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2,864,301

LOUVERING SYSTEM

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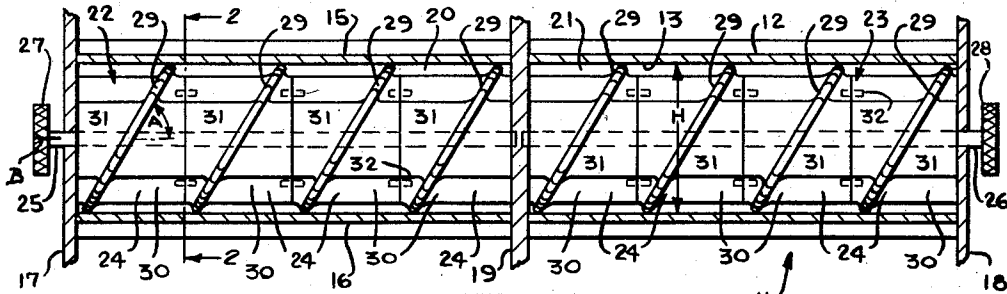


Fig 1

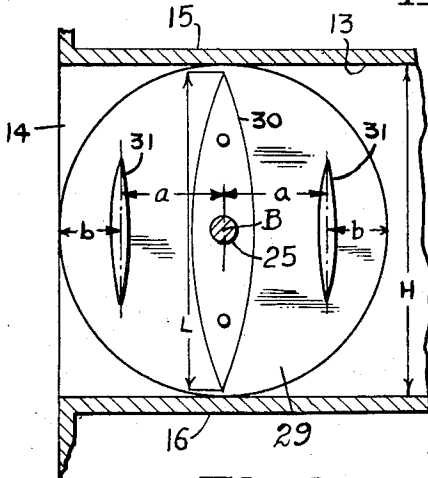


Fig 2

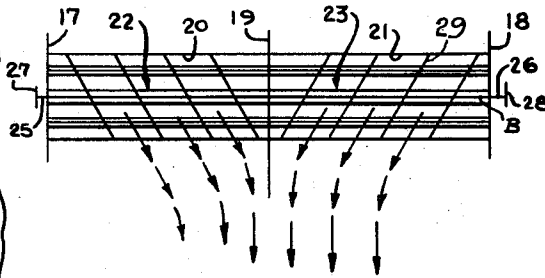


Fig 3

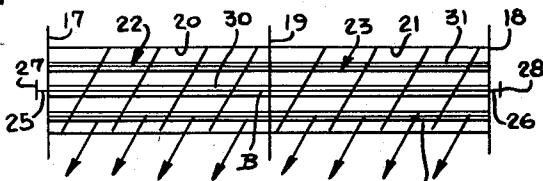


Fig 4

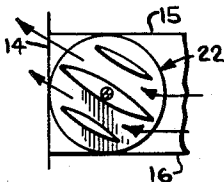


Fig 5

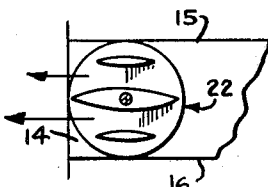


Fig 6

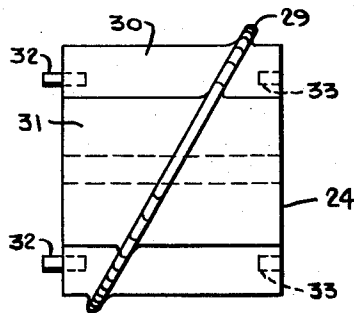


Fig 7

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2,864,301

LOUVERING SYSTEM

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6 Claims. (Cl. 98—40)

The invention relates to louvering systems, and relates more particularly to the control of streams of air flowing in a passage, such as exhaust ducts, for instance of air conditioning equipment.

The invention has among its objects to provide for the control of the size of the passage, for controlling a stream of air in said passage, and to deflect said stream in one or more directions simultaneously.

