

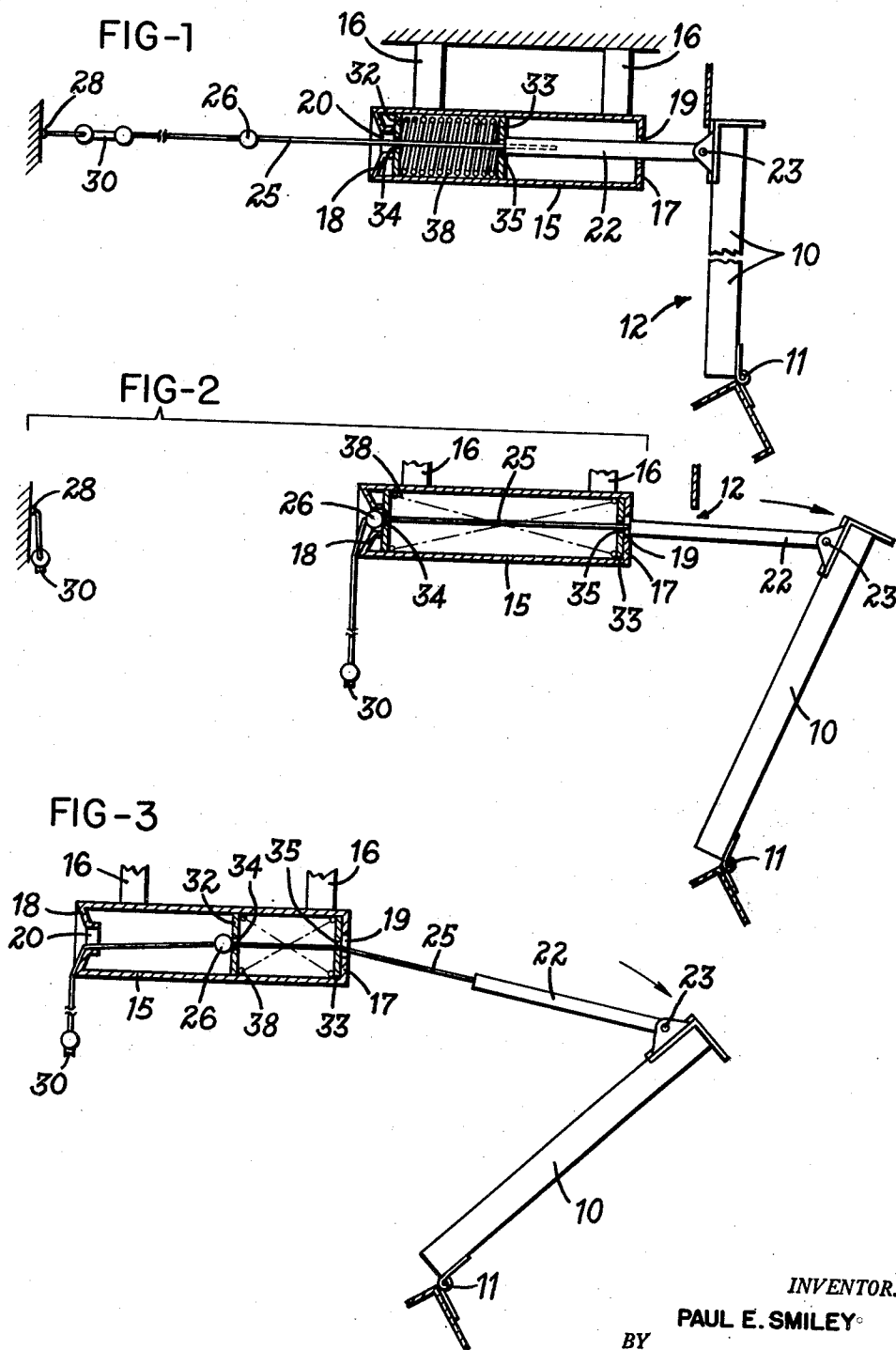
Nov. 12, 1957

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2,812,835

AUTOMATIC VENTILATOR

Filed May 11, 1956



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2,812,835

AUTOMATIC VENTILATOR

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Application May 11, 1956, Serial No. 584,216

5 Claims. (Cl. 189—50)

This application relates to an automatic ventilator, particularly to a ventilator of the type in which a window or other openable ventilating closure in a building is arranged to open automatically in response to certain unusual conditions within the building.

