

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 1 094 181 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

28.12.2005 Bulletin 2005/52

(51) Int Cl.7: **E05B 65/20**, E05B 65/12

(21) Application number: **00308964.6**

(22) Date of filing: **12.10.2000**

(54) **A vehicle door latching mechanism**

Schlossmechanismus für Fahrzeugtüre

Dispositif de verrouillage pour porte de véhicule

(84) Designated Contracting States:
DE FR GB

(30) Priority: **23.10.1999 GB 9925008**

(43) Date of publication of application:
25.04.2001 Bulletin 2001/17

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Description

[0001] This invention relates to a vehicle door latching mechanism, and in particular to vehicle door latching mechanisms used to releasably secure a vehicle door in a closed position.

[0002] A vehicle door is provided with a latch for engagement with a keeper mounted on a door post or on the frame of the associated vehicle, and with internal and external handles for operating the latch. Traditionally, rods are used in vehicle doors to connect the internal and external handles with the latch. Where a vehicle is involved in a severe impact, such as a head-on collision, doors are known to fly open, which can lead to the ejection of a passenger, and/or a significant reduction in the strength of the passenger cell (since the strength of the cell is dependent on the vehicle door remaining closed). The inertia of one or more of the components of the latching mechanism may, in itself, be sufficient to change the state of the latch, and in particular to open the latch during a severe impact. In particular, the door rod connecting the inside handle to the latch is particularly likely to result in release of the latch during a severe impact. This is because this door rod extends in a longitudinal direction of the vehicle, and has a relatively long length, and hence a relatively high inertia in the direction tending to operate the latch. Consequently, when the associated vehicle is involved in a head-on collision, the inertia of this rod may be sufficient to open the latch. Although the inertia of the rod joining the external handle to the latch is less, there is still a chance that this is sufficient to open the latch.

[0003] A vehicle door latching mechanism also incorporates a locking mechanism for locking the latch in a closed position. Traditionally, the locking mechanism can be actuated by an internal sill button, or by operating a key barrel lock, using a key, from the outside. In each case, the locking mechanism is attached to the actuator (the sill button or the key barrel) by means of a respective rod. Here again, the inertia of these rods can be sufficient, in the case of a severe impact, for the operation of the locking mechanism to be affected.

[0004] The relatively high inertia of the rods used to connect the various components of the latching mechanism arises because they have been traditionally constructed as solid rods. One of the reasons for this is that many of the rods found within vehicle doors have bends to avoid contact with other components within the vehicle door, and solid rods are means of cost effectively providing the required rigidity to enable such rods to operate consistently.

[0005] DE19803871 and US5769471 show examples of various rods associated with vehicle door latches.

[0006] The aim of the invention is to provide a vehicle door latching mechanism with a reduced risk of opening during an impact.

[0007] The present invention provides a vehicle door latching mechanism comprising a latch, an actuator for

initiating actuation of the latch, and a substantially rigid elongate member associated with the latch and the actuator for operating the latch in response to operation of the actuator, wherein the substantially rigid elongate member is a substantially tubular member.

[0008] Preferably, the latching mechanism further comprises a second actuator for initiating actuation of the latch, and a second substantially rigid elongate member associated with the latch and the second actuator for operating the latch in response to operation of the second actuator, the second substantially rigid elongate member being a generally tubular member.

[0009] In a preferred embodiment, the latching mechanism further comprises a locking mechanism for locking the latch in a closed position. In this case, the locking mechanism may comprise a first actuating member for actuating the locking mechanism, and a third substantially rigid elongate member associated with the first actuating member and the locking mechanism for operating the locking mechanism in response to operation of the first actuating mechanism, the third substantially rigid elongate member being a substantially tubular member. Preferably, the locking mechanism further comprises second actuating mechanism for actuating the locking mechanism, and a fourth substantially rigid elongate member associated with the locking mechanism and the second actuating mechanism for operating the locking mechanism in response to operation of the second actuating mechanism, the fourth substantially rigid elongate member being a generally tubular member.

