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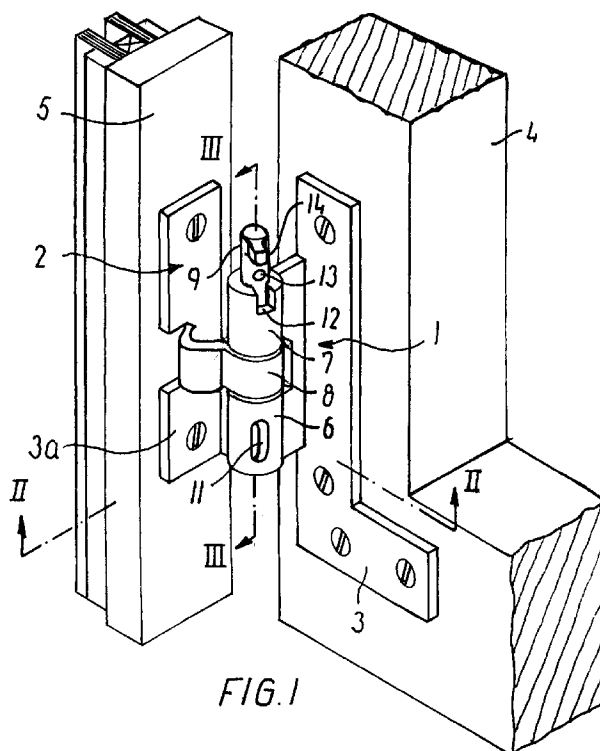
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(54) A safety hinge

(57) A safety hinge for windows and doors comprises hinge parts (1, 2) for fastening on a frame (4) and an opening leaf or sash part (5), respectively, and has tubular guideways (6-8) which form a continuous tubular bearing for removable, axial retention of a hinge pin (9).

The bearing is closed at one end and open at the

other end and is of a greater length than the pin (9) so that the said pin does not project from the open end. For removal of the pin (9), an opening (11, 12) is formed on a side of at least one guideway (6, 7), which is inaccessible in the closed position of the sash part (5), for insertion of a tool for impact on the pin (9) for disengagement from the axial retention.

**FIG. 1****EP 0 916 793 A1**

Description

[0001] The present invention relates to a safety hinge, preferably for windows and doors, comprising a first hinge part for fastening on a stationary frame part and a second hinge part for fastening on an opening leaf or sash part, which hinge parts have substantially tubular guideways, which at assembly of the hinge parts are axially aligned and, for removable axially positioned retention of a hinge pin, together form a substantially continuous tubular bearing which is closed at one end and open at the other end and has a greater length than the hinge pin so that the said hinge pin does not project from the open end of the bearing, the bearing being formed with an opening which is accessible only in an open position of the leaf part or the sash part for disengagement of the hinge pin for removal from the bearing.

[0002] In a common design of such burglar-safe hinges known, for example, from FR-A1-2 616 173, the hinge pin is secured against unauthorized removal by means of a hole formed on a side of the bearing which is inaccessible when the leaf part or sash part is in its closed position, through which hole a securing screw can be screwed into the pin. At removal of the securing screw, the pin is disengaged for removal, which may, for example, be effected by hitting the pin with a punch which is inserted through the open end of the bearing, possibly after removal of a closing screw therein as shown in the above FR publication. Due to oversight or for other reasons, however, situations may occur where the securing screw is not mounted whereby the intended safety against burglary is not established, since in such situations the hinge pin can be easily removed also in the closed position of the leaf or sash part, whereupon the window or door can be dismantled.

[0003] The object of the present invention is to provide a hinge of a simple design in which the hinge pin is secured against removal in the closed position of the leaf or sash part without the use of securing screws or similar additional securing elements, so that the safety against burglary is always effective in this position.

[0004] This is achieved according to the invention by a design of a safety hinge of the type stated characterized in that said opening is provided in a position on a side of a first guideway, which is inaccessible in the closed position of the leaf or sash part, such that in the said open position it permits insertion of a tool for impact on the hinge pin for disengagement thereof from the bearing.

