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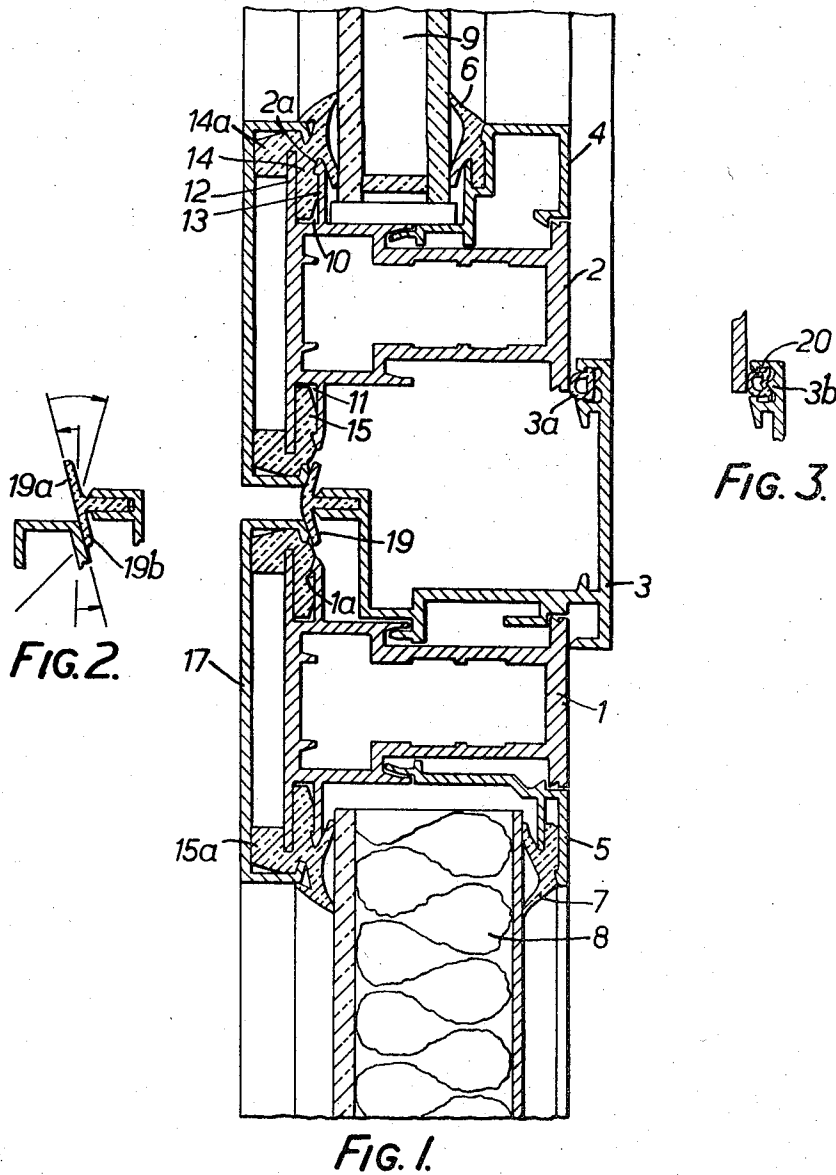
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3,555,735

WINDOW AND DOOR FRAMEWORKS

Filed Feb. 11, 1969

3 Sheets-Sheet 1



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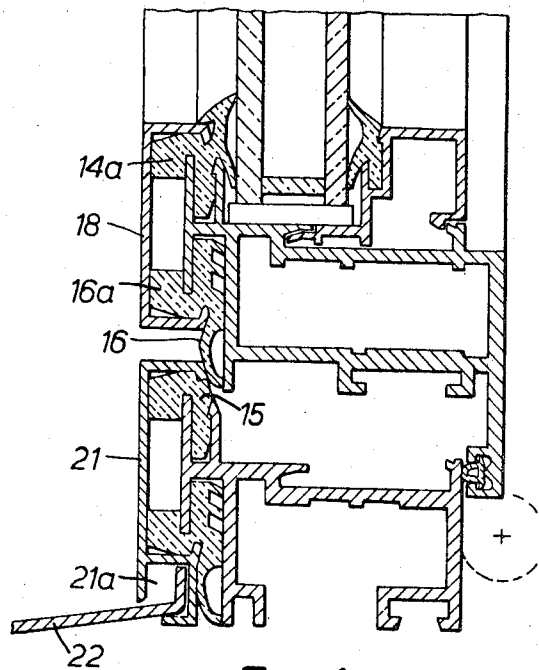
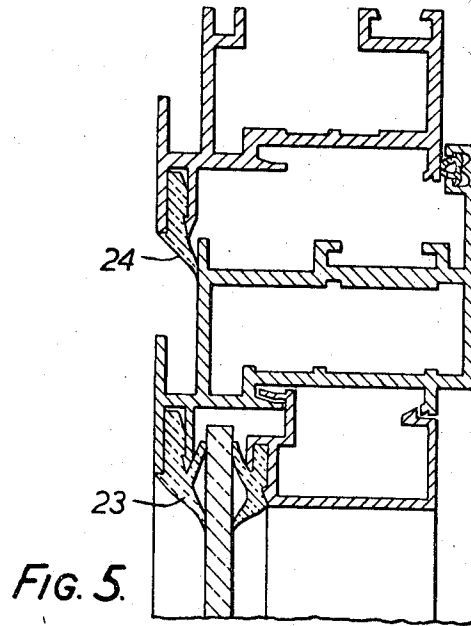
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3 Sheets-Sheet 3

