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(54) Ventilator for door or window frames

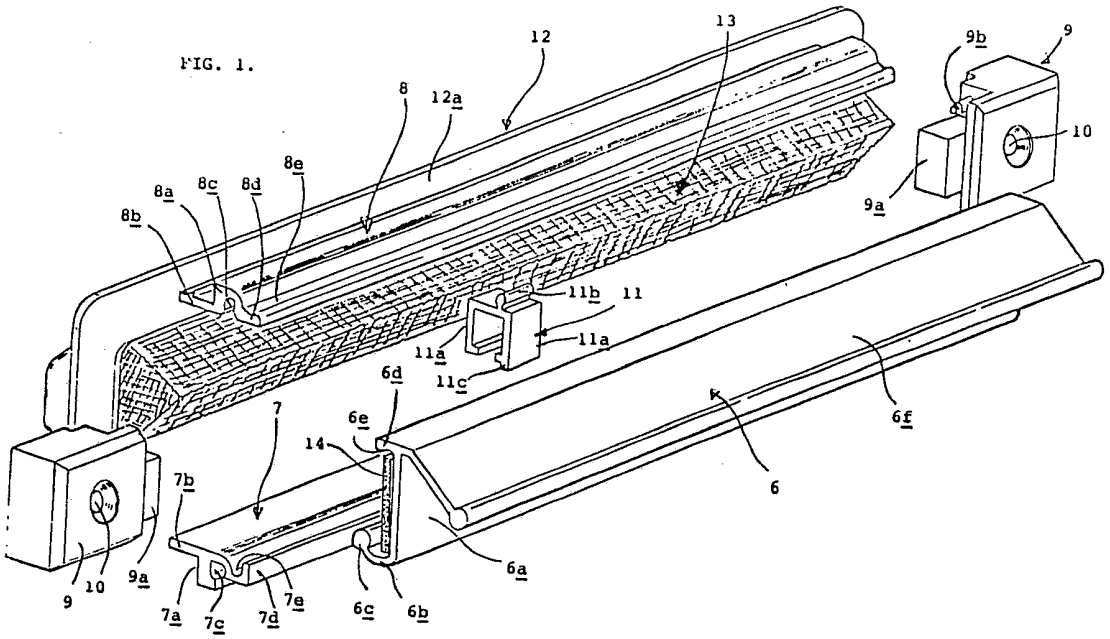
(57) A ventilator has an obdurator flap 6 pivotal between closed and open positions for controlling the air flow through a passageway defined by an elongate opening formed in a door or window frame.

The ventilator has first and second elements 7 and 8 respectively supported between ends by a spacer 11 and at each end by a respective one of a pair of mounting blocks 9 by means of which the ventilator is secured to a frame with respective flanges 7*b*,8*b* of the elements received within the opening.

The flap 6 is pivotally connected to the first element 7 by complementary hinge formations 6*c*,7*c* and carries a seal member 14 engageable with a respective seating face of each element 7,8 in the closed position in which the flap 6 is secured to the second element 8 by releasable inter-engageable formations 6*e*,8*e*.

In use, the assembly of the elements 7,8, mounting blocks 9 and flap 6 is secured to a frame on one side of its opening and the ventilator optionally includes a weatherhood 12 which is secured to the frame on the other side of its opening with a filter member 13 mounted in the passageway.

FIG. 1.