The foregoing and other objects of the invention will be best understood from the following description of exemplifications thereof, reference being had to the accompanying drawings, wherein:

Fig. 1 is a front elevational view of a louver structure, showing the parts in one position with the slats closed, in accordance with the invention;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a diagrammatic longitudinal sectional view of the louver structure showing two shutters in one position in the passage;

Fig. 4 is a diagrammatic view similar to Fig. 3 showing the two shutters in another position in the passage;

Fig. 5 is a schematic sectional view similar to Fig. 2, but showing the slats in a different, though open, position;

Fig. 6 is a schematic sectional view similar to Fig. 5, but showing the slats in open position; and

Fig. 7 is a large-scale elevational view of a segment of one of the parts shown in Fig. 1.

In carrying the invention into effect in one of the embodiments which has been selected for illustration in the accompanying drawings and for description in this specification, and referring now particularly to Figs. 1 and 2, there is provided a louver structure generally indicated at 11. The structure 11 comprises a duct of frame 12 that defines a passage 13 that has a terminal front opening 14. The frame 12 has a top wall 15, a bottom wall 16, side walls 17 and 18, and a partition 19.

The partition 19 divides the passage 13 into two passage sections 20 and 21. In the drawing there are shown only two passage sections 20 and 21, but it will be understood that the passage 13 may be sub-divided into more than two sections, or may be made without sub-division as a single passage.

A shutter is disposed in each passage section, the shutter generally indicated at 22 being disposed in the section 20, and the shutter generally designated 23 being disposed in the section 21. Each of the shutters 22 and 23 may either be composed of one piece, of cast, forged or molded material as indicated diagrammatically in Figs. 3 and 4 or may be composed of similar segments 24 of the type shown in Fig. 7.

The shutters 22 and 23 are mounted for rotation in the passage 13. Each shutter 22 may be mounted on a separate rotatable member, for instance the shutter 22 on a shaft 25 and the shutter 23 on a shaft 26. Each of the shafts 25 and 26 is journaled in one of the side walls 17 and 18 in the partition 19, and the shaft 25 is secured to the shutter 22 and carries a knob 27 for

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turning, while the shaft 26 is secured to the shutter 23 and carries a knob 28 for turning. Instead, a common stationary shaft may be provided for both shutters 22 and 23 to be turnable thereon freely, for instance manually.

Each of the shutters carries a series of inclined parallel elliptical disks 29. The disks have their major axes forming an angle A with the axis B of the shaft, while their minor axes are perpendicular to axis B and that axis B is disposed transverse in a cross-section plane of the passage 13 parallel with the opening 14. Diametrically intersecting the disks 29 of each shutter and disposed on each of the shafts 25 and 26 is a large slat 30 with convex sides. Each shaft passes axially through a slat 30. The shutter may also be provided with two smaller slats 31 having convex sides. The smaller slats 31 are disposed parallel to the large slat 30 and are spaced therefrom for a distance a which is sufficiently large to permit the flow of air through the passage 13 in two large equal streams. The small slats 31 are furthermore spaced from the periphery of the disks 29 by distance b to further divide the stream of air into smaller streams between the slats 31 and walls 15, 16. The disks 29 intersect the slats 30 and 31 to form an integral shutter unit therewith.

The large slat 30 has a width L which is only slightly smaller than the height H of the passage 13, and extends throughout its passage section. Thus, as best shown in Fig. 2, when a shutter is turned so that the large slat is positioned across the passage 13, it will substantially close that passage section, effectively blocking a stream of air flowing in that passage section. Each of the shutters may be turned to other positions, for instance the position of maximum air passage shown in Fig. 6, wherein the slats 30 and 31 are parallel to the top and bottom walls 15 and 16 of the passage 13. They may also be turned to other positions, for instance the position shown in Fig. 5, wherein the slats 30 and 31 direct upwardly the air that emerges at the opening 14. By turning the shutter about its axis of rotation, provided by the shaft, the slats may be positioned in any position, either substantially closing the passage (Fig. 2), or providing only a minimum resistance to the passage of air (Fig. 6), or various degrees of upward direction or downward direction of the air emerging at the opening 14 radially of said axis B.