[0010] The terms "generally tubular member" and "substantially tubular member" should be construed broadly, to include not only cross-sectional forms other than circular, but also rod configuration that are not completely tubular. Thus, rods of part-tubular cross-section could be used, provided the degree of "tubularity" is sufficient to provide the rods with sufficient rigidity (particularly where rods are bent) to fulfil their functionality.

[0011] Advantageously, the or each substantially rigid elongate member is made of a material such as mild steel, or of a plastics material.

[0012] The invention also provides a vehicle door including a latch mechanism as defined above.

[0013] Preferably, the first actuator is an internal door handle, and the first substantially rigid elongate member extends within the door generally longitudinally with respect to the vehicle body. The first substantially rigid elongate member may be formed with at least one bend.

[0014] According to a further aspect of the present invention there is provided a vehicle door latching mechanism comprising a latch, an actuator for initiating actuation of the latch and a locking mechanism for locking the latch in a closed position, the locking mechanism comprising an actuating member for actuating the locking mechanism, and a substantially rigid elongate member associated with the actuating member and the locking mechanism for operating the locking mechanism in response to operation of the actuating mechanism, the

substantially rigid elongate member being a generally tubular member.

[0015] Advantageously this provides for a door which can be locked whilst the vehicle is in motion and is less likely to become unlocked during a crash. It should be noted that a locked door is less likely to open during a crash than an unlocked door as a result of inertia forces since two distinct operations need to take place for such a door to open, namely the door must first unlock and then the door must unlatch.

[0016] Thus whilst the preferred option for a locking latch is to have tubular connectors from the latch to the associated inside and outside door handles, sill button and key barrel, it is nevertheless advantageous to have tubular connectors between the latch and sill or key barrel and non-tubular connectors between the latch and inside and outside door handles when compared with an arrangement having only non-tubular connections.

[0017] A vehicle door latching mechanism construed in accordance with the invention will now be described in greater detail, by way of example, with reference to the accompanying drawing, in which:-

Figure 1 is a schematic view of a vehicle door incorporating a mechanism according to the present invention;

Figure 2 is an enlarged view of part of figure 1 ; and

Figure 3 is a cross section taken along the line AA of figure 2.

[0018] Referring to figure 1, a vehicle door 1 includes a latch 2 which co-operates with a keeper (not shown) mounted on a door post or the frame of the vehicle. The latch 2 can be operated either by an internal handle 3 or an external handle 4, via respective link members 3a and 4a. The latch 2 can be held in a locked position either by means of an internal sill button 5 or by turning a key in an external lock 6, via respective link members 5a and 6a.

[0019] Each of the link members 3a, 4a, 5a and 6a is made of a metal such as mild steel, and is of tubular construction. These members have, therefore, considerably less inertia than the solid rods of known mechanisms. Consequently, if the associated vehicle is involved in a severe impact, such as a head-on collision, the inertia of the link members 3a, 4a, 5a and 6a is considerably less than that of the comparable rods of known mechanisms, and this inertia is extremely unlikely to be sufficient to open the latch 2 or to alter the state of the locking action. This is particularly important for the link member 3a, as this link member has a considerable length, and runs generally longitudinally with respect to the vehicle. This link member 3a does, therefore, have a larger inertia than the other link members 4a, 5a and 6a, and so is the link member most likely to release the latch 2 during a severe impact.

[0020] It will be noted that link member 3a has several bends, 7, 8, 9, 10 and 11 along its length.

[0021] In one form these bends can be formed to have a generally circular cross section throughout the bend.

[0022] Figures 2 and 3 show an alternative form of bend wherein the outer surface 12 of the bend 11 is convex and the inner surface 13 is concave and provides for a recess 14. Such an arrangement allows for relatively tight bends to be provided in the elongate members.

[0023] It will be apparent that modifications could be made to the vehicle door latching mechanism described above. Thus, the link members 3a, 4a, 5a and 6a could be made of any other suitable rigid material, such as a plastics material.