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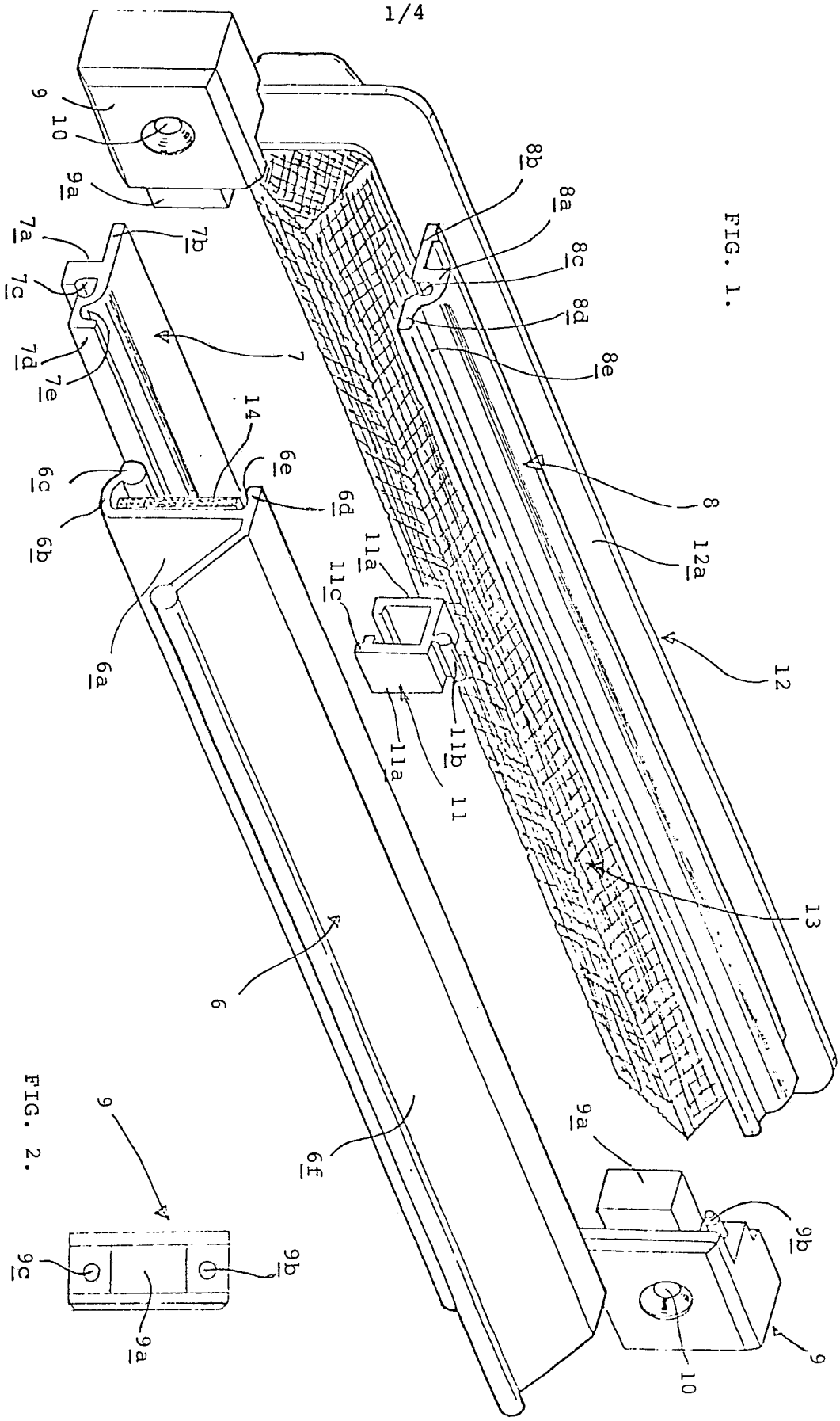
9
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FIG. 1.

9
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9b
9a

FIG. 2.

