

[72] Inventor **Ernst Pudenz**
Im Haferkamp 1, 4811 Leopoldshohe,
Germany
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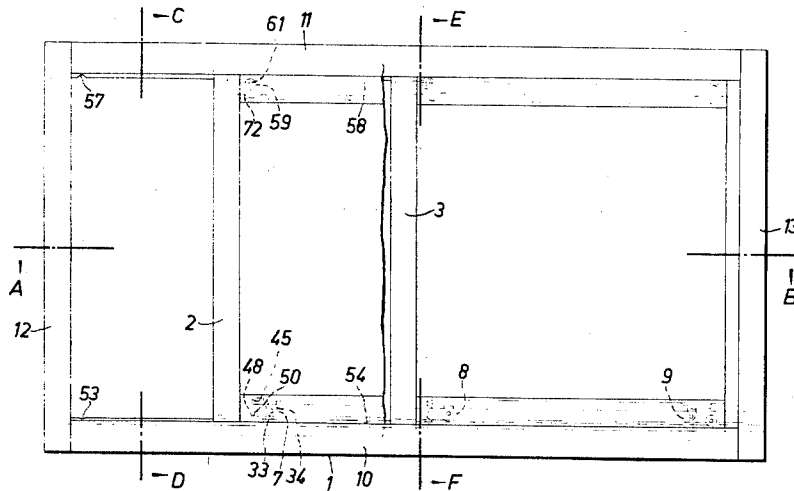
Primary Examiner—David J. Williamowsky
Assistant Examiner—Philip C. Kannan
Attorneys—Curt M. Avery, Arthur W. Wilfond, Herbert L. Lerner and Daniel J. Tick

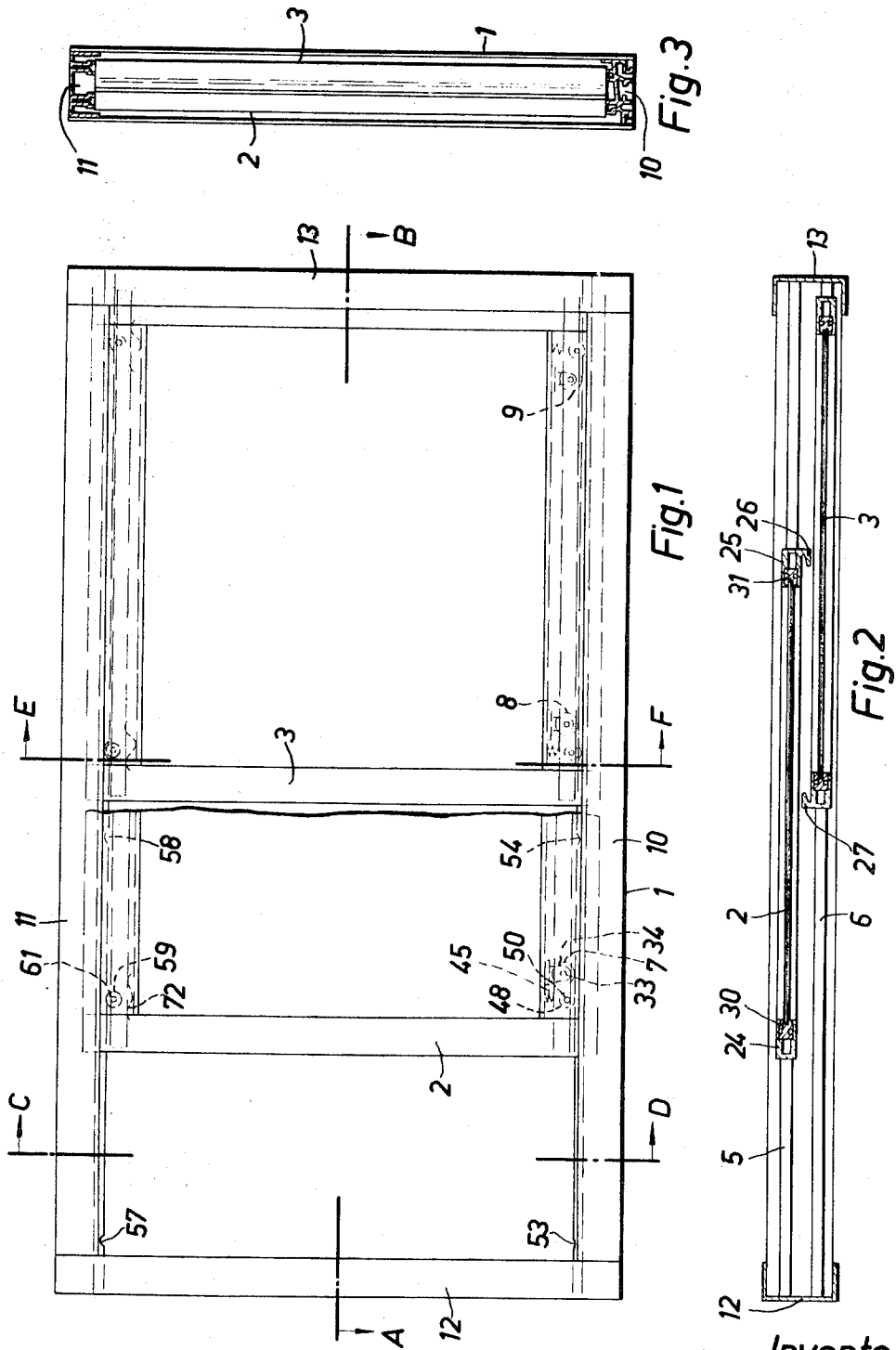
[54] **DEVICE FOR SEALING SLIDING WINDOWS, SLIDING DOORS AND THE LIKE**
 4 Claims, 5 Drawing Figs.

