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3,025,882

AIR INLET CONTROL FOR FANS AND THE LIKE

Filed Dec. 3, 1958

2 Sheets-Sheet 1

FIG. 1

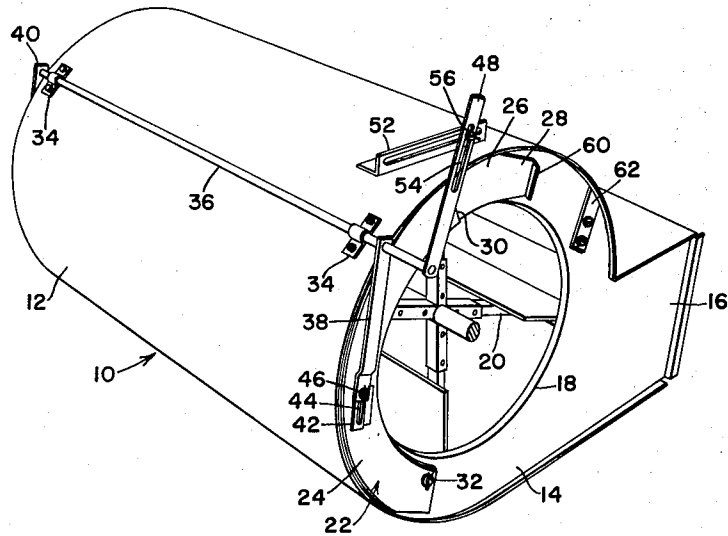
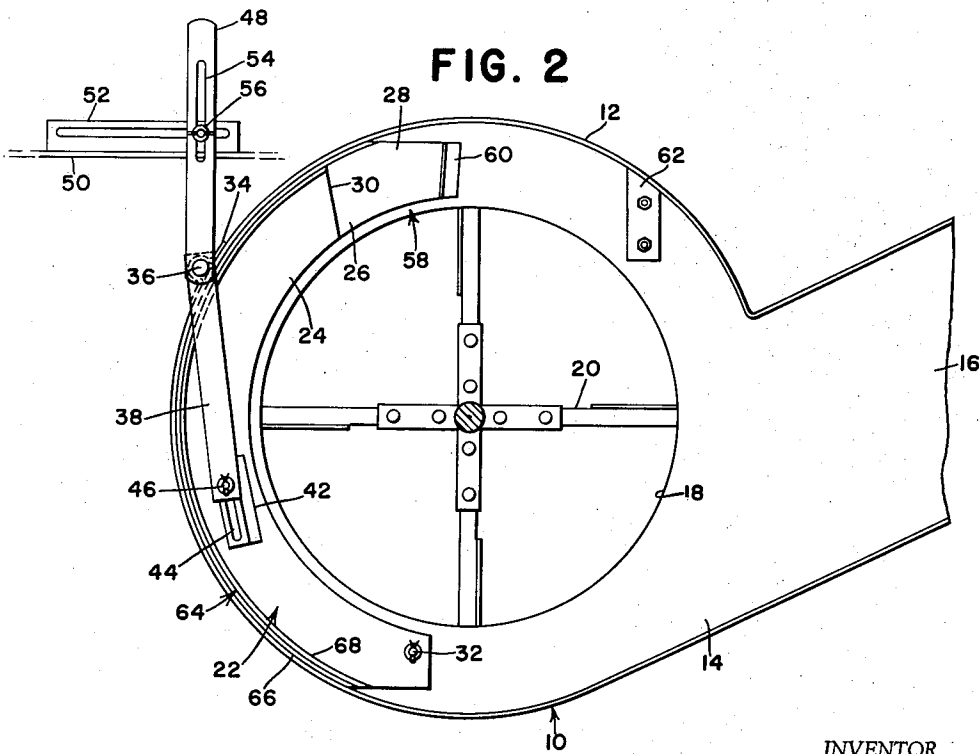


