

Jan. 18, 1966

E. KOLLER

3,229,332

WINDOW CONSTRUCTION

Filed July 23, 1964

2 Sheets-Sheet 1

Fig. 1

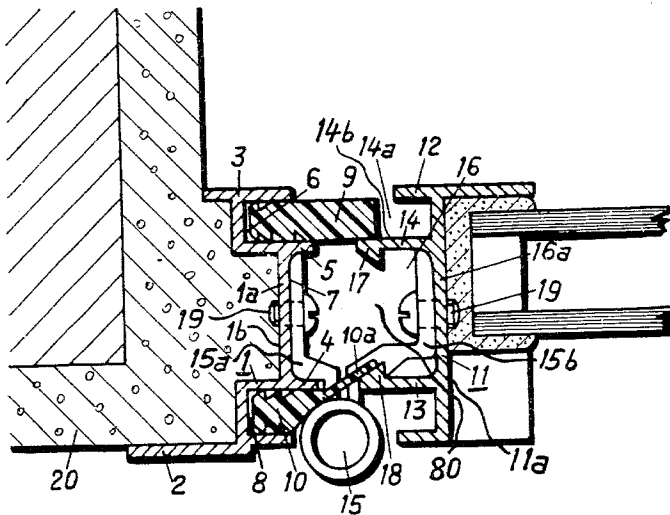
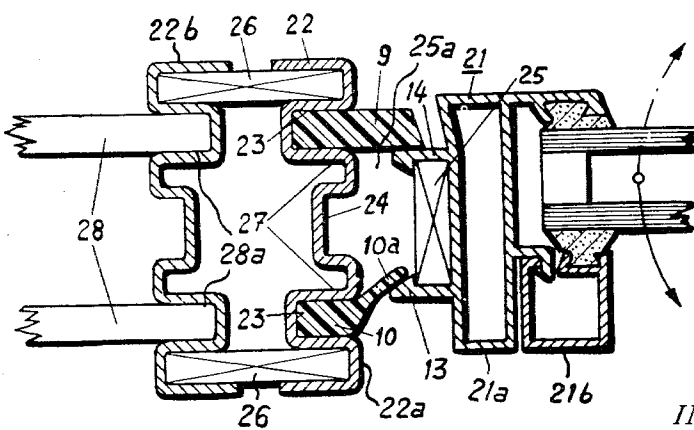


