

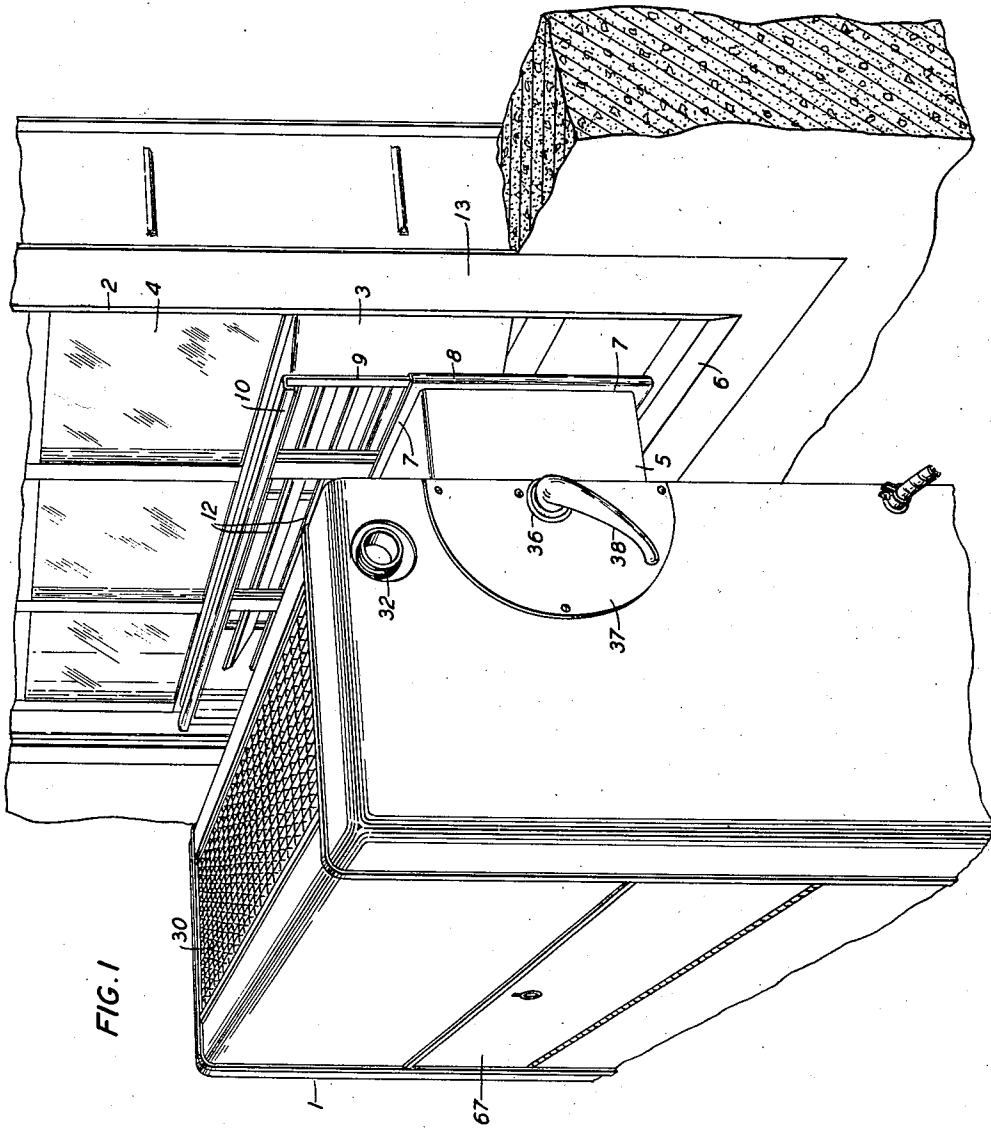
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O. C. ELIASON
VENTILATOR