Claims

1. A vehicle door latching mechanism comprising a latch (2), an actuator (3, 4) for initiating actuation of the latch, and a substantially rigid elongate member (3a, 4a) associated with the latch and the actuator for operating the latch in response to operation of the actuator, **characterised in that** the substantially rigid elongate member is a substantially tubular member.
2. A latching mechanism claimed in claim 1, further comprising a second actuator (3, 4) for initiating actuation of the latch, and a second substantially rigid elongate member (3a, 4a) associated with the latch and the second actuator for operating the latch in response to operation of the second actuator, the second substantially rigid elongate member being a substantially tubular member.
3. A latching mechanism as claimed in claim 1 or claim 2, further comprising a locking mechanism for locking the latch in a closed position.
4. A latching mechanism as claimed in claim 3, wherein the locking mechanism comprises a first actuating member (5, 6) for actuating the locking mechanism, and a third substantially rigid elongate member (5a, 6a) associated with the first actuating member and the locking mechanism for operating the locking mechanism in response to operation of the first actuating member, the third substantially rigid elongate member being a substantially tubular member.
5. A latching mechanism as claimed in claim 4, wherein the locking mechanism further comprises a second actuating member (5, 6) for actuating the locking mechanism, and a fourth substantially rigid elongate member (5a, 6a) associated with the locking mechanism and the second actuating member

for operating the locking mechanism in response to operation of the second actuating member, the fourth substantially rigid elongate member being a substantially tubular member.

6. A latching mechanism as claimed in any one of claims 1 to 5, wherein the or each substantially rigid elongate member (3a, 4a, 5a, 6a) is made of mild steel.
7. A latching mechanism as claimed in any one of claims 1 to 5, wherein the or each substantially rigid elongate member (3a, 4a, 5a, 6a) is made of a plastics material.
8. A latching mechanism as defined in any preceding claim wherein at least one substantially rigid elongate member (3a, 4a, 5a, 6a) is formed with at least one bend.
9. A latching mechanism as claimed in claim 8 in which the cross section of the bend is generally similar to the cross section of those portions of the substantially rigid elongate member proximate the bend.
10. A latching mechanism as defined in claim 8 in which the cross section profile of the bend includes a recess (14).
11. A vehicle door (1) including a latching mechanism as claimed in any one of claims 1 to 10.
12. A vehicle door (1) as defined in claim 11, wherein the first actuator is an internal door handle (3), and the first substantially rigid elongate member extends within the door generally longitudinally with respect to the vehicle body.
13. A vehicle door latching mechanism comprising a latch (2), an actuator (3, 4) for initiating actuation of the latch and a locking mechanism for locking the latch in a closed position, the locking mechanism comprising an actuating member (5, 6) for actuating the locking mechanism, and a substantially rigid elongate member (5a, 6a) associated with the actuating member and the locking mechanism for operating the locking mechanism in response to operation of the actuating member, **characterised in that** the substantially rigid elongate member is a substantially tubular member.

Patentansprüche

1. Fahrzeugtürschließmechanismus mit einem Schloss (3), einem Aktuator (3, 4) zum Auslösen der Betätigung des Schlosses und einem zu dem Schloss und dem Aktuator gehörigen im Wesentli-

chen starren lang gestreckten Teil (3a, 4a) zum Betätigen des Schlosses in Reaktion auf den Betrieb des Aktuators, **dadurch gekennzeichnet, dass** das im Wesentlichen starre lang gestreckte Teil ein im Wesentlichen rohrförmiges Teil ist.

