Aug. 20, 1940. F. DIESTELKAMP 2,212,114

WINDOW CASEMENT ROTATABLE ABOUT TWO AXES

Original Filed Dec. 24, 1937 2 Sheets-Sheet 1

Fig. 1

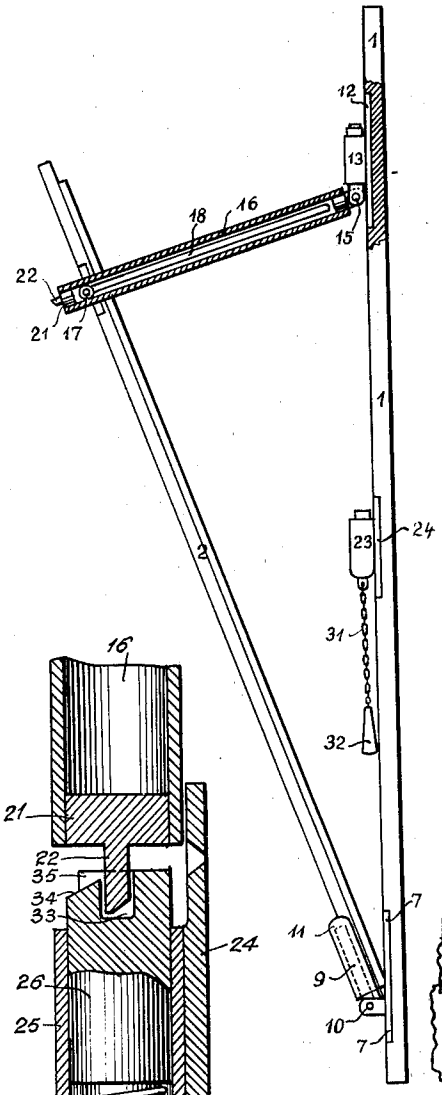


Fig. 2

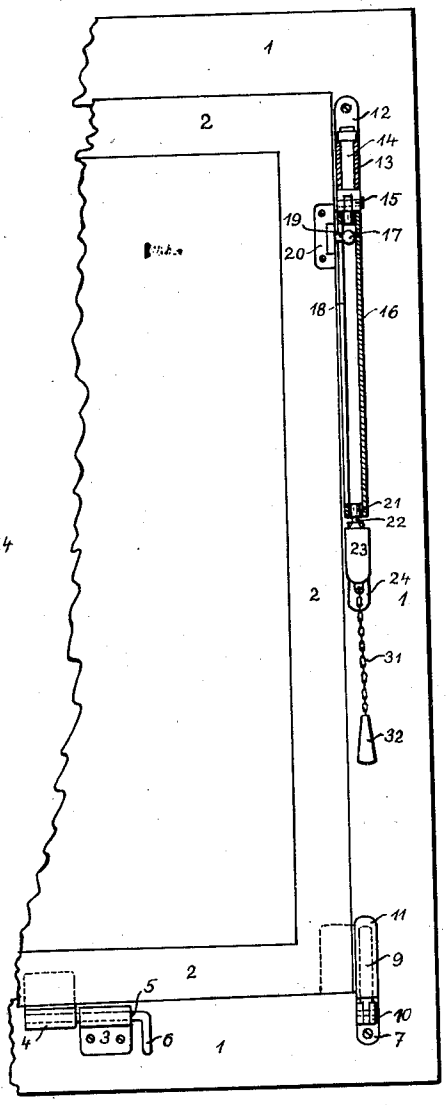


Fig. 3

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WINDOW CASEMENT ROTATABLE ABOUT TWO AXES

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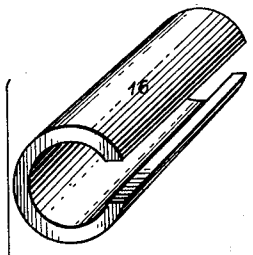
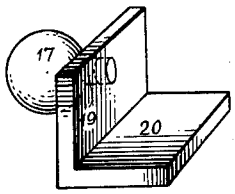