2,218,330

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5 Sheets-Sheet 1



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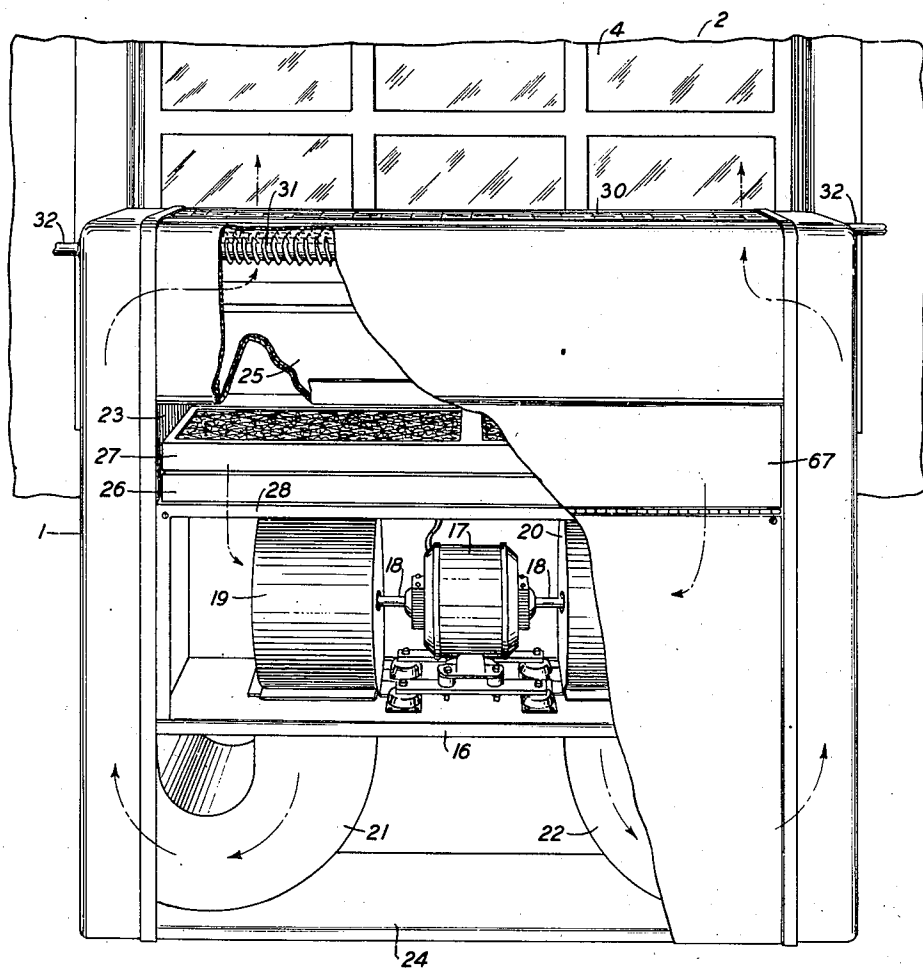
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FIG. 2