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 [51] Int. Cl. **E05d 13/02**
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ABSTRACT: Device for sealing sliding windows, sliding doors and the like having a plurality of casements which are displaceable in a single plane includes seal carriers mounted within the space formed in the casement frame and constrained to move in a direction perpendicular to the displacement direction of the casement, and sealing strips carried by the seal carriers in the space and extending in the displacement direction of the casement.





Inventor:

Ernst Pudenz

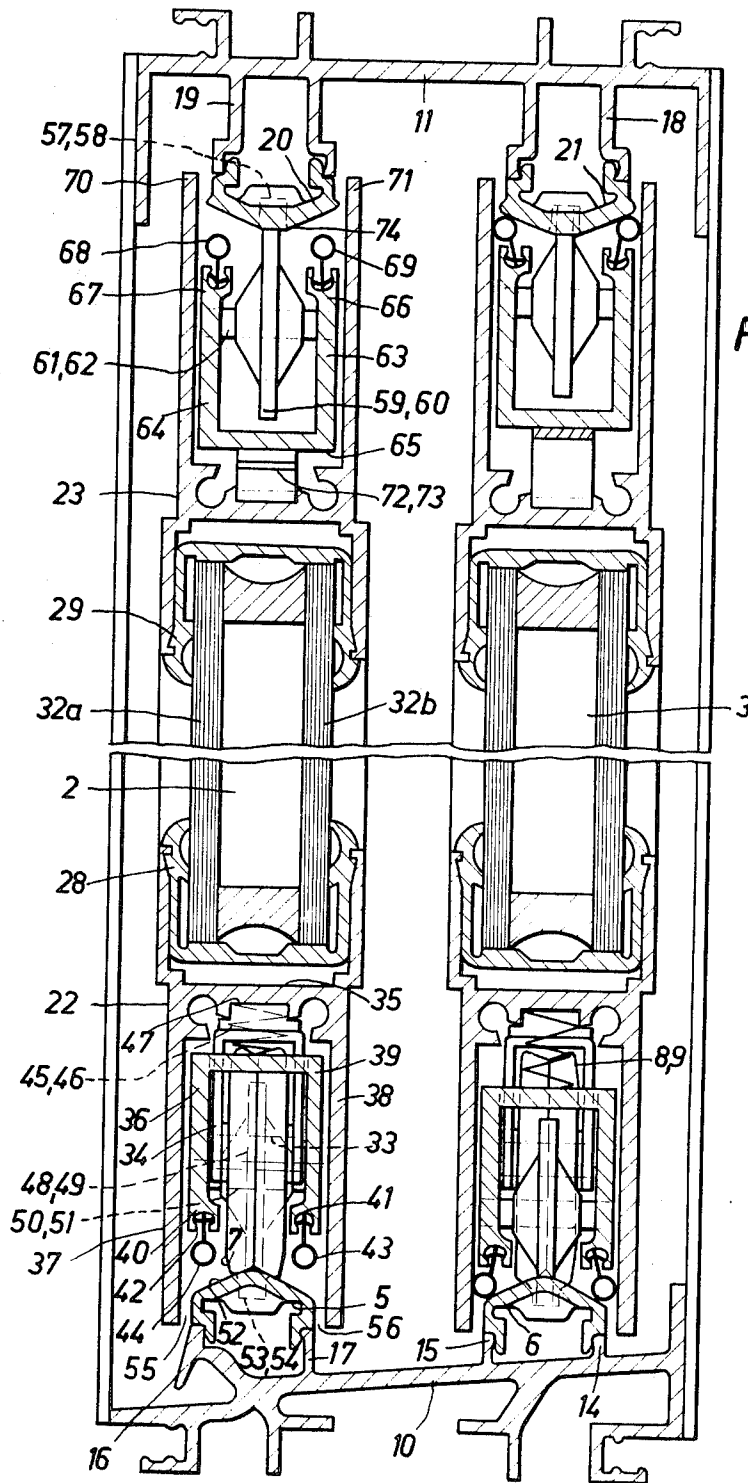
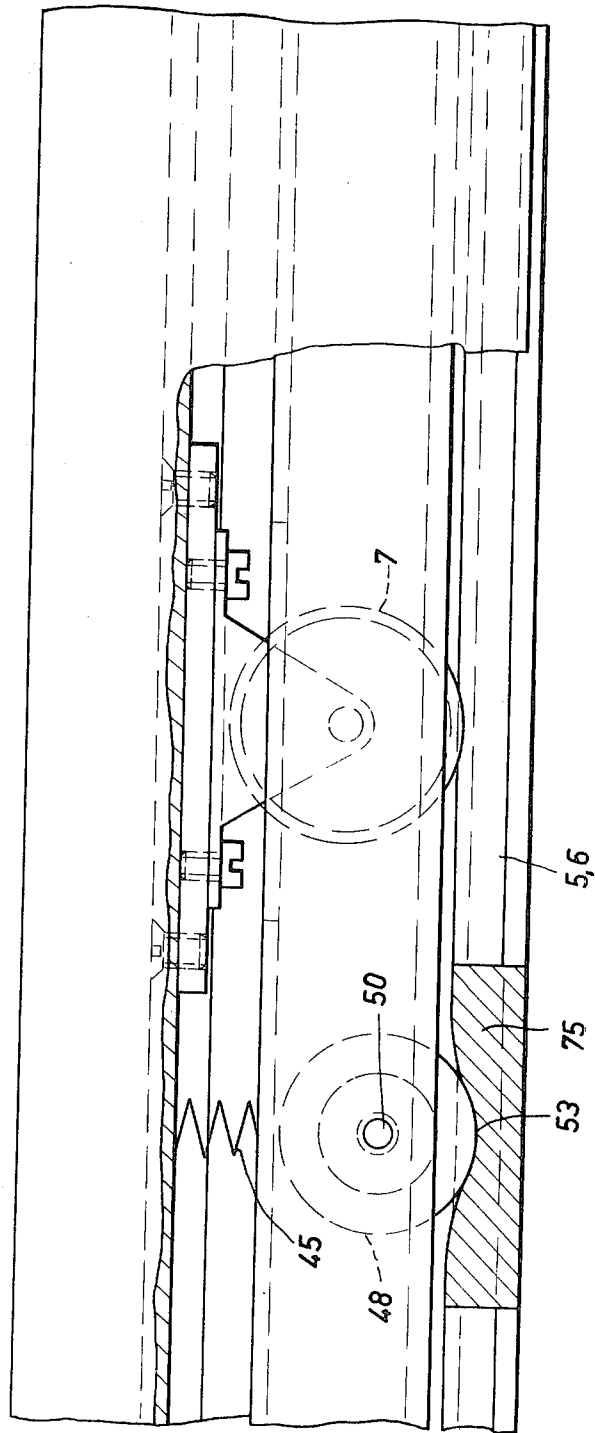


