersunk portion and a main recess, a knuckle-pin plate having a face portion that can be fastened to the mortise casing at the countersunk portion and a swinging arm pivoted on a pin of the knuckle pin plate and held in the main recess of the mortise casing by the same, substantially as described.

4. A concealed hinge, having in combination with a body, provided with a mortise, a casing therefor, a knuckle pin plate adapted to lie in horizontal position therein and provided with a pair of pins held in vertical position in said casing, a hinge arm and a door attached thereto, the said hinge arm adapted to rest on the floor of the casing and provided with a pair of slots in which the pins engage, the said pins and slots being positioned so as to act only as guides for the swinging arm in swinging and to increase the radius of the swinging arm in its outward swing, substantially as described.

5. The combination with a vehicle-body provided with a door-post having a mortise

therein and a door provided with a molding that projects beyond the edge of the door adjacent the door-post, of a hinge-arm fastened to the door and partially located in the mortise, the hinge arm having a segmental slot and a second slot arranged angularly in relation to the first-mentioned slot, and a pair of pins located in said mortise and secured therein, one pin protruding through each slot, the said pins and slots being arranged with respect to one another so as to increase the swinging radius of the hinge-arm as the door opens out, whereby the clearance between the molding and vehicle-body is increased, substantially as described.

In testimony whereof, I sign this specification in the presence of two witnesses.

JOHN F. STREBERGER.

Witnesses:

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VIRGINIA C. SPRATT.