[0005] Thereby, the pin can only be removed in the open position of the leaf or sash part by insertion of a tool for impact on the pin through the said side opening. In the closed position, the closed end of the bearing prevents removal of the pin by axial impact, for example by means of a punch, and as the pin does not project from the open end of the bearing there is no possibility of removal by means of nippers or the like. Due to the absence of a securing screw or similar additional securing

elements there is no risk of oversights in connection with the mounting leading to lack of securing of the hinge.

[0006] Suitable embodiments of the safety hinge according to the invention are stated in the dependent claims.

[0007] The hinge parts and the pin can be made of materials of the necessary strength and corrosion resistance, such as iron alloys, bronze alloys or light metal alloys, if necessary with a corrosion-resistant coating. Synthetic materials of the required strength can also be used. The hinge can be manufactured by conventional processes comprising, for example, punching or bending of plate-shaped material or casting or forging.

[0008] Preferred embodiments of the invention will now be explained in further detail below with reference to the schematic drawing, in which

Fig. 1 is a perspective view of a three-knuckle design of the safety hinge according to the invention, Fig. 2 is a cross-sectional view of the embodiment in Fig. 1 shown in the closed position of the leaf or sash part of an opening window,

Fig. 3 is an axially sectional view of the embodiment in Fig. 1,

Fig. 4 is a perspective view of a two-knuckle design of the hinge, and

Fig. 5 is an axially sectional view of a modification of the embodiment shown in Fig. 4.

[0009] In the embodiment shown in Figs. 1-3 the safety hinge according to the invention has three knuckles and comprises a first hinge part 1 for fastening on a frame 4, such as a window frame, a second hinge part 2 for fastening on the opening sash part 5 of the window and a hinge pin 9. The hinge parts 1 and 2 each has a fastening part 3 and 3a, respectively, in the form of a conventional plate element with holes for screws or other retaining elements for secure fastening of the hinge parts 1 and 2 to the frame 4 and the sash part 5, respectively. In the embodiment shown, the fastening part 3 for the hinge part 1 is formed as a plate angle, a so-called angle brace, which makes it more difficult to remove the hinge part 1 once it has been mounted on the frame 4.

[0010] In connection with the fastening part 3, the hinge part 1 is formed with a first and a second tubular guideway 6 and 7, respectively, in linear, coaxial alignment and with a space for positioning of a third tubular guideway 8 pertaining to the second hinge part 2. The guideways 6, 7 and 8 together form a tubular bearing for reception of the hinge pin 9 and provision of the assembled hinge.

[0011] On the side accessible from the outside in the closed position of the sash part 5, the bearing formed by the guideways 6, 7 and 8 is continuous. The first guideway 6 on the hinge part 1 and thus the assembled bearing are closed at one end so that the pin 9 is inaccessible through the said end. This renders it impossible to remove the pin 9 by axial impact, for example with a

punch, from this closed end.

[0012] The second guideway 7 on the hinge part 1 is open at both ends for providing an open end of the assembled bearing for removal of the pin 9. However, the length of the pin 9 is smaller than the total length of the bearing formed by the guideways 6, 7 and 8, and as shown in Fig. 3 the pin 9 is positioned in the bearing in the axial direction so that it does not project from the open end of the bearing, which renders it impossible to remove the pin from the said end, for example by means of nippers or similar tools, in the closed position of the window.

[0013] In the closed position of the window, in which the hinge parts 1 and 2 are folded together as shown in Fig. 2, the pin 9 thus presents no points of attack accessible from the outside and is thereby secured against unauthorized removal from the bearing.

[0014] To render possible removal of the sash part 5 in its open position, for example in connection with painting or other repair or service of the window, an opening 11 is positioned on the side 10 of the first guideway 6 on the first hinge part 1, which is inaccessible in the closed position of the sash part 5, but which is accessible from the outside in the open position, the said opening being positioned in the axial direction on a level with the end surface 15 of the pin 9 inserted in the guideway 6. At insertion of a tool such as a screwdriver through the side opening 11, the pin 9 can be pushed in the axial direction towards the open end of the bearing at the end of the second guideway 7 and thus be disengaged from its axial retention in the bearing, which may be provided by press fitting of the pin into the guideway 6.