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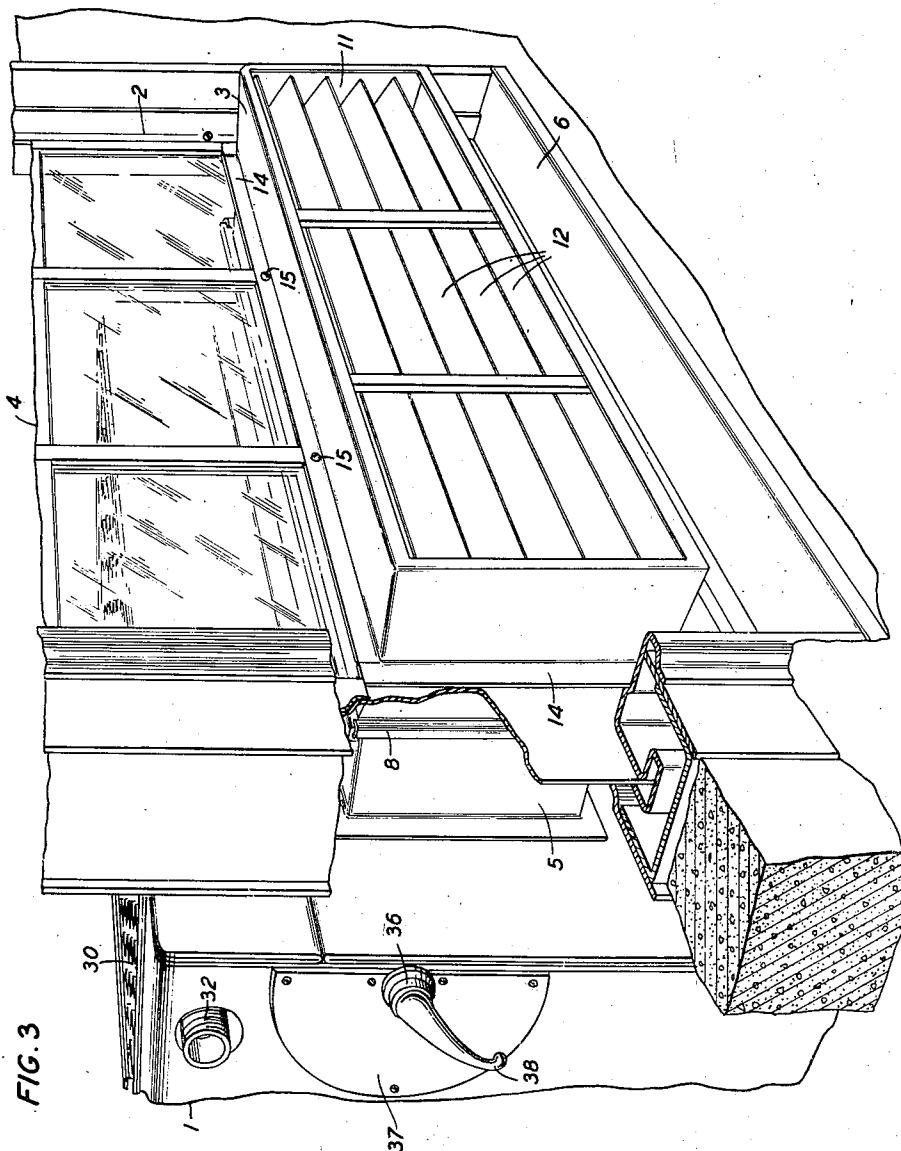
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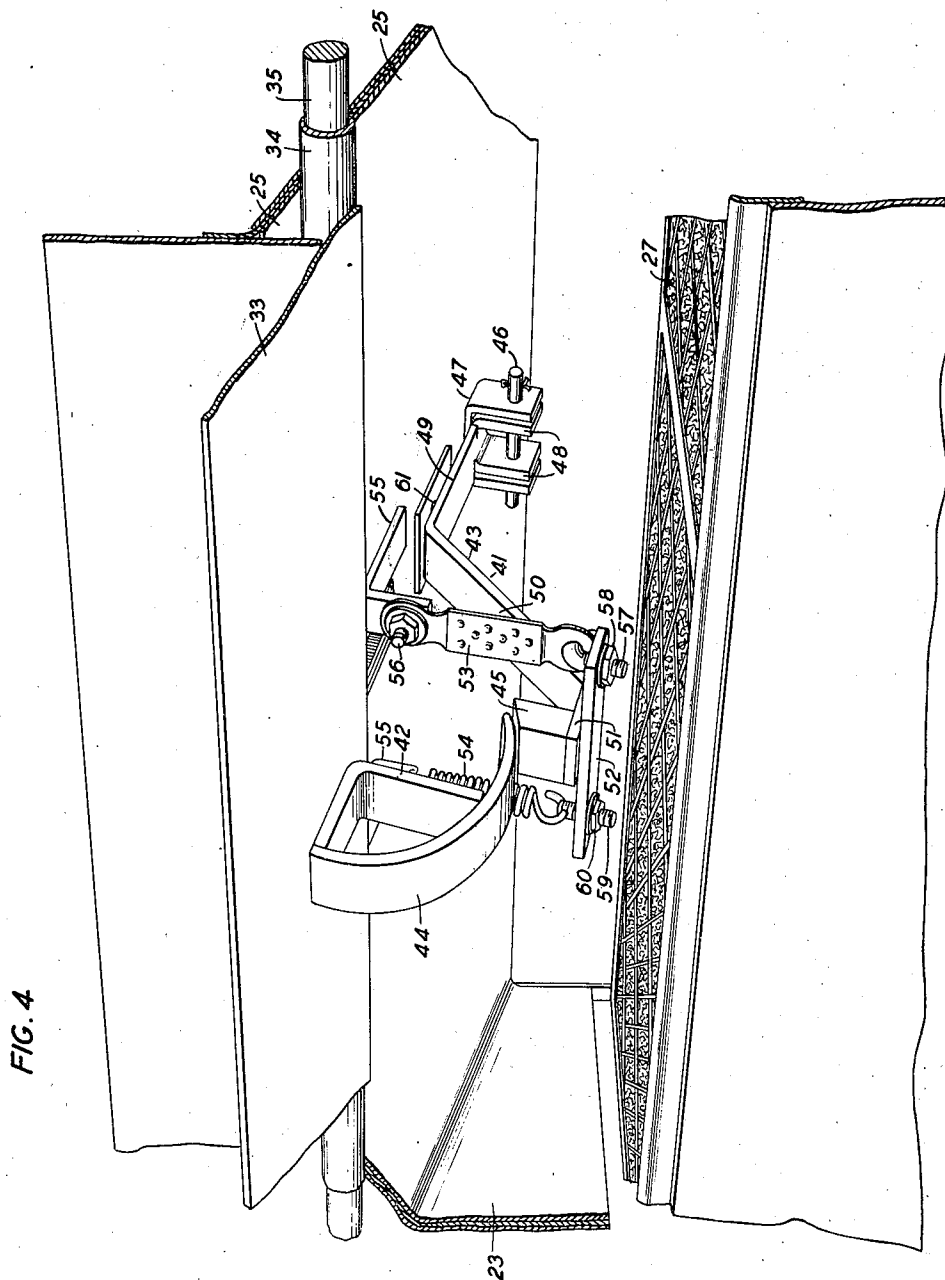
