

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN, OR RELATING TO, HINGES

(71) I, RICHARD HEINZE, a German Citizen of Eupener Strasse, 4900 Herford/Westphalia, Federal Republic of Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to hinges and more particularly to self-latching hinges.

Hinges of this self-latching type fitted for example to a cabinet door produce a force necessary for keeping the door closed, without holding devices such as magnets, spring latches or the like.

Self-latching hinges are known in which a latching member is provided formed as a roller and co-operating with a latching cam integral with the hinge. This is an unsuitable arrangement in that it is difficult to form the latching cam on this hinge or to mount it thereon and, due to the circular cross-section of the roller, only relatively weak retaining forces can be achieved.

Self-latching hinges are also known which have a pivotably mounted triangular latching element co-operating with a bearing sleeve for the pivoted lever. This design requires, particularly for the latching element and spring, a considerable amount of space and this fact makes a small compact construction impossible. It is also difficult, particularly if strong closing forces are necessary, to incorporate a powerful spring.

The object of the present invention is to provide an improved form of self-latching hinge.

Accordingly, the invention provides a self-latching hinge, for hinging together first and second members, comprising a hollow insert member for attaching the hinge to the first member, an attachment member for attaching the hinge to said second member itself secured to the hollow insert member by pivoted links, a housing extending in the

hinge-open position, from the hollow insert member oppositely from the attachment member, said housing having a guide passage for receiving a latching element, the latching element having a forward nose extending into the hollow insert member and being spring urged in the forward direction, one of said links terminating at one end in a sleeve surrounding a pivot pin fixed in the attachment member, the forward nose of the latching element co-operating with the said sleeve and having such profile as to provide a closing or latching moment of the first member relatively to the second.

Preferably, the latching element and guide passage of the housing are of corresponding non-circular, for example rectangular, cross-section.

Conveniently, the latching element is forwardly urged by a spring housed in a bore therein.

Preferably, the guide passage in the housing is oblique at an acute angle to the face of the first hinged member.

Conveniently, the forward nose of the latching element then has a convex profile.

It is preferred, when the first and second hinged members are in a relatively latched position, that the said one link lies wholly in the hollow of the insert member.

In order that the invention may be readily carried into practice, an embodiment will now be described in detail, by way of example, with reference to the accompanying drawings in which:—

Fig. 1 shows a section through a fitted self-latching hinge according to the invention in the closed condition;

Fig. 2 shows a perspective view of an unmounted hinge according to Fig. 1 in its open condition;

Fig. 3 shows the latching element of the hinge of Fig. 1 in perspective; and

Figs. 3a—3c show various alternative profiles of the latching cam, or curve, of the latching member according to Fig. 3.

In the drawings, Figs. 1 and 2 show a hinge 1 which comprises a hollow insert

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member 2 having a serrated profile 3 insertable in the door 14, and an integral housing 4 for a latching element 17. A serrated profile dowel 5 is mounted in the usual manner on the housing 4 for additionally securing the hinge casing 1 and to prevent it from rotation and displacement. The hinge casing 1 is connected by two pivoted links 6, 7 at pivot pins 8, 9, 10, 11 to a U-section member 12 which can be secured in any convenient manner, to the side wall 13 of a cabinet. The housing 4 has a guide passage 16 for the latching element 17, in this example extending at an acute angle to the surface 15 of the door 14. This acutely inclined arrangement of the guide passage 16 has been selected, because the best closing results have been achieved thereby. However, it is alternatively possible to allow the guide passage 16 to extend parallel to the surface 15 of the door 14, in order to obtain a low overall height of the housing 4. In such a case, however, it is advisable to adapt the profile of the latching cam, or curve 24, to the parallel form.

The latching element 17 is hook-shaped (Fig. 3) and engages by its hook end 18 inside the hollow insert member 2. The guide shank 19 preferably has a rectangular cross-section by which means it is non-rotatably retained in the guide passage 16 of corresponding internal cross-section. A transverse retaining pin 21 engages through a slot 20 in the latching element 17.

