Jan. 4, 1955 A. S. FEINBERG 2,698,570

TEMPERATURE CONTROL AIR DEFLECTING LOUVER

Filed Nov. 7, 1951

Fig. 1.

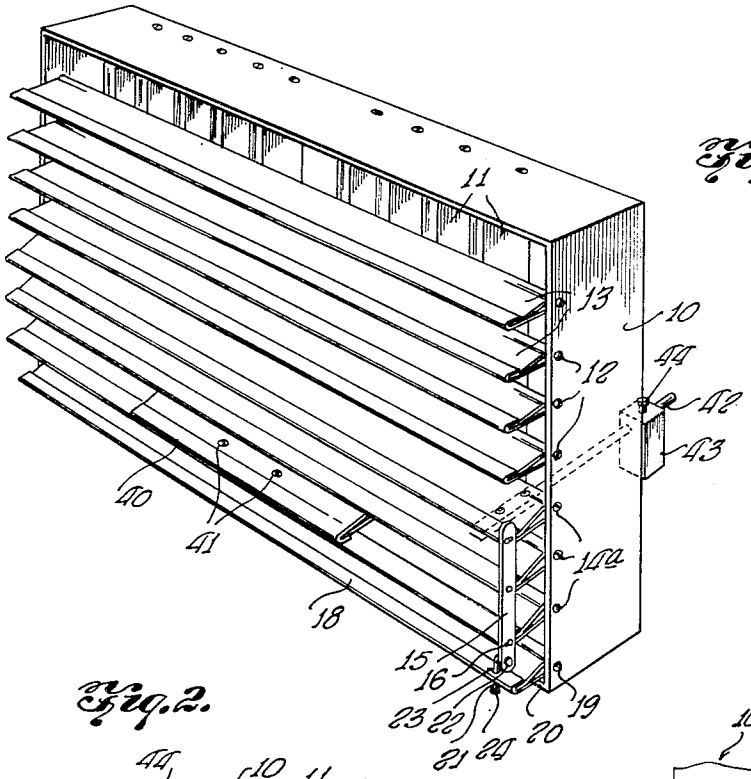


Fig. 2.

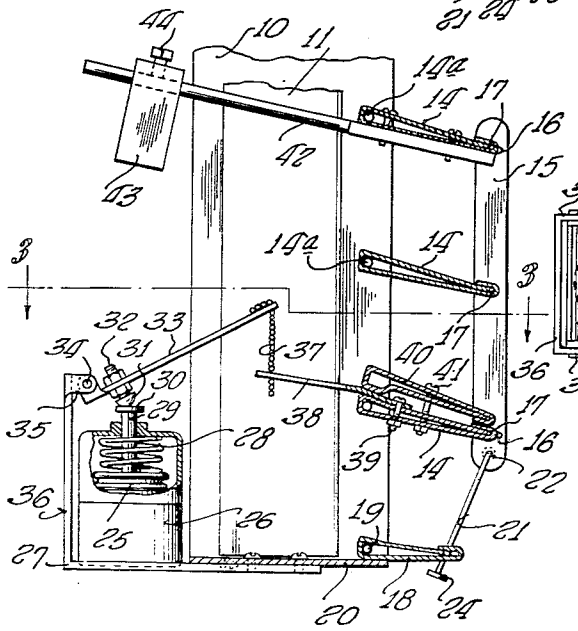
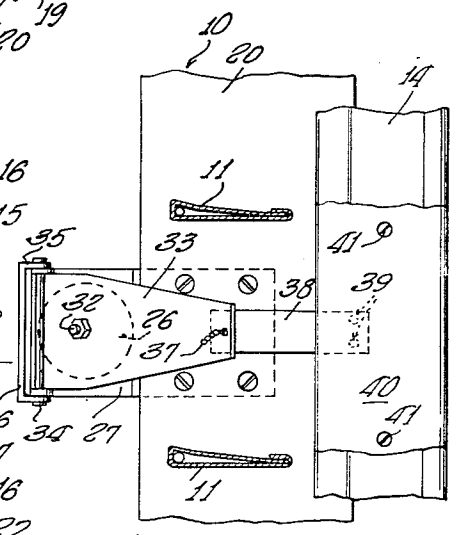


Fig. 3.



