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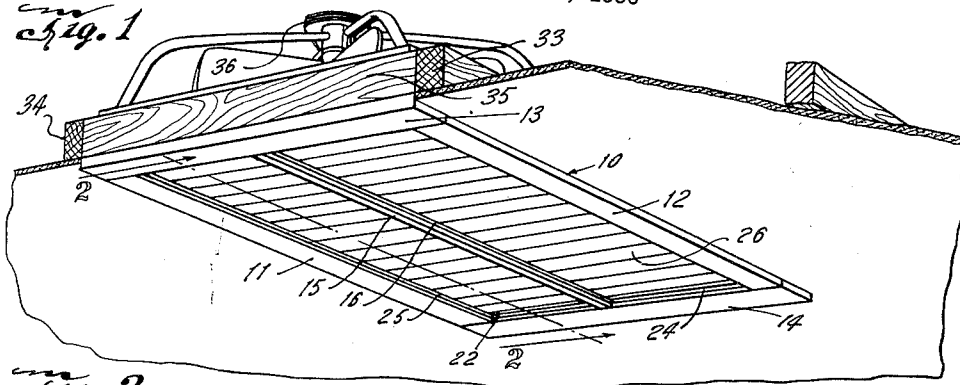
E. N. HANKS

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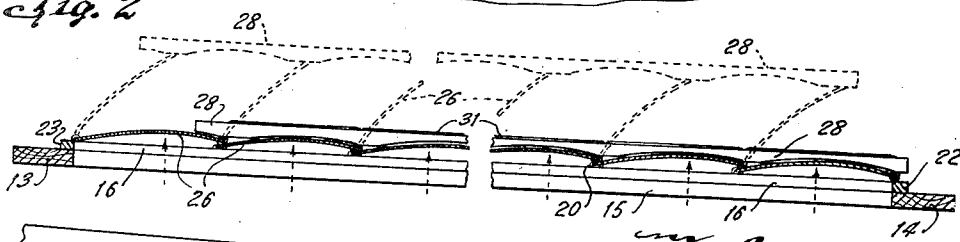
SUCTION CONTROLLED LOUVER

Filed June 19, 1950

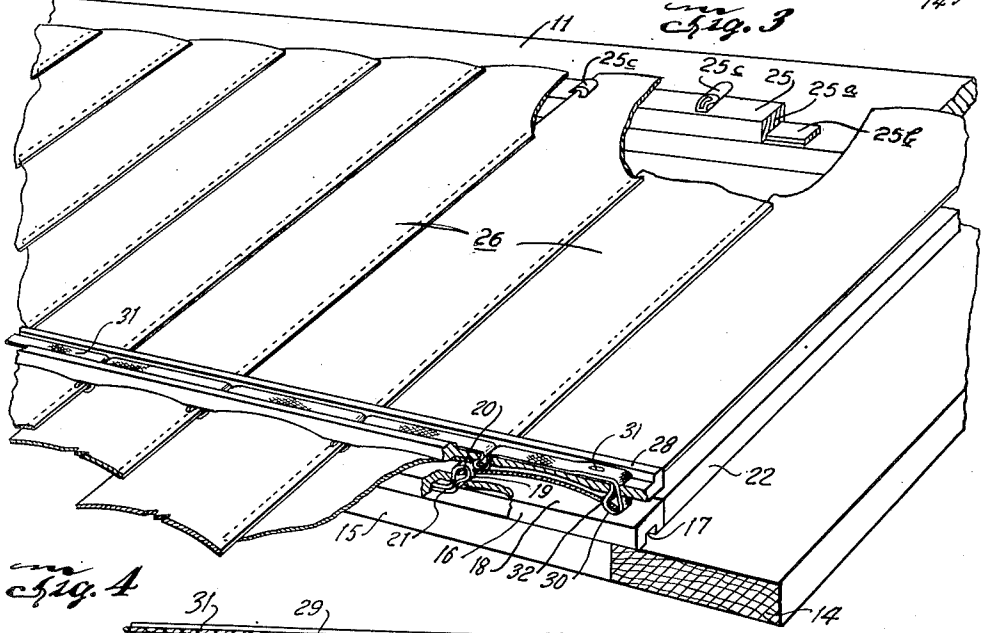
*Fig. 1*



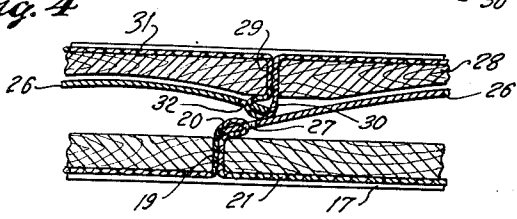
*Fig. 2*



*Fig. 3*



*Fig. 4*



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# UNITED STATES PATENT OFFICE

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SUCTION CONTROLLED LOUVER

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6 Claims. (Cl. 98-116)

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This invention relates to air grilles and more particularly to ceiling grilles for use with air blowers.