Fig. 4

Inventor:
Robert H. ...

Fig. 5



Inventor:

W. H. King

DEVICE FOR SEALING SLIDING WINDOWS, SLIDING DOORS AND THE LIKE

My invention relates to device for sealing sliding windows, sliding doors and the like, and more particularly of the bypass wherein each casement is displaceable in a single plane.

The heretofore known sliding windows are provided with rigidly built-in seals having sealing surfaces along which the upper and lower edges of the casement slide when the window is being opened. In the German Gebrauchsmuster 1,1919,724 such a sliding window is shown wherein sealing profiles or sections are secured below the tracks or guide rails on crosspieces that are part of a section of the blind frame of the window and are formed of two ribs.

Sliding windows and doors which are lifted are also known wherein the casement or the sliding door respectively is raised by means of a lever system from the locked position thereof and is displaced by means of built-in rollers. Further, similar structures were known in the art heretofore wherein the sliding casements or sliding doors slide on rollers which travel into depressions formed in the guide rails when placed in locking position. With the heretofore known sliding windows or doors which are displaced by means of lever systems, the sealing of the respective windows or doors is effected by pressing the rigidly built-in seals against portions of the blind frame. The functional capability of the upper horizontal sealing of the windows or doors is dependent, however, upon the precise assembly of the upper blind frame. As a result of settling of a building or subsequent warping of the lintel of the window or the overhead beam of the door, the seal of the warped blind frame can no longer fit and thereby loses its effectiveness. A further disadvantage of sliding windows and doors that are furnished with lifting mechanism is that the costs of the auxiliary devices are very high. A considerable disadvantage of the lifting mechanism of the aforementioned type is that only two guide rollers can be employed, which limitation is particularly disadvantageous for windows of relatively heavy construction. A further disadvantage is that a great amount of force is necessary in order to start the casement with its entire weight moving from the rest (lowered) position thereof.

It is accordingly an object of my invention to provide device for sealing sliding windows, doors and the like, which avoids the aforementioned disadvantages of the heretofore known sliding windows and doors.

It is a further object of my invention to provide such sealing device at reduced cost of materials and which will fully maintain its functional capability under unfavorable operations conditions.

With the foregoing and other objects in view, I provide in accordance with my invention, a sliding window or sliding door of such construction that the horizontal lower and upper seals thereof, in a locked position of the window or door, are brought yieldably into sealing position by spring-biasing action.

More specifically, I provide in accordance with my invention device for sealing sliding windows, sliding doors and the like having a plurality of casements each displaceable in a single plane, comprising seal carriers mounted within the space formed in the casement frame and constrained to move in a direction perpendicular to the displacement direction of the casement; and sealing strips carried by the seal carriers in the space and extending in the displacement direction of the casement.

It is a further object of my invention to provide such sealing device wherein the functional capability of the sealing elements will always be ensured.