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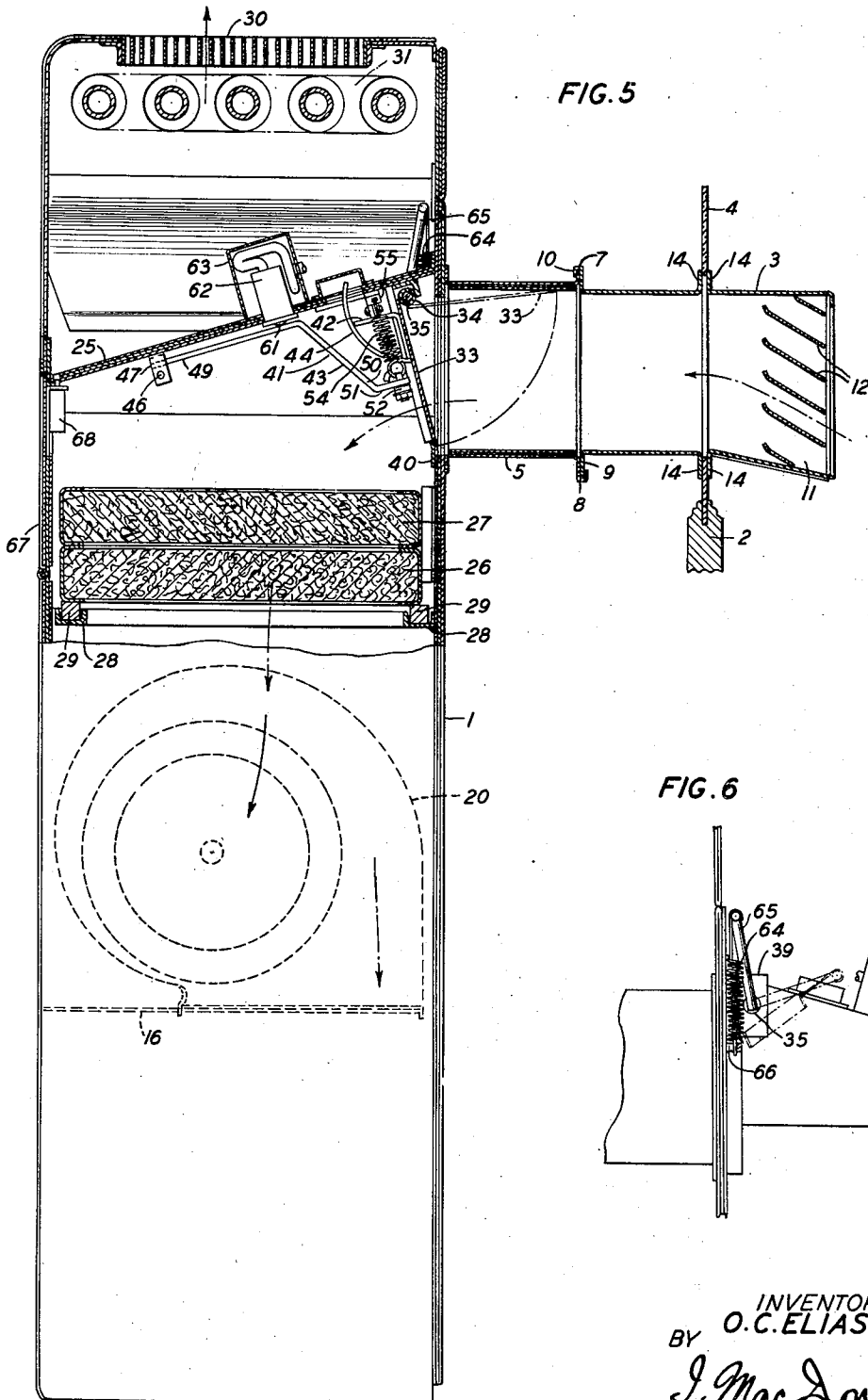
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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

