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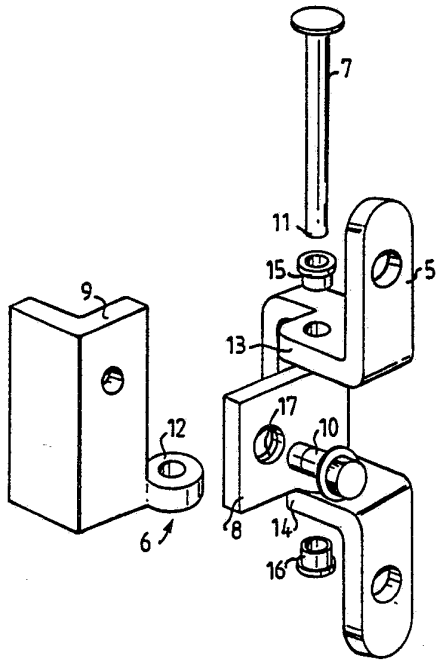
(57) Abstract

A hinge (4) for a vehicle door (1) has two hinge halves (5, 6) which are pivotably connected, where the hinge half (6) intended for fixed assembly to the vehicle is separable and has a pin part (8) intended for a hinge pin (7) and a post part (9) intended for a door post (2). The hinge pin (7) has a downwardly directed free end (11) which can be axially introduced into an attachment (12) on the post part (9). The pin part (8) and post part (9) can be joined to or released from each other while the hinge pin (11) is situated in the attachment (12) and holds the vehicle door hung.



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HINGE, IN PARTICULAR FOR A VEHICLE DOOR

The present invention relates to a hinge, in particular for a vehicle door, with two hinge halves which are pivotably connected by means of a hinge pin and of which the one, fixed hinge half consists of two parts which are detachably connected to each other and is intended for fixed assembly to the vehicle.

In the manufacture of vehicle bodies, it is usually desirable, after hanging and adjustment of a vehicle door, to improve the accessibility for other work stages by again demounting the door. With conventional hinges, this has led to the adjustment of the hinges being all too easily altered upon rehanging. In order to avoid the adjustment of hinges on the doors being altered, separable hinges are consequently now often used, often with the hinge pin fixed only at one end. The disadvantage with such a design is, however, that the stresses on the hinge pin become unfavourable, and at the same time there is a risk that a door may be unhinged inadvertently.

In an improved hinge of this type, the hinge pin is fixed in the moveable hinge half and can be fitted with its lower end in a lower part of the fixed hinge half. The upper end of the hinge pin is thereafter fixed with the aid of an upper part included in the fixed hinge half, which upper part is screwed securely on the lower part. The lower end of the hinge pin is moreover fixed in the lower part by means of a nut. One disadvantage of this design is that several loose parts, namely the upper part in the fixed hinge half and the screw and the nut must be handled and assembled. A further important disadvantage of this type of hinge, as in many other conventional types of hinges, is that it is necessary upon rehanging to accurately adjust the hinge parts before the door can be hung. Since the door is usually hung on a number of hinges, this involves the simultaneous adjustment of a number of hinges, which makes the hanging work- intensive, especially in those cases when the door is in addition heavy.

The aim of the invention is to eliminate these disadvantages and to provide a hinge which is simple and is easier to handle upon hanging and rehanging of, for example, a vehicle door.

This aim is achieved according to the invention by virtue of the fact that the one part of the fixed hinge half is pivotably mounted on the moveable hinge half by means of the hinge pin, and is locked relative to the moveable hinge half in the axial direction of the hinge pin, and by virtue of the fact that the hinge pin has a downwardly directed free end which can be axially introduced into an attachment on the other part of the fixed hinge half intended for fixed assembly to the vehicle, the two parts of the fixed hinge half being designed in such a way that, while the free end of the hinge pin is located in the attachment and thereby makes it possible to hold a vehicle door hung, they can be joined to or released from one another, by which means hanging or demounting of a vehicle door can be carried out without demounting the whole hinge.

The attachment can advantageously consist of a lug projecting in the lateral direction at the bottom of the other part of the fixed hinge half. In this way it is easy, when rehanging the door, to hinge the latter securely.

According to a particularly advantageous embodiment, the lower end of the hinge pin is dimensioned so as to fit with considerable play in a hole in the attachment. This permits a simple hanging of the door without any need for accurate adjustment of the parts of the hinge relative to each other.

According to a further particularly advantageous embodiment, the two parts of the fixed hinge half can be connected to each other by means of a screw connection, in which respect a screw can advantageously be screwed into the other part of the fixed hinge half.

By virtue of the design according to the invention, a hinge is obtained with fewer loose parts than previously, which considerably facilitates handling. In addition, the parts of the hinge are designed in such a way that a simple secure hinging of the door is possible upon rehanging of the door.