It is yet another object of my invention to provide such a sealing device which will not require any additional lifting and displacing mechanisms nor any manually actuable fixtures for that purpose since the sliding casements or sliding doors move only in a single plane.

Other features which are considered as characteristic for the invention are set forth in the appended claims.

The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description of the specific embodiment when read in connection with the accompanying drawings in which:

FIGS. 1 to 3 are front elevational, top plan and side elevational views of a sash window constructed in accordance with my invention;

FIG. 4 is a much enlarged longitudinal sectional view of FIG. 3; and

FIG. 5 is a much enlarged fragmentary view of the lower left-hand side of the casement shown in FIG. 1.

Referring now to the drawings, there is shown a sash window formed of a blind frame 1 (FIG. 1) and a pair of sliding casements 2 and 3 which are displaceable by means of ball bearing support rollers 7 to 9 along profiled guide rails 5 and 6 (FIG. 2, 4 and 5). The blind frame 1 is assembled from a lower blind frame section 10, an upper blind frame section 11, as well as U-shaped lateral blind frame sections 12 and 13. The lower blind frame section 10 (FIG. 4) is provided at the inner side thereof with two pairs of longitudinal ribs 14, 15 and 16, 17, which accommodate the profiled guide rails 5 and 6 respectively therebetween. The upper blind frame section 11 is also constructed in the same manner as that of the lower section 10 and has longitudinal rib pairs 18 and 19 which respectively receive therebetween guide rails 20 and 21.

The lower and upper profile shanks 22 and 23 of the casement 2 have an H-shaped cross section or profile, whereas the vertical profile shanks 24 and 25 (FIG. 2) are of U-shaped cross section. The inner vertical profile shank 25 is additionally provided with a hook-shaped profile section 26 on the side thereof facing the casement 3. When the sash window is being closed, the hook-shaped profile section 26 of the casement 2 catches in a corresponding hook-shaped profile section 27 of the casement 3, and can be additionally furnished with a nonillustrated sealing strip for the purpose of effecting better exclusion of air. The profile shanks 22 to 25 are provided with substantially U-shaped elastic seals 28, 29 and 30, 31, adapted to receive glass panes 32a and 32b respectively therein. The casement 2 is provided with relatively wide support rollers 7 mounted on shafts 33 that are secured in U-shaped bearing stands 34 respectively. Each bearing stand 34 is screwed to a transverse rib 35 of the respective casement section. As shown in FIG. 4, a U-shaped seal carrier 36 is displaceably disposed under the transverse rib 35 of the lower casement section and is guided by side portions 37 and 38. Both shanks 39 and 40 of the seal carrier 36 are reinforced and widened at the free ends thereof and are respectively formed thereat with a longitudinal groove 41, 42 serving for receiving therein elastic sealing strips 43 and 44 respectively. The seal carrier 36 is under the biasing influence of several compression springs 45 and 46 which abut at one end in a groove 47 formed in the transverse rib 35, and is carried by two or more lifting rollers 48 and 49 having relatively narrow bearing surfaces and mounted on respective shafts 50 and 51 secured in the shanks 39 and 40.

The somewhat curved peakroof shaped guide surface 52 of the guide rail 5 on which the aforementioned wide support rollers 7 of the sliding casement 2 and the lifting rollers 48 and 49 of the seal carrier 36 slide during the displacement operation of the casement is provided with depressions 53 and 54, fitting or accommodating to the width and the radius of the narrow lifting rollers 48 and 49, into which the lifting rollers 48 and 49 run, when the sliding casement 2 is closed. In the closed condition of the sliding casement 2 the seal carrier 36 is pressed downward under the biasing action of the compression springs 45 and 46 so that the sealing strips 43 and 44 seal the respective airgaps 55 and 56 between the guide rail 5 and the sidewalls 37 and 38. As soon as the sliding casement 2 is opened by being laterally displaced, the lifting rollers 48 and 49 run out of their depressions 53 and 54 and onto the curved guide surface 52, thereby pressing the sealing carrier 36 in an upward direction as viewed in FIG. 4, so that the sealing strips 43 and 44 are raised from the guiding surface.