Fig. 6



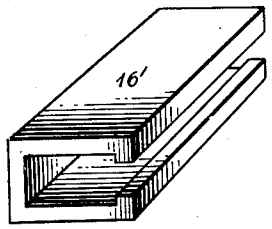


Fig. 7

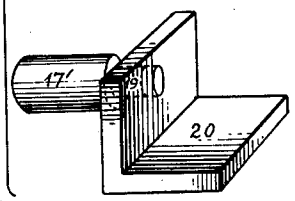


Fig. 8

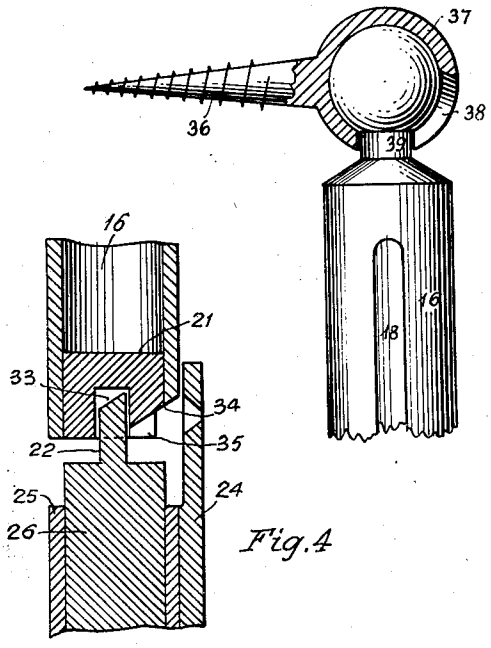
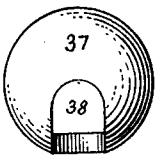


Fig. 4

Fig. 9



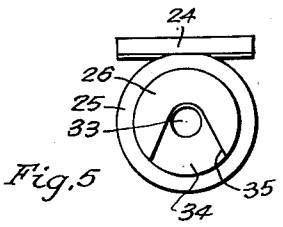


Fig. 5

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2,212,114

WINDOW CASEMENT ROTATABLE ABOUT TWO AXES

Fritz Diestelkamp, Stuttgart, Germany

Application December 24, 1937, Serial No. 181,503. Renewed May 3, 1940. In Germany December 24, 1936

20 Claims. (Cl. 16—147)

This invention relates to the construction of side fittings, more particularly for window casements, which are rotatable at will about a vertical and a horizontal axis. Windows of this type are described, for example, in the German Patent No. 646,815 in which the upper side fitting, which also fulfils the function of the upper hinge, is constructed as a solid adjusting bar of circular cross section on which slides a sleeve united with the window casement through a pin connection. If the window casement is to be rotated about its vertical axis the lower end of the adjusting bar, which can oscillate about a horizontal axis extending parallel to the plane of the window, is fixed by means of a rotary bolt and the sleeve fixed to the window casement serves as a hinge. This known device has the disadvantage that the surface of the adjusting bar cannot be provided with a coat of paint and that as it is generally oiled as a protection against rust and to lubricate the sleeve it generally has a dark and unsightly appearance and leads to soiling of the hands and curtains.

The subject of the invention is an improvement in these known windows which avoids the disadvantages mentioned above and gives a substantially improved construction which is inconspicuous, has an appearance similar to that of a hinge and by simplifying the individual parts provides a not inconsiderable reduction in costs compared with the known device serving the same purpose so that the new fittings cost only slightly more than those of a normal window. Fittings of this kind are equally applicable to wood and metal windows.

Reference will now be made to the accompanying drawings illustrating several examples of construction according to the invention and in which:

Figure 1 is a side elevation of a side and bottom hung casement window with the window casement tilted about the horizontal axis, the lateral adjusting bar being shown in section,

Figure 2 is a front elevation of a closed window casement, the lateral adjusting bar being shown in section,

Figure 3 is a section through the holding bolt for the adjusting bar in the position of Figure 2 in a plane at right angles to the plane of the window,

Figure 4 is a section corresponding to Figure 3, of a modified form of construction of the bolt device,

Figure 5 is a plan of the surface of the bolt in Figure 3,

Figure 6 is a spherical sliding block with a part of the corresponding cylindrical adjusting bar,

Figure 7 is a cylindrical sliding block with a part of the corresponding adjusting bar of rectangular cross section,

Figure 8 is a longitudinal section through another form of construction of the upper joint of the adjusting bar,

Figure 9 is a view of the joint in Figure 8 after removal of the connecting ball.