[0015] To further facilitate the removal of the pin 9 from the bearing, the embodiment shown in Figs. 1-3 comprises an opening 12 in the form of a recess at the opening edge of the guideway positioned on the side of the second guideway 7 which is only accessible in the open position, and in the vicinity of the end surface inserted in the guideway 7, the pin 9 is manufactured with a transverse hole 13 which at disengagement of the pin is brought into communication with the recess 12. By insertion of a suitable tool through the recess 12 into the hole 13, the pin can be removed from the bearing.

[0016] In the embodiment shown, the recess 12 also functions as an engaging part for positioning of the pin 9 in both the axial and radial directions, as the pin 9 flush with the hole 13 is manufactured with a lug 14 projecting from its end surface. At insertion of the pin 9 into the bearing, the lug 14 is pushed into the recess 12, thereby achieving exact positioning of the pin 9 both axially, so that the end surface 15 is placed on a level with the opening 11 in the first guideway 6, and radially for placing the hole 13 on a level with the recess 12 in the second guideway 7.

[0017] The design of the second guideway 7 with the recess 12 and of the pin with the hole 13 in correspondence therewith and the engaging lug 14 is not, however, a necessary characteristic of the hinge according to the

invention, as the desired possibility of removing the pin 9 in the open position of the sash part 5 can be provided solely by means of the opening 11 in the first guideway 6 positioned on a level with the end surface 15 of the pin 9, especially if the opening 11 as shown in Fig. 1 is manufactured as an axially extending slot, which provides a certain amount of tolerance in respect of the positioning of the end surface 15 when the pin 9 is pressed into the guideway 6. In this connection, the axial retention of the pin 9 in the bearing can be secured solely by press fitting of the pin into the guideway 6, as the inner surface of the guideway 6 and the part of the pin 9 intended for insertion therein may, for example, be slightly conical as shown in Fig. 3.

[0018] For the purpose of removing the pin 9 by insertion of a tool through the opening 11, the pin 9 may alternatively be manufactured with a hole or a recess, with which the inserted tool engages instead of acting direct on the end surface 15 of the pin.

[0019] Alternatively, disengagement of the pin 9 for removal from the bearing can be effected by insertion of a tool below the lug 14 pressed into the recess 12, thus rendering dispensable the opening 11 in the guideway 6 with the closed end.

[0020] In the embodiment shown in Figs. 4 and 5, the two-knuckle hinge has guideways 17 and 18 on each one of two hinge parts 19 and 20 for fastening on a frame and a sash part, respectively. For securing the axial retention of the pin 21 in the bearing formed by the guideways 17 and 18, the pin 21 must, in this embodiment, be inserted with relatively tight press fitting into the guideway 18 containing the closed end of the bearing. For removal of the pin 21, the guideways 17 and 18 as well as the pin 21 can furthermore be manufactured with openings 22 and 23 and a hole 24 and a lug 25, respectively, in the same way as described above for the embodiment shown in Figs. 1-3.

[0021] As in the embodiment in Figs. 1-3, the guideway 18 may be manufactured without the engaging parts 23 and 25, but if so the pin 21 must be press fitted or otherwise retained in both guideways 17 and 18.