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TEMPERATURE CONTROL AIR DEFLECTING LOUVER

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5 Claims. (Cl. 98—40)

This invention relates to apparatus for controlling the direction and distribution of air within a room and it has particular reference to a device for redeflecting or recirculating for short periods the current of air discharged from ducts of a non-thermostatic controlled cooling or ventilating system.

As a general rule, the directional air escape registers of air cooling systems in a building are located at points spaced well above the floor. These deflector grille registers for the most part are equipped with multiple horizontal and vertical louver blades, each individually adjustable and each individually located in whatever position may be necessary to maintain and control the distribution of the air throughout the room. Moreover, such individual louver blade positioning is designed to exercise control over the air circulating within the occupancy zone near the floor so that during normal temperature conditions a rate of skin evaporation considered comfortable will be obtained.

In the present dual tiered louvered grille registers there is no provision for immediate selective displacement of the positioned blades through which a portion of the air, normally directed towards the floor, may be directed upwardly to lessen increased feeling of turbulence, drafty aspects and excessive skin evaporation, of air within the breathing zone; such chillier manifestations being apparent, in this type of system, with sudden temperature changes outdoors during the summer, or during the changeable climatic conditions of the late spring or early autumn.

The principal object of the invention therefore is to provide an improved grille register for air ducts of cooling systems of this nature, in which a single blade or baffle is hinged along the lower edge of the register and operated from a point spaced below the latter to function as a medium of redeflection of air emerging from the register. A predetermined number of the horizontal blades of the grille are joined together and collectively operable to cause a portion of the air stream to be directed to a higher level during low dry-bulb temperatures reducing the pressure on, and the turbulence within, the occupancy zone during such adverse temperature periods and conversely, to lower the air stream during higher temperature conditions.

Another object of the invention is to provide automatic means for operating the deflector blades of the register, the said automatic means consisting of a bellows containing a gas responsive to changes in dry-bulb temperatures and effective to expand the bellows as atmospheric temperature increases, thus to actuate, through a suitable linkage, the deflector blades of the register and thus cause a part of the air stream in the ceiling zone to descend into the occupancy zone.

This application is a continuation-in-part of my copending application Serial No. 135,797, filed December 29, 1949, now abandoned.

Other objects will appear as the description proceeds, taken in connection with the accompanying drawing wherein:

Figure 1 is a front perspective view of a wall register on which the invention is installed.

Figure 2 is a fragmentary view in vertical section, and

Figure 3 is a fragmentary view in transverse section taken on line 3—3 of Figure 2.

Continuing with a more detailed description of the drawing, reference numeral **10** denotes a square or rectangular frame which is mounted in a wall opening, usually disposed adjacent the ceiling of a room or enclosure into or through which is discharged the air passed through the duct of a cooling system. In order that the air discharged from the duct may be controlled directionally, a series of louvers **11** are mounted on vertical shafts and spaced horizontally in the frame **10**. The louver blades **11** are mounted conventionally on rods **11***a* so as to be independently adjustable on their vertical axes to cause the air to be deflected at any desired angle or angles with respect to the normal passage so that it will be distributed throughout the room.

Disposed on horizontal shafts **12**, forwardly of the group of louvers **11** is a series of louvers **13** which are vertically spaced on the frame **10** and are independent of the control mechanism described herein as affecting the lowest three or more louvers of the grille.

It is of course possible to manually adjust the lowermost louvers of the conventional register above described in order to accomplish the result obtained by the invention, to be described presently, but to do so would be difficult and troublesome because the register is out of normal reach from the floor and in some cases, adjustments would have to be frequently made, depending upon temperature conditions in the room, air circulation conditions within the occupancy zone, and the like.

The invention aims to simplify the means by which more comfortable conditions may be had in an air cooled room and to provide a varying perceptibility in occupancy zone air circulation, depending upon temperatures, than can be obtained even through manual adjustment of the individual louvers of a conventional register.

