

The invention relates to a door or window hinge comprising a lamina fixed onto the leaf, a second lamina made integral with the door or window frame, one of these laminae being provided with a central knuckle arranged in the free space between two end knuckles integral with the other lamina, and a pin engaged into these knuckles ensuring the free rotation of a lamina with respect to the other, said central knuckle being provided with at least one plug having a cylindrical body provided at its one end with a flange butting against one of the end faces of the central knuckle and means to axially fix the pin, these means engaging into a peripheral cut made in the pin (corresponding to document FR-A-2,573,468).

It is known to use hinges to ensure the free rotation of the door or window leaf with respect to the sash-frame, this rotation being about a vertical or horizontal axis. Very often, for reasons of clearance or easiness of mounting, it is necessary to engage the pin into the knuckles of the hinge laminae either from the top or from the bottom. However, due to gravity, there is a risk that the pin slides downward and comes out of the knuckles, which causes the disengagement of the joint between the lamina integral with the leaf and the lamina fixed onto the sash-frame. Therefore, these hinges comprise circlips or clips allowing to impede the pin from moving in its axial direction, but, since such circlips or clips are very often of a small size, they increase the difficulties in mounting, require the use of a tool and are unreliable.

Another solution to fix the pin in its axial direction consists in fixing same by means of a screw integral with a knuckle of a lamina. Besides this solution having the same disadvantages as above-mentioned, i.e. an increased mounting time and the use of a tool, this screw not only fixes the pin in the axial direction, but also its free rotation about its axis. Consequently, this pin, which is always stressed at the same places, will have a tendency to quickly wear out, causing a backlash in a direction perpendicular to the axis of rotation of the leaf, which may be a nuisance for a good closing of the door or window. This disadvantage also exists when, in order to avoid the sliding downwards of the pin, a close fitting

between the pin and the knuckles of the lamina is foreseen. This close fitting requires to exert some pressure onto the pin to obtain its engagement into both laminae of the hinge.

On the other hand, there is already known, from document FR-A-
5 2,573,468, a door or window hinge comprising a lamina fixed onto the leaf and a second lamina made integral with the door or window frame. One of these laminae is provided with a central knuckle arranged in the free space between both end knuckles integral with the second lamina, a pin engaged into these knuckles ensuring the
10 free rotation of a lamina with respect to the other. The central knuckle has a bore into which are engaged, on both sides, sleeves or plugs provided with resting flanges butting against the end faces of the knuckle. These sleeves join each other in the central part of the bore and form a cover for same. Thus, the guiding func-
15 tion of the pin is ensured by these sleeves. An internal peripheral enlargement associated with the end of the sleeves engaged into the bore comes to be located into a peripheral cut into the pin, allowing to impede same from moving in the direction of its axis. A chamfering of the outer periphery in the area of the enlargements
20 allows same to be separated when engaging the pin into the knuckles. According to a particular embodiment, it is preconized, furthermore, to provide cuts in the very end of the sleeves in order to allow their fitting in the area of their joining and the cooperation of their internal enlargement with a single peripheral
25 cut in the pin.

The hinge according to the former document has a number of disadvantages. Since the guiding of the pin is insured only by the sleeves of plastic material, there is a premature wear of same. In addition, when engaging the pin, the internal enlargements are
30 highly stressed, which substantially reduces their fixing action after several mountings and removals of the hinge. The withdrawal of the peripheral enlargements at the passage of a pin of larger diameter indeed occurs by elastic distortion of the plastic material. This distortion occurs in the area of the enlargement, only
35 possible place to obtain an enlargement of the internal diameter of

same thanks to the peripheral chamfer external to the sleeve. At each passage of the peripheral enlargement onto an uneven surface, such as a bur, or simply at the passage of the peripheral groove of the pin, there is an important wear of the material. In addition,
5 the disengagement of the pin out of the knuckles requires for an important pressure to be exerted onto said pin in order to cause again a widening of the inner diameter of the enlargement.

Another disadvantage appears from the hinge as described in the aforementioned document. Since the sleeves join each other in the
10 middle of the bore of the central knuckle, it is indeed necessary to increase on both sides the diameter of same. Now, the knuckle must have a certain mechanical strength in order to withstand the stresses applied to same. This strength can only be obtained by conferring an overdimension to the outer diameter of the central
15 knuckle. This results into a larger size of the hinge. Another solution would consist in reducing the diameter of the pin, but, in that case, the consequences would be comparable to those of a central knuckle with reduced strength.