In many applications ceiling grilles are employed with fans which draw air from within a room and expel it to the outdoors. For example, attic fans are often employed to draw the warm air from within a room and into the attic from whence it is moved to the outdoors. The ceiling grilles employed in such installations must be opened when the attic fan is placed in operation to permit the air to move from within the room to the attic and must be closed when the attic fan is inoperative to prevent heat from the attic, which is usually at a higher temperature than the room, from passing from the attic into the room. It is, of course, preferable to employ ceiling grilles which open and close automatically when the fan is started and stopped, which are of relatively simple construction and which operate with a minimum of noise.

Accordingly it is an object of my invention to provide a new and improved air grille.

It is another object of my invention to provide a new and improved ceiling grille.

It is another object of my invention to provide a new and improved ceiling grille for use with an updraft fan which closes and opens automatically with the commencement and cessation of operation of the fan.

It is still another object of my invention to provide a new and improved ceiling grille which opens and closes noiselessly.

Briefly stated, my new and improved ceiling grille comprises a plurality of overlapping arched vanes which are movably attached to supporting members along their lower edges by means of looped, flexible tapes. The upper overlying edges of the vanes are movably connected to a top strip by means of a looped flexible tape which passes through appropriate apertures provided in the vanes adjacent the upper overlying edges. The lower surface of the top strip adjacent the vanes is so shaped that the top strip at no point makes contact with vanes. The looped tapes prevent all contact between the top strip and the vanes, between the vanes and the supporting members, and between the vanes themselves. Since the tapes are of soft material, no noise is produced during opening and closing movements of the vanes. A fan is mounted above the vanes and when in operation, pulls a draft of air up between the vanes. The moving air impinges on the arched undersurfaces of the vanes and raises the vanes to nearly vertical positions, thus open-

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ing the ceiling grille. When the fan ceases to operate, the updraft of air also ceases and the vanes return to their normal inoperative position wherein the upper edge of one vane overlies the lower edge of its adjacent vane thus closing the ceiling grille.

For a better understanding of my invention reference may be had to the following specification taken in connection with accompanying drawing and its scope will be pointed out in the appended claims.

In the drawing,

Figure 1 is a perspective view, partly cut away, of an embodiment of the ceiling grille of my invention installed in a ceiling;

Figure 2 is a sectional view taken along line 2-2 of Figure 1, the fan of Figure 1 not being shown;

Figure 3 is a perspective view, partly cut away, of the ceiling grille of Figure 1 showing a slightly modified form of the top strip illustrated in Figure 2; and

Figure 4 is an enlarged sectional view showing in detail the manner in which the looping tapes prevent all contact between the other members of the ceiling grille.

Referring now to the drawing, the preferred embodiment of my invention there illustrated comprises a rectangular frame 10 having side members 11 and 12 and end members 13 and 14. A bottom strip 15 is secured to end members 13 and 14 and lies parallel to and between side members 11 and 12. Lying immediately above bottom strip 15 is a bottom grooved strip 16 provided with a downwardly facing groove 17. The upper side 18 of grooved strip 16 is provided with a plurality of apertures 19 through which extend the loops 20 of a flexible member 21, which may be a fabric tape. End strips, such as end strips 22, 23, and 24, the fourth end strip not being visible in the drawing, are fastened to end members 13 and 14 while side strips, such as side strip 25, the other not being visible in the drawing, are fastened to side members 11 and 12. The end strips and the side strips are of the same thickness as strip 16 in order to avoid unsightly gaps between these strips and the vanes 26.

The vanes 26 extend outwardly beyond the inner sides of side members 11 and 12 and lie in overlapping relation to each other. An aperture 27 is provided in each vane 26 adjacent the lower or overlapped edge of each vane 26. The flexible member 21 is drawn through each aperture 19 in grooved strip 16, through the aperture 27 in an adjacent vane 26, and back through aper-

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 ture 19 into groove 17 of strip 16 to form the loops 20 and movably and pivotally secure the lower or overlapped edges of vanes 26 to strip 16 and therefore to frame 10. Each free end of member 21 is doubled back and firmly secured to strip 16 by any suitable means, such as a tack, not shown, in order that the flexible member 21 may not work free. The side strips, such as the strip 25, may be grooved as at 25a and provided with similar flexible members 25b lying in the groove and looped as at 25c through longitudinally spaced apertures in the strip 25 and engaging aligned apertures in the vanes 26 to secure the vanes 26 adjacent their ends. Or, if desired, only the side strips, such as strip 25, could be provided with flexible members to movably secure the vanes 26 with strip 16 being a solid strip and not provided with a flexible member.