The invention is illustrated in greater detail below on the basis of exemplary embodiments shown in the drawing, in which:

Fig. 1 shows a perspective view of a section of a vehicle which is provided with hinges according to the invention,

Fig. 2 shows a side view of a complete hinge according to the invention,

Fig. 3 shows an exploded sketch of a hinge according to the invention, and

Fig. 4 shows a view, corresponding to Fig. 2, of an alternative embodiment of a hinge according to the invention.

According to Fig. 1, a vehicle door 1 is intended to be hung on a door post 2 in a vehicle body 3 with the aid of two hinges 4 according to the invention. In order to facilitate demounting and rehanging of the door 1, after adjustment of the latter, the two hinges are separable.

Each hinge 4 has a moveable hinge half 5 intended for securing on the door 1 and a fixed hinge half 6 intended for securing on the door post 2, which halves are joined pivotably by a hinge pin 7. The fixed hinge half 6 is in turn divided into two parts, a pin part 8 intended for the hinge pin 7 and a post part 9 intended for the door post, which parts are detachably connected to each other, for example by means of a screw connection, where a screw 10 is threaded into the post part 9.

The hinge pin 7 has a downwardly directed free end 11, which is intended to be located in an attachment 12 projecting in the lateral direction and in the form of a lug at the bottom of the post part 9 of the fixed hinge half. In the embodiment shown, the hinge pin 7 is mounted in the moveable hinge half 5 at two mutually separated bearing positions, an upper and a lower bearing position 13 and 14, respectively. If appropriate, bushings 15 and 16, respectively, may be situated at these bearing positions for the hinge pin 7.

In the embodiment according to Figs. 1-3, the pin part 8 is intended to be accommodated between the bearing positions 13 and 14, while, according to Fig. 4 in contrast, it is designed to surround the bearing positions 13 and 14. This prevents the pin part 8 from being released inadvertently from the moveable hinge half 5. The moveable hinge half 5 consists advantageously of a bent metal part (see Fig. 3), which has been provided with suitable holes for retaining screws and hinge pin. In the embodiment according to Fig. 4, however, instead of two separate bearing positions 13, 14 for the hinge pin

7, a single, extended bearing position can be used, in which case the moveable hinge half 5 can, for example, be cast instead of bent.

For reasons of safety, the hinge pin 7 is advantageously axially locked, and this locking can be effected in a number of different ways, for example by means of the hinge pin 7 being pressed into the pin part 8.

The attachment 12 is designed with a continuous hole, the diameter of which is so much greater than the diameter of the free end 11 of the bearing pin that a considerable play is obtained between the hole and the end 11. In the simplest embodiment, both the hole and the end 11 can be essentially cylindrical. In alternative embodiments, the hole and the end 11, or either one of them, can have, for example, a conical or rounded form in order to facilitate hinging of the door.

In order to obtain easily a correct mutual positioning between the pin part 8 and the post part 9 during hanging, the screw 10 advantageously has a conical section, the screw hole 17 in the pin part 8 having a corresponding design. In the hung position and before the screw 10 has been completely tightened, there is a radial play between the screw 10 and the screw hole 17. There can of course instead be other types of cooperating members on the pin part and the post part in order to facilitate correct hanging.

As hinges according to the invention will be used to hang a vehicle door, hinges 4 mounted together according to Fig. 2 or 4 will be used, and the post part 9 of each hinge will first be fixed on the door post 2, for example by welding. Thereafter, the door 1 will be hung by means of the moveable hinge halves 5 being secured on the door by means of retaining screws, which are tightened when the door has been adjusted to the desired position.

The door 1 can now be demounted easily, without any new adjustment of the position having to be made upon rehanging. This is achieved simply by means of separating the two parts 8 and 9 of the fixed hinge halves by removing the screws 10. The door can then be easily unhinged, i.e. the free end 11 of each hinge pin 7 is raised together with the door out of its attachment 12 (see Fig. 1). In the demounted state, it is now possible, with

the aid of the free ends 11 of the two hinge pins 7, for the door to be hinged easily into suitable attachments in a fixture which is intended to hold the door temporarily in the normal position.

Rehanging of the door is carried out simply by the hinge pins 7 being hinged into their attachments 12.

The fitting of the free ends 11 of the hinge pins is facilitated by the fact that the cooperating holes in each attachment 12 are larger than the ends. By means of this fitting, the door 1 is secured roughly to the vehicle body 3. Continued hanging can thereafter be carried out without the fitter having to hold the door 1 tight. First, the screws 10 are arranged in their screw holes, which, despite the fact that the door is still not located in the adjusted position, is possible by virtue of the fact that the screws 10 have a certain play in the screw holes 17. In the final stage of the tightening of the screws, each pin part 8 is centred relative to its screw with the aid of respective guide surfaces, which have been exemplified above as a conical section on the screw 10 and a corresponding section in the screw hole 17. The door is thus rehung in the previously adjusted position.