2. Schließmechanismus nach Anspruch 1, ferner mit einem zweiten Aktuator (3, 4) zum Auslösen der Betätigung des Schlosses und einem zu dem Schloss und dem zweiten Aktuator gehörigen zweiten im Wesentlichen starren lang gestreckten Teil (3a, 4a) zum Betätigen des Schlosses in Reaktion auf den Betrieb des zweiten Aktuators, wobei das zweite im Wesentlichen starre lang gestreckte Teil ein im Wesentlichen rohrförmiges Teil ist.
3. Schließmechanismus nach Anspruch 1 oder Anspruch 2, ferner mit einem Verriegelungsmechanismus zum Verriegeln des Schlosses in einer geschlossenen Stellung.
4. Schließmechanismus nach Anspruch 3, bei dem der Verriegelungsmechanismus ein erstes Betätigungsteil (5, 6) zum Betätigen des Verriegelungsmechanismus und ein zu dem ersten Betätigungsteil und dem Verriegelungsmechanismus gehöriges drittes im Wesentlichen starres lang gestrecktes Teil (5a, 6a) zum Betätigen des Verriegelungsmechanismus in Reaktion auf den Betrieb des ersten Betätigungsteils umfasst, wobei das dritte im Wesentlichen starre lang gestreckte Teil ein im Wesentlichen rohrförmiges Teil ist.
5. Schließmechanismus nach Anspruch 4, bei dem der Verriegelungsmechanismus ferner ein zweites Betätigungsteil (5, 6) zum Betätigen des Verriegelungsmechanismus und ein zu dem Verriegelungsmechanismus und dem zweiten Betätigungsteil gehöriges viertes im Wesentlichen starres lang gestrecktes Teil (5a, 6a) zum Betätigen des Verriegelungsmechanismus in Reaktion auf den Betrieb des zweiten Betätigungsteils umfasst, wobei das vierte im Wesentlichen starre lang gestreckte Teil ein im Wesentlichen rohrförmiges Teil ist.
6. Schließmechanismus nach einem der Ansprüche 1 bis 5, bei dem das bzw. jedes im Wesentlichen starre lang gestreckte Teil (3a, 4a, 5a, 6a) aus Weichstahl besteht.
7. Schließmechanismus nach einem der Ansprüche 1 bis 5, bei dem das bzw. jedes im Wesentlichen starre lang gestreckte Teil (3a, 4a, 5a, 6a) aus Kunststoff besteht.
8. Schließmechanismus nach einem der vorhergehenden Ansprüche, bei dem mindestens ein im Wesentlichen starres lang gestrecktes Teil (3a, 4a, 5a,

6a) mit mindestens einer Biegung ausgebildet ist.

9. Schließmechanismus nach Anspruch 8, bei dem der Querschnitt der Biegung dem Querschnitt jener Abschnitte des im Wesentlichen starren lang gestreckten Teils in der Nähe der Biegung insgesamt ähnlich ist.

10. Schließmechanismus nach Anspruch 8, bei dem das Querschnittsprofil der Biegung eine Ausnehmung (14) umfasst.

11. Fahrzeugtür (1) mit einem Schließmechanismus nach einem der Ansprüche 1 bis 10.

12. Fahrzeugtür (1) nach Anspruch 11, bei der der erste Aktuator sich in einem Türinnengriff (3) befindet und das erste im Wesentlichen starre lang gestreckte Teil sich in der Tür insgesamt in Längsrichtung zu der Fahrzeugkarosserie erstreckt.

13. Fahrzeugtürschließmechanismus mit einem Schloss (2), einem Aktuator (3, 4) zum Auslösen der Betätigung des Schlosses und einem Verriegelungsmechanismus zum Verriegeln des Schlosses in einer geschlossenen Stellung, wobei der Verriegelungsmechanismus ein Betätigungsteil (5, 6) zum Betätigen des Verriegelungsmechanismus und ein zu dem Betätigungsteil und dem Verriegelungsmechanismus gehöriges im Wesentlichen starres lang gestrecktes Teil (5a, 6a) zum Betätigen des Verriegelungsmechanismus in Reaktion auf den Betrieb des Betätigungsteils umfasst, **dadurch gekennzeichnet, dass** das im Wesentlichen starre lang gestreckte Teil ein im Wesentlichen rohrförmiges Teil ist.