Due to this rectangular cross-sectional form, large bearing surfaces are also obtained on the sliding parts of the latching element 17 and its housing 4. However, the guide shank 19, or the interior face of the guide passage 16, may alternatively be provided with ribs for reducing the bearing surface friction. Furthermore, due to the rectangular cross-section, the latching member 17 is prevented from turning, and this relieves loading on the retaining pin 21. However, it may be mentioned that this advantage may alternatively be obtained by other means. In the case of a circular cross-section of the guide shank 19, guide grooves and integral locating projections, or pins may be provided.

The end of the guide shank 19 of the locking element 17 is provided with the slot 20. This slot, in conjunction with the retaining pin 21 (Fig. 1) which passes through the housing 4, is set for the necessary displacement resulting from the engagement between the guide profile 24 and a sleeve 6a, at one end of the link 6. At the same time, the retaining pin 21 provides a point of support for a compression spring 22 and retains the latching element 17 from dropping out. A bore 28 in the guide shank 19 receives the compression spring 22. The outer surface 23 of the hook member 18 of

the latching element 17 is shaped with a profile which, calculated relatively to the operative transverse length of the member 18, provides preferably a convex latching cam 24 which co-operates with the sleeve 6a of the pivoted link 6.

The latching cam 24 may alternatively co-operate with a roller in place of the sleeve 6a. The lower part 24a of the latching cam 24 may, according to the proposed use of the hinge, and the desired latching action, be provided with a preferred profile. For example, different closing and holding properties may be obtained by differently selected profiles. Furthermore, the profiled member 18 may have a recess 25 (Fig. 3a) in which the sleeve 6a engages, or it may have a projection 26 behind which the pivot sleeve 6a engages, or a shoulder 27 may be provided beyond which the pivoted sleeve 6a engages.

Assembly of the hinge, including the introduction of the compression spring 22, is simple in the hinge of the present invention. This assembly is effected in such manner that the latching element 17 is inserted into the guide passage 16 to face the hollow interior of the insert member 2 and the compression spring 22 is then introduced into the bore 28 of the guide shank 19 of the latching element 17 from the opposite end.

In the case of the closed hinge, according to Fig. 1, a suitably shaped tool can now be placed on the free end of the compression spring 22 and said spring 22 compressed until the retaining pin 21 can be freely inserted. Due to the fact that the compression spring 22 is disposed in the bore 28, which is open only at one end, the risk of the compression spring 22 springing away laterally is eliminated and assembly is effected more rapidly and reliably.

WHAT I CLAIM IS:—

1. A self-latching hinge, for hinging together first and second members, comprising a hollow insert member for attaching the hinge to the first member, an attachment member for attaching the hinge to said second member itself secured to the hollow insert member by pivoted links, a housing extending in the hinge-open position, from the hollow insert member oppositely from the attachment member, said housing having a guide passage for receiving a latching element, the latching element having a forward nose extending into the hollow insert and being spring urged in the forward direction, one of said links terminating at one end in a sleeve surrounding a pivot pin fixed in the attachment member, the forward nose of the latching element co-operating with the said sleeve and having such profile as to provide a closing or latching moment of the first member relatively to the second.

member 2 having a serrated profile 3 insertable in the door 14, and an integral housing 4 for a latching element 17. A serrated profile dowel 5 is mounted in the usual manner on the housing 4 for additionally securing the hinge casing 1 and to prevent it from rotation and displacement. The hinge casing 1 is connected by two pivoted links 6, 7 at pivot pins 8, 9, 10, 11 to a U-section member 12 which can be secured in any convenient manner, to the side wall 13 of a cabinet. The housing 4 has a guide passage 16 for the latching element 17, in this example extending at an acute angle to the surface 15 of the door 14. This acutely inclined arrangement of the guide passage 16 has been selected, because the best closing results have been achieved thereby. However, it is alternatively possible to allow the guide passage 16 to extend parallel to the surface 15 of the door 14, in order to obtain a low overall height of the housing 4. In such a case, however, it is advisable to adapt the profile of the latching cam, or curve 24, to the parallel form.