A window casement which is to be rotatable at will about a vertical or horizontal axis requires two rotary pivots for each of the axes of rotation lying at right angles to each other, that is, four joints or hinges altogether. Generally two of these rotary pivots are combined in one fitting, the so-called corner hinge, so that altogether three separate fittings are sufficient for a bottom and side hung window casement. This corner hinge allows two rotations at right angles to each other.

The hinge required in addition to the corner hinge for the horizontal axis of rotation consists, in the example of construction illustrated, of a horizontal hinge strip disposed underneath the window casement, of which one socket **4** is provided at the lower edge of the casement frame **2** whilst the second socket **3** forming this hinge strip is fixed to the window frame **1**. Within the socket **3** the bolt **5** providing the horizontal axis of rotation is limited as regards movement by means of its end **6** bent over at right angles to form a handle whereby the two hinge strip parts can be coupled and uncoupled. This fitting, which does not form the subject of the invention, is illustrated in Figure 2.

The corner hinge required for both directions of rotation is illustrated in Figures 1 and 2. The pivot pin **9** is connected by means of the pin joint **10** to the plate **7**, sunk into the window frame **1** and secured thereto by screws, and serves as a hinge pin for the hinge strip **11** fixed to the window casement **2**.

The most important component of a window casement which is to be rotatable at will about a horizontal and vertical axis is the upper side fitting which simultaneously serves as the upper vertical hinge and as the retaining or adjusting device for the window casement opened out about its horizontal axis. According to the invention this holding or adjusting bar is formed as a slotted hollow bar which is secured at its upper end in such a way that it can be rotated about a vertical axis and can also be swung for-

wards about a horizontal axis extending parallel to the plane of the window.

These conditions can be fulfilled with the fitting according to the invention. The vertically disposed socket 13 is screwed to the window frame 1 by means of the plate 12 (see Figures 1 and 2). The hinge pin 14 to the lower end of which the adjusting bar 16, consisting of a slotted tube, is connected by means of the horizontal pin joint 15, is rotatably supported in the socket 13. The hollow adjusting bar 16 can have a round, rectangular or similar profile (see Figures 6 and 7).

Inside there is disposed the sliding block 17 corresponding to the profile of bar 16. The block 17 by means of the pin 19 sliding in the slot 18 is firmly connected with the bracket 20 secured to the casement frame 2. The sliding block 17 is shaped as a rotational body, co-axial with the fixing bolt, whose axial section corresponds to the cross sectional shape of the adjusting bar 16.

Two examples of this are shown on an enlarged scale in Figures 6 and 7. If the adjusting bar 16 has a cylindrical cross section the sliding block is constructed as a ball 17 with a neck 19. If the adjusting bar is a tube 16' (Figure 7) of rectangular cross section the sliding block is shaped as a cylinder 17' co-axial with the neck 19'.

For the rotation of the window casement about the vertical axis where the adjusting bar 16 has to take over the function of the upper hinge, it is fixed in the vertical position according to the invention by means of a locking device 23, preferably maintained in its position of rest by the action of a spring, acting as a rotary pin, axial bearing, bush or the like and which is fixed to the window frame 1 vertically below the upper rotary hinge 15 of the adjusting bar 16 at a distance corresponding to the length of the adjusting bar 16.

The section shown in Figure 3 shows an example of construction of the lower axial point of the adjusting bar 16 in which the securing member fixed to the window frame 1 is constructed as an axial bearing, bush or the like, in which is inserted an axial pin 22 fixed to the lower end of the adjusting bar 16 and lying in its longitudinal axis and rotatably supported therein.