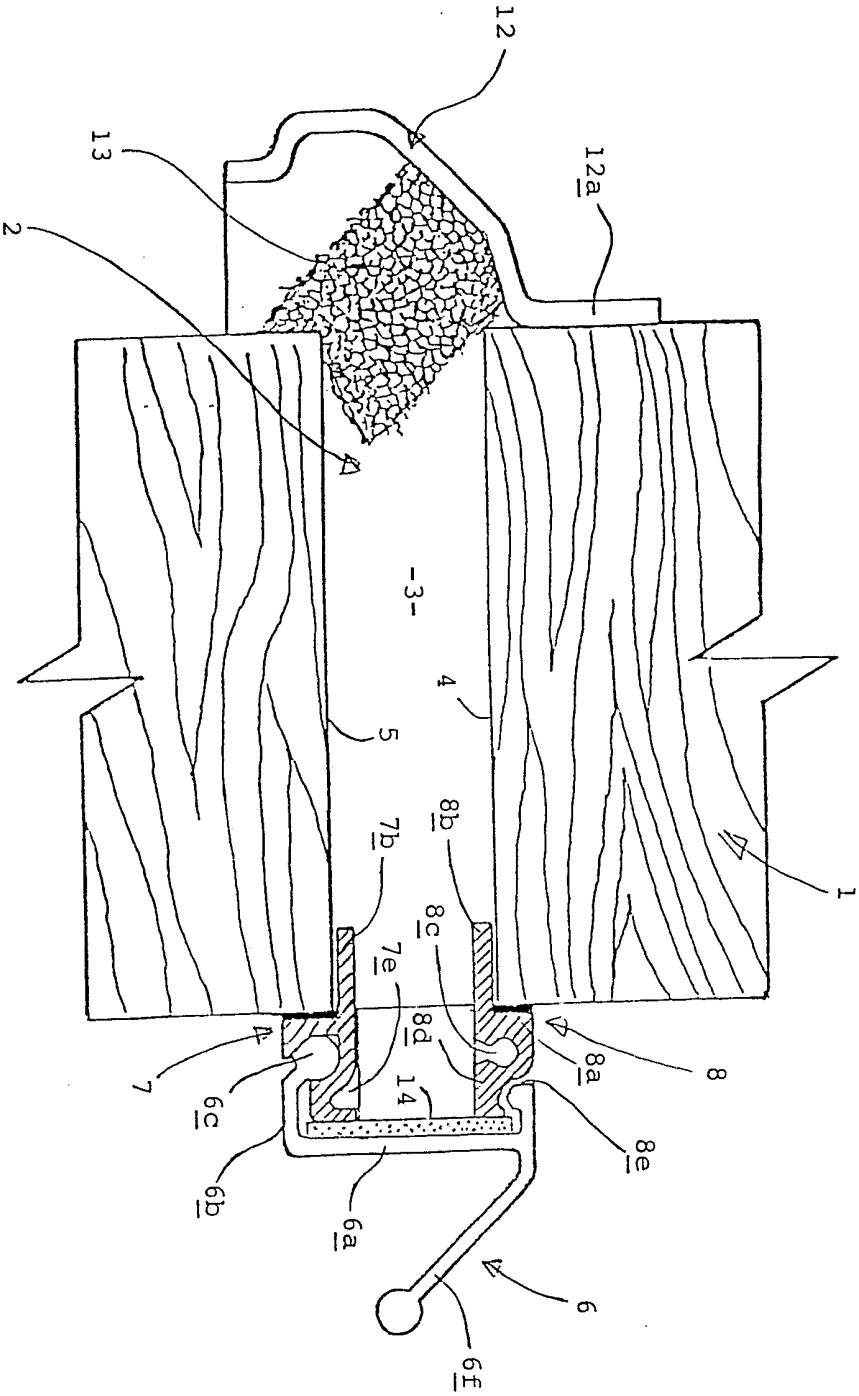

FIG. 3.

