

PATENT SPECIFICATION

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(54) IMPROVEMENTS RELATING TO VENTILATORS

(71) We, COLT INTERNATIONAL LIMITED, a British Company, of New Lane, Havant, Hampshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to ventilators and concerns louvred ventilators more particularly for wall mounting.

An object of this invention is to simplify and standardise the construction of louvred ventilators giving varying degrees of protection against weather entry, as required.

Increase of such protection can be obtained by arranging the louvres in banks one behind the other and more commonly the banked louvres are arranged in zig-zag fashion, the louvres of adjacent banks sloping in opposite directions. Also, special arrangements can be adopted for separating and draining off water droplets in the air stream passing inwardly through the banks of louvres. One such arrangement is described and claimed in British Patent Application No. 59103/68 (Serial No. 1,285,721) where two louvre banks are arranged with the banked louvres in zig-zag fashion to define air passages each having a bend on the inside of which a slot is formed, between a trailing edge portion of a louvre of the front bank of louvres and a leading edge portion of a louvre of the rear bank of louvres, the slot lying adjacent to and upstream of the bend and facing upstream in the air passage. Water droplets tend to pass through these slots and means is provided, including drainage channels extending along the trailing edges of the underside of the louvres in the rear bank of louvres to collect and drain off water droplets passing through the slots.

According to this invention a louvred ventilator comprises a plurality of louvred modules each comprising a pair of opposite

side walls and louvres extending therebetween, the modules being arranged one on top of another, each module being received between and supported by a common pair of vertical frame members of the ventilator, and wherein each module includes a bank of downwardly and rearwardly inclined louvres, which louvres are provided along their rear edges each with a drainage channel for collecting water on the undersurface of the louvre which channel opens through drainage holes in the side walls of the module, the drainage holes open into vertical drain passages defined between said side walls and said frame members supporting the module, and the frame members support a bank of louvres at the front of the ventilator and in front of the modules.

Each module may have front and rear flanges by means of which it is attached to the vertical frame members, the vertical frame members being flanged to present channels which form said drain passages with the module side walls, and the rear faces of the module flanges may abut the front faces of the channel flanges, the arrangement being such the the module is insertable and replaceable from the front of the ventilator prior to the attachment of said bank of louvres at the front of the ventilator.

The louvres of the front bank of louvres may be positioned immediately in front of the downwardly and rearwardly inclined module louvres, in which case they are oppositely inclined with respect thereto.

Each module may have a further bank of louvres disposed to the rear of said bank of downwardly and rearwardly inclined louvres, the louvres in said further bank of louvres, being oppositely inclined with respect to the downwardly and rearwardly inclined louvres.

Specific embodiments of this invention will now be described by way of example with reference to the accompanying drawings in which:—

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Fig. 1 is a perspective view from the front and to one side of part of a louvred ventilator according to this invention.

Fig. 2 is a perspective view from the front and to one side of a module of the ventilator shown in Fig. 1.

Fig. 3 is an end elevation from the far end of the module shown in Fig. 2.

Fig. 4 is a detail of the module shown in Fig. 2.

Fig. 5 is a partial cross-section through the ventilator of Fig. 1 on line 5—5 in Fig. 6, showing a modification.

Fig. 6 is a cross-section plan view of the ventilator of Fig. 1 showing the same modification.

Fig. 7 is a partial cross-section corresponding with Fig. 5 to a larger size and showing further details of the front louvre fixings.

Fig. 8 is a view corresponding with a part of Fig. 7 showing an alternative front louvre fixing detail, and

Figs. 9 and 10 and Figs. 11 and 12 and Figs. 13 and 14 and Figs. 15 and 16 and Figs. 17 and 18 and Figs. 19 and 20 and Figs. 21 and 22 and Figs. 23 and 24 and Figs. 25 and 26 and Figs. 27 and 28 all show still further different forms of front louvre fixings.

With reference to the accompanying drawings, Figs. 1 to 7 illustrate embodiments of ventilators according to this invention intended to present a continuous louvre effect to the outside of a building, that is to say as viewed in the direction of arrow 20.

The louvres 90 have a cross-sectional shape as described and claimed in our concurrently filed patent application No. 12370/71 (Serial No. 1404451).