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VENTILATOR

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3 Claims. (Cl. 98—94)

This invention relates to ventilator apparatus and more particularly to a ventilator unit for supplying air to a room.

An object of the invention is to provide means in the ventilator for controlling the supply of air passing through the ventilator.

A feature of the invention resides in a holding means for a shutter in the ventilator.

Another feature resides in a means for controlling the operation of a motor driven fan.

Another feature resides in an inlet structure of the ventilator.

In the drawings:

Fig. 1 is a view in perspective and partly in section of an upper portion of the ventilator and a portion of a window in a wall structure of a building;

Fig. 2 is a front elevational view of the ventilator and a portion of the window and with portions of the ventilator broken away to disclose some of the inner parts;

Fig. 3 is a view in perspective and partly in section of portions of the ventilator and the window in the building and taken from outside of the window;

Fig. 4 is a view in perspective and partly in section of the shutter and its holding means and some of the nearby parts of the ventilator structure and is drawn on an enlarged scale relative to the other figures in the drawings;

Fig. 5 is a side elevational view partly in section of the ventilator and a portion of the window; and

Fig. 6 is a view of a portion of the structure shown in Fig. 5 and in reverse position relative to Fig. 5.

The ventilator described herein is adapted to condition air and supply the conditioned air in regulated volume to a room, the air being taken in through an opening in a window located in the wall structure of the room.

The ventilator as shown in Figs. 1, 2, 3 and 5 comprises a casing 1 adapted to be placed adjacent a window 2 and an air inlet casing 3 supported in the lower sash 4 of the window 2. The casing 1 has a rectangular air inlet portion 5 extending from the back of the casing and in a position slightly above the sill 6 of the window 2.

The inlet portion 5 is flanged on its rear edge portion to provide a peripheral flange 7, the lower and side portions of the flange 7 being formed to provide channels 8 adapted to receive a peripheral flange 9 formed on the inner end portion of the air inlet casing 3. The upper portion of the peripheral flange 7 is not made in the form of a

channel but is left plain to receive a channel-shaped upper edge portion 10 of the peripheral flange 9 on the air inlet casing 3. The air inlet casing 3 is a rectangular box-like structure mounted in the sash 4 of the window 2 and extending transversely through the sash 4 so that an open inlet end portion 11 provided with louvers 12 extends outward on the outside of the sash. The sash 4 may be specially constructed to include the air inlet casing 3 or may be a standard and well-known type of window sash modified to include the air inlet casing 3. It is contemplated that the sash 4 is so mounted in the window frame 13 as to permit raising and lowering of the sash relative to the sill 6. If a standard type of sash having horizontal rows of window panes therein is used, the lower row of window panes may be removed to provide a space to accommodate the air inlet casing 3, the casing 3 having flanges 14—14 to engage portions of the sash 4 and being secured thereto by suitable fastening means, such for instance as the screws 15. In Fig. 1 the sash 4 is shown as being in a position slightly raised from its normal closed position. In Figs. 2, 3 and 5, the sash 4 is shown as being in fully closed position which is the normal position of the sash when the ventilator is in operation. In this normal position, the channel-shaped upper edge portion 10 of the flange 9 on the air inlet casing 3 fits over the upper plain portion of the flange 7 on the inlet portion 5 and the lower portion of the flange 9 on the air inlet casing 3 fits into the lower portion of the channel 8 on the inlet portion 5. It can readily be seen by looking at Figs. 2, 3 and 5 that when the sash 4 is in normal closed position, it would be difficult to get at some of the window panes in the sash to clean them because portions of the window panes are below the level of the top portion of the ventilator casing 1. By raising the sash 4, however, to the position shown in Fig. 1, access may be had to the portions of the window panes normally below the level of the upper portion of the ventilator.