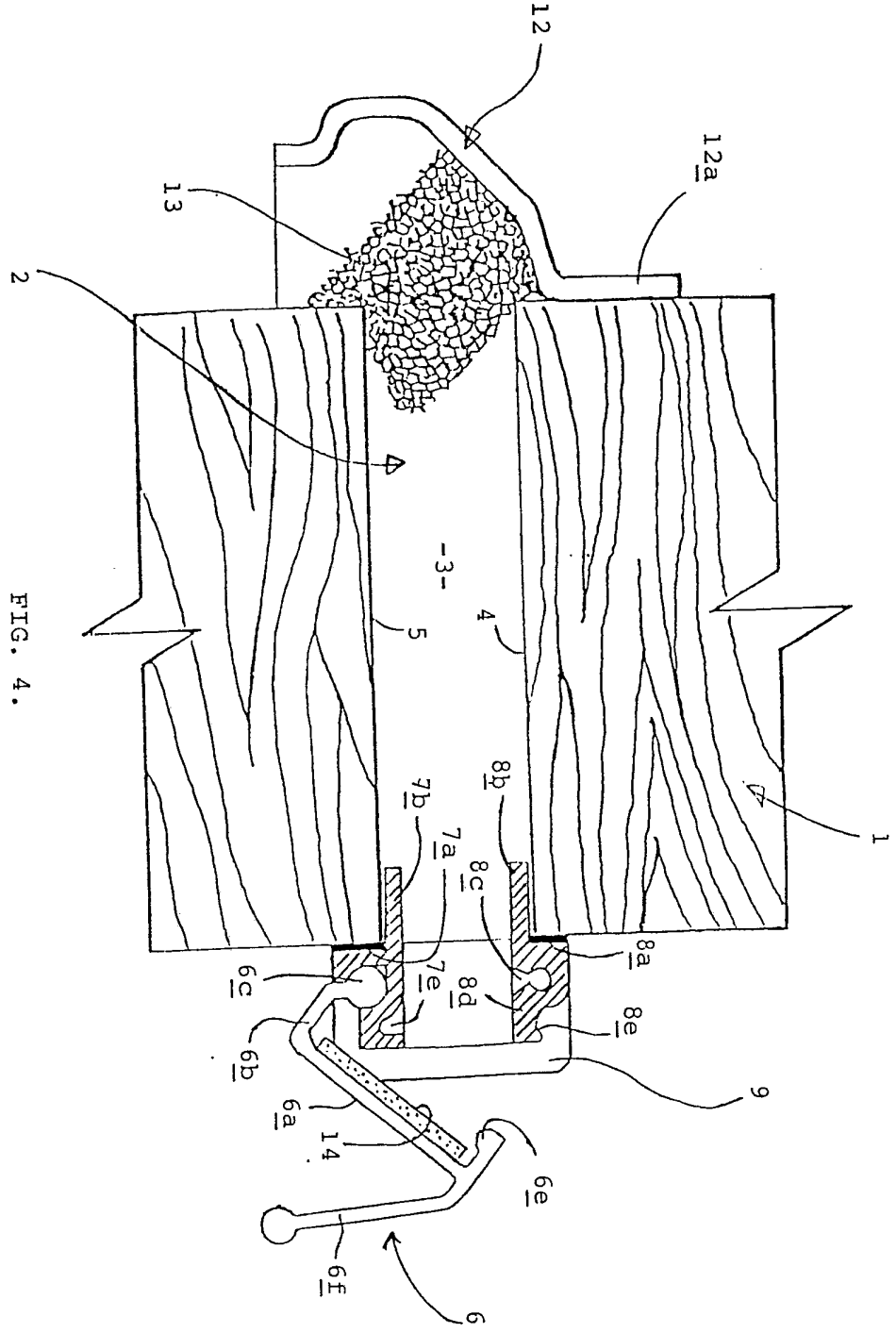

FIG. 4.

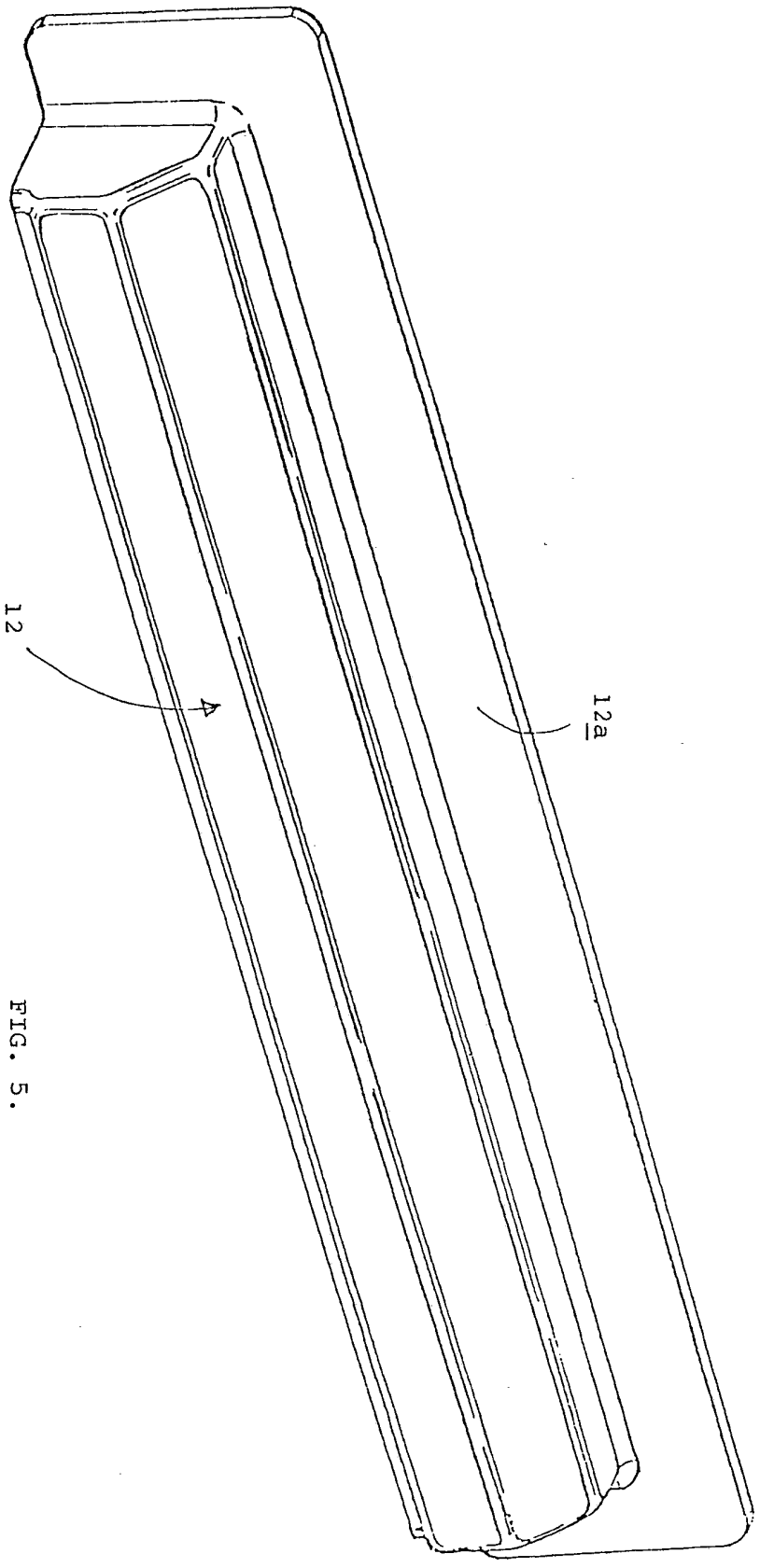

FIG. 5.