Referring to Figs. 1 to 7 of the accompanying drawings a louvred ventilator comprises horizontally spaced, vertically extending mullions 152 having I-sectioned rearward extensions 152a defining on each side, channels 152b.

The ventilator has a frame comprising upright side members 170 of a channel form presenting inwardly facing channels 170b corresponding with the channels 152b.

The mullions 152 and side frame members 170 mount a bank 114 of louvres 90 which extend in continuous fashion across the front of the side frame members and the mullions. Each interfacing pair of channels 152b of adjacent mullions and each interfacing pair of channels 170b and 152b of adjacent mullions and side frame members receive a stack of louvred modules 180 of further louvre banks mounted one on top of the other.

The modules 180 have front and rear flanges 181 and 182. The modules 180 are inserted, and are removable and replaceable if necessary, from the front of the ventilator. Thus each module may be

moved rearwardly with respect to the mullions to bring the rear faces of the module flange 181 and 182 against the front faces of channel flanges defining channels 152b or 170b to which the flanges 181 and 182 are rivetted for example. Instead of rivets, any other convenient form of fixing can be used.

A complete module is shown in Fig. 2 and comprises top, bottom and side walls 184, 186 and 188 respectively forming a frame.

The module contains two banks 130 and 131 of louvres 90 extending between the side walls 188 to make up, with the louvre bank 114 a ventilator having an arrangement of louvres as described with reference to Fig. 4 of our concurrently filed patent application No. 12370/71 (Serial No. 1404451).

The louvres in the bank 130 of louvres are downwardly and rearwardly inclined and the louvres in the bank 131 of louvres, which is disposed to the rear of the louvre bank 130, are oppositely inclined with respect to the louvres in the bank 130. The louvres in the bank 114 which are positioned immediately in front of the louvres in the bank 130, are also oppositely inclined with respect thereto.

The top and bottom walls 184 and 186 of the modules have longitudinal, adjacent, oppositely inclined wall portions forming interfitting troughs in adjacent top and bottom walls 184 and 186 of adjacent modules, the cross-sectional shape of the top and bottom walls generally corresponding with the oppositely inclined formation of adjacent louvres in the banks 130 and 131 of louvres respectively.

The louvres of the banks 130 and 131 are fitted between the side walls 188 of the modules by means of tongues formed on the two ends respectively of the louvres 90 by cutting away from the flat intermediate section 100 of each louvre a rectangular notch. These notches are most clearly indicated at 190 in Fig. 4. The resulting tongues 191 at the front and rear edges respectively of the louvres in the bank 131 are entered through drainage holes 193 in the side walls 188 while the front tongues on the louvres in the bank 130 engage against the flanges 181, the rear tongues of these louvres being entered through the same drainage holes 193 as the front tongues on the louvres in the bank 131.

The louvres 90, as assembled in the modules, are held resiliently distorted to a small extent so that they cannot rattle. This is indicated by the angles α marked in Fig. 3.

Instead of only two banks of louvres, the modules may contain three banks of louvres to make up a ventilator having an arrangement of louvres as described with reference to Fig. 8 of our concurrently filed patent application No. 12370/71 (Serial No.

1404451). This is shown in Fig. 5. The tongues 191 at the ends of the drainage channels 101 form spouts directing water collected in the channels 101 into the vertical drain passages 152b and 170b closed off by the module side walls. Water runs from the bottom of the passages 152b and 170b out over the cill plate 160 (see Fig. 1). An opening is left at 200 for this purpose between the cill plate 160 and the bottom module of each stack.

The modules may incorporate pivotable louvres pivoted to the side walls 188 on pivot connectors as described with reference to Figs. 5 and 6 of our concurrently filed patent application No. 12370/71 (Serial No. 1404451).

Thus, alternate pairs of louvres of the banks 130 and 131 respectively may be pivoted to the side walls 188, each on a pivot axis extending generally along the rear edge of the louvre in the bank 130, the drainage holes 193 associated with the drainage channel 101 of this louvre being formed in the pivots.

As an alternative, a further bank of pivotable louvres may be provided fixed to the rear of the mullions behind the modules, and this may be as described with reference to Fig. 3 of our concurrently filed patent application No. 12370/71 (Serial No. 1404451).

The form of the top and bottom walls 184 and 186 of the modules 180 positively locates the modules with respect to one another and provides a water trap between adjacent modules. Holes 202 are provided in the side walls 188 to drain off water in the troughs formed in the bottom walls 186 into the vertical passages 152b.