In addition to the aforementioned deflection of the air, which takes place radially of the axis B of rotation, and is provided by the slats 30 and 31, another deflection is provided by the disks 29. By rotating a shutter about its axis B the disks 29 are rotated along therewith. For instance, a rotation of about 180° will turn the disks 29 of the shutter 22 from the rightward deflection position shown in Fig. 3 to the leftward deflection position shown in Fig. 4. The shutter 23 can be turned independently of the shutter 22, either to align its disks 29 with those of the shutter 22 or at an angle thereto, for instance oppositely thereto (Fig. 3).

Figs. 3 and 4 are diagrammatic representations of the shutters 22 and 23 in either sectional or one piece form as mentioned above. In one piece form each shutter includes a plurality of spaced parallel elliptical disks 29 each obliquely disposed at an acute angle to the longitudinal central axes of slats 30 and 31 and to the axes of shafts 25, 26. The shutters are turned as independent units on shafts 25 or 26 by means of knobs 27 or 28 respectively.

The combined action of the slats 30 and 31 and of the disks 29 therefore makes it possible to direct air emanating from the passage 13 either straight or upward and downward, as well as sidewardly, and also en-

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ables to effectuate substantially full closure of the passage (Fig. 2).

Where the shutter is segmented (Fig. 7), each segment 24 may be provided with two pins or dowels 32 and two matching bores 33 adapted to receive the pins 32 of the next adjoining segment 24.

It will be apparent to those skilled in the art that the novel principles of the invention disclosed herein in connection with specific exemplifications thereof will suggest various other modifications and applications of the same. It is accordingly desired that in construing the breadth of the appended claims they shall not be limited to the specific exemplifications of the invention described herein.

Having thus described the invention, what I claim as new and desire to be secured by Letters Patent, is as follows:

1. A louver structure, comprising a frame having perpendicularly disposed top, bottom and side walls defining a rectangular passage, a first slat disposed transversely across the passage and mounted for axial rotation between opposite side walls thereof, said slat having a width substantially equal to the height of the passage so that the slat closes the passage when disposed in one position and restricts the passage in all other positions of the slat, a disk intersecting said slat at an acute angle to a central axis thereof to deflect air flowing through the passage into several streams moving at said angle to said slat, and a pair of further slats smaller in width than the first slat and spaced parallel thereto in said passage, said further slats intersecting said disk at said angle to divide the flow of air in the passage into still further streams, said first slat, disks and smaller slats being formed as an integral shutter unit rotatable simultaneously in the passage so that said streams are directed angularly with respect to said top, bottom and side walls in all of said other positions of the first slat.

2. A louver structure according to claim 1, further comprising a shaft extending axially through the first slat and journaled in the side walls.

3. A louver structure according to claim 2, further comprising a manually operable member disposed outside one of the side walls and secured to one end of the shaft for rotating said shutter.

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4. A rotatable louver structure comprising a first generally flat slat, an elliptical air deflector disk disposed at an acute angle to a central axis of said slat and diametrically intersecting the slat, and a pair of other slats disposed parallel to each other and respectively spaced from the opposite sides of the first slat, said pair of slats intersecting said disk so that the disk and slats form an integral unit, said unit being provided at portions thereof with means for engaging corresponding portions of another similar louver structure for rotation therewith.

5. A louver structure comprising a frame having perpendicularly disposed top, bottom and side walls and a partition, disposed between the side walls defining two rectangular passages, a pair of shutters respectively mounted in said two passages, each of said shutters including a first slat disposed transversely across one of the passages between one of the side walls and said partition and journaled for axial rotation therebetween, said slat having a width substantially equal to the height of the passage, a plurality of spaced parallel disks intersecting said slat at an acute angle to a central axis thereof, and a pair of further slats smaller in width than the first slat and equal in axial length thereto, said pair of slats being disposed parallel to the first slat and spaced therefrom, said disks intersecting the smaller slats at said angle, said first slat, disks and smaller slats being formed as a single unit rotatable in said one passage.

6. A louver structure according to claim 3, further comprising manually operable means disposed outside of said side walls and operatively joined to said shutters for independently rotating the shutters in the passages.

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