The present invention is particularly adapted for use in large factory buildings, warehouses, and the like. It is generally accepted that when a fire breaks out in such a large building it is desirable to ventilate the interior of the building to carry off smoke, fumes, and the like and thus to clear the atmosphere within the building so that the fire fighters can enter unhampered by such smoke or fumes and quickly locate and combat the fire. It is therefore desirable to provide for automatic opening of skylight windows or windows located in the upper portion of the building walls near the roof, in response to certain unusual conditions within the building. For example, the operating mechanism for such ventilating closures may be actuated in response to excessive heat in the building such as to melt a fusible link or the like in the mechanism and thus to actuate the ventilating mechanism.

It is therefore a primary object of this invention to provide an improved device for automatically opening a ventilating closure member.

An additional object of the invention is to provide such a device which initially acts to urge the closure member into an open position, and then subsequently acts to check the movement of the closure member as it approaches its fully open position to prevent breakage of the closure member due to a too rapid deceleration thereof at its fully open position.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawing—

Fig. 1 is a somewhat schematic view of an automatically operating ventilating closure control device in accordance with the invention;

Fig. 2 is a view similar to Fig. 1 showing the initial operation of the device urging the closure member to an open position; and

Fig. 3 is another view similar to Fig. 1 illustrating the checking of the opening movement of the closure member as it reaches its fully open position.

Referring to the drawing, which illustrates a preferred embodiment of the present invention, a window or other suitable ventilating closure member is indicated generally at 10, hinged at 11 adjacent its bottom to extend across a vertical opening 12 in a building. Such opening might, for example, be in a skylight or in some other relatively elevated position on the building. A guide tube 15 is held in a fixed position relative to opening 12 by a suitable support 16, and includes fixed abutments 17 and 18 adjacent the opposite ends thereof and having generally centrally located openings 19 and 20, respectively.

A control rod 22 is fixed by a suitable hinged connection 23 at one end thereof to the upper portion of window 10, and the other end of rod 22 extends through opening 19 into the interior of guide tube 15, in freely movable relation with respect to the tube and fixed abutment 17.

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A control cable 25 extends through opening 20 into guide tube 15 and is secured to the end of rod 22 within the guide tube. Cable 25 carries a suitable stop 26 thereon, fixed to the cable and normally positioned outwardly of the guide tube. The free end of cable 25 may be suitably anchored, as shown schematically at 28, or may extend to any suitable manually operated mechanism for opening and closing closure member 10 if it is desired to use that closure member for ordinary ventilating purposes as well as for the emergency ventilating described above. Between stop 26 and the anchored end of the cable there is provided at least one fusible link 30 which normally connects the anchored end of the cable to the portion thereof extending into guide tube 15, as shown in Fig. 1.

Within the guide tube are two movable abutment members 32 and 33, having suitable central openings 34 and 35, respectively, provided for free passage of cable 25. In the normal position of the device, with the closure member 10 in its closed position as shown in Fig. 1, the second movable abutment 32 rests against fixed abutment 18, and the first movable abutment 33 engages the end of rod 22 within tube 15. The movable abutments are urged into these respective positions by a spring 38 normally compressed between them. The dimensions of the parts are such that stop 26 is freely passable through opening 20, but is impassable through opening 34, and therefore is engageable with the second movable abutment 32. Similarly, the first movable abutment 33 engages the end of rod 22, but it cannot pass through opening 19 and therefore is engageable with the fixed abutment 17.

Referring to Fig. 2, the relation of the parts is shown after frangible link 30 has broken due to excessive heat or to some other abnormal condition in the atmosphere within the building requiring emergency ventilation. Thus, the control rod is forced to an opening position due to expansion of spring 38 and resultant pressure of movable abutment 33 against the end of rod 22 until the closure member 10 reaches the position shown in Fig. 2, wherein the spring is fully expanded. At this time stop 26 is approximately entering guide tube 15 through opening 20 for engagement with the second movable abutment 32.

The opening of the closure member continues due to its own weight and due to the acceleration imparted thereto by the expanding spring 38. Control rod 22 passes entirely outwardly of guide tube 15, through the opening 19, and stop 26 engages the movable abutment 32, causing it to act against the expanded spring 38 and to contract the spring, as shown in Fig. 3, with the first movable abutment 33 now engaging the fixed abutment 17. This action of the spring and movable abutments gradually checks the decelerates the opening closure member, stopping it in a fully open position and preventing a too rapid deceleration thereof which might result in breakage of the parts.