Revendications

1. Un mécanisme de verrouillage de porte de véhicule comprenant un pêne (2), un dispositif d'actionnement (3,4) pour activer l'actionnement du pêne, et un élément allongé sensiblement rigide (3a, 4a) associé avec le pêne et le dispositif d'actionnement pour manoeuvrer le pêne en réponse à la manoeuvre du dispositif d'actionnement, **caractérisé en ce que** l'élément allongé sensiblement rigide est un élément sensiblement tubulaire.
2. Un mécanisme de verrouillage suivant la revendication 1, comprenant également un deuxième dispositif d'actionnement (3,4) pour activer l'actionnement du pêne, et un deuxième élément allongé sensiblement rigide (3a, 4a) associé avec le pêne et le deuxième dispositif d'actionnement pour manoeuvrer le pêne en réponse à la manoeuvre du second dispositif d'actionnement, le deuxième élément al-

longé sensiblement rigide étant un élément globalement tubulaire.

3. Un mécanisme de verrouillage selon l'une des revendications 1 ou 2, comprenant également un mécanisme de condamnation pour bloquer le pêne en position fermée.

4. Un mécanisme de verrouillage selon la revendication 3, dans lequel le mécanisme de condamnation comprend un premier élément d'actionnement (5,6) pour actionner le mécanisme de condamnation, et un troisième élément allongé sensiblement rigide (5a, 6a) associé avec le premier élément d'actionnement et le mécanisme de condamnation pour manoeuvrer le mécanisme de condamnation en réponse à la manoeuvre du premier mécanisme d'actionnement, le troisième élément allongé sensiblement rigide étant un élément sensiblement tubulaire.

5. Un mécanisme de verrouillage selon la revendication 4, dans lequel le mécanisme de condamnation comprend également un deuxième mécanisme d'actionnement (5,6) pour actionner le mécanisme de condamnation, et un quatrième élément allongé sensiblement rigide (5a, 6a) associé avec le mécanisme de condamnation et le deuxième mécanisme d'actionnement pour manoeuvrer le mécanisme de condamnation en réponse à la manoeuvre du deuxième mécanisme d'actionnement, le quatrième élément allongé sensiblement rigide étant un élément globalement tubulaire.

6. Un mécanisme de verrouillage selon l'une quelconque des revendications 1 à 5, dans lequel le ou chaque élément allongé sensiblement rigide (3a,4a,5a, 6a) est fait d'acier doux.

7. Un mécanisme de verrouillage selon l'une quelconque des revendications 1 à 5, dans lequel le ou chaque élément allongé sensiblement rigide (3a,4a,5a, 6a) est fait de matière plastique.

8. Un mécanisme de verrouillage tel que défini dans l'une quelconque des revendications précédentes dans lequel au moins l'un des éléments allongés sensiblement rigides (3a,4a,5a,6a) est formé avec au moins un coude.

9. Un mécanisme de verrouillage selon la revendication 8 dans lequel la section transversale du coude est globalement similaire à la section transversale des parties de l'élément allongé sensiblement rigide qui se trouvent à proximité du coude.

10. Un mécanisme de verrouillage selon la revendication 8 dans lequel le profil de la section transversale

comporte une cavité (14).

11. Une porte de véhicule (1) comprenant un mécanisme de verrouillage selon l'une quelconque des revendications 1 à 10. 5
12. Une porte de véhicule selon la revendication 11, dans lequel le premier élément d'actionnement est une poignée intérieure de porte (3), et le premier élément allongé sensiblement rigide s'étend à l'intérieur de la porte de façon globalement longitudinale par rapport au corps du véhicule. 10
13. Un mécanisme de verrouillage de porte de véhicule comprenant un pêne (2), un dispositif d'actionnement (3,4) pour activer l'actionnement du pêne et un mécanisme de condamnation pour bloquer le pêne en position fermée, le mécanisme de condamnation comprenant un élément d'actionnement (5,6) pour actionner le mécanisme de condamnation, et un élément allongé sensiblement rigide (5a, 6a) associé avec l'élément d'actionnement et le mécanisme de condamnation pour manoeuvrer le mécanisme de condamnation en réponse à la manoeuvre du mécanisme d'actionnement, **caractérisé en ce que** l'élément allongé sensiblement rigide est un élément sensiblement tubulaire. 15 20 25

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