The drainage channels 101 collect water droplets positively separated from air following a zig-zag path between banks of the louvres by impingement upon the underside of the louvres.

In order to obtain the effect of the louvres in the louvre bank 114 running say for the full length of a building, the louvres are mounted on brackets fixed to the mullions so that the louvres cover the brackets and the mullions. A specific mounting arrangement for these louvres is illustrated in Figs. 5, 6 and 7.

These Figs. show the mullions 152 formed each with a T-slot 151 and brackets 153 having T-pieces 154 mounting them in the T-slot. The brackets 153 are shaped to fit the profile of the louvres 90 which are simply sprung onto the brackets as illustrated centrally of Fig. 7. Successive brackets 153 are mounted in the T-slot by inserting their T-pieces into the slot and then twisting the brackets.

Each subsequent bracket 153 rests on the louvre or louvres 90 clipped onto the next

lower bracket to lock them in place, as shown in Fig. 7.

The lowermost bracket 153 rests on the cill plate 160 of the ventilator as shown in Fig. 7. At the upper end, the uppermost bracket 153 and its louvre 90 are held in place by a resiliently compressible member 161 positioned between the louvre and an upper member 162 of the ventilator frame immediately over the bracket. The member 161 may comprise a coiled compression spring 161a and shaped abutment plates 161b one at each end of the spring. The abutting ends 90' of adjacent louvres 90 extending in line are positioned over a common bracket 153 as indicated in Fig. 6.

The member 161 is designed to positively lock the louvres in place and yet allow for and take up thermal movements of the components.

The louvres in the bank 114 are likewise supported from the side frame members 170 by brackets 153 mounted in corresponding T-slots 151 in the side frame members.

In this way a "continuous louvre effect" is created, that is to say the appearance of an unbroken length of louvres free from fixing for the louvres as seen from the front of the ventilator.

The louvres in the bank 114 could instead be mounted on spring clips 170 rivetted to a front wall 171 of the mullions, as shown in Fig. 8. In this arrangement each subsequent clip 170 holds the louvre on the next lower clip 171 on its clip.

In a still further arrangement the louvres in the bank 114 are mounted on pairs of bracket formations 173 as shown in Figs. 9 and 10 formed on a bracket strip 175 formed integrally with the mullions. The bracket formations are shaped to interfit with the louvres which are a snap fit thereon generally in the manner already described with reference to Fig. 7. A single louvre may be mounted on both formations of each pair or each formation may mount an end of a separate louvre, the louvres abutting one another end to end between the formations.

The pairs of bracket formations 173 may be formed each on a separate U-shaped bracket rivetted to the mullion if desired.

Figs. 11 and 12 show a still further arrangement for mounting the louvres in the bank 114. Spring steel brackets 180 rivetted to the mullions 181 are of the form shown in these figures. A louvre is hooked onto the bottom of each bracket and the bottom bracket arm deflected upwards to allow the louvre to be sprung over the top of the bracket.

The resiliency of the bracket then tensions the louvre. The louvres are mounted beginning at the bottom of the bank 114 and the arrangement may be such that each subsequently mounted louvre holds the

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louvre immediately below it on its clip. This is not, however, shown.

5 Figs. 13 and 14 show a still further arrangement for mounting the louvres in the bank 114 using one spring steel bracket 186 for mounting adjacent pairs of the louvres one above the other in the bank. The brackets 186 are rivetted to the mullions 187. One louvre is located over a foot 188 at the end of a lower leg of a bracket and rivetted at its upper end as at 189, to the upper bracket leg. The next upper louvre is located over a foot 190 at the end of the upper bracket leg and rivetted at its upper end to the lower leg of the next upper bracket.

The louvres are tensioned by resilient deformation of the bracket during fixing.

20 Figs. 15 and 16 show a still further arrangement for mounting the louvres in the bank 114 using spring steel brackets 192. These brackets are rivetted to the mullions 193 and have the form shown in the figures. The brackets may act to tension the louvres, and each bracket may hold the next lower louvre in place on the next lower bracket.

25 In Figs. 17 and 18 the mounting arrangement for the louvres in the bank 114 is generally as described with reference to Figs. 15 and 16 but the brackets 192' are of slightly modified shape to present a foot 194 which engages with the formations at the lower edges of the louvres to prevent any possible rattling movement.