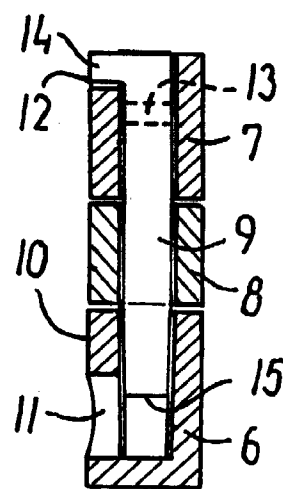
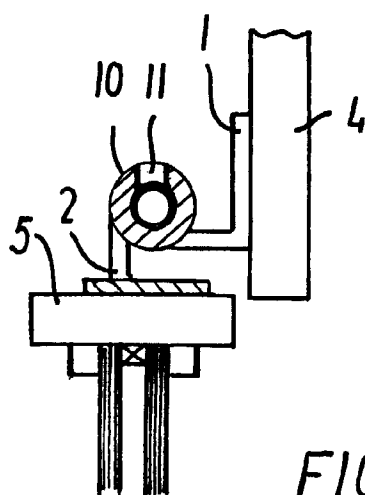
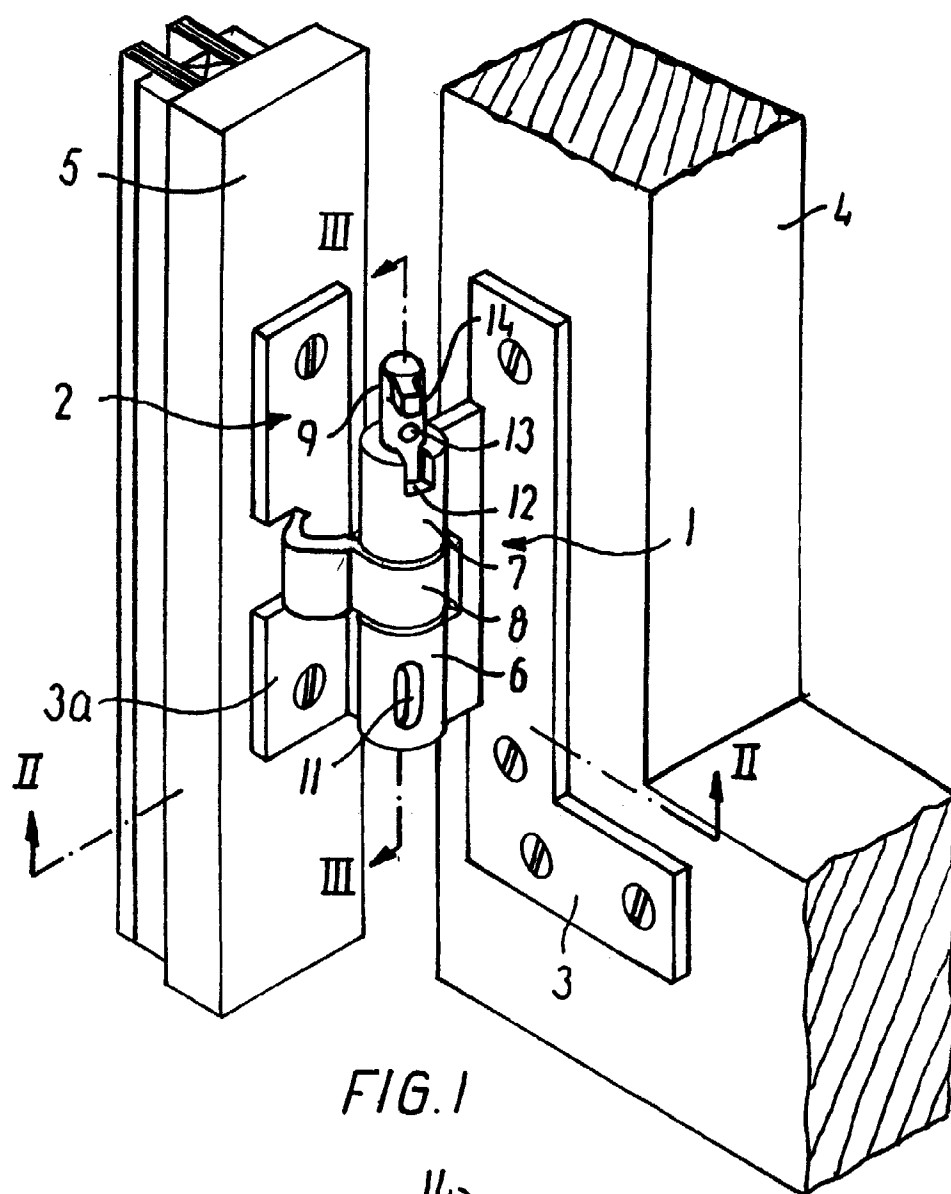
[0022] The two-knuckle hinge in Figs. 4 and 5 is substantially suited for horizontal mounting, for example as a hinge for a top-hung window, while the hinge designed with three or more knuckles can be used both for horizontal and vertical mounting, in the latter case with optional orientation of the bearing with the open end facing upwards as shown in Fig. 1 or downwards.