The lower end of the hollow adjusting bar 16 is closed with a closure member 21 fitting inside and which has a downwardly projecting and backwardly chamfered axial pin 22 of circular cross section (see Figures 1 to 3). This axial pin 22 co-operates with the locking device 23 (Figures 1 and 2) which is shown in longitudinal section in Figure 3 on an enlarged scale at right angles to the plane of the window frame 1. The vertically disposed socket 25 is screwed to the window frame 1 by means of the plate 24. The securing bolt 26 under the action of the spring 27 is freely supported in the socket 25 and secured through a gripping ring 28 or a pin or like member. At the constricted lower end 29 of the bolt 26 the draw chain 31 with a handle 32 is fixed in the eye 30, this being particularly necessary for unbolting if the locking device is situated comparatively high up.

At its upper end the locking bolt 26 has a cup shaped or cylindrical recess 33 allowing axial rotation of the pin 22. In order to facilitate the engagement of the axial pin 22 in the recess 33 particularly when the adjusting bar 16, whose lateral guiding is effected substantially through the sliding block 17, has a slight amount of lateral play, the front chamfered surface 34 of the locking bolt 26 is widened towards the outside in deltoid shape, whereby the lateral flanks 35 form a suitable guide for the axial pin 22 so that on downward movement of the adjusting bar 16 the said pin automatically goes into the recess 33 of the locking bolt 26 serving as a rotary bearing and which snaps back under spring action. The surface of the bolt with the opening 33 and the chamfer 34 is shown in plan in Figure 5.

There is no departure from the principle of the invention if, reversing the arrangement illustrated here, the axial pin 22 is provided on the locking bolt 26 and the central aperture with the deltoid chamfer is provided in the closure part 21 of the adjusting bar 16, as illustrated in section in Figure 4.

The upper rotary connection of the adjusting bar 16 can also be constructed as a ball pivot formed in such a way that in addition to rotation about a vertical axis it also allows swinging about a horizontal axis in a plane at right angles to the window frame. For this purpose the ball socket 37, illustrated in Figure 8 in longitudinal section and in Figure 9 in plan after removal of the ball pivot, and secured to the window frame 1 by a screw 36, is provided with a vertical slot 38 which permits the aforesaid oscillation of the neck 39 of the ball 40 which is fixed on the upper end of the hollow adjusting bar 16.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:

1. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar held in its vertical position by a locking device which is constructed as a vertical rotary bearing for the adjusting bar.

2. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block.

3. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, and being held in its vertical position by a locking device which is constructed as a vertical rotary bearing for the adjusting bar.

4. A hinge device for a window casement rotatable about two axes the upper hinge of the vertical axis of which is formed by an oscillatory adjusting bar having at its free end a projecting pin preferably coinciding with its longitudinal axis, which in the vertical limiting position of the adjusting bar engages in a bearing cup connected with the window frame.

5. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, and having at its free end a projecting pin coinciding with its longitudinal axis, which in the vertical limiting position of the adjusting bar engages in an axial socket connected with the window frame.

6. A hinge device for a window casement rotatable about two axes the upper hinge of the

vertical axis of which is formed by an oscillatory adjusting bar having at its free end an axial bearing cup, coinciding with its longitudinal axis, in which a pin connected with the window frame engages at the vertical limiting position of the adjusting bar.

7. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, and having at its free end a projecting pin coinciding with its longitudinal axis, which in the vertical limiting position of the adjusting bar engages in an axial socket connected with the window frame, said pin, engaging in the axial socket or bearing cup, acting as a lower vertical rotary bearing of the adjusting bar.

8. A hinge device for a window casement rotatable about two axes the upper hinge of the vertical axis of which is formed by an oscillatory adjusting bar having at its free end a bearing cup, coinciding with its longitudinal axis, in which a pin connected with the window frame engages at the vertical limiting position of the adjusting bar, said pin, engaging in the bearing cup, acting as a lower vertical rotary bearing of the adjusting bar.

9. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, and having at its free end an axial socket coinciding with its longitudinal axis, in which a pin connected with the window frame engages at the vertical limiting position of the adjusting bar, said pin, engaging in the axial socket, acting as a lower vertical rotary bearing of the adjusting bar.

10. A hinge device for a window casement rotatable about two axes the upper hinge of the vertical axis of which is formed by an oscillatory adjusting bar having at its free end a projecting pin coinciding with its longitudinal axis, which in the vertical limiting position of the adjusting bar engages in a bearing cup connected with the window frame, said engagement being provided by a locking device fixed to the window frame, said locking device being constructed as a vertically movable bolt held in its upper position of rest by means of a spring.

11. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, and having at its free end a projecting pin preferably coinciding with its longitudinal axis, which in the vertical limiting position of the adjusting bar engages in an axial socket connected with the window frame, said engagement being provided by a locking device fixed to the window frame, said locking device being constructed as a vertically movable bolt held in its upper position of rest by means of a spring.

12. A hinge device for a window casement rotatable about two axes the upper hinge of the vertical axis of which is formed by an oscillatory adjusting bar having at its free end a bearing cup, coinciding with its longitudinal axis, in which a pin connected with the window frame engages at the vertical limiting position of the adjusting bar, said engagement being provided by a locking device fixed to the window frame, said locking device being constructed as a vertically movable bolt held in its upper position of rest by means of a spring.

13. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, said sliding block, movable in the hollow adjusting bar, being constructed as a rotational body with a horizontal axis, secured to the window casement, its cross section corresponding to the cross sectional shape of the adjusting bar.

14. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, and having at its free end a projecting pin preferably coinciding with its longitudinal axis, which in the vertical limiting position of the adjusting bar engages in a bearing cup connected with the window frame, said sliding block, movable in the hollow adjusting bar, being constructed as a rotational body with a horizontal axis, secured to the window casement, its cross section corresponding to the cross sectional shape of the adjusting bar.

15. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, and having at its free end an axial socket coinciding with its longitudinal axis, in which a pin connected with the window frame engages at the vertical limiting position of the adjusting bar, said sliding block, movable in the hollow adjusting bar, being constructed as a rotational body with a horizontal axis, secured to the window casement, its cross section corresponding to the cross sectional shape of the adjusting bar.

16. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block and the upper end of the oscillatory adjusting bar, constructed as a ball, being held in a ball cup fixed to the window frame and which by means of a vertical slot-like recess provided on its front side enables the adjusting bar to be swung out vertically in a vertical plane at right angles to the plane of the window frame.

17. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, said sliding block, movable in the hollow adjusting bar, being constructed as a rotational body with a horizontal axis, secured to the window casement, its cross section corresponding to the cross sectional shape of the adjusting bar and the upper end of the oscillatory adjusting bar, constructed as a ball, being held in a ball cup fixed to the window frame and which by means of a vertical slot-like recess provided on its

front side enables the adjusting bar to be swung out vertically in a vertical plane at right angles to the plane of the window frame.

18. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, and having at its free end a projecting pin preferably coinciding with its longitudinal axis, which in the vertical limiting position of the adjusting bar engages in a bearing cup connected with the window frame, said sliding block, movable in the hollow adjusting bar, being constructed as a rotational body with a horizontal axis, secured to the window casement, its cross section corresponding to the cross sectional shape of the adjusting bar and the upper end of the oscillatory adjusting bar, constructed as a ball, being held in a ball cup fixed to the window frame and which by means of a vertical slot-like recess provided on its front side enables the adjusting bar to be swung out vertically in a vertical plane at right angles to the plane of the window frame.

19. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar being a tube provided with a longitudinal slot, inside which is disposed a sliding block, and having at its free end an axial socket coinciding with its longitudinal axis, in which a pin connected with the window frame engages at the vertical limiting position of the adjusting bar, said sliding block, movable in the hollow adjusting bar, being constructed as a rotational body with a horizontal axis, secured to the window casement or a bracket fixed thereto, its cross section corresponding to the cross sectional shape of the adjusting bar, and the upper end of the oscillatory adjusting bar, constructed as a ball, being held in a ball cup fixed to the window frame and which by means of a vertical slot-like recess provided on its front side enables the adjusting bar to be swung out vertically in a vertical plane at right angles to the plane of the window frame.

20. A hinge device for a window casement rotatable about two axes the vertical axis of which is formed by a corner hinge and an adjusting bar serving as an upper hinge, said adjusting bar held in its vertical position by a locking device which is constructed as a vertical rotary bearing for the adjusting bar and said corner hinge consisting of a vertical hinge socket, fixed to the window casement, and which is rotatably supported on a pin hinged to the window frame by means of a horizontal pin connection.

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