In a similar manner, the guide rail 20 of the blind frame section 11 is provided with corresponding depressions 57 and 58 into which the lifting rollers 59 and 60 run when the sliding frame 2 is being closed. The lifting rollers 59 and 60 are mounted on shafts 61 and 62, respectively, which are end supported in the shanks 63 and 64 of the upper seal carrier 65, as viewed in FIG. 4. The reinforced ends 66 and 67 of the shanks 63 and 64 are formed with grooves in which sealing strips 68 and 69 are respectively received. The upper seal carrier 65 is guided laterally by means of the walls 70 and 71 and is subjected to the biasing influence of several leaf springs 72 and 73 which continually maintain the lifting rollers 59 and 60 in engagement with the guide surface of the profiled section 74 of the guide rail 20. The lifting rollers 59 and 60 run into the depressions 57 and 58, respectively as they are moved into the closing position of the of the window. The leaf springs 72 and 73 then force the seal carrier 65 upwardly, as viewed in FIG. 4, and the sealing strips 68 and 69 then assume the task of sealing both the upper and lower sides of the casement. The sliding casement 3 and the guide rail 6 provided therefor, as well as the guide rail 21, are constructed in precisely the same manner as the aforementioned casement 2 and the guide rails associated therewith. The sliding casements 2 and 3 are shown, respectively, in open and closed position in FIG. 4.

In order to avoid subsequent machining of the depressions 53 and 54 of the guide rails 5 and 6 on the one hand and of the depressions 57 and 58 of the guide rails 20 and 21 on the other hand, which depressions are furnished with an arcuate profile, into the completed profile rods, suitably formed members 75 (according to the embodiment shown in FIG. 5) made of light metal, plastic material or the like are clamped and, if necessary, are firmly secured by screws or adhesive to the corresponding profile rods so as to form the completed guide rollers.

For particularly wide sliding casements and hence using relatively great weight, tandem rollers or more than two roller pairs can be employed instead of rollers 7 or 8, 9, in order to maintain the specific bearing or applied forces of the rollers as small as possible. Since the guide surfaces of the rollers 7, 8, 9 are of considerably wider construction than those of the lifting rollers 48 and 49, the narrow depressions 53 and 54 do not hinder the sliding operation because the rollers 7, 8, 9 roll thereover without changing their relative vertical position.

The sealing function of the lower sealing strips 43 and 44 as well as of the upper sealing strips 68 and 69, as viewed in FIG. 4, is always ensured in the condition wherein the associated guide rollers 48 and 49 on the one hand and 59, 60 on the other hand have run into the respective depressions by means of the compression springs 45 and 46 acting together with the intrinsic weight of the sealing carrier 36 or by means of leaf springs 72, 73 which have a relatively high spring force constant. For this purpose, the sealing strips 43 and 44 on the one hand and 68 and 69 on the other hand are preferably of circular construction on the side thereof engageable with the guide surfaces of the guide rails, so that an especially good deformation thereof occurs, conforming to the surfaces which are to be sealed. The seal carriers 36, 65 can preferably be combined with the sealing strips 43 and 44 on the one hand and 68 and 69 on the other hand by making them in one piece from plastic material having partially hard and soft structural portions.

By means of flexibly disposed seal carriers 36 and 65 and the deformable and inherently resilient sealing strips 43 and 44 on the one hand and 68 and 69 on the other hand, a trouble-free seal is achieved even in case of large installation tolerances of the blind frame sections. Also in the event of subsequently occurring settling of the building, the stresses produced thereby, which can have an undesirable effect upon the installed sliding window, will not impair the functional capability of the sealing members.