SPECIFICATION

Ventilator for door or window frames

This invention concerns ventilators for installation in the frames of doors or windows.

The invention is particularly concerned with ventilators of the kind in which an air path is formed through the frame, such as an elongate slot, and the air passageway is to be opened or closed by operation of an obdurator in the form of a pivotal flap. Such kind of ventilator is well known, and various constructions have been proposed and used previously.

Usually, the parts of the ventilator are all made of metal, typically aluminium, and often with these all metal assemblies, there are problems of condensation.

In addition, many known ventilators are complex in design and construction and not simple to install.

Such complexities in design and construction increase the overall cost.

An object of this invention is to provide a ventilator of the foregoing kind with a pivotal flap but which is simple in construction and easy to install.

A further object of this invention is to provide a ventilator of such kind which reduces the thermal transfer and obviates condensation.

Yet another object of this invention is to provide a ventilator of such kind which can be assembled from a modular kit of parts to a selected length within a specified range of lengths.

Other objectives of this invention will be referred to later herein and will be understood with reference to the advantages of this invented ventilator as also given later herein.

According to this invention we provide a ventilator of the kind in which the obdurator is a pivotal flap arranged to be pivotal between a closed position and an open position to control the flow of air through an elongate passageway formed in the frame of a door or window, the ventilator comprising first and second elements supported at each end by a respective one of a pair of mounting blocks adapted for connection to the frame, each element being of substantially uniform section along it's respective length and each element having a respective flange for location and engagement within the passageway with the blocks mounting the elements in spaced apart parallel relationship, the obdurator flap being mounted on the first element which is lowermost by means of complementary hinge formations extending along the respective lengths of the first element and the flap, inter-engagable formations on the uppermost edge of the flap and the uppermost second element for holding the flap in the closed position, and the internal face of the flap carrying a seal member for engagement with respective seating faces extending along the length of each element remote from said respective flanges.

By this invented ventilator, the construction is very simple with there only being four parts that are sized to the required length and which are assembled and mounted by means of the mounting blocks. Thus, the ventilator can be fitted to a frame in an easy manner once the relevant parts are cut to the desired length for fitting to the opening of the elongate passageway with the flanges of the first and second elements locating the ventilator assembly in position.

Preferably the obdurator flap of the ventilator is made of plastics material having a low coefficient of thermal conductivity. The use of a plastics material with a low coefficient of thermal conductivity obviates the problem of condensation on the obdurator when there is a high thermal gradient between inside and outside temperatures.

Other parts of the ventilator may also be made of plastics material, but if the first and second elements are made of metal, for instance aluminium extrusions, the fact that the obdurator flap is made of a low thermally conductive plastics material prevents thermal transfer and the risk of condensation on the obdurator.

The first and second elements are both spaced apart and located on the mounting blocks which engage each respective end of each element with the spaced distance and length of the elements being selected to the size of the passageway in the frame.

By such an arrangement, the elongate slot to be formed in the frame before mounting the ventilator will be to a standard height whilst the width in the lengthwise direction of the ventilator can be varied as desired and the ventilator can be fitted thereto by sizing the lengths of the elements and obdurator as required. This simplifies stock-holding and fitting of the ventilator for a wide range of doors and windows which are made to various widths and for which a wide range of ventilating flow requirements may have to be accommodated.

Conveniently, to support each end of the respective elements on the mounting blocks, each mounting block may include a pedestal member which is arranged to be engaged with the respective ends of the first and second members to locate them together.

By such arrangement, it is possible to align and support the first and second members in their respective parallel and spaced apart positions prior to mounting and securing the parts on the frame.

One or more discrete spacer pieces may be provided to be seated between the first and second elements intermediate the mounting blocks to support the elements against relative displacement in situ.

The complementary hinge formations on the first element and the obdurator flap may comprise a part-circular bead received within a part-circular recess, each formation extending continuously along the respective edges. By such an arrangement, the hinge is continous along the lowermost part of the ventilator and provides a neat and effective continuous hinge which enables the obdurator flap to be mounted on the first element by inter-engaging the two parts together and sliding one lengthwise relative to the other to locate the two parts together for the required pivotal movement. As will be appreciated, as the first element is lowermost in the assembly when in use, the obdurator flap is arranged to be opened downwardly about the hinge.

