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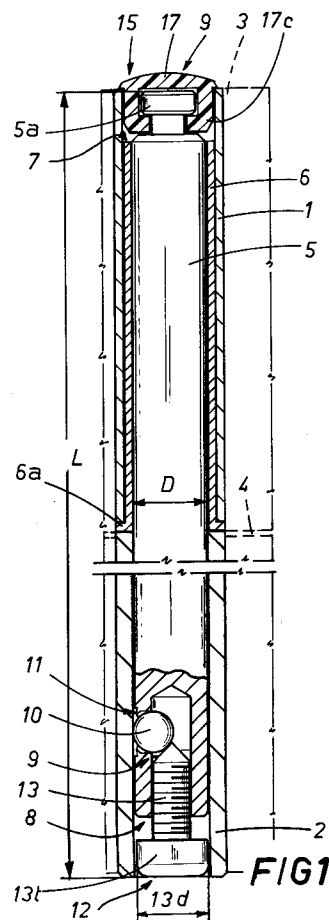
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I-40121 Bologna (IT)(54) **A butt hinge for door and window fixtures.**

(57) A hinge pivot (5) can be secured to one of the two associated bosses (1,2) by means of a mechanical restraint (9) comprising a plunger (10), preferably a ball, freely accommodated in a radial socket (11) afforded by a lower part of the pivot (5) and opening onto its cylindrical surface; the plunger (10) is operated by an adjustment mechanism (12) comprising a screw (13) seated in the bottom end of the pivot (5) with the head (13t) accessible from externally of the relative boss (1,2), which, with the pivot (5) inserted, can be turned one way and the other to select a non-operative limit position in which the ball (10) lies completely within the socket (11), and an operative limit position in which the ball (10) emerges marginally from the socket, protruding beyond the surface of the pivot (5) and entering forcibly into contact with the inside wall of the boss (1,2).

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The present invention relates to a butt hinge for door and window fixtures, and in particular metal window fixtures with side and/or horizontally hung sashes, including tilt-and-turn windows.

Conventionally, this type of hinge consists in two bosses, generally aluminium, secured respectively to the moving sash and to the fixed frame (or to a terminal portion of the tilt stay rod, in the case of the tilt-and-turn type sash) by way of flanges, using screws of which the heads are accommodated in respective sockets afforded by the flanges and the shanks either impinge on clamp plates insertable into longitudinal channels afforded by the section, or are driven into the section itself.

The bosses exhibit respective through bores which, with the hinge fitted, are disposed substantially coaxial and accommodate a relative pivot allowing articulation of the sash and the frame; the hinge also incorporates an alignment sleeve embodied in plastic material, associated at least with the boss uppermost, which is interposed between the boss and the pivot and functions as a friction bearing.

The pivot is fashioned generally in such a manner as to allow its concealment at one end (typically the bottom end, being the end most often exposed to view) by means of a cap snap-fitted directly to the pivot itself, whilst the remaining end exhibits a circumferential groove positioned externally of the bores and designed to accept a circlip by which the pivot is retained internally of the bosses through mechanical interference.

A requirement that often arises when installing a fixture, for example when the hinge pivot cannot be inserted from above due to the obstruction created by a low roller blind casing, or, in the particular instance of a tilt-and-turn window, when the fitter first anchors the fixed frame and then proceeds to hang the sash, locating the bottom hinge initially and then making the assembly secure by joining the top hinge, is that the fitter may in effect wish to complete the assembly operation by inserting the pivot of the top hinge from beneath.

The solution previously outlined betrays certain drawbacks, however: it has been found in practice that the expedient of securing and concealing the pivot with a circlip uppermost and a cap at bottom can be less than wholly reliable in some instances, and not especially suitable in terms of appearance.

For example, there are often circumstances during installation in which the fitter is obliged to let go the top part of the fixture momentarily and may subsequently forget to attach the circlip to the pivot (if not already fitted beforehand), by reason not least of the fact that the pivot remains lodged initially in the assembled hinge and, viewing from beneath, it cannot easily be established whether or

not the circlip is in place.

Such an omission can prove hazardous, since with repeated use of the sash over time, the pivot will tend to work loose from its position and jeopardize the correct operation of the fixture.

An additional drawback, already intimated, is the relative fragility over time of the circlip and cap arrangement, suggesting naturally that these parts may need to be replaced, and perhaps repeatedly.

Other avenues explored with these same difficulties in mind have included that of providing the hinge boss with a radial setscrew or grub screw impinging either on a circumferentially tapered portion of the pivot or directly on its outer surface, though with obvious disadvantages in terms of appearance.