The radial plays between, on the one hand, the hinge pin 7 and the cooperating hole in the attachment 12 and, on the other hand, the screw 10 and the screw hole 17 are chosen in such a way that it is possible, upon rehanging, to make the screw 10 fit tightly in the screw hole with its threads, despite the fact that the door is only roughly secured. In addition, the plays are chosen such that, when the screws 10 are tightened fully and the door is situated in the adjusted position, the free ends 11 of the pins run completely freely in their holes in the attachments 12. In this respect, the moveable hinge half 5 and the attachment 12 should advantageously also be axially separated with a certain play. When the hinge has been finally rehung in this way , the attachment 12 no longer has any function to fulfil. If the door needs to be demounted again, the attachment in an analogous manner supports the door before it is unhinged.

Patent claims

1. Hinge, in particular for a vehicle door (1), with two hinge halves (5, 6) which are pivotably connected by means of a hinge pin (7) and of which the one, fixed hinge half (6) consists of two parts (8, 9) which are detachably connected to each other and is intended for fixed assembly to the vehicle, *characterised* in that the one part (8) of the fixed hinge half (6) is pivotably mounted on the moveable hinge half (5) by means of the hinge pin (7), and is locked relative to the hinge half (5) in the axial direction of the hinge pin, in that the hinge pin (7) has a downwardly directed free end (11) which can be axially introduced into an attachment (12) on the other part (9) of the fixed hinge half (6) intended for fixed assembly to the vehicle, and in that the two parts (8, 9) of the fixed hinge half (6) are designed in such a way that, while the free end (11) of the hinge pin is located in the attachment (12) and thereby makes it possible to hold a vehicle door hung, they can be joined to or released from one another, by which means hanging or demounting of a vehicle door can be carried out without demounting the whole hinge.

2. Hinge according to Claim 1, *characterised* in that the attachment (12) consists of a lug projecting in the lateral direction at the bottom of the other part (9) of the fixed hinge half.

3. Hinge according to Claim 1 or 2, *characterised* in that the two parts (8, 9) of the fixed hinge half (6) can be fixed to each other by means of a screw connection (10).

4. Hinge according to Claim 3, *characterised* in that the fixed hinge half (6) has at least one centring member (10, 17) for mutual centring of its two parts (8, 9).

5. Hinge according to Claim 4, *characterised* in that the centring member consists, on the one hand, of a conical section of a screw (10) which can be screwed into the other part (9) and, on the other hand, a conical hole (17) in the one part (8) cooperating with this conical section.

6. Hinge according to any one of Claims 1-5, *characterised* in that the one part (8) of the fixed hinge half (6) on the hinge pin (7) is situated between two mutually separated bearing positions (13, 14) for the hinge pin on the moveable hinge half (5).

7. Hinge according to any one of Claims 1-5, *characterised* in that the one part (8) of the fixed hinge half (6) on the hinge pin (7) has two mutually separated attachments for the hinge pin, and in that these attachments engage around a section of the moveable hinge half (5) intended for the hinge pin (Fig. 4).

8. Hinge according to any one of Claims 1-5, *characterised* in that the attachment (12) has a continuous hole which, upon hanging, cooperates with the free end (11) of the hinge pin (7) for rough securing of the parts (8, 9) of the fixed hinge half (6) relative to each other, and in that the free end (11) passes into the hole in the attachment (12) with a considerable play.

9. Hinge according to Claim 8, *characterised* in that the play between the free end (11) and the hole is so great that, after hanging, there is no contact between the free end (11) and the hole.