Within the casing 1 and supported therein and in a horizontal position, as shown in Figs. 2 and 5, is a shelf 16. The shelf 16 supports a blower comprising a motor 17 and fans (not shown) but supported on opposite ends of the motor shaft 18. The fans are housed in the fan housings 19 and 20 and are adapted to draw air in through openings in the ends of the housings 19 and 20 and drive the air through apertures in the shelf 16 located in line with openings provided in the lower sections of the fan housings 19 and 20. Air

ducts 21 and 22 extend from the openings in the shelf 16 to direct the air delivered by the fans of the blower to air passages extending up opposite ends of the casing 1. The air passages mentioned are not shown in the drawings but are defined by end portions of the casing and two vertical wall members 23 inwardly spaced from the ends of the casing. The wall members 23 extend from a bottom wall 24 of the casing 1, upwardly to a sloping wall member 25. The wall member 25 extends horizontally across an upper portion of the casing and between the top portions of the wall members 23, 23 and slopes downwardly from a point slightly above the top of the inlet portion 5 to the front of the casing 1.

Dust screens 26 and 27 are located in the casing 1. The dust screens 26 and 27 comprise suitable frameworks filled with material adapted to screen out dust particles from the air taken in by the ventilator. The material may be for instance mineral wool impregnated with oil. The screens 26 and 27 are stacked one on top of the other and are supported by means of a rack 28. The rack 28 extends between the wall members 23, 23 and slightly above the fan housings 19 and 20 and supports the screens 26 and 27 in a horizontal position. The screen 26 rests on a cushion 29 supported on the rack 28.

A grilled opening 30 is provided in the top of the casing 1 to permit escapement of the air into a room. A heating device 31 may be provided in the ventilator to heat the air before the air passes through the grilled opening 30, the ends of the casing being apertured at suitable points to accommodate inlet and outlet connections 32 for the heating device 31. The course of the air through the ventilator is shown by the arrows in Figs. 2 and 5, when a shutter 33 to be later described is in an opened position.

The shutter 33 is a swinging wall member adapted to regulate the volume of air passing through the ventilator and is disposed adjacent the inner end of the inlet portion 5. One edge portion of the shutter 33 as shown in Figs. 4 and 5 is attached to a cylindrical tube 34 encompassing a rotatable rod 35, the tube and rod being secured together by suitable means so that rotation of the rod 35 will cause swinging movement of the shutter 33. The rod 35 is journaled at one end in a bearing 36 shown in Figs. 1 and 3, the bearing 36 being mounted in an apertured plate 37 secured to an outer face of one end portion of the casing 1. A manually operated handle 38 is secured to this end of the rod 35 to permit manual operation of the shutter 33. The other end of the rod 35 as shown in Fig. 6 is rotatably supported in an apertured bracket 39 which is secured to an inner wall surface of a back portion of the casing 1. When the handle 38 is in the position shown in Figs. 1 and 3, the shutter 33 is in the dotted line position shown in Fig. 5. In this position the shutter 33 extends into the inlet portion 5 and the inlet portion of the ventilator is in fully opened condition to permit free passage of air to the fans. By turning the handle 38 in a clockwise direction the shutter 33 may be moved to various positions between fully opened and fully closed position to regulate the volume of air flowing to the fans. In Fig. 5 the shutter 33 is shown in full line in fully closed position. In this position of the shutter 33 the lower edge of the shutter bears against a strip 40 which is secured to an inner wall surface of the back portion of the casing 1. The shutter 33 as shown in Figs. 4 and 5

is located below the higher edge portion of the sloping wall member 25 in the casing 1 and is adapted to swing within the inlet portion 5. A holding means generally indicated by the number 41 and which will hereinafter be referred to as a brake is provided to hold the shutter 33 in various positions.