It will thus be seen that the present invention provides an automatic ventilating closure opening device which is relatively simple and inexpensive to manufacture, and yet which exerts a positive force to open the ventilating closure when such opening is required due to unusual conditions within the building. Furthermore, the device provides a checking action which decelerates the opening closure member and stops it in a fully open position.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to

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be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In combination with a normally closed ventilating closure member, a control rod having one end secured to said closure member, guide means for the other end of said rod, means for supporting said guide means in fixed relation to the opening controlled by said closure member, spring means acting against said other end of said rod to urge said closure member forcibly to an open position, anchor means holding said closure member in a normally closed position against the force of said spring means to provide for a positive opening movement of said closure member on release of said anchor means, means for releasing said anchor means in response to a condition requiring opening of said closure member to provide ventilation, and means interconnecting said other end of said rod and said spring means to check the movement of said closure member as it approaches a fully open position.

2. In combination with a normally closed ventilating closure member of the character described, a control rod fixed at one end to said closure member, guide means for the other end of said rod, means for supporting said guide means in fixed relation to the opening controlled by said member, anchor means holding said rod in a normally closed position of said member, means for releasing said anchor means in response to excessive heat, spring means cooperating with said guide means and said control rod to urge said closure member forcibly into an open position upon release of said anchor means, and means engageable with said spring means to provide a resilient check for said closure member in the fully open position thereof.

3. In a device of the character described for automatically opening a ventilating closure member in response to excessive heat, the combination of a control rod having one end thereof adapted for securing to the closure member, guide means for the other end of said rod, means for supporting said guide means in fixed relation to the opening controlled by the closure member, spring means acting against said other end of said rod to urge the closure member forcibly to an open position, anchor means for holding the closure member in a normally closed position against the force of said spring means to provide for a positive opening movement of the closure member on release of said anchor means, means interconnecting said other end of said rod and said spring means to check the movement of the closure member as it approaches a fully open position, and means for releasing said anchor means in response to excessive heat to release the closure member for opening movement.

4. In a device of the character described for automatically opening a ventilating closure member in response to excessive heat, the combination of a guide means adapted for mounting in fixed relation to the ventilating opening to be controlled, first and second fixed abutments at opposite ends of said guide means, a control rod having one end thereof receivable in said guide means in

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freely movable relation to said first fixed abutment, the other end of said control rod being adapted for securing to the closure member to control opening and closing movements thereof, a cable fixed to one end of said rod and adapted for anchoring in spaced relation to the other end of said guide means for normally retaining said one end of said rod within said guide means to close the ventilating closure member, a fusible link in said cable outwardly of said guide means, a stop on said cable normally outwardly of said guide means and freely movable past said second fixed abutment, first and second movable abutments carried by said guide means between said fixed abutments, said movable abutments being freely movable with respect to said cable, said first movable abutment being engageable with one end of said control rod, said second movable abutment being engageable with said second fixed abutment in the normal closed position of the device, spring means extending between said movable abutments and normally urging said movable abutments apart, and said stop being engageable with said second movable abutment on breaking of said link to provide for initial expansion of said spring means to urge the closure member to an open position and to provide for subsequent contraction of said spring to check the opening movement of said closure member as it approaches a fully open position.

5. In combination with a ventilating window hinged at its bottom and normally extending in closing relation across a vertical opening in a building, a guide tube supported in fixed relation to said opening within the building, first and second fixed abutments at opposite ends of said tube and having openings therein, a control rod secured at one end to said window and having its other end normally received within said guide tube extending through the opening in said first abutment in freely movable relation, a first movable abutment in said tube engaging said other end of said rod, said first movable abutment being impassable through the opening in said first fixed abutment, a second movable abutment normally engaging said second fixed abutment, spring means urging said movable abutments apart, a cable secured to said other end of said rod and passing through said movable abutments and said second fixed abutment outwardly of said tube for drawing said window to its closed position, a fusible link in said cable outwardly of said guide tube, a stop carried on said cable between said link and the adjacent end of said guide tube, said stop being passable through said second fixed abutment and being engageable with said second movable abutment on severance of said fusible link and subsequent expansion of said spring means to urge said window to an open position for gradually checking the movement of said window as it reaches a fully open position to ventilate the interior of the building.

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