The inter-engagement of the two parts for the pivotal movement may be an interference fit to provide frictional resistance to relative movement so that the obdurator flap can be maintained in an intermediate position between fully open and closed by the frictional effect in the hinge. Alternatively, the obdurator flap may be arranged merely to open under gravity to the full open position if there is a free or unrestrained hinging movement between the two parts.

The inter-engagable formations on the uppermost edge of the flap and the uppermost second element may comprise simple edge beads or ribs which extend along the edges for an interference or "snap action" engagement to hold the obdurator flap in the closed position. Such "snap action" may be facilitated by the choice of material for the second element and the obdurator flap. Thus, by such simple type of closure arrangement, no complex fittings are required to maintain and hold the obdurator flap in the closed position.

Preferably, the obdurator is provided with a laterally extending flange portion for use in operating the ventilator.

Additionally, in known manner, the ventilator may comprise a weatherhood section for fitting to the outer side of the frame to cover the opening leading to the air passageway through the frame and to prevent the ingress of rain.

Furthermore, the passageway may have a reticulated foam member mounted therein to prevent the ingress of detritus through the passageway. The reticulated foam member may be resiliently deformable for fitting between the weatherhood and the outer face of the frame in the entry of the passsageway. The foam filter is selected for the required air flow rating.

Other features of the ventilator according to this invention will be referred to later with reference to a preferred exemplary embodiment as shown in the accompanying drawings wherein:

FIGURE 1 is an isometric exploded view of the ventilator component parts;

FIGURE 2 is a detail end view of a mounting block;

FIGURE 3 is a sectional view of the ventilator assembled to a frame with the obdurator being shown in the closed position;

FIGURE 4 is a sectional view similar to that of Figure 2 but showing the obdurator in the open position; and

FIGURE 5 is a view of the ventilator from the outside depicting the weatherhood.

With reference to the drawings, the invented ventilator is shown installed in the frame 1 of a door or window in which an elongate opening 2 has been formed therein defining an air passageway 3 bounded by upper and lower walls 4,5 respectively.

The ventilator comprises an obdurator flap 6 pivotally mounted on a lowermost first element 7 and an uppermost second element 8 which is engagable by the flap 6 in the closed position. There are two mounting blocks 9 10 with each mounting block being similar but of opposite hand. Each mounting block 9 is formed with a through hole 10 for use in securing the ventilator to the frame 1 by means of screws or the like (not shown). A spacer piece 11 is provided for location between the first and second elements 7,8.

The ventilator also includes a weatherhood 12 having an outer mounting flange 12*a* by which it can be mounted on the outer face of the frame 1 by screws or the like (not shown). A length of recticular foam 13 is mounted between the weatherhood 12 and the frame 1 to protrude into the entry of the passageway 3 to act as a filter, and the foam may be adhesively secured or affixed to the inner face of the weatherhood.

The obdurator flap 6 and the first and second elements 7,8 are each of substantially uniform section along their length. In this exemplary embodiment, the first and second elements are extrusions of aluminium and the obdurator flap, mounting blocks and spacer are of plastics material. The weatherhood may be of plastics material as well.

The obdurator flap has a main wall portion 6*a* and mounted on the inner face of the wall is a strip 14 of sealing material. This strip may be adhesively secured to the inner face of the wall. The strip may be an elastomeric material such as PVC or a dense resilient foam or a typical pile faced fabric.

The obdurator flap 6 has a lower flange 6*b* terminating in a re-entrant neck with a bead 6*c* of part-circular section. The obdurator flap has an upper flange 6*d* extending in the same direction as the lower flange 6*b* but terminating in a rib 6*e*. Extending from the opposed side of the wall 6*a* at the upper portion is a lateral inclined flange 6*f* terminating in a bead edge to provide a pull-push handle for operating the obdurator flap 6.

The first element 7 has a central leg portion 7*a* that extends to one side of a flange 7*b* so

that the flange 7*b* can be received within the passageway 3 engaging the lower wall 5 with the leg portion 7*a* providing a stop or abutment face. The first element is formed with a part-circular groove or recess 7*c* to the underside and to the outer side of the leg portion 7*a* and this recess 7*c* is complementary to the bead 6*c* of the obdurator flap 6. The first element 7 also has an outer flange 7*d* which provides a flat seating face for engagement with the seal strip 14 when the obdurator flap is closed as shown in Figure 3. The upper face of the flange 7*d* has a groove 7*e*.