The brake 41 comprises a bracket 42 and a pivotally supported arm 43. The bracket 42 is attached to the inner face of the shutter 33 and has an arcuate extension 44 bowed inwardly from the inner face of the shutter 33. The extension 44 has a broad outer face adapted to be frictionally engaged by a block 45 mounted on the free end of the arm 43. The block 45 may be made of asbestos or other material suitable for making good frictional holding engagement with the outer face of the extension 44 and is beveled on its upper face to make good frictional engagement with the curved portion 44 of the bracket 42. The block 45 serves as a brake shoe to hold the shutter 33 in an adjusted position. The arm 43 is pivotally supported at one end on a shaft 46, the shaft 46 being supported in spaced arms of a U-shaped bracket 47 which is attached in inverted position to the under surface of the sloping wall member 25. The pivotally supported end of the arm 43 is provided with downwardly extending spaced ears 48 which are apertured to receive the shaft 46. The arm 43 has a relatively long straight portion 49, a downwardly sloping portion 50 and a relatively short straight portion 51 extending at an angle from the sloping portion 50 and supporting the brake shoe 45. The arm 43 is arranged to swing downward to release the brake shoe 45 from engagement with the arcuate extension 44 of the bracket 42, but is normally held in elevated position by means of a bar 52. The bar 52 normally extends transversely beneath the under surface of the relatively short portion 51 of the arm 43 and is held in this position by means of a fusible link 53 of relatively low melting point metal and a spring 54 which extend downward in parallel spaced relation from brackets 55 secured on the under surface of the sloping wall member 25, the upper end portion of the fusible link 53 being secured to a bracket 55 by means of a bolt 56 and the upper end of the spring 54 being hooked into or otherwise secured to its associated bracket 55. The fusible link 53 is anchored to one end of the bar 52 by means of a hook-shaped bolt 57 and a nut 58, the threaded end of the bolt 57 extending through an aperture in the bar 52 and the nut 58 being adjustably disposed against the under surface of the bar 52. The lower end of the spring 54 is anchored to a bolt 59 which extends through an aperture in the bar 52, the spring 54 being hooked into a transverse aperture in the bolt 59 and a nut 60 being provided on the bolt 59 and bearing against the under surface of the bar 52 so that suitable tension may be developed in the spring 54 by turning the nut on the bolt 59. The pull of the spring 54 on the bar 52 may be regulated by means of the nut 60 so that the brake shoe 45 will have sufficient frictional engagement with the curved extension 44 of the bracket 42 to hold the shutter 33 in any adjusted position determined by operation of the handle 38 on the outside of the casing, but still permit manual adjustment of the position of the shutter 33 through operation of the handle 38.

When the arm 43 is held by means of the fusible link 53 and the spring 54 in the position shown in Figs. 4 and 5, the relatively long por-

tion 49 of the arm 43 bears upward against an operating member 61 of a switch 62 to hold contacts (not shown) in the switch 62 in a closed circuit position. The switch 62 is housed in a casing 63 supported on the sloping wall member 25, a portion of the switch 62 being extended through an aperture in the wall member 25 to meet the portion 49 of the arm 43 and the switch 62 being arranged to control the supply of operating current to the motor 17. The switch 62 is arranged to open its contacts and cut off the supply of operating current to the motor 17 when the arm 43 is released from engagement with the operating member 61 of the switch.

The shutter 33 as above mentioned may be swung to various positions within the inlet portion 5 of the ventilator to regulate the volume of air passing through the ventilator to the room supplied, the shutter being moved by manual operation of the handle 38 and being held in any adjusted position by means of the brake 41. Should the temperature in the room rise, however, to a relatively high degree, such as might be caused for instance by the breaking out of a fire in the building, the fusible link 53 will melt and release the brake shoe 45 from engagement with the curved portion 44 of the bracket 42. When the fusible link 53 melts and releases its associated end of the bar 52, the spring 54 tilts the bar 52 so that it no longer holds up the free end of the arm 43. The arm 43 thereupon swings downward and carries the brake shoe 45 out of engagement with the curved portion 44 of the bracket 42. The shutter 33 then swings downward by gravity and shuts off the supply of air to the ventilator. When the arm 43 swings downward the portion 49 of the arm 43 swings away from the control member 61 of the switch 62 and allows the switch contacts to open. The opening of the switch contacts cuts off the supply of operating current for the motor 17 and hence stops the fans in the ventilator simultaneously with the closing of the shutter 33.