Fig. 2



INVENTOR.
ERNST KOLLER
BY *Admold Klemm*
ATTORNEY

Jan. 18, 1966

E. KOLLER

3,229,332

WINDOW CONSTRUCTION

Filed July 23, 1964

2 Sheets-Sheet 2

Fig. 3

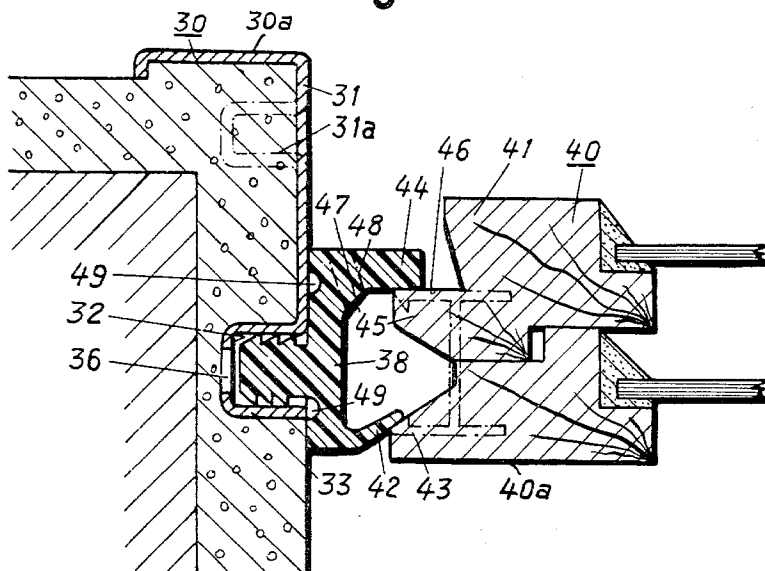


Fig. 4

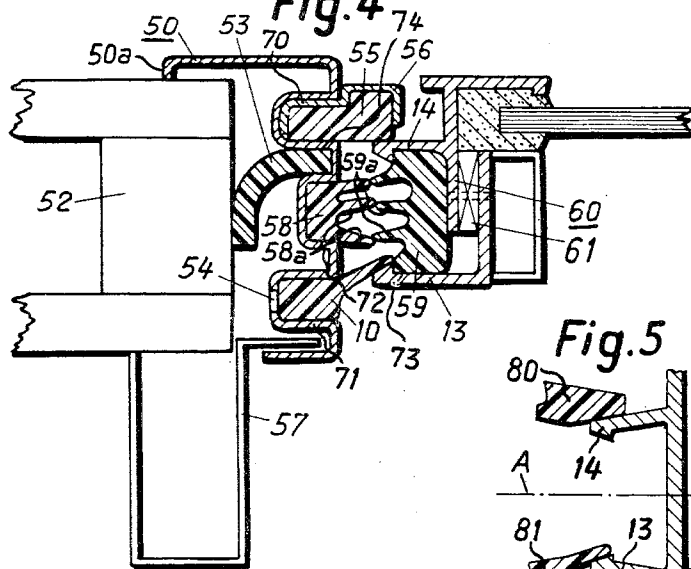
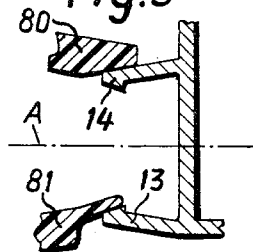


Fig. 5



INVENTOR.
ERNST KOLLER
BY *Herbert W. Heeman*
ATTORNEY

1

3,229,332

WINDOW CONSTRUCTION

Ernst Koller, Paradiesstrasse 64, Binningen,
Basel-Land, Switzerland

Filed July 23, 1964, Ser. No. 384,651

Claims priority, application Switzerland, Aug. 8, 1963,
9,905/63

7 Claims. (Cl. 20—52.4)

The present invention relates to an improved window construction of the type incorporating a window sash and a stationary blind frame surrounding the aforesaid sash, also generally referred to as jamb or frame.

With the heretofore known window constructions different profile cross-sections are necessary for the frame and the sash depending upon the manner of operating the sash, direction of opening of such sash and manner of erecting the frame at the building. After the installation of a window its mode of operation and the direction of opening towards the inside or outside is fixed once and for all time. The frame as well as also the sash are generally composed of a number of different profiled slats, which considerably complicates storage, pre-mounting and installation. Different profiles or additional profiles are also necessary, depending upon whether the frame is mounted externally or internally at a wall or at a rail or header element. Further, the different thicknesses of a window sash require appropriately different frame or jamb sections or profiles.

In many instances subsequent changes are desired in that, for example, an inswinging type window should be changed to an outswinging window, or a window opening at the right should be changed to open at the left, or a projected window such as a pivoting sash should be changed to a balance sash. However, such is not possible with known window constructions without re-building the frame and the sash, welding other hinges and so forth. Furthermore, difficulties previously occurred on account of damaging corrosion effects if frames of different materials which impact one another are combined, for example frames of steel and sash of aluminum.

Accordingly, it is a primary object of the present invention to provide an improved window construction which overcomes the aforementioned disadvantages.

Another very important object of the present invention is to provide an improved window construction by means of which it is possible, while basically retaining the profile or section shape of the sash as well as also the frame, to selectively and in accordance with the momentary requirements construct check-rail and double-hung windows, casement sash, projected windows, or the like, in particular balance sash (hinged at the top), turning sash, pivoting sash (hinged at the center of the window), gliding sash, tilting sash (hinged at the bottom), parallel or sliding sash, which permit opening outwardly or inwardly, whereby also subsequent changes of the manner of use or direction of opening with relatively small alterations are possible, in any case without disassembling the frame.

In accordance with preferred physical constructions of the inventive embodiments it is possible to simultaneously fulfill still further practical requirements in that, for example, the section of the frame after completed mounting can serve as a plaster border, or the application or erection of provisional window closures in the form of plastic foils is simplified by the grooves available at the frame section. With the dimensions of the frame section accommodated to one another it is also possible to form rigidly glazed window fields or wall elements of plates, or the webs of the grooves can simultaneously serve as roller- or sliding sash guides.