It will be noted, Figure 4, that the lower or overlapped edge of each vane 26 can be supported entirely on the flexible member 21, the lower edge of vane 26 not contacting the upper surface of strip 16. Since the upper surfaces of side strips, such as strip 25, and the surface 12 lie in the same plane, the lower edges of vanes 26 will not contact the side strips. Any slight possible contact of vanes 26 with the side strips or strip 25 will not produce an appreciable noise upon relative movement between these components since the area of contact is necessarily very small. A top strip 23 which may have a straight upper surface, Figure 2, or a grooved upper surface, Figures 3 and 4, is disposed above vanes 26 and preferably intermediate their ends overlying bottom strip 15. Top strip 23 is provided with a plurality of spaced apertures 29 through which are drawn the loops 30 of a flexible member 31. Each vane 26 is provided with an aperture 32 adjacent its upper or overlapped edge. The flexible member 31 is drawn through each aperture 29 in top strip 23, the aperture 32 in the adjacent vane 26, and then back through each aperture 29 to form the loops 30 and movably secure top strip 23 to the upper or overlapped edges of vanes 26. The ends of flexible member 31 are secured to strip 23 by any suitable means such as tacks 31'.

It will be noted that the bottom side of strip 23 is shaped to conform somewhat to the shape of the upper sides of vanes 26. Due to this conformation of the bottom side of strip 23, strip 23 never comes in contact with the vanes 26 as is clearly illustrated in the drawing. The flexible member 31 is interposed between the possible points of contact of strip 23 and vanes 26. Moreover, the overlapping edge of a vane 26 does not contact the lower or overlapped edge of its neighboring or adjacent vane 26 since the portion of flexible member 31 forming loop 30 lies between the overlapping and overlapped edges of two adjacent vanes 26. As a result, a gap exists between each pair of vanes since flexible member 31 maintains each vane separated from every other vane.

Since either flexible member 21 or flexible member 31 is interposed between possible points of contact of any two members of the ceiling grille which could produce noise by their contact, opening and closing movements of the ceiling grille are practically noiseless, flexible members 21 and 31 being of fabric do not produce noise even when vanes 26 drop suddenly upon one another. The movable upper strip 23 maintains even spacing between vanes 26 when they are moved from their normal position by the fan.

The ceiling grille may be installed in a ceiling between a pair of joists 33 and 34 by means of nails or in any other conventional manner. Reinforcing members, such as the member 35, may be secured between the joists 33 and 34. A fan, indicated generally by the numeral 36, is then mounted over the ceiling grille in any conventional manner. When the fan is turned on, it pulls the air upward through the interstices between vanes 26. The updraft of air impinges the undersurfaces of vanes 26 and forces them to a nearly vertical position when fan 36 is running at full speed. Vanes 26 are arcuate in form in order to facilitate the raising of the vanes 26 by the force of the air drawn by fan 36.

The frame 10 may be constructed of wood as may be all the strips. The wooden members and strips of the ceiling grille may be fastened together where necessary, by any conventional means such as nails or glue. Vanes 26 are preferably formed of a light, easily cleaned substance. Vanes 26 of aluminum have been found to have the desired properties and are preferred over vanes of other materials.

It will be apparent in light of the foregoing discussion that the ceiling grille of my invention is almost completely noiseless in operation and of simple construction. This ceiling grille is also automatic in operation since vanes 26 will open whenever fan 36 is turned on and will close whenever the fan is stopped.

While I have described and illustrated a preferred embodiment of my invention, it will be obvious to those skilled in the art that various changes and modifications can be made without departing from my invention and I, therefore, aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of my invention.

What is claimed is:

1. A ceiling grille comprising a frame having a central opening; a plurality of vanes having overlapping edges and adapted to close said opening when disposed in substantially horizontal position; a pair of side members on said frame below the ends of said vanes, each of said side members having a longitudinal groove and a plurality of longitudinally spaced apertures, said vanes having apertures adjacent their lower edges aligned with said longitudinally spaced apertures, a tape disposed in the groove of each of said side members and looped in the apertures of said vanes through the apertures of said side members to pivotally secure said vanes to said frame; and a member overlying said vanes transversely, each of said vanes having an overlapping upper edge pivotally secured to said overlying member, said vanes being adapted to be pivotally moved from their substantially horizontal positions by upward movement of air through said opening in said frame.