Accordingly, the object of the present invention is to overcome the various drawbacks mentioned above through the provision of a hinge comprising a pivot that is structurally solid, practical and secure when installing, and of which the correct position can be verified swiftly whether by the installer or by the end user.

The stated object is fully realized in a hinge as characterized by the appended claims.

The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- fig 1 shows the hinge according to the invention in a frontal elevation, with certain parts cut away and certain in section better to reveal others;
- fig 2 shows the pivot of a hinge as in fig 1, seen in a side elevation with certain parts in section;
- fig 3 shows a detail of the hinge pivot of fig 2, enlarged and in section;
- fig 4 illustrates a concealment cap forming part of the hinge according to the invention, viewed in plan from beneath;
- fig 5 illustrates an alternative embodiment of the detail shown in fig 3, viewed in section.

Referring to the accompanying drawings, the hinge disclosed is of the type used to interconnect the topmost parts of a fixed frame and a moving sash, in particular side and/or horizontally hung sashes for windows and similar fixtures.

Such hinges comprise two bosses 1 and 2 (see fig 1) associated respectively with a moving sash and its fixed frame (neither of which is illustrated, being conventional in embodiment and only incidental to the invention) by means of relative flanges 3 and 4 (indicated in phantom lines) secured with fastening means (typically clamp plates anchored internally of the metal section with screws, conventional in embodiment and therefore not illustrated) to the corresponding sash or frame; the two bosses 1 and 2 are connected by a vertical

pivot 5 (shown in the more usual arrangement with the hinge supporting a side-hung sash) which is accommodated together with an alignment sleeve 6 internally of two coaxially disposed through bores 7 and 8 afforded by the two bosses 1 and 2, respectively. More precisely, the sleeve 6 is interposed between the pivot 5 and the upper boss 1, the diameter of the relative bore 7 being greater than that of the remaining bore 8 in order to accommodate the sleeve 6, which affords a collar 6a at the bottom extremity and functions thus both as a stop and a friction bearing between the two bosses when in relative rotation, and as a means of reducing the bore 7 of the upper boss 1 to match the internal diameter D of the lower boss 2.

The hinge disclosed incorporates angular restraint and concealing means 9, interacting with the ends of the pivot 5, by which the pivot is respectively immobilized in relation to one of the bosses 1 or 2 and capped at the end occupying the remaining boss; restraint means 9 consist in a plunger element 10 freely accommodated within a corresponding radial socket 11 formed in the lower part of the pivot 5 and opening onto its circumferential surface. The plunger element 10 is directly engaged by means 12 allowing the adjustment of its position, located at the bottom end of the pivot 5 and disposed in such a manner as to remain accessible from externally of the relative boss 2 for the purposes of operation.

In the preferred embodiment of figs 2 and 3, the plunger element 12 appears as a simple ball seated in the radial socket 11, and the area of the socket emerging onto the external surface of the pivot 5 is upset, or caulked, in order to obtain a lip of reduced diameter such as will prevent the ball 10 from being forced out under the pressure applied by the adjustment means 12.

The adjustment means 12 are embodied as a screw 13, preferably a socket screw, insertable into a blind tapped hole 14 afforded by and disposed coaxially with the longitudinal axis of the pivot 5, which naturally will connect with the socket 11 occupied by the ball 10; the screw 13 affords a cone point, such that its rotation back and forward within the hole 14 has the effect of translating the ball 10 between two limit positions, namely a non-operative position in which the ball 10 is wholly encompassed by the socket 11 (as in fig 3), and an operative position (indicated by the phantom line in fig 3) in which a portion of the ball 10 projects beyond the circumferential compass of the pivot 5 and is driven forcibly against the internal surface of the relative boss 2, thereby immobilizing the pivot.

In the alternative embodiment of fig 5, the plunger element 10 consists in a wedge 10c of which the two tapered working faces 10a and 10b are positioned to interact respectively with the ra-

dial socket 11 and with the cone point of the screw 13.

The end of the pivot 5 remote from that occupied by the ball 10 and the screw 13, or in effect the end located internally of the upper hinge boss 1, is capped by a concealing element 15 associated in a positive fit with a narrowed portion or groove 16 afforded by the corresponding end of the pivot 5 and, as already intimated, constituting a further element of the angular restraint and concealing means 9. In practice, the concealing element 15 is embodied as a straightforward cap 17 comprising a disk 17p uppermost and a plug 17c beneath, of which the underside affords a U-profile seating 18 shaped in such a way as to allow its connection, bayonet fashion, to a button 5a integral with the pivot 5 and separated from the main body by the groove 16; whilst the plug 17c is matched in diameter to the corresponding bore 7 and therefore remains lodged in the upper hinge boss 1 once the cap 17 has been fitted, the disk 17p is of diameter Da greater than that of the bore 7 and thus provides the pivot 5 with a stop shoulder (for a reason to be described in due course).