As will be appreciated from the foregoing, the obdurator flap 6 may be mounted for pivotal movement on the first element 7 by sliding the obdurator lengthwise of the first element 7 once the bead 6*c* has been entered in one end of the recess 7*c* and once the two parts are so assembled they are held together for pivotal movement. The bead 6*c* is a tight interference fit within the recess 7*c* so that there is frictional inter-engagement of the two parts to provide a frictional hinge which can maintain the obdurator flap 6 is any selected position between the fully open and closed positions as shown in Figures 2 and 3.

The second element 8 has a central leg portion 8*a* that extends to one side of a flange 8*b* so that the flange can be received within the passageway 3 engaging the upper wall 4 with the leg portion 8*a* providing a stop or abutment in a similar manner as for the first element 7. The second element 8 is formed with a keyhole shaped groove 8*c* to the outer side of the leg portion 8*a* for engaging with the mounting blocks 9 or with the spacer piece 11 as later described. The second element 8 has an outer flange 8*d* which provides a flat seating face for engagement with the seal strip 14 when the obdurator flap 7 is closed.

The upper side of the outer flange 8*d* is provided with a recess groove 8*e* which is designed to receive the rib 6*e* for a snap action closure engagement when the obdurator flap is closed and for release when the flange 6*f* is pulled down to disengage and open the obdurator flap.

As best shown in Figure 1, the spacer piece 11 is of hollow channel shape providing side walls 11*a* that are of a height corresponding to the required distance between the elements 7,8. The upper wall of the spacer piece 11 is provided with an upstanding necked bead 11*b* which is arranged to be received within the keyhole groove 8*c* of the second element 8 and to assemble the two parts together, the spacer piece is entered into one end of the second element groove 8*c* and slidden thereallong to an intermediate position. The lower front edge of the spacer piece is formed with a dependent lug 11*c* for engagement and location in the groove 7*e* of the first element 7.

The spacer piece 11 may be a short length of an extrusion, and is optional. It is possible to use more than one spacer piece in a long ventilator with the spacer pieces being spaced apart along the length of the first and second elements to support same at intermediate positions.

Each mounting block 9 provides a pedestal 9*a* for supporting the ends of the first and second elements 7,8 in the required spaced relationship. Above and below the pedestal 9*a* there are short lugs 9*b*,9*c* for engagement respectively within the keyhole groove 8*c* and the hinge groove 7*c* to assemble and locate the first and second elements 7,8 on a mounting block at each end.

As should now be appreciated, the invented ventilator is designed for simple and easy assembly from basic components or parts. The first and second elements together with the obdurator and seal are capable of being cut to any desired length for sizing to the width of the passageway in a frame. Once the parts have been so sized, then the parts can be assembled together with any spacer pieces being slid onto the first element, and the first and second elements are mounted on the pedestals of each respective mounting block engaging the respective lugs to locate and hold the parts together.

Once this assembly has been completed, then the ventilator may be presented to the opening in the frame for securing thereto after the inwardly directed flanges 7*b* and 8*b* of the first and second elements have been seated in place. If desired, a mastic sealant or thin seal may be interposed between the outer face of the frame and each element 7,8.

Once the ventilator is so assembled in the opening of the passageway, then the mounting blocks are screwed to the face of the frame and the fixing is complete without any special tools or fitting requirements.

On the outside of the frame, all that is required is to fit the weatherhood over the extent of the width of the passageway with the foam filter being located as required in the length of the opening through the frame. The weatherhood can be longer than the passageway width and provided that the flange mounting does not obstruct the air flow through the passageway, the mounting of the weatherhood is not critical.

In this invented ventilator, the obdurator is maintained in the selected open position by friction due to the interference fit of bead and recess forming the hinge connection between the first element and the obdurator flap. Thus, the action is a simple pull-push arrangement to open and close the air path as required.

The seal face of each element is engaged by the seal strip on the inner face of the obdurator wall, and these faces are aligned accurately by means of the mounting of the first and second elements on the mounting blocks and by the location of the elements in

the passageway opening. This accurate sealing with full seating faces is a distinct advantage over other forms of ventilators where the obdurator is intended to seal directly on the face of the frame surrounding the air passageway. In such direct sealing arrangements it is often found that a good seal is not achieved due to uneven surface or defects in the timber such as caused by original machining, warping or damage to the timber, or subsequent painting or the like.