Accordingly, the invention in its preferred form consists of a group of horizontal louver blades **14** in the lower portion of frame **10** which are pivoted to the frame sides at **14***a* and are connected together at their ends by a link **15**. The link **15** has a transverse slot **16** adjacent each end and an aperture in its midsection, all receiving screws **17** which connect the link with the ends of the louver blades for pivotal displacement. The slots **16** permit the required displacement between the blades and link due to differences in pivotal radii.

Below the lowermost louver **14** of the group is a louver **18**, pivoted at **19** to the sides of the frame **10**. The louver **18** is effective only to control the air emerging underneath the lowest louver **14** and its downward movement is limited by the bottom portion **20** of the frame, on which its rests in lowered position. The louver **18** is displaced only during cool periods when the air stream is so be directed upwardly and it is actuated by means of a short rod **21**, pivoted at one end to the lower end of link **15** at **22** while its opposite end is movable freely through an aperture **23** in the louver **18** near its end. A head **24** is provided on the rod **21** to prevent its displacement from the aperture **23**. The louver **18** is also made narrower so that it will not interfere with air directed downwardly by the next adjacent louver **14** thereabove.

To actuate the louvers **14**, a bellows **25**, filled with a temperature sensitive gas, is mounted in a casing **26**, which in turn is mounted on a bracket **27** secured to the bottom portion **20** of the frame **10** rearwardly of the vertical louvers **11**. The gas contained in the bellows expands as atmospheric temperature increases and collapses a coil spring **28** interposed between the top of the case **26** and the top of the bellows. The spring functions to restore the bellows to collapsed position as the temperature lowers.

A plunger **29** extends upwardly from the bellows **25** through the top of the case **26** and carries a head **30** which bears against a semi-spherical head **31** on an adjusting bolt **32** which extends through an arm **33**, pivoted on a shaft **34** supported by ears **35** on the upstanding portion **36** of the bracket **27**. The bolt **32** is located near the hinged end of the arm **33** in order to obtain maximum displacement of the outer end of the arm when the bellows expands under increased temperature conditions. By moving the bolt **32** longitudinally the degree of displacement of the arm **33** is changed in relation to displace-

ment of the plunger 29 of bellows 25 and consequently the displacement of the group of louvers 14.

Attached at one end to the free end of arm 33 is a length of chain 37. The opposite end of the chain is similarly attached to the free end of an arm 38 whose opposite end is affixed, by means of bolts 39, to the lowest link actuated louver 14 at its midsection. A reinforcing plate 40 is secured to the louver 14 over the point of securement thereto of arm 38, by means of bolts or metal screws 41.

Affixed at one end to the topmost louver 14 adjacent one end is a lever 42. The rod extends inwardly of the frame 10 and carries a slidable weight 43, held in adjusted positions on the rod by a set screw 44. The function of the weight 43 is to exert a force counter to that of the bellows to maintain the louvers 14 in the positions to which they are adjusted by the bellows 25.

As the bellows 25 expands due to increasing atmospheric temperature, the head 30 of the bellows plunger 29 will move upwardly against the semispherical head 31 of the adjusting screw 32, causing the outer end of arm 33 to rise. The chain 37 connecting the arms 33 and 38 will raise to the outer end of the latter arm which will lower the free edge of the lowest louver 14 and consequently the companion louvers 14 through the medium of the link 15. All of the louvers 14 as well as the louvers 18 are freely movable on their pivots hence the louver 18 will move downwardly under its own weight until it comes to rest on the bottom plate 20 of frame 10. The companion louvers 14 may, however, continue in their downward movement due to the loose connection between the rod 21 and the louver 18, which forms the connection between the latter and the companion louvers 14. When the louvers are thus positioned, the stream of air emerging from the register is divided, the upper strata moving parallel with the ceiling while the lower strata will be deflected downwardly towards and into the occupancy or breathing zone with sufficient turbulence to create a more comfortable condition for the occupants.

Manifestly, the construction as shown and described is capable of some modification and such modification as may be construed to fall within the scope and meaning of the appended claims is also considered to be within the spirit and intent of the invention.