To assemble the hinge according to the invention, the two bosses 1 and 2 are first secured to the relative parts of the fixture (sash and frame) by way of the fastening means; thereafter, with the sleeve 6 located in the upper boss 1, the pivot 5 is inserted with the ball 10 and screw 13 in the non-operative position and pushed up to the point at which the button 5a projects from the boss 1, whereupon the cap 17 is fitted so as to conceal the end in question and ensure that the pivot 5 cannot drop out of the bosses by reason of its own weight.

Finally, by rotating the socket screw 13 (arrow F, fig 3) with a key of suitable size and profile, the cone point can be made to impinge on the ball 10, which as a result is driven progressively through the radial socket 11 (arrow F1, fig 3) and forcibly into contact with the internal surface of the lower boss 2, thereby locking the pivot 5 in the relative bore 8 (in this situation, the head of the screw 13 will be accommodated completely within the boss).

As discernible from fig 1, the overall length L of the pivot 5, screw 13 and cap 17, with the hinge assembled, is substantially the same as that of the two hinge bosses 1 and 2 placed end to end, whilst the diameter 13d presented by the head 13t of the socket screw 13 is substantially identical to the diameter D of the corresponding bore 8.

With a pivot embodied in the manner thus described and illustrated, the safety of the hinge is notably enhanced and its appearance likewise significantly improved; the operation of installing the pivot is especially swift, not least by virtue of the fact that the component parts (except for the cap) can be supplied stably preassembled. No less im-

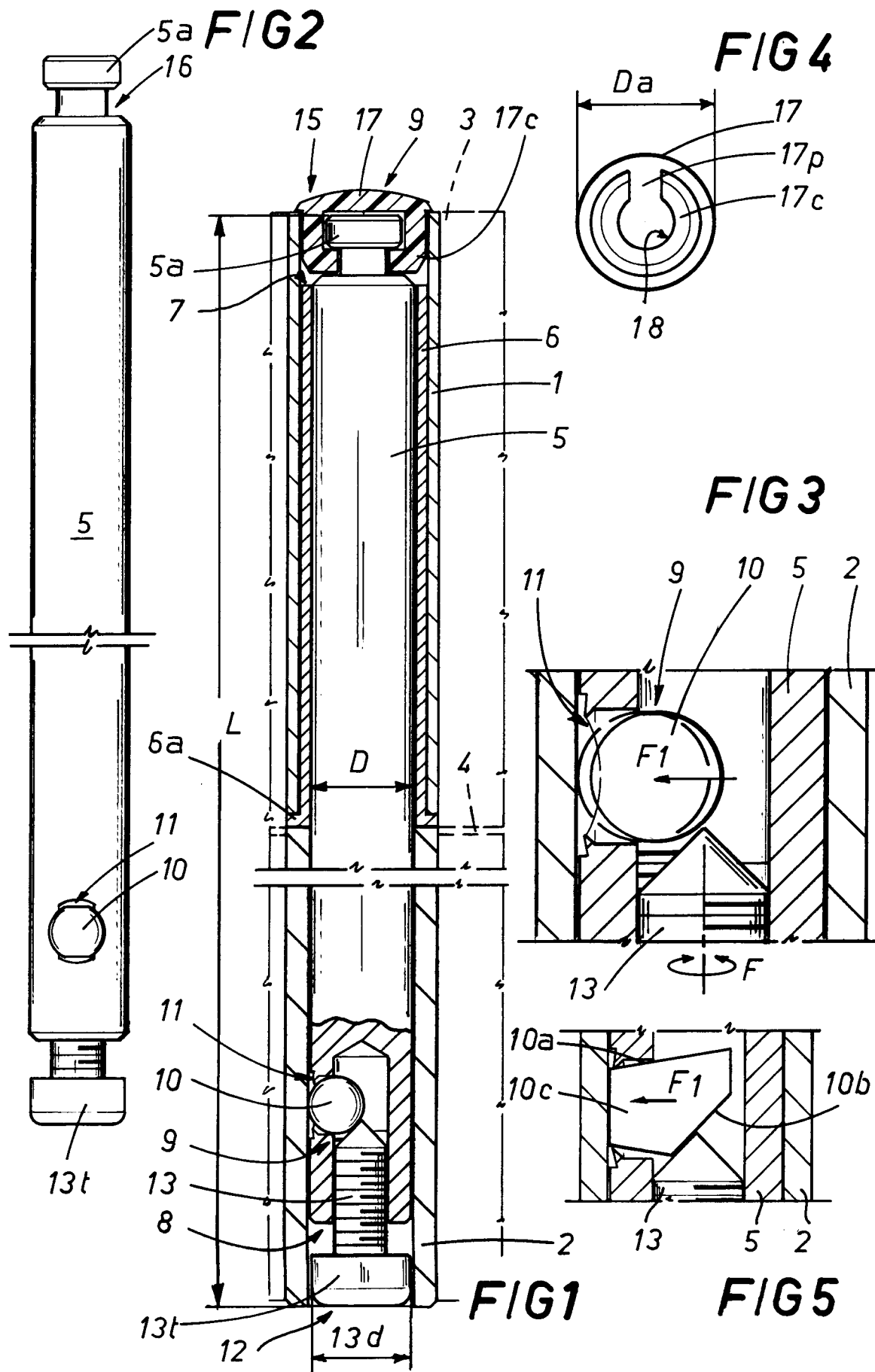
portant is the fact that installer and end user alike can easily verify the position of the socket screw and thus be certain that the hinge has been correctly assembled.