The object of this invention is to cope with all the above-
20 mentioned troubles and to propose a door or window hinge having a high wear-strength, viz. of the pin and the knuckles, but also means allowing to fix the pin in its axial direction without it being necessary to increase the size of either component of the hinge. Another object aimed to by this invention is to make easier
25 the mounting which, therefore, does no longer require a tool.

The invention as characterized in claim 1 solves the problem which consists in creating a door or window hinge comprising a fixed lamina on the leaf, a second lamina made integral with the door or window frame, one of these laminae being provided with a central
30 knuckle arranged in the free space between two end knuckles integral with the other lamina, and a pin engaged into these knuckles ensuring the free rotation of a lamina with respect to the other one, said central knuckle being provided with at least a plug having a cylindrical body provided at its one end with a flange but-
35 ting against one of the end faces of the central knuckle and means

to axially fix the pin, these means engaging into a peripheral cut made in the pin, the central knuckle comprising, in addition, a bore adjusted to the diameter of the pin and ending into one or several recesses into which is (are) engaged the plug(s) and the
 5 fixing means being flexible jaws vertically protruding out of the other end of the plug, these flexible jaws having, at their free end, claws forming a circle the inner diameter of which is smaller than the diameter of said pin and being formed by a rim with the shape of an arc of a circle and directed towards the inside of the
 10 plug, these jaws taking the shape of a cylinder provided with vertical cuts and having an outer diameter equal to the inner diameter of the bore of the recess, reduced by at least twice the thickness of the claws.

The advantages obtained thanks to this invention substantially reside in that the pin-guiding function is dissociated from axially
 15 fixing same. In fact, this function is ensured by the bore machined into the central knuckle, the diameter of which is adjusted to that of the pin. This obviously results into an increased life of the hinge and viz. of the plugs engaged into the recess(es) into which
 20 ends this bore of the central knuckle. Another advantage resides in that this invention makes easy the mounting and removal of a leaf, e.g. of a door or window. This easiness is partly due to the possibility which is given the user of partly engaging the pin into the knuckles of the hinge while ensuring the axial fixing of said pin.
 25 Only the claws of the first plug met can indeed be brought into co-operation with a peripheral groove provided in said pin. Thus, should several settings be necessary, e.g. of the lamina fixed onto the sash-frame, the withdrawal of the pin out of the knuckles is the easier.

30 Preferred embodiments are object of the sub-claims.

The invention is explained more in detail with reference to drawings which show only one embodiment.

Figure 1 is a bird's eye view along a cross-section of the door or window hinge.

35 Figure 2 is a top view of the plug allowing to impede the pin from

axially moving.

Figure 3 is a front and cross-sectional view according to line II-II of Figure 2.

Figure 4 is an enlarged view of part "A" of Figure 1 and showing
5 the plug and the pin during the engagement.

Figure 5 is an enlarged view, comparable to Figure 4, showing the plug and the pin at the end of mounting, in an operational position.

Reference is made to Figure 1.

10 The invention relates to a door or window hinge 1 comprising two laminae 2 and 3, one of which is fixed onto the door or window frame, the other one being made integral with the leaf.

Very often the laminae have a particular shape for each case of use of this hinge and, in view of their independance with respect to
15 this invention, there is no interest in giving a full description of same. Figure 1, which is chosen for easiness's sake, shows a hinge the laminae of which have a configuration specific to their use.

In any and all cases, these laminae have the components according
20 to this invention. Thus, lamina 2 is provided with two end knuckles 4 and 5 arranged above each other and comprises a bore, 6 and 7, respectively. The axis of the bore 6 of knuckle 4 is in the vertical extension of the axis of bore 7 of knuckle 5. The aggregate outer sizes of the end knuckles 4 and 5 may vary and depend on the
25 stresses exerted onto the hinge. These sizes may easily be determined by the Man of the Art.

Between these two end knuckles 4 and 5 is provided a space allowing the location of a central knuckle 8 of lamina 3. This central knuckle 8 has a bore 9 ending into a recess 11 into which is locat-
30 ed a plug 12.