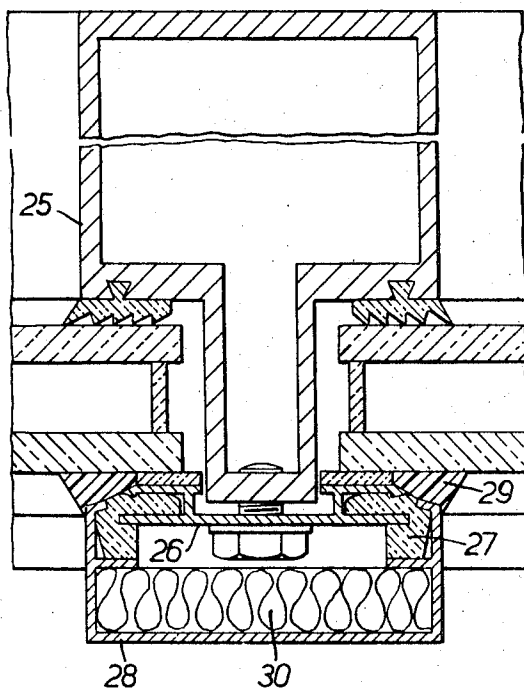


FIG. 6.

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WINDOW AND DOOR FRAMEWORKS

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Int. Cl. E06b 3/00

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1 Claim

ABSTRACT OF THE DISCLOSURE

A window frame is made up of integral profiled bar members and the outer face of each bar is covered with a shield having a trapped air space, which prevents heat transfer through the frame.

BACKGROUND OF THE INVENTION

(1) Field of invention

The invention relates to a frame component, primarily for windows, doors, facades, sashes and the like.

(2) Description of the prior art

Frame components of this kind are made of material that is known to be a good conductor of heat. This is naturally undesirable and leads to corrosion damage in consequence of the undue formation of water of condensation. In addition, the practically unopposed heat transfer results in a considerable raising of room temperatures in summer and cold convection currents in the vicinity of the window in winter, which latter gives rise to additional heating costs and also to discomfort.

Various attempts have already been made to overcome these difficulties. Most of the measures hitherto proposed take the form of window structures in which the normal load-bearing window section is interrupted for the insertion of a poorly conductive, specially shaped bar made of plastics or the like. The arrangements hitherto proposed are unstable, awkward to produce and effective only to a limited extent, especially in the vicinity of the bearing faces and fittings.

In other proposals, exterior or interior mouldings made of plastics are used for insulation. Thin coatings over the metal surfaces have also been suggested in order to provide at least some slight heat barrier.

In all these prior proposals, the attachment of fittings is an additional source of difficulty. It is usual for certain parts of these, which lie outside the insulation and can be fixed only to the outer profiles, to have to receive additional separate insulation, so that the familiar difficulties may also be partly overcome in relation to these.

An object of the invention is to improve the frame components hitherto proposed in such a way as to eliminate the adverse effects of high thermal conductivity.

SUMMARY OF THE INVENTION

According to the present invention there is provided in a framework defining an opening, a plurality of interconnected profiled elongate members each of integral construction, and means defining a closed chamber mounted on each said member to provide at least a thermal barrier, said means including a shield of substantially U-section, and low thermal conductivity plastics material packings interposed between the two free edges of the shield and the corresponding elongate member.

For this purpose, the load-bearing frame bars should be provided with two open longitudinal channels parallel to the glazing, in which the pairs of packings are fitted, and pressed together to form a resilient seal by the shield strips.

Maintenance of the width of the air space should pref-

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erably be ensured by the provision of an additional arm on the packings, which serves as a slide rail during the fitting of the shield strips.