30 Figs. 19 and 20 show an arrangement generally similar to that described with reference to Figs. 9 and 10. The formations 173' are of a slightly modified shape so as more accurately to interfit with the front and rear edge formations of the louvres.

35 Figs. 21 and 22 correspond with Figs. 19 and 20 except that in this case compression springs 195 are provided on the bracket formations to engage the front edges of the louvres to prevent the louvres from rattling.

40 The still further arrangement illustrated in Figs. 23 and 24 uses mullions 196 which appear in front elevation as shown in Fig. 24 and which are formed at their front in the manner shown in side elevation in Fig. 23. A tab 197 bent up from the mullion prevents each louvre from bowing.

45 Figs. 25 and 26 show an alternative spring steel fixing bracket 199 for the louvres in the bank 114 to be used in place of the brackets shown in Figs. 15 and 16 for example. In this case the louvre is first located over the bracket foot 200. The lower bracket leg is then drawn up and the louvre located over the tab 201. The louvre is tensioned by resilient deformation of the bracket but held in place by a screw 203 screw threadedly engaged with a nut 204 welded to the upper bracket leg.

65 Figs. 27 and 28 show an arrangement for

mounting the louvres in the bank 114 using spring steel wire brackets 210 positioned in openings 211 formed in the front face of the mullions 212 by bending outwardly and then downwardly, tabs 213, the louvres being held in position at their rear edges by the tabs 213.

WHAT WE CLAIM IS:—

1. A louvred ventilator comprising a plurality of louvred modules each comprising a pair of opposite side walls and louvres extending therebetween, the modules being arranged one on top of another, each module being received between and supported by a common pair of vertical frame members of the ventilator, and wherein each module includes a bank of downwardly and rearwardly inclined louvres which louvres are provided along their rear edges each with a drainage channel for collecting water on the undersurface of the louvre which channel opens through drainage holes in the side walls of the module, the drainage holes open into vertical drain passages defined between said side walls and said frame members supporting the module, and the frame members support a bank of louvres at the front of the ventilator and in front of the modules.

2. A ventilator as claimed in claim 1 wherein each module has front and rear flanges by means of which it is attached to the vertical frame members, the vertical frame members are flanged to present channels which form said drain passages with the module side walls, and the rear faces of the module flanges abut the front faces of the channel flanges, the arrangement being such that the module is insertable and replaceable from the front of the ventilator prior to the attachment of said bank of louvres at the front of the ventilator.

3. A ventilator as claimed in claim 2 wherein the louvres of the front bank of louvres are positioned immediately in front of the downwardly and rearwardly inclined module louvres, and are oppositely inclined with respect thereto.

4. A ventilator as claimed in claim 3 wherein each module has a further bank of louvres disposed to the rear of said bank of downwardly and rearwardly inclined louvres, the louvres in said further bank of louvres being oppositely inclined with respect to the downwardly and rearwardly inclined louvres.

5. A ventilator as claimed in claim 4 wherein each module has a bottom wall and a top wall extending between its side walls and forming with the side walls, a module frame, the top and bottom walls having longitudinal, adjacent, oppositely inclined wall portions forming interfitting troughs in adjacent top and bottom walls of adjacent modules and a hole is provided in a side wall

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louvre immediately below it on its clip. This is not, however, shown.

5 Figs. 13 and 14 show a still further arrangement for mounting the louvres in the bank 114 using one spring steel bracket 186 for mounting adjacent pairs of the louvres one above the other in the bank. The brackets 186 are rivetted to the mullions 187. One louvre is located over a foot 188 at the end of a lower leg of a bracket and rivetted at its upper end as at 189, to the upper bracket leg. The next upper louvre is located over a foot 190 at the end of the upper bracket leg and rivetted at its upper end to the lower leg of the next upper bracket.

The louvres are tensioned by resilient deformation of the bracket during fixing.

20 Figs. 15 and 16 show a still further arrangement for mounting the louvres in the bank 114 using spring steel brackets 192. These brackets are rivetted to the mullions 193 and have the form shown in the figures. The brackets may act to tension the louvres, and each bracket may hold the next lower louvre in place on the next lower bracket.