In order to insure that the shutter 33 will move to the fully closed position when the brake 41 is released and the shutter swings downward by gravity, a spring 64 and a lever 65 are provided as shown in Fig. 6. The spring and lever operate on an over-center principle and are effective to aid the gravitational movement of the shutter 33 when the shutter is nearing its closed position, but are ineffective to hold the shutter in an opened position, the spring 64 being too weak to overcome the weight of the shutter. The lever 65 is secured at one end to an end of the rod 35 opposite to the end occupied by the handle 38 and extends radially upward of the rod 35, the point of attachment of the lever 65 to the rod 35 being beyond the point where the rod 35 extends through the bracket 39. The spring 64 is secured at one end to the free end of the lever 65, the other end of the spring being secured to a lug 66 extending from an inner surface of the back wall of the casing 1 and the lug 66 being located below and offset relative to the rod 35. When the shutter 33 is swung over its center line of travel in either direction, the spring 64 is stretched as the center line is being passed and on either side of the center line of travel the spring 64 contracts and aids the movement of the shutter in the direction of its travel. The spring 64, however, is too weak to pull the shutter against the holding action of the brake 41 and as above mentioned is also too weak to hold the shutter 33 against its own gravitational move-

ment when the brake 41 is released. However, when the shutter 33 is swinging down beyond its center line of travel toward the closed position, and the gravitational force becomes less effective to move the shutter as the lower end of the shutter comes more directly under the point of suspension of the shutter, the spring 64 and lever 65 supplement the lessening gravitational force sufficient to continue movement of the shutter to the fully closed position so that the lower end of the shutter comes to rest against the strip 40.

The wall members forming the casing 1 and the inlet portion 5 or at least some of the wall members are preferably made in laminated form as shown particularly well in Fig. 5. The laminated wall structure is provided for attenuation of the sound waves entering the ventilator or produced by the motor and fans and to prevent or reduce vibrations of the wall structures such as might cause the generation of sound waves in the room. The wall structures, for instance, may be made in layers, one of the layers being made of sound or vibration absorbing material. The three-layer back wall of the casing 1, for instance, may comprise two outer layers of metal and an intermediate layer of asbestos or other vibration absorbing material. The same construction may also be followed in the inlet portion 5, the sloping wall member 25 and in other parts of the casing structure.

The dust screens 26 and 27 as above mentioned are disposed horizontally within the casing 1 and simply rest one on top of the other on the cushion 29. The dust screens are located between the brake mechanism 41 and the motor 17. Since the screens 26 and 27 have to be cleaned or replaced from time to time and adjustment of the brake mechanism and replacement of the fusible link may at times be required, a door 67 is located in the front portion of the casing 1 in a position to provide access to the dust screens and the brake mechanism. The door 67 is hinged at its lower edge portion to the front wall of the casing and is provided with a latch device 68 at its top edge portion.

What is claimed is:

1. In a ventilator comprising a casing, having air inlet and outlet openings, in combination, a shutter supported within said casing and adapted to swing across an opening, means for moving said shutter to a required position and a brake to hold said shutter in the required position, said brake comprising a bracket supported on said shutter, an arm pivotally supported at one end in said casing, a brake shoe carried on said arm and adapted to frictionally engage said bracket and a fusible link means supporting said arm in a position to hold said brake shoe in engagement with said bracket.

2. In a ventilator comprising a casing and an air inlet portion, in combination, a shutter supported within said casing and adapted to swing within said air inlet portion, manually operated means to swing said shutter and a brake to hold said shutter in an adjusted position, said brake comprising a curved bracket supported on said shutter, an arm pivotally supported in said casing, a brake shoe carried on said arm and adapted to frictionally engage said bracket, a bar extending beneath said brake shoe and in engagement with said arm and a spring and fusible link supported in parallel spaced relation and anchored to said bar and said casing to hold said brake shoe in engagement with said bracket.

3. In a ventilator comprising a casing, a fan therein, a motor for said fan and air passages in said casing in communication with the fan and the outside of said casing, in combination, a shutter supported in said casing and arranged to swing across an air passage, a curved bracket supported on said shutter, a switch for said motor, an arm pivotally supported in said casing, a portion of said arm engaging said switch to normally hold said switch closed, a brake shoe supported on said arm in frictional engagement with said bracket to hold said shutter against swinging movement and means including a fusible link normally holding said arm in a position to hold said brake shoe in engagement with said bracket and said arm in engagement with said switch. 5

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