According to another embodiment, the central knuckle 8 comprises two recesses 11 situated on both sides of the bore 9. Plug 12 is provided with a flange 13 butting against the end face 14 of the central knuckle 8. Thus, the distance 15 separating both end
35 knuckles 4 and 5 of the lamina 2 correspond to the sum of the

length of the central knuckle 8 and either once or twice the thickness 16 of the flanges 13, so as to allow the engagement of the central knuckle 8 provided with its plug or plugs 12 between both end knuckles 4 and 5, the axis of bore 9 being then in the same vertical extension as the axis of the bores 6 and 7.

In knuckles 4, 5 and 8 is engaged a pin 17 the diameter of which is slightly smaller than the diameter of the various bores 6, 7 and 9, in order to allow same to ensure a perfect guiding of said pin 17. Reference is made to Figures 2 and 3.

According to a feature of this invention, plug 12 engaged into a recess 11 and comprising, at its one end, the flange 13 butting against an end face 14 of the central knuckle 8 is provided, at the other end 18, with flexible jaws 19 provided with claws 20 penetrating into a peripheral cut 21 made in pin 17. Within the framework of the embodiment providing two recesses 11 and, consequently, two plugs 12, pin 17 comprises two peripheral cuts 21. In order to guarantee a perfect hold of plug 12, in directions perpendicular to its vertical axis 22, it will be necessary to foresee an adequate adjustment between the outer diameter 23 of plug 12 and the inner diameter of recess 11.

According to a first embodiment, the jaws 19 are flexible metal laminae.

According to another embodiment, these jaws 19 are made of flexible plastic material. Should the case arise, it can be foreseen that the whole plug 12 be of plastic material.

In order to make easier the mounting of hinge 1, plug 12 can be provided with a varying number of vertical rims 24 on the outer surface. These vertical rims 24, which are aimed to perform a clamping between recess 11 and plug 12, avoid a sudden movement of same in an axial direction during the mounting. In addition, a chamfer 25 located at the end 18 of plug 12 makes easy the engagement of same into its corresponding recess 11.

The jaws 19, integral with the end 18, have substantially the shape of a cylinder into which are provided vertical cuts 26. According to an embodiment of this invention, these jaws 19 are four in num-

ber, perfectly symmetrical with respect to the vertical axis 22 of plug 12. It is obvious that by increasing the number of vertical cuts 26, it is possible to increase the number of jaws 19, but these latter will then be less strong.

5 A claw 20, located at the end of a jaw 19, consists in a rim having the shape of an arc of a circle and located at the free end of jaw 19, this claw 20 being directed towards the inside of plug 12. The inner diameter 27 of circle 28 formed by the aggregate claws 20 is smaller than the diameter of the pin 17.

10 The jaws 19 define a cylindrically shaped inner space the diameter of which is equal to the inner diameter 29 of the bore of plug 12. At the other hand, the outer diameter of the jaws 19 is equal to the inner diameter of bore 31 of recess 11 reduced by at least twice the thickness 30 of the claws 20. Thus, an empty space 10 is
15 obtained between bore 31 of recess 11 and the outer diameter of the jaws 19. Hence, it will be possible for the jaws 19, because of their flexibility, to sufficiently go apart to cause the withdrawal of the claws 20 during the passage of pin 17.

Figure 4 shows the arrangement of pin 17 and plug 12 during the
20 mounting. Pin 17 exerts, because of its outer diameter, a pressure onto the claws 20, this pressure causing the jaws 19 to go apart by flexible distortion of the material in the area of the connexion to the end 18 of plug 12. Through the action of a lever arm, due to the length of the jaws 19, the stress exerted onto the claws 20 is
25 substantially reduced. This results into a better wear-strength.

Because of their flexibility, the length of the jaws 19 may vary. However, the sum of their length 32 and the height 33 of the body 34 of plug 12 should be equal or smaller than the height 35 of recess 11.

30 Figure 5 shows the elements of Figure 4, pin 17 being in its position mounted in hinge 1. The claws 20 of plug 12 are in their position penetrating into the peripheral cut 21, ensuring a perfect hold of pin 17 respect to any movement of same in its axial direction, it being understood that, if the central knuckle 8 comprises
35 two plugs 12, the claws 20 of same engage into the respective peri-

peripheral cuts 21. It should be observed that the hold and the guiding of this pin 17 in directions perpendicular to its axis are ensured by the bore 9 of the central knuckle 8 and the bores 6 and 7 of the end knuckles 4 and 5.