2. A ceiling grille comprising a plurality of overlapping vanes, each of said vanes having an overlapped edge and an overlapping edge, each of said vanes being provided with a first aperture adjacent said overlapped edge and a second aperture adjacent said overlapping edge; an aperture fixed member on said frame beneath said vanes; a first flexible member lying longitudinally below and attached to said fixed member and forming spaced loops passing through said first apertures and the apertures of said fixed member to pivotally secure said overlapped edges of said vanes to said fixed member, a movable member above said vanes; a second flexible mem-

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ber lying longitudinally above and attached to said movable member and forming spaced loops passing through said second apertures to pivotally secure said overlapping edges of said vanes to said movable member, said vanes being adapted to be moved pivotally to non-horizontal positions by the upward movement of air past and between said vanes.

3. A ceiling grille comprising a plurality of overlapping vanes, each of said vanes having an overlapped edge and an overlapping edge, each of said vanes being provided with a first aperture adjacent said overlapped edge and a second aperture adjacent said overlapping edge; an aperture fixed member on said frame disposed beneath said vanes and provided with a plurality of spaced apertures; a first flexible member affixed longitudinally to the underside of said fixed member and looped through said first apertures and said spaced apertures of said fixed member to pivotally secure said overlapped edges to said fixed members, each of said overlapped edges being disposed adjacent one of said spaced apertures; a movable member overlying said vanes intermediate their ends and provided with a plurality of spaced apertures; and a second flexible member affixed longitudinally to the upper side of said movable member and looped through said second apertures and said spaced apertures of said movable member to pivotally secure said overlapping edges to said movable member, said vanes being adapted to be moved pivotally to non-horizontal positions by the upward movement of air past said vanes.

4. A ceiling grille comprising a frame, a plurality of overlapping vanes, each of said vanes having an overlapped edge and an overlapping edge, each of said vanes being provided with a first aperture adjacent said overlapped edge and a second aperture adjacent said overlapping edge; a fixed member disposed along each edge of said frame and provided with a plurality of longitudinally spaced apertures; a first flexible member disposed under and attached longitudinally to said fixed member and looped through said apertures in said fixed member and through said first apertures of said vanes and forming a loop at each of said apertures in said fixed member, each of said loops pivotally securing one of said overlapped edges to said fixed member; a movable member overlying said vanes and provided with a plurality of spaced apertures; and a second flexible member disposed over and attached longitudinally to said movable member and looped through said apertures in said movable member and through said second apertures of said vanes and forming a loop at each of said apertures in said movable member, each of said

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last mentioned loops pivotally securing one of said overlapping edges to said movable member, said vanes being adapted to be moved pivotally to non-horizontal positions by the upward movement of air past said vanes.

5. In combination: a ceiling grille comprising a frame, a plurality of overlapping vanes, each of said vanes having an aperture adjacent its lower overlapped edge and an aperture adjacent its upper overlapping edge, a fixed member on said frame and having spaced apertures and also having a longitudinal groove in its lower surface, a first tape in said groove of said fixed member having loops extending through said spaced apertures in said fixed member and looped in said apertures adjacent the lower edges of said vanes; a movable member disposed above said vanes having spaced apertures and also having a longitudinal groove in its upper surface; a tape lying in said groove of said movable member and having loops extending through said spaced apertures in said movable member and through said apertures adjacent the upper overlapping edges of said vanes; and a fan disposed above said ceiling grille and adapted to move air upwardly past said vanes, said air in its upward movement past said vanes moving said vanes from substantially horizontal positions to non-horizontal positions and maintaining said vanes in non-horizontal positions as long as said fan remains in operation.

6. A ceiling grille comprising a frame, a plurality of overlapping vanes; a fixed member on said frame having a longitudinal groove in its lower surface; a movable member having a longitudinal groove overlying said vanes intermediate their ends, said fixed and movable members each having a plurality of longitudinally spaced apertures; a tape lying in the groove of each of said members and looped through said spaced apertures in each of said members, each of said vanes having a lower overlapped edge pivotally secured to said fixed member by the loops in the tape of said fixed member and an upper overlapping edge pivotally secured to said movable member by the loops in the tape of said movable member, said vanes being adapted to be moved pivotally to non-horizontal positions by the upward movement of air passing between said vanes.

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