Generally speaking, the inventive window construction is characterized by the features that, the sash at the

2

side of a section confronting the frame possesses two ribs of equal height and which are provided with lateral impact surfaces, that the frame preferably constructed in the form of a metal section construction exhibits at all sides a larger inside width or internal dimensions than the sash. Furthermore, the frame is provided at the side facing the sash with two ledges or strips preferably formed of elastic flexible material, of which one cooperates with a respective rib of the sash as an impact strip and the other cooperates with a respective rib of the sash as a sealing or packing strip, wherein the mentioned strips or ledges are interchangeably insertable in at least one groove of the frame section, in order to render possible selective opening of the sash outwardly or inwardly.

The frame is preferably constructed from a steel section, whereas the sash can be formed of aluminum, steel, plastic, wood and so forth, and can further be selectively constructed for single, double or compound glass constructions.

Other features, objects and advantages of the invention will become apparent by reference to the following detailed description and drawings in which:

FIGURE 1 is a cross-sectional view of a first embodiment of inventive window construction taken at the side of the hinge joint;

FIGURE 2 illustrates in cross-section a further embodiment of window construction taken at the opening side of the window, with a column structure forming a portion of the frame;

FIGURE 3 illustrates in cross-section a further embodiment of inventive window construction provided with a wooden sash;

FIGURE 4 illustrates in cross-section a fourth embodiment of window construction taken at the opening side thereof, and provided with additional sealing and insulating means; and

FIGURE 5 depicts a variant arrangement of the ribs and ledges or strips employed with the inventive window constructions.

Prior to describing the individual embodiments it is indicated that the different illustrative embodiments are hereinafter described with reference to horizontal cross-sections taken through vertical sections of the frame and the sash. However, since the frame and the sash exhibit the same cross-sectional profile all around, the different figures can also be viewed as vertical sections of the horizontally extending frame and sash portions.

Referring now specifically to the embodiment of window construction according to FIGURE 1, it is to be appreciated that the frame 1 is formed of a metal frame section 1b of steel or light metal and so forth, and the sash 11 of a section or profile 11a, preferably from a light metal i.e. alloy. The frame section 1b incorporates two outer legs 2 and 3 and two inner legs 4 and 5 connected with one another by an intermediate web 1a. These legs 2, 3, 4 and 5 collectively form three grooves or slots 6, 7 and 8 opening in the direction of the sash 11.

The sash section 11a of the sash 11, constructed for single or double glass, exhibits a flange 12 at the side of the glass as well as two ribs 13 and 14 of equal depth or height which are directed towards the frame 1 and interconnected by a web 16a. The frame 1 formed by the metal section 1b possesses at all sides a larger inside width or inner dimension than the height and width, in other words external dimensions, of the sash 11. The spacing between the frame section 1b and sash section 11a is bridged by two protruding strips or ledges 9 and 10, advantageously consisting of an elastic flexible material, for instance rubber or a suitable plastic, and inserted in the grooves 6 and 8 respectively, of the frame 1.

The strip or ledge 9 acts as an impact strip together

with the projecting or protruding rib 14 and with its outer side flank 14b serving as an impact surface, whereas the strip or ledge 10 and its thinned leg or flap 10a laterally bears as a packing strip against the rib 13. Naturally, the impact strip or ledge 9 also bears with a certain pre-compression or bias laterally in overlapping fashion against the rib 14, so that between both ledges 9 and 10 there is enclosed an insulating, channel-shaped compartment 80. It is further to be appreciated that the ledge 9 can also be formed of a rigid material.

In the embodiment of FIGURE 1 the frame 1 is erected from the inside at a plastered wall 20 and the sash 11 constructed as a casement sash of the inswinging type. The axis of rotation is formed by hinged joints or hinge-type band means 15 possessing flaps 15a and 15b, of which on the one hand flap 15a is guided about the rib or leg 4 of the frame section 1b and screwed, at 19, into the web 1a of the groove 7 and, on the other hand, flap 15b is guided about the rib 13 of the sash section 11 and threaded, at 19, into the web 16a of the groove 16 formed between the ribs 13 and 14. As should be apparent, the hinge means 15 could, however, also be applied to the outside in that the flaps thereof would then engage about the legs 5 and 14, while the same fastening holes in the webs 1a and 16a respectively for the fastening screws 19 would be employed. Apart from these non-visible fastening holes no further bores, slots or the like are necessary at the sections of the frame 1 and sash 11.