Claims

1. A safety hinge, preferably for windows and doors, comprising a first hinge part (1, 19) for fastening on a stationary frame part (4) and a second hinge part (2, 20) for fastening on an opening leaf or sash part (5), which hinge parts have substantially tubular guideways (6-8; 17, 18) which at assembly of the

hinge parts are axially aligned and, for removable axially positioned retention of a hinge pin (9, 21), together form a substantially continuous tubular bearing which is closed at one end and open at the other end and has a greater length than the hinge pin (9, 21) so that the said hinge pin does not project from the open end of the bearing, the bearing being formed with an opening (11, 12; 22, 23) which is accessible only in an open position of the leaf or sash part (5) for disengagement of the hinge pin (9, 21) for removal from the bearing, **characterized** in that said opening (11, 12; 22, 23) is provided in a position on a side of the first guideway (6, 7; 17, 18), which is inaccessible in the closed position of the leaf or sash part (5), such that in the said open position it permits insertion of a tool for impact on the hinge pin (9, 21) for disengagement thereof from the bearing.

2. A safety hinge according to claim 1, **characterized** in that said first guideway (6, 17) contains the closed end of the bearing.
3. A safety hinge according to claim 2, **characterized** in that the hinge pin (9, 21) is so much shorter than the total length of the bearing that the end of the pin inserted in said first guideway (6, 17) is directly accessible through said opening (11, 22) for impact by the said tool.
4. A safety hinge according to claim 1, **characterized** in that said first guideway (7, 18) contains the open end of the bearing.
5. A safety hinge according to claim 4, **characterized** in that said opening is formed as a recess at the opening edge of said guideway (7), and that the hinge pin (9, 21) is formed with a projecting lug for engagement in said recess, which recess and lug form interacting engaging parts for radial and axial positioning of the pin (9, 21) in the bearing.
6. A safety hinge according to claim 5, **characterized** in that below said lug the hinge pin (9, 21) is formed with a transverse hole which at disengagement of the pin (9, 21) is brought into communication with the said recess.
7. A safety hinge according to any one of the preceding claims, **characterized** in that it is a three-knuckle hinge, the first hinge part comprising two guideways which contain the closed end and the open end, respectively, of the bearing, while the second hinge part comprises a third guideway positioned between the said two guideways when the hinge pin (9) is inserted.
8. A safety hinge according to any one of claims 1-6, **characterized** in that it is a two-knuckle hinge, said first and second hinge parts comprising a respective one of two guideways which contain the closed end and the open end, respectively, of the bearing.
9. A safety hinge according to any one of the preceding claims, **characterized** in that the pin (9, 21) is inserted by press fitting at least in the guideway containing the closed end of the bearing.
10. A safety hinge according to claim 9, **characterized** in that the said guideway and the part of the pin inserted therein are slightly conical.



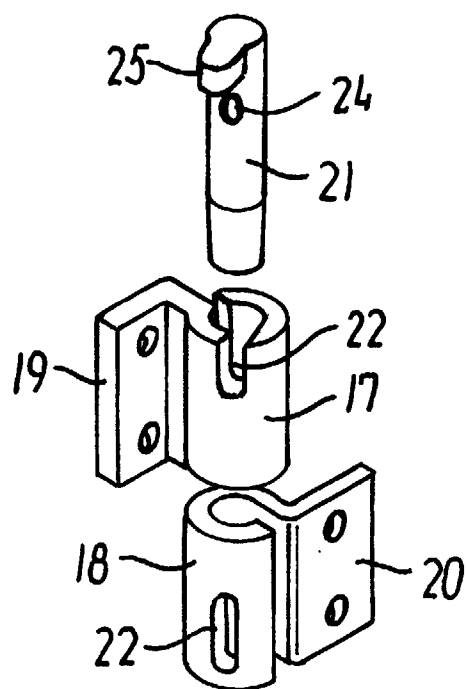


FIG. 4

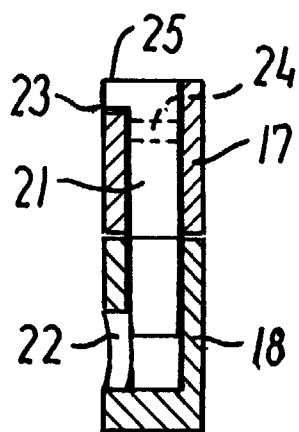


FIG. 5



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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			
Place of search STOCKHOLM		Date of completion of the search 9 February 1999	Examiner WENDENIUS CHRISTER
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