Claims

1. A butt hinge for door and window fixtures, of the type consisting in two bosses (1, 2) associated respectively with a moving sash and a fixed frame by way of relative flanges (3, 4) secured with relative fastening means to the sash and the frame, and a vertical hinge pivot (5) insertable together with at least one interposed alignment sleeve (6), accommodated by the upper boss (1, 2), into through bores (7, 8) afforded by the respective bosses, wherein the pivot (5) is provided with angular restraint and concealing means (9) associated with either end and interacting with the bosses (1, 2) characterized
 - in that restraint means (9) comprise a plunger element (10) freely accommodated within a radial socket (11) fashioned in a lower portion of the pivot (5) and opening laterally onto the relative circumferential surface; and
 - in that the plunger element (10) is capable of translatable motion brought about through the agency of adjustment means (12) associated with the bottom end of the pivot (5) and accessible from externally of the hinge bosses (1, 2) with the pivot inserted, in such a manner as to determine a non-operative limit position, in which the plunger element (10) is completely encompassed by the socket (11), and an operative limit position in which a portion of the plunger element (10) is disposed marginally beyond the circumferential compass of the pivot (5) and in stable contact with the internal surface of the relative hinge boss (1, 2).
2. A hinge as in claim 1, wherein the plunger element (10) consists in a simple ball accommodated within a radial socket (11) of which the area opening onto the circumferential surface of the pivot (5) is upset or caulked in such a way as to prevent the ball (10) escaping.
3. A hinge as in claim 1, wherein the plunger element (10) consists in a wedge accommodated within the radial socket (11).
4. A hinge as in claim 1, wherein the plunger element (10) consists in a simple ball accommodated within a radial socket (11) of which

the area opening onto the circumferential surface of the pivot (5) is upset or caulked in such a way as to prevent the ball (10) escaping, and adjustment means (12) are embodied as screw means (13) insertable threadedly into a blind tapped hole (14) disposed coaxially with the longitudinal axis of the pivot (5) and connecting with the radial socket (11) in such a way as to allow the translatable motion of the ball (10) between the non-operative and operative limit positions.

5. A hinge as in claim 1, wherein the end of the inserted pivot (5) remote from the adjustment means (12) and occupying the upper hinge boss (1, 2) is capped by a concealing element (15) embodied in such a way as to engage in a positive fit with a groove (16) afforded by the relative end of the pivot (5), and comprising a disk portion (17p) uppermost of which the diameter (Da) is greater than the diameter (D) of the relative bore (7, 8), such that the pivot (5) is furnished with a stop shoulder as a result of the concealing element (15) being fitted.
6. A hinge as in claim 1, wherein the length (L) of the pivot (5) together with the restraint and concealing means (9) is equal, in the operative position, to the length of the upper and lower hinge bosses (1, 2) placed end to end.
7. A hinge as in claim 4, wherein screw means (13) consist in a socket screw exhibiting a head (13t) of diameter (13d) substantially equal to the diameter (D) of the bore (7, 8) offered by the relative hinge boss (1, 2).





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EUROPEAN SEARCH REPORT

Application Number
EP 94 83 0054

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
A	US-A-3 390 419 (FOLTZ) * column 2, line 15 - line 58; figures 1-6 * ---	1,2	E05D5/12
A	US-A-3 188 686 (ORCUTT) * column 2, line 37 - line 56; figures 2-4 * ---	1,3	
A	US-A-2 780 830 (KAMMERER) * column 2, line 24 - line 35; figures 1-3 * ---	1,3,4	
A	EP-A-0 425 794 (SIEGENIA-FRANK) * abstract * -----	1,5,6	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			E05D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 May 1994	Examiner Van Kessel, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			