- 5 According to a particular embodiment of the peripheral cuts 21 of pin 17, the lateral sides 36 and 37 have a truncated shape, so as to make easier the disengagement of pin 17 from the claws 20 without deterioration of same or of the jaws 19.

According to another embodiment, the peripheral cuts 21 have a se-
10 micircular cross-section.

This invention also relates to the hinges comprising two laminae, each of which is provided only with one single knuckle. In this case, one of the knuckles may comprise only one recess 11 and, hence, one single plug 12, arranged on the side of the joining of
15 both knuckles. It is also possible that one and the same knuckle comprises two recesses 11 and two plugs 12, but, in that case, it is preferred to engage the second plug 12 after the location of pin 17.

During the mounting, one proceeds as follows: first of all, the
20 plugs 12 are engaged into the recesses 11 of the central knuckle 8 of lamina 3, the central knuckle 8, above which are mounted the flanges 13 of the plugs 12, being arranged between the end knuckles 4 and 5 of lamina 2, so that the bores 6, 7 and 9 be located in the vertical extension of each other. Then, pin 17 is engaged by its
25 end 38 into the end knuckle 5 and in the central knuckle 8 until it meets the claws 20 of the first plug 12. A pressure is exerted onto the end 39 of pin 17, causing the jaws 19 to go apart and the claws 20 to withdraw. This mounting will be made easier thanks to a chem-fer 40 provided at the end 38 of pin 17.

30 In order to be sure of the penetrating position of the claws 20 of both plugs 12 in their respective peripheral cut 21, it is foreseen that these peripheral cuts 21 be located at such places that the end 39 of pin 17 be at level with the lower face 41 of the end knuckle 5.

35 In order to be able to use hinge 1 both at the top or at the bottom

of the door or window, the various components of hinge 1 are symmetrical with respect to a horizontal median plane 42. Thus, pin 17 may be engaged as well from bottom to top as from top to bottom.

In order to disengage pin 17 from its mounted position, it is necessary to exert a pressure onto its end 38 provided with the chamfer 40. A peripheral cut 43, located near the end 39 of pin 17, is then disengaged from the end knuckle 5 and makes easy the seizing of pin 17 by means of an appropriate tool with a view to exert a sufficient traction to obtain its extraction.



C L A I M S

1. Door or window hinge (1) comprising a lamina (3) fixed onto the leaf, a second lamina (2) made integral with the door or window frame, one (3) of these laminae being provided with a central
5 knuckle (8) arranged in the free space between two end knuckles (4, 5) integral with the other lamina (2), and a pin (17) engaged into these knuckles (4, 8, 5) ensuring the free rotation of a lamina with respect to the other, said central knuckle (8) being provided with at least one plug (12) having a cylindrical body (34) provided
10 at its one end with a flange (13) butting against one of the end faces (14) of the central knuckle (8) and means to axially fix the pin (17), these means engaging into a peripheral cut (21) made in the pin (17), which hinge is characterized in that the central knuckle (8) comprises a bore (9) adjusted to the diameter of the
15 pin (17) and ending into one or several recesses (11) into which is (are) engaged the plug(s) (12) and the fixing means being flexible jaws (19) vertically protruding out of the other end (18) of the plug (12), these flexible jaws (19) having, at their free end, claws (20) forming a circle (28) the inner diameter (27) of which
20 is smaller than the diameter of said pin (17) and being formed by a rim with the shape of an arc of a circle and directed towards the inside of the plug (12), these jaws (19) taking the shape of a cylinder provided with vertical cuts (26) and having an outer diameter equal to the inner diameter of the bore (31) of the recess
25 (11), reduced by at least twice the thickness (30) of the claws (20).
2. Hinge (1) according to claim 1, characterized in that the flexible jaws (19) are comprised of flexible metal laminae inserted onto the end (18) of the plug or plugs (12) and forming a cylinder.
- 30 3. Door or window hinge (1) according to claim 1, characterized in that the pin (17) comprises one or two peripheral cuts (21) co-operating with the claws (20) of the jaws (19) of the one or two plugs (12).
4. Door or window hinge (1) according to claim 1, characterized in
35 that the pin (17) comprises, at its one end (39), a seizing cut



(43) and, at the other end (38), a chamfer (40).

5. Door or window hinge (1) according to claim 1, characterized in that the peripheral cuts (21) are located at such places that the end (39) of pin (17), provided with the seizing cut (43), be at level with the lower face (41) of the end knuckle (5).