The flap means 15b at the side of the sash engages about the wedge-shaped constructed ends 18 or 17 of the ribs 13 and 14 respectively, and are additionally guided at such. With the mentioned reversed mounting of the hinge means 15 the ledges 9 and 10 are to be alternately inserted in the grooves 6 and 8, whereby there results an outswinging sash, with the closed position of the sash section 11a and its ribs 13 and 14 remaining exactly the same with regard to the frame section 1b. By employing other suitable hardware or fixtures providing the axis of rotation in place of the hinge-type band means 15 it is possible, however, to construct, as desired, outswinging or inswinging type projected windows, such as balance sash (hinged at the bottom), tilting sash (hinged at the top), or pivoting sash (centrally hinged). Moreover, the same sections can, if desired, be used as guides for vertical or horizontal sliding sash. It is also possible to construct in a non-viewable manner locks, shift locks and so forth in the grooves 7 and 16. A change-over regarding the manner of use or direction of opening of the sash can be performed at any time without great effort, particularly afterwards, in that only the hardware (e.g. hinges and locks) need be displaced in the grooves and the strips or ledges 9 and 10 must be interchanged.

With the embodiment according to FIGURE 1, at the frame section 1b and the sash section 11a the side confronting, in each instance, the other section is symmetrically constructed with respect to a central plane which is parallel to the plane of the frame 1. However, such does not of necessity always have to be the case, or may be only so with respect to one section, as an inspection of the remaining embodiments will reveal. What is of importance is the cooperation of the alternately and exchangeably mountable strips or ledges 9 and 10 with the similarly constructed sash ribs 14 and 13 respectively and their side flanks, and the larger inner width of the frame metal section 1b, so that such is disposed outside of the path of movement of the sash section 11a. The same basic frame section can then also be readily employed in conjunction with sash sections of different widths (larger or smaller), as indicated by reference to the different figures.

It is further of advantage to widen in the direction of the frame 1 the leg 12 at the sash section 11a which is disposed at the side of the glass or externally, as illustrated, so that it at least partially protects the elastic

ledge 9 mounted at the frame 1 at the weatherside. With reversed mounting in order to open the sash 11 outwardly there is thereby also achieved a certain protection of the hinge means 15. The widened leg 12 forms together with the rib 14 a groove 14a in which rain water collects.

In FIGURE 2, there is illustrated a further embodiment of inventive window construction in which the frame 22 incorporates a frame section 22a preferably formed of steel or light metal sheeting which is assembled together with a similar section 22b into a column (or a horizontally extending support) by employing two webs or bridges 26. As shown at the left-hand side of the figure, in the grooves 28a of the section 22b there can be mounted plate elements 28, or a glass structure can also be directly rigidly mounted therein.

Here again, in the grooves 23 of the frame section 22 there are mounted the protruding or projecting impact and sealing strips 9 and 10 respectively, preferably formed of rubber or elastic plastic. Both of the strips or ledges 9 and 10 again cooperate in overlapping manner with two similar protruding or projecting ribs 14 and 13 respectively, appearing at the sash section 21a of the sash 21. By reversing the mounting of the strips 9 and 10 in the grooves 13 and 14 respectively, it is possible to change the direction of opening of the sash, as generally indicated with the full line and chain-dot line arrows. In the groove 25a between the ribs 13 and 14 of the sash section 21a there is housed the schematically indicated locking mechanism 25 which engages at the top and at the bottom in a confronting groove 24 of the frame section 22a located between the grooves 23. In the sash 21 constructed as a hollow section there is inserted a double-glass construction provided with a single additional profile or section 21b.

The frame section 22a naturally also permits of mounting individually in a wall or imbedding in plaster. Moreover, in one or both of the outer grooves 27 there can be inserted an elastic insulating strip, such as is more clearly shown in the embodiment of FIGURE 4 hereinafter to be described.