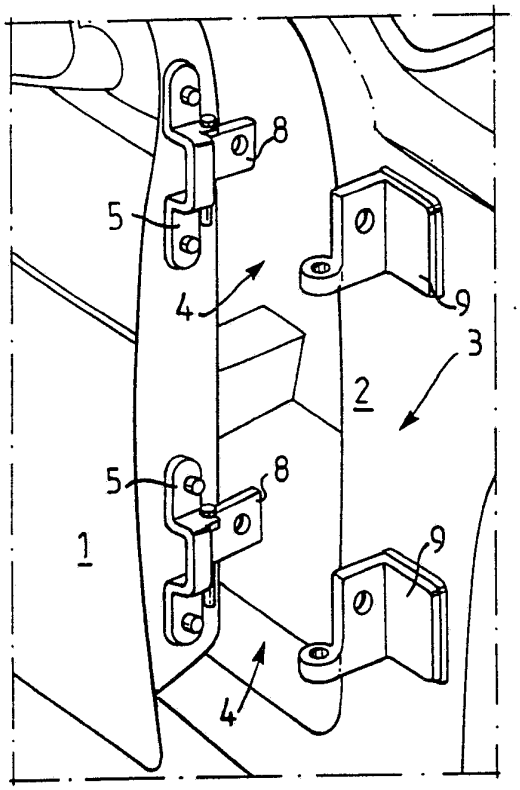

FIG.1

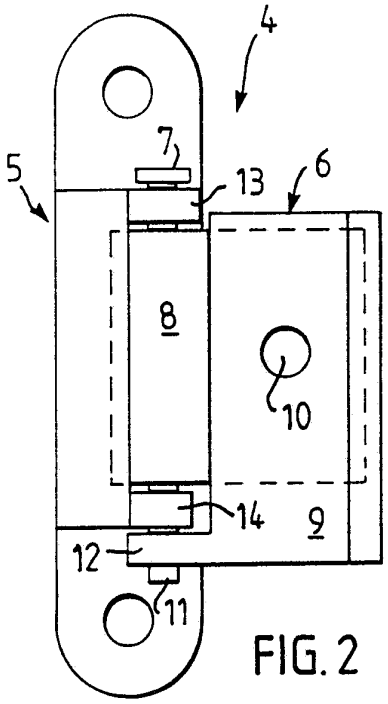

FIG. 2

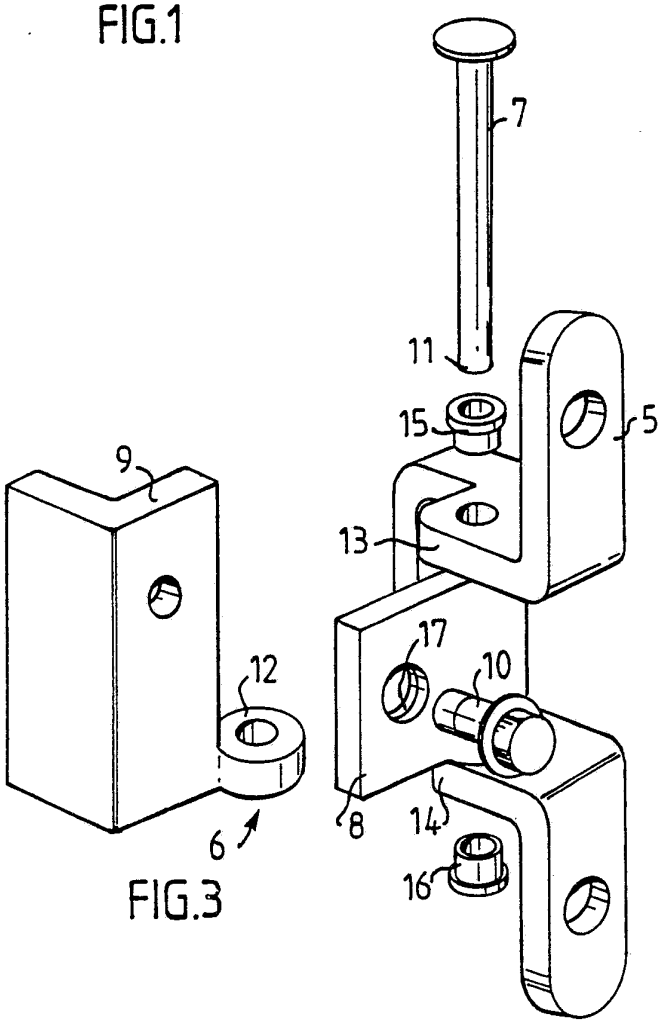

FIG.3

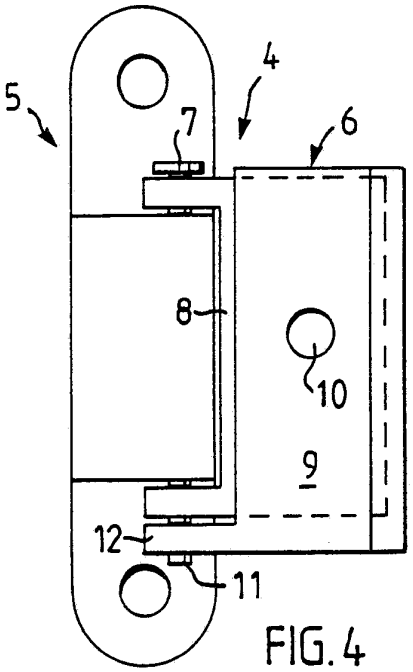

FIG. 4

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 90/00853

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: E 05 D 7/10, 3/02

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
IPC5	E 05 D

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched[8]

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III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

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X	US, A, 4807331 (CALUCCI) 28 February 1989, see the whole document -- --------	1-7

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IV. CERTIFICATION

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US-A- 4807331	89-02-28	NONE	