25 In Figs. 17 and 18 the mounting arrangement for the louvres in the bank 114 is generally as described with reference to Figs. 15 and 16 but the brackets 192' are of slightly modified shape to present a foot 194 which engages with the formations at the lower edges of the louvres to prevent any possible rattling movement.

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45 The still further arrangement illustrated in Figs. 23 and 24 uses mullions 196 which appear in front elevation as shown in Fig. 24 and which are formed at their front in the manner shown in side elevation in Fig. 23. A tab 197 bent up from the mullion prevents each louvre from bowing.

50 Figs. 25 and 26 show an alternative spring steel fixing bracket 199 for the louvres in the bank 114 to be used in place of the brackets shown in Figs. 15 and 16 for example. In this case the louvre is first located over the bracket foot 200. The lower bracket leg is then drawn up and the louvre located over the tab 201. The louvre is tensioned by resilient deformation of the bracket but held in place by a screw 203 screw threadedly engaged with a nut 204 welded to the upper bracket leg.

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mounting the louvres in the bank 114 using spring steel wire brackets 210 positioned in openings 211 formed in the front face of the mullions 212 by bending outwardly and then downwardly, tabs 213, the louvres—being held in position at their rear edges by the tabs 213.

WHAT WE CLAIM IS:—

70 1. A louvred ventilator comprising a plurality of louvred modules each comprising a pair of opposite side walls and louvres extending therebetween, the modules being arranged one on top of another, each module being received between and supported by a common pair of vertical frame members of the ventilator, and wherein each module includes a bank of downwardly and rearwardly inclined louvres which louvres are provided along their rear edges each with a drainage channel for collecting water on the undersurface of the louvre which channel opens through drainage holes in the side walls of the module, the drainage holes open into vertical drain passages defined between said side walls and said frame members supporting the module, and the frame members support a bank of louvres at the front of the ventilator and in front of the modules.

75 2. A ventilator as claimed in claim 1 wherein each module has front and rear flanges by means of which it is attached to the vertical frame members, the vertical frame members are flanged to present channels which form said drain passages with the module side walls, and the rear faces of the module flanges abut the front faces of the channel flanges, the arrangement being such that the module is insertable and replaceable from the front of the ventilator prior to the attachment of said bank of louvres at the front of the ventilator.

80 3. A ventilator as claimed in claim 2 wherein the louvres of the front bank of louvres are positioned immediately in front of the downwardly and rearwardly inclined module louvres, and are oppositely inclined with respect thereto.

85 4. A ventilator as claimed in claim 3 wherein each module has a further bank of louvres disposed to the rear of said bank of downwardly and rearwardly inclined louvres, the louvres in said further bank of louvres being oppositely inclined with respect to the downwardly and rearwardly inclined louvres.

90 5. A ventilator as claimed in claim 4 wherein each module has a bottom wall and a top wall extending between its side walls and forming with the side walls, a module frame, the top and bottom walls having longitudinal, adjacent, oppositely inclined wall portions forming interfitting troughs in adjacent top and bottom walls of adjacent modules and a hole is provided in a side wall

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of each module to drain off water penetrating into the trough formed in the bottom wall of the module.

5 6. A ventilator as claimed in any preceding claim wherein said downwardly and rearwardly inclined louvres of each module each have a flat intermediate section extending the full length of the louvre and notched at its two ends to provide tongues one of which, at each end of the louvre, is formed by an end portion of the drainage channel, and said one tongues are entered through said drainage holes in the adjacent side walls of the modules and form drainage spouts.

15 7. A ventilator as claimed in claim 6 wherein said downwardly and rearwardly inclined louvres of each module are held resiliently distorted by said tongues.

20 8. A ventilator as claimed in claim 1, 2, 3, 4 or 5 wherein alternate ones of said downwardly and rearwardly inclined louvres of each module are pivoted to the side walls

of the module each on a pivot axis extending generally along its rear edge, and each drainage hole of each pivoted louvre is formed in one of the louvre pivots.

9. A ventilator as claimed in any preceding claim further comprising at least three of said vertical frame members two of which are side frame members and the remainder of which are mullions, and wherein each louvre of said bank of louvres at the front of the ventilator extends in a continuous fashion across the front of the side frame members and the mullions.

10. A louvred ventilator as claimed in claim 1 substantially as any one of the embodiments hereinbefore described with reference to the accompanying drawings.

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