The use of plastics material for the obdurator permits of the selection of a strong tough material having just enough resilience to provide the slight degree of resilience required for such snap action closure and release as aforementioned. In addition, plastics materials of low thermal conductivity avoid the chill effect leading to condensation on the flap when high thermal gradients arise. Although the first and second elements are described as being of aluminium in the exemplary embodiment, they may be coated with plastic to prevent thermal transfer, or if a suitable rigid plastic material is used, such elements can be made of plastics.

The weatherhood as described is a simple design of hood, and other shapes or designs can be used as may be required for aesthetic requirements for appearance to the outside of a building.

Although the mounting blocks as described are preferred, the shape and method for securing the assembled ventilator may be varied for any application, and the profile of the spacer pieces may be varied to suit other types of mounting block. The spacer pieces may be short solid blocks or hollow blocks which are glued or bonded in the required position intermediate the first and second elements.

Although the invented ventilator preferably has the kind of full edge closure achieved by the snap action, it is possible for this to be varied by having another kind of fastening arrangement to hold the obdurator in the closed position. For instance, the fastener could be a spring-loaded catch for release manually or there could be a detent device which automatically closes but has to be actuated for release. Alternatively, a slidable catch operable between the second element and the obdurator flap could be provided.

The obdurator flap may be mounted on the first element without such interference fit between the bead and the recess so that the hinge is not frictional, and in this alternative arrangement, the obdurator flap will open to the fully open position by gravity after the edge closure has been released.

Any such alternatives are considered within the scope of this invention.

CLAIMS

1. A ventilator of the kind in which the obdurator is a pivotal flap arranged to be pivotal between a closed position and an open position to control the flow of air through an elongate passageway formed in the frame of a door or window, the ventilator comprising first and second elements supported at each end by a respective one of a pair of mounting blocks adapted for connection to the frame, each element being of substantially uniform section along it's respective length and each element having a respective flange for location and engagement within the passageway with the blocks mounting the elements in spaced apart parallel relationship, the obdurator flap being mounted on the first element which is lowermost by means of complementary hinge formations extending along the respective lengths of the first element and the flap, inter-engagable formations on the uppermost edge of the flap and the uppermost second element for holding the flap in the closed position, and the internal face of the flap carrying a seal member for engagement with respective seating faces extending along the length of each element remote from said respective flanges.

2. A ventilator according to Claim 1 wherein each mounting block includes respective means engageable with the respective ends of the first and second members to locate them together.

3. A ventilator according to Claim 2 wherein the locating means comprises a pedestal member disposed between the respective ends of the first and second members and first and second lugs engageable with the ends of the first and second members respectively.

4. A ventilator according to any one of the preceding Claims including at least one spacer between the first and second elements intermediate the mounting blocks.

5. A ventilator according to any one of the preceding Claims wherein the complementary hinge formations on the first element and the obdurator flap extend continuously along the respective edges.

6. A ventilator according to Claim 5 wherein the complementary hinge formations comprise a part-circular bead received within a part-circular recess.

7. A ventilator according to Claim 5 or Claim 6 wherein the complementary hinge formations are formed integrally with the first element and the obdurator flap.

8. A ventilator according to any one of the preceding Claims wherein the complementary hinge formations are an interference fit to provide frictionally restrained pivotal movement of the obdurator flap.

9. A ventilator according to any one of the preceding Claims wherein the inter-engageable formations for holding the obdurator flap in the closed position are arranged for an interference or snap action engagement.

10. A ventilator according to Claim 9 wherein the inter-engageable formations comprise edge beads or ribs which extend along

the respective edges.

11. A ventilator according to Claim 9 or Claim 10 wherein the inter-engageable formations are formed integrally with the second element and the obdurator flap.

12. A ventilator according to any one of the preceding Claims wherein the obdurator flap has a laterally extending flange portion providing an operating handle.

13. A ventilator according to any one of the preceding Claims wherein the obdurator flap is arranged to be mounted on one side of the frame and the ventilator further includes a weatherhood section for fitting to the opposed side of the frame to cover the passageway through the frame.

14. A ventilator according to any one of the preceding Claims further including a filter member for mounting in the passageway.

15. A ventilator according to Claim 14 as dependent on Claim 13 wherein the filter member is attached to the inner surface of the weatherhood section.

16. A ventilator according to Claim 14 or Claim 15 wherein the filter member consists of reticulated foam.

17. A ventilator according to Claim 16 wherein the reticulated foam member is resiliently deformable.

18. A ventilator according to any one of the preceding Claims wherein at least one component is made of or coated with material having a low thermal conductivity.

19. A ventilator according to any one of the preceding Claims wherein the first and second elements each have a respective stop for limiting insertion of the associate flange in the passageway.

20. A ventilator substantially as hereinbefore described with reference to the accompanying drawings.

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