In the embodiment according to FIGURE 3, the frame section 30a of the frame 30 is preferably formed of steel and the sash 40 of wood. The frame section 30a with its leg 31 is mounted from the outside. This frame section 30a possesses a groove 32 in which there is mounted a single rubber or plastic profile or section 38 having a projecting impact ledge or strip 44 and a projecting sealing ledge or strip 42 cooperating in overlapping fashion with appropriate projecting ribs 45 and 43 respectively, of the sash 40. Also, in this case, the section or member 38 is reversibly or alternately insertable in the groove 32 for the purpose of changing the direction of opening of the sash 40.

Instead of providing the ribs 43 and 45 of wood at the section 40a of the sash 40 there could also be mounted a metal section 46 to the aforesaid sash which is provided with appropriate ribs, as shown in phantom lines, and possessing for instance the same cross-section as with the previous embodiment. The sash 40 is provided with a projecting leg 41 which protects the ledge or strip 44 at the weatherside. At the lower horizontal frame portion of the section or member 38 there can be provided bores 48, here shown in chain-dot lines, leading from the groove 47 between the ledges 42 and 44 towards the outside and directing away rain water penetrating into such groove. As indicated in phantom lines at the frame section 30a it is also possible to provide a further groove 31a at the leg or flange 31 which can serve as guide means for roller shutters or Venetian blinds.

The leg 33 of the frame section 30a, after mounting of the frame 30, simultaneously serves as a plaster border. It is covered by the subsequently inserted profile 38 which preferably exhibits two lengthwise grooves or notches 49. As a result, insulation is improved in that

the metallic leg 33 is no longer in contact with the air of the inner room or compartment.

In order to further improve the insulation and prevent a "cold bridge" it is advantageous to provide at the section 30a lengthwise extending slots 36 at the base of the groove 32 which reduce the heat conducting cross-section of the metal profile to a small fractional portion.

Naturally, the frame 30 can also be constructed such that it borders the wall on the inside as well as also on the outside, whereby for the purpose of preventing a cold bridge an inner and an outer metal section portion are separated by a heat insulating intermediate layer, that is, the frame is constructed in the form of a known insulating section, as will be more fully explained in the embodiment of FIGURE 4. Also, it is readily possible to construct the sash as an insulating section while retaining the salient features of the invention.

A particularly advantageous embodiment of window construction is shown in FIGURE 4. The frame 50 incorporates a frame section 50a preferably cold formed from an approximately 1 to 1.5 millimeters thick sheet metal structure, drawn or rolled and, in the present case, mounted to a railing element 52 at which there can be joined an additional member or section 57 serving as sill covering. In two grooves 70 and 71, approximately corresponding to the grooves 6 and 8 of FIGURE 1, there are exchangeably mounted the projecting impact strip 55 and the sealing or packing strip 10, respectively. The impact strip 55 can with advantage be partially bordered by an insertable metal profile support strip or flange 56 which mechanically supports the elastic strip 55 and, at the same time, screens such at the weatherside.

In this instance, the sash 60 is constructed as an insulating frame provided with the heat insulating intermediate layer 61 and again exhibits both of the symmetric projecting ribs 13 and 14 of equal depth or height which cooperate in overlapping fashion together with the projecting strips 10 and 55 respectively. In two confronting grooves 72 and 73 arranged between the ledges 55 and 10 of the frame 50 and the ribs 13 and 14 of the sash 60, respectively, there can be mounted additional elastic profiles 58 and 59, respectively, possessing flaps 58a and 59a, respectively, for the purpose of improving the sealing effect and sound dampening. A further sealing member or profile 53 can be mounted in a groove 74 of the frame section 50a opening towards the side of the wall and which elastically bears against such wall.

In order to prevent a heat bridge through the metallic frame section 50a it is advantageous to punch out lengthwise slots 54 in the base of a groove, such as groove 71, whereby the coefficient of thermal conductivity can be reduced by a factor of 400 to 2000. On the one hand, the slots 54 are covered by the elastic and insulating ledge or strip 10 and, on the other hand, the air influx from the outside is held back by the sealing member 53.

The illustrated cross-sectional form of the frame section 50a is also particularly suitable as sash and roller guide for vertical or horizontal sliding sash or window, whereby the spacing between sash and frame serves for the installation of hardware and the parallel guides. The lengthwise grooves provide an exceptionally high rigidity or stiffness for the section.