The latching element 17 is hook-shaped (Fig. 3) and engages by its hook end 18 inside the hollow insert member 2. The guide shank 19 preferably has a rectangular cross-section by which means it is non-rotatably retained in the guide passage 16 of corresponding internal cross-section. A transverse retaining pin 21 engages through a slot 20 in the latching element 17.

Due to this rectangular cross-sectional form, large bearing surfaces are also obtained on the sliding parts of the latching element 17 and its housing 4. However, the guide shank 19, or the interior face of the guide passage 16, may alternatively be provided with ribs for reducing the bearing surface friction. Furthermore, due to the rectangular cross-section, the latching member 17 is prevented from turning, and this relieves loading on the retaining pin 21. However, it may be mentioned that this advantage may alternatively be obtained by other means. In the case of a circular cross-section of the guide shank 19, guide grooves and integral locating projections, or pins may be provided.

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the latching element 17 is shaped with a profile which, calculated relatively to the operative, transverse length of the member 18, provides preferably a convex latching cam 24 which co-operates with the sleeve 6a of the pivoted link 6.

The latching cam 24 may alternatively co-operate with a roller in place of the sleeve 6a. The lower part 24a of the latching cam 24 may, according to the proposed use of the hinge, and the desired latching action, be provided with a preferred profile. For example, different closing and holding properties may be obtained by differently selected profiles. Furthermore, the profiled member 18 may have a recess 25 (Fig. 3a) in which the sleeve 6a engages, or it may have a projection 26 behind which the pivot sleeve 6a engages, or a shoulder 27 may be provided beyond which the pivoted sleeve 6a engages.

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1. A self-latching hinge, for hinging together first and second members, comprising a hollow insert member for attaching the hinge to the first member, an attachment member for attaching the hinge to said second member itself secured to the hollow insert member by pivoted links, a housing extending in the hinge-open position, from the hollow insert member oppositely from the attachment member, said housing having a guide passage for receiving a latching element, the latching element having a forward nose extending into the hollow insert and being spring urged in the forward direction, one of said links terminating at one end in a sleeve surrounding a pivot pin fixed in the attachment member, the forward nose of the latching element co-operating with the said sleeve and having such profile as to provide a closing or latching moment of the first member relatively to the second.





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2. A self-latching hinge as claimed in Claim 1, in which the latching element is of non-circular cross-section and the guide passage of the housing is of corresponding non-circular internal cross-section. 25
3. A self-latching hinge as claimed in Claim 2, in which the latching element and guide passage are of rectangular cross-section. 30
4. A self-latching hinge as claimed in any one of Claims 1 to 3, in which, in the latched position of the first and second hinged members, said one link lies wholly in the hollow of the insert member. 35
5. A self-latching hinge as claimed in any one of the preceding claims, in which the latching element is spring urged by a spring retained in a bore therein. 40
6. A self-latching hinge as claimed in Claim 5, in which the latching element has a transverse slot and the spring is retained by a retaining pin fixed in the housing and passing through the slot.
7. A self-latching hinge as claimed in any of the preceding claims, in which the guide passage in the housing is oblique at an acute angle to the face of the first hinged member. 25
8. A self-latching hinge as claimed in Claim 7, in which the forward nose of the latching element has a convex profile. 30
9. A self-latching hinge as claimed in Claim 8, in which the forward nose of the latching element is provided with a recess, projection or shoulder for co-operating with the sleeve of the said one link for providing a latching moment. 35
10. A self-latching hinge as claimed in any one of the preceding claims in which the surface of the latching element, or of the guide passage in the housing, is ribbed. 40
11. A self-latching hinge as claimed in Claim 1, constructed substantially as described herein with reference to the accompanying drawings.

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