The shield strips may with advantage contain a channel to take window flanning bars and the like.

The invention thus differs from the frame components of this type known hitherto, in that it constitutes an undivided, that is to say integral, strengthened construction, which shields the entire window opening, right from the exterior, thereby sealing and insulating it. Thus, the construction proper, which lies behind this, lies entirely within the warm inner zone and is not subjected to harmful influences of any kind, whether from corrosion, heat radiation or expansion stresses. Moreover, because of the high moment of inertia of the integral frame bars, narrower frames are possible, which ensure maximum possible access for light.

The insulating packing strips may also be combined, in accordance with the invention, into a profile and either enclose a variable insulating air gap directly in front of the profiles bars or serve indirectly, as insulating supports, to provide a sealed and positive means of securing a separate shield strip of light alloy, special steel or the like.

In this way, the entire load-bearing frame structure, including the chambers for the bearing arrangements and fittings, cannot be brought into contact with the outside air, but is surrounded solely by room air at approximately the same temperature. The linear expansion of these profile bars therefore remains low and distortion is avoided. The external shield strips, on the other hand, are small in cross-sectional area, have little mass for storing heat and can move freely and noiselessly on the packing strips as guides when temperature differences are high. These shield strips with the insulating packings and the interior frame components, enclose a space in which the enclosed air, interrupted at the mitring points, cannot circulate. This air space, moreover, can be further enlarged when still better frame insulation is desired by fitting, for example, triple glazing with two air gaps. External noise caused by the beating of rain and hail is also absorbed by these insulated bearing arrangements and is prevented from penetrating to the interior.

Should double glazing not be desired initially, in the case of new buildings, single packings can be incorporated at no extra cost into the same construction and can be changed over later.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a vertical section of part of a pivotal casement with frame components in accordance with the invention, the casement being shown in the closed position;

FIG. 2 is a fragmentary section of a part of the arrangement shown in FIG. 1, with the casement open;

FIG. 3 is a fragmentary section of a part of the arrangement shown in FIG. 1;

FIG. 4 is a vertical section of part of a casement of the pivot, balance or combined pivot/balance type with frame components in accordance with the invention;

FIG. 5 is a vertical section of part of a type resembling the arrangement shown in FIG. 4, but slightly modified, with renewable packings in uninsulated form; and

FIG. 6 is a horizontal section of part of a frame component in accordance with the invention, used as a post with facing.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The one-piece, that is to say integral, bar of a window or casement frame, preferably made of light alloy, is referenced 1 and 2 (FIG. 1).

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The numeral 3 denotes a profiled bar secured to the two bars 1 and 2. There are also inner frame members, 4 and 5, which, with the sealing strips 6 and 7 respectively, serve to secure sill plates 8 and a double-glazing unit 9.

At the outer face of these bars 1 and 2, longitudinal channels 10 and 11, are provided, between side limbs 12 and 13, the said side limbs extending generally parallel to the plane of the double glazing unit 9.

Packing strips, 14 to 16, formed with or without sealing lips are mounted within the channels 10 and 11.

The bars 1 and 2 are of barbed section at 1a and 2a, to retain the packing strips 14 to 16 in the longitudinal channels 10 and 11.

Elongate lips 14a to 16a, one on each of the packing strips 14 to 16 are sprung around one end of the corresponding side limbs 12 and 13.

Shield strips 17, 18 are held in place by the packing strips 14 to 16, the lips 14a to 16a of the packing strips 14 to 16 serving as distance pieces to ensure the maintenance of a gap between the associated shield strips 17 and 18 and the limbs 12 and 13. The width of this gap can be varied by appropriate choice of thickness for the lips 14a to 16a.

As can be seen from the drawings, the shield strips 17 and 18 are of channel section comprising a base and opposed longitudinal side walls extending from the base, a flange extending from the longitudinal edge of each longitudinal side wall being retained within the packing strips 14 to 16. The thickness of the corresponding lips 14a to 16a is such that they are compressed, between the side limb 12 and an abutment comprising the base of the shield strip so as to enhance the sealing action.

The packing strips 14 to 16 are of fairly large section, so as to impede heat transfer and increase the quality of the seal. They can be compressed, and when released will recoil resiliently parallel to the plane of the glass pane.

Placed between the two adjacent frame bars 1 and 2 is another bar 3, into which a T-sectioned packing 19, is fitted.

When the bar 3, forming part of a pivotal casement, is fitted into the frame bar 1, this packing 19 takes up the position shown in FIG. 2.