Naturally, it is not required that the ribs 13, 14 and their side flanges or flanks, as with the previously disclosed embodiments, be disposed parallel to one another. As shown in FIGURE 5, it is readily possible that the mentioned projecting ribs 13, 14 and, if desired, also the projecting impact strip 80 and packing strip 81 are symmetrically inclined to a central plane A. Also, it will be understood numerous further variations are possible; for example, the grooves for receiving the impact strip and the sealing strip can be constructed to possess a dove-tailed cross-section.

As should now be readily apparent from the details of the described embodiments of the inventive window con-

structions, the teachings of the invention render possible the construction of windows, in each instance from the basic sections, for the most different manner of use and optional direction of opening, whereby also subsequent change-overs are possible without difficulty. Apart from the considerable simplification of storage and mounting, also all requirements placed upon the physical properties such as insulation, sound deadening and so forth are fulfilled, and additionally there can be carried out the most varying manner of erection of the frame.

The invention can be equally applied to single web profiles, hollow profiles and insulating profiles or sections, as well as for sliding windows or sash. A particular advantage also resides in the quiet operation during opening and closing the window or sash. When the window is slammed shut, for example due to a draft, the impact is first dampened by the sealing strip and thereafter elastically absorbed by the impact strip, whereby also glass breakage is considerably prevented.

While there is shown and described present preferred embodiments of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practised within the scope of the following claims.

What is claimed is:

1. Window construction comprising a sash, a stationary frame surrounding said sash, said sash possessing two ribs of equal height having lateral impact surfaces, said ribs being arranged at a side of said sash confronting said frame, said frame possessing at all sides larger inner dimensions than the dimensions of said sash, a pair of differently constructed ledges possessing different cross-sectional configurations mounted at said frame at a side confronting said sash, at least one of said ledges being formed of an elastic flexible material, a given one of said ledges cooperating in overlapping fashion with a lateral impact surface of a rib of said sash to provide an impact strip and the other of said ledges cooperating with a lateral impact surface of the other rib of said sash to provide a packing strip, said frame being provided with at least one groove, said ledges being interchangeably insertable in said groove in order to permit opening of said sash inwardly or outwardly.

2. Window construction as defined in claim 1 wherein said pair of ledges are provided at a common member, said frame being provided with a single groove, said common member being alternately mountable in said single groove.

3. Window construction as defined in claim 1 wherein at least an edge of said frame bounding said groove serves as a plaster border, said plaster border being covered by the body of said packing ledge inserted into said groove.

4. Window construction as defined in claim 1 wherein the base of said groove of said frame is provided with lengthwise extending slot means for restraining heat conductivity.

5. Window construction as defined in claim 4 wherein said slot means is covered by the body of said packing strip inserted into said groove.

6. Window construction as defined in claim 1 further including a metallic support section cooperating with said impact ledge, said metallic support section and said impact ledge being conjointly mountable in said groove.

7. Window construction comprising a sash, a stationary frame surrounding said sash, said sash possessing two ribs of substantially equal height, said ribs projecting from and being arranged at a face of said sash confronting said frame, said frame possessing at all sides larger inner dimensions than the external dimensions of said sash, a pair of differently constructed projecting ledges provided at said frame at a side confronting said sash, at least one of said ledges being formed of an elastic flexible material, a given one of said ledges cooperating in overlapping fashion with a rib of said sash to provide an impact strip and the other of said ledges cooperating with the other rib of

said sash to provide a packing strip, said frame being provided with at least one groove, said ledges being reciprocally insertable in said groove in order to permit opening of said sash inwardly or outwardly.

References Cited by the Examiner

UNITED STATES PATENTS

2,623,248	12/1952	Saunders	20—35
2,798,578	7/1957	Toth	189—65
2,811,754	11/1957	Toth	20—53
3,012,642	12/1961	Emmerich	189—78

3,072,229	1/1963	Pasche et al.	189—65
3,105,576	10/1963	Jones et al.	189—65

FOREIGN PATENTS

230,964	10/1960	Australia.
1,302,156	7/1962	France.
929,934	6/1963	Great Britain.
101,733	4/1963	Norway.

HARRISON R. MOSELEY, *Primary Examiner*.
A. I. BREIER, *Assistant Examiner*.