Since the sealing carriers 36 and 65 and the members associated therewith are preferably formed of light metal or plastic material and are therefore of relatively lightweight, a relatively easy lifting of the sealing carriers 36 and 65 can be achieved when opening the sliding frames 2 and 3, respectively, by suitably curing the guide rails on approaching and leav-

ing the depressions 53 and 54 on the one hand and 57 and 58 on the other hand. The displacing operation proper for relatively large and heavy sliding casements can therefore be relatively easily effected. In the closed position, the sliding casements 2 and 3 are latched by nonillustrated well-known locking devices. These locking devices are preferably constructed so that the sliding casements 2 and 3 can be fixed in any desired position. It might also be noted that by means of the aforescribed sliding window a draft-free ventilation can be effected by a slight lateral displacement of the sliding casements 2 and 3 so that the sealing strips 43 and 44 on the one hand and 68 and 69 on the other hand are raised slightly from the position wherein they are engaged with the guide rails surfaces and so as to thereby permit the circulation of air into the interior of the building.

Also sliding doors and the like instead of the aforescribed sliding windows can be furnished in a similar manner with the aforescribed sealing members, in which case only the lower guide rails have to meet special requirements.

The invention is not limited only to sliding windows, sliding doors or the like, which have casements that are movable in horizontal direction, but can also be used obviously for devices with vertically displaceable casements.

The scope of my invention also encompasses such sliding windows, sliding doors and the like wherein the raising and lowering of the seal carriers and the seals carried thereby are effected by manually serviceable mechanisms which can, for example be coupled with the locking devices.

I claim:

1. Device for sealing sliding windows, sliding doors and the like having at least one casement displaceable in a single plane, comprising seal carrier means mounted within spaced formed in upper and lower profile shanks, respectively, of the casement frame and constrained to move in a direction perpendicular to the displacement direction of the casement; sealing strip means carried by said seal carrier means in said space and extending in the displacement direction of the casement, said seal carrier means being actually movable perpendicularly to the displacement direction of the casement in a locking position of the latter for displacing said sealing strip means from a nonsealing position thereof into a position wherein it seals the casement, spring means supported by the casement frame and biasing said seal carrier means in said direction perpendicular to the displacement direction of the casing, fixed guide means extending in said displacement direction of the casement adjacent said casement frame, and lifting roller means supporting said seal carrier means and rollable along said fixed guide means, said lifting roller means cooperating with said fixed guide means for determining the position of said seal carrier means.

2. Device according to claim 1, wherein said fixed guide means comprises a guide rail having a profile formed with at least one depression therein, said lifting roller means being receivable in said depression so as to displace said seal carrier means in substantially vertical direction.

3. Device according to claim 2, wherein said guide rail is subdivided by a member formed with said depression whereby said seal carrier means are raised and lowered.

4. Device for sealing sliding windows, sliding doors and the like having at least one casement displaceable in a single plane, comprising seal carrier means mounted within space formed in the casement frame and constrained to move in a direction perpendicular to the displacement direction of the casement, sealing strip means carrier by said seal carrier means in said space and extending in the displacement direction of the casement, spring means supported by the casement frame and biasing said seal carrier means in said direction perpendicular to the displacement direction of the casing, fixed guide means extending in said displacement direction of the casement adjacent said casement frame, lifting roller means supporting said seal carrier means and rollable along said fixed guide means, said lifting roller means cooperating with said fixed guide means for determining the

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position of said seal carrier means, said fixed guide means comprising a guide rail having a profile formed with at least one depression therein, said lifting roller means being receivable in said depression so as to displace said seal carrier means in substantially vertical direction, and support rollers rollably supporting the casement on said fixed guide rail, said guide rail being so profiled and said depression being so formed that

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said support rollers, without variation in the vertical position thereof, and said lifting roller means supporting said seal carrier means are movable on the same plane, said lifting rollers means, in closing position of the casements, being rollable into said depression.

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