FIG. 1 shows the packing when the window frame, though closed, has not yet been bolted. As can be seen from FIGS. 1 and 2, the upper arm 19a of the packing 19 is turned through about 30° to the right by the casement frame, the lower arm 19b in this case being pressed against the flange of the shield strip 17. This gives a high-quality, resilient seal, uniform on both sides, in addition to providing further spring-action travel when the casement is bolted and the tubular packing 20 (FIG. 3) housed in a channel 3a is compressed as far as the stop against the frame bar 2.

Despite its small cross-section, the tubular packing 20 is resilient. It is easy to insert, being trapped behind the projections, and deforms into a kidney shape section when its flat rear face is forced against a projecting ridge 3b.

In the embodiment shown in FIG. 4, the shield strip 21 has a channel 21a, to accommodate a window flanning bar 22. In this way, expensive plastering can be avoided.

In the embodiment shown in FIG. 5, there are no shield strips and the packing strips 14 to 16 are also absent. The packing strips are shaped as shown at 23 and 24. They are fitted in similar channels, however, but have no insulating supports.

FIGS. 4 and 5 show quite clearly that, because of the form of construction of the frame bars 1 and 2, the shield strips 17 and 18 are considerably narrower than in the embodiment illustrated in FIG. 1.

FIGS. 1 to 5 show frame constructions with casements for windows with interior glazing, whereas FIG. 6 is a cross-section of a sash or post 25 with external glazing. Here, the post 25, can be connected to a detachable holding strip 26. Inserted in both ends of the holding strip 26

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are packing strips, 27, which serve at the same time to hold a shield strip 28 in place. Instead of the packing strips 27 being lipped to form a seal, a sealing compound fillet is provided at 29. The packing strips 27 can also be used in short lengths, inserted at suitable intervals, if they are made from solid, injection-moulded insulating material, the gaps between being hermetically sealed. Also, each packing strip is compressed between the strip 26 and an abutment on the respective longitudinal side wall of the shield strip 28.

The air gap behind the shield strip 28, which may be extra large, for example, may also be filled additionally with foamed plastics material 30. This, because of its closed cells, prevents all air circulation and makes even better insulation possible. Here, too, it is of particular advantage if the holding strip 26 itself is in the warm zone and the heat transfer paths form outside via the connecting bolts are interrupted.

The form of the holding strips and inserted insulating packings, again, may vary according to the size of the shield strips 28 and the performance expected of them; but it remains important that the heat transfer paths should be interrupted by insulated packings.

The constructions hereinbefore described afford frontal insulation of the inside frame construction and, in conjunction with the double glazing units, provides a complete heat barrier, which markedly increases the continuously effective equalisation of air temperature within the rooms, saves heating costs and prevents the formation of water of condensation. Comfort in the occupied rooms is thereby considerably increased in both hot and cold climates.

I claim:

1. A pivotal casement frame including two frameworks, each said framework defining a plane opening and comprising
 - a plurality of interconnected parallel profiled elongate members,
 - means defining two opposed longitudinal channels on each said member, the side limbs of each said channel extending generally parallel to the plane of said opening,
 - means defining a closed chamber on each said member to provide at least a thermal barrier, said means comprising
 - a longitudinal shield, said shield including
 - abutment means,
 - opposed interconnected longitudinal side walls, and
 - a flange extending from the longitudinal edge of each said side walls, and
 - a low thermal conductivity packing interposed between each said channel and the shield, each said packing including
 - a first elongate lip retained within the channel, and
 - a second elongate lip extending between the channel and the abutment means of the shield, to space the shield therefrom, the said flange extending from the longitudinal edge of each said wall of the shield being retained within a respective packing, and
 - a profiled elongate member lying between juxtaposed parallel elongate members of said two frameworks and secured to one of said parallel members, said profiled elongate member comprising
 - first and second limbs,
 - a first channel-section part, carried by said first limb,
 - a tubular packing engaged in the first channel-section part,
 - a ridge extending longitudinally on the internal face of the base of the said first channel-section part, said ridge serving to deform the said tu-

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bular packing to have a section substantially of kidney shape when the casement is closed,
 a second channel-section part carried by said second limb, and
 a packing of T-section retained in said second channel-section part, said T-section packing being deformed during fitting so that the cross member of said packing forms an angle of approximately 15° to the central leg of said packing and which, when the casement is closed, makes contact with the shield of the two said juxtaposed members so that the two halves of the cross-member of said packing make angles

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of approximately 30° to the central leg of said packing.

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10 KENNETH DOWNEY, Primary Examiner

U.S. Cl. X.R.

52—403