What is claimed is:

1. In a register for heating and cooling systems, a frame, a series of relatively spaced vertical louvers pivoted in said frame for independent manual adjustment, a series of horizontal louvers pivoted in said frame forwardly of said vertical louvers, means joining a predetermined number of the lowermost of said horizontal louvers for collective movement, means responsive to an increase in atmospheric temperature for moving said predetermined number of louvers to a position to deflect a portion of the air emerging from said register in a downwardly direction, means independent of said temperature responsive means for restoring said predetermined number of louvers to a neutral position, a single louver pivoted in the bottom of said frame in parallelism with said horizontal louvers and means connecting said single louver operatively with said collectively movable louvers for upward displacement when said collectively movable louvers have moved upwardly past a neutral position.

2. In a wall register for heating and cooling systems, a frame, a series of relatively spaced vertical louvers pivoted in said frame for individual adjustment, a series of horizontal louvers pivoted in said frame for individual adjustment in advance of said vertical louvers, a group of collectively movable horizontal louvers below and in coextensive parallelism with the lowest of said individually adjustable horizontal louvers, a single louver pivoted in said frame in coextensive parallelism with the lowest of said collectively movable louvers, means connecting said single louver to said collectively movable louvers to effect its displacement by said collectively movable louvers in one direction, temperature responsive means for moving said collectively movable louvers into positions to deflect air emerging from said register according to changes in atmospheric temperature and independent means exerting a force counted to that of said temperature responsive means to maintain said collectively movable louvers in the position to which they are adjusted by said temperature responsive means.

3. In a wall register for heating and cooling systems, a plurality of horizontally pivoted louvers, means connecting a group of the lowest of said louvers for simultaneous pivotal displacement, a temperature expansible element, a hinged arm adapted to be raised and lowered by said element, a cooperating arm affixed to one of said group of louvers, means connecting said arms to effect movement of said cooperating arm and said group of louvers when said element is expanded, means acting counter to said temperature expansible element for maintaining said group of louvers in the positions to which they are adjusted by said temperature expansible element, a single horizontal louver below said group of louvers and means connecting said single louver to said group of louvers for movement thereof in one direction, said connecting means having sliding engagement with said single louver whereby the latter will be capable of returning to its initial position under its own weight.

4. In a wall register for heating and cooling systems, a plurality of horizontally pivoted louvers, means connecting a group of the lowest of said louvers for simultaneous pivotal displacement, a temperature expansible element, a hinged arm adapted to be raised and lowered by said element, a cooperating arm affixed to one of said group of louvers, means connecting said arms to effect movement of said cooperating arm and said group of louvers when said element is expanded, a rod affixed at one end to one of said louvers, a weight movable to adjusted positions on said rod to overbalance said group of louvers to hold said group of louvers in the positions to which they are adjusted by said temperature expansible element, a single horizontal louver below said group of louvers, a member pivoted to said group of louvers and having slidable connection with said single louver for moving the latter in one direction but releasing the same for return to its initial position under its own weight.

5. In a wall register for heating and cooling systems, a plurality of horizontally pivoted louvers, means connecting a group of the lowest of said louvers for simultaneous pivotal displacement, a temperature expansible element, a hinged arm adapted to be raised and lowered by said element, a cooperating arm affixed to one of said group of louvers, means connecting said arms to effect movement of said cooperating arm and said group of louvers when said element is expanded, a rod affixed at one end to one of said louvers, a weight movable to adjusted positions on said rod to overbalance said group of louvers to hold said group of louvers in the position to which they are adjusted by said temperature expansible element, a single horizontal louver below said group of louvers, a rod pivoted to the lowermost of said group of louvers and slidable through an apertaure in said single louver, said rod having a head thereon for lifting said single louver when said group of louvers are raised beyond a predetermined point, said single louver being free to assume its intial position under its own weight when said group of louvers are lowered below said predetermined point, and an adjusting screw forming connection between said temperature expansible element and said hinged arm to vary the degree of displacement of said hinged arm and said group of levers in relation to the displacement of said temperature expansible element.

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