FIG. 2



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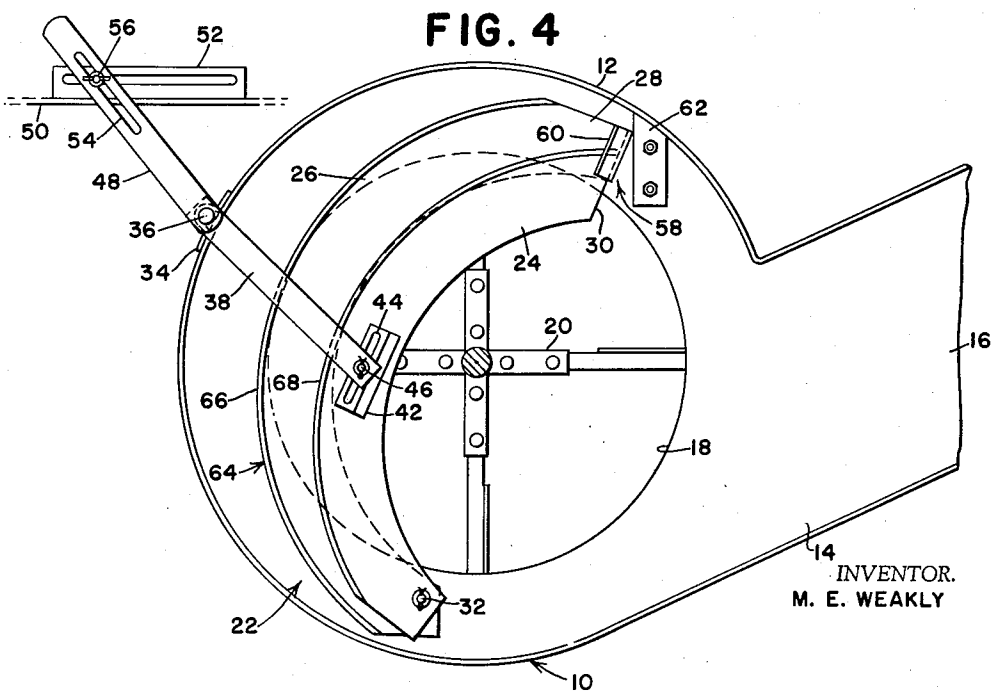
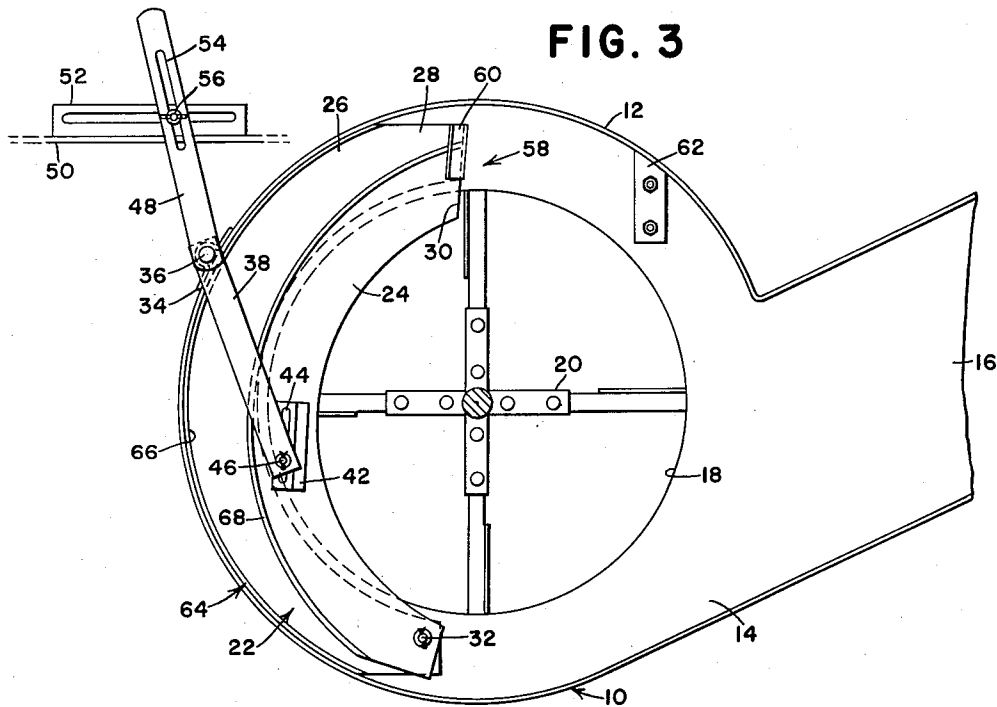
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AIR INLET CONTROL FOR FANS AND THE LIKE
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 8 Claims. (Cl. 138-46)

This invention relates to air control means for fan and blowers and the like and more particularly to air control means embodying a pair of complementary shutter members selectively movable to vary the size of an air inlet opening.

The principal object of the invention is to provide a novel and inexpensive shutter means of the character indicated and to provide the arrangement with improved controls whereby similar shutter means at opposite ends of a fan or blower housing, for example, may be simultaneously operated. The invention features the provision of a pair of complementary plates, to only one of which the control means is connected, together with one-way lost-motion means between the plates so that upon movement of one of the plates through a certain distance the lost-motion means becomes effective to pick up the other plate so that it will move in trailing relation to the plate that is connected to the control means. The invention features not only the provision of shutter means which can accomplish at least three basic positions but which also can achieve an infinite number of positions between minimum and maximum ranges.

The foregoing and other important objects and features inherent in and encompassed by the invention will become apparent as a preferred embodiment thereof is disclosed in detail, by way of example, in the ensuing description and accompanying sheets of drawings, the several figures of which are described below.

FIG. 1 is a perspective of a fan housing embodying the improved shutter means.

FIG. 2 is an enlarged end view, showing the shutter means in open position.

FIG. 3 is a similar end view, showing the shutter means in an intermediate position.

FIG. 4 is a similar view, showing the shutter means in maximum position.

The numeral 10 represents a fan or blower housing of conventional shape, having a generally annular or cylindrical wall 12 and opposite end walls, only one of which is shown at 14. The walls are appropriately shaped to afford an air discharge or outlet 16. Each end wall is provided with a circular opening 18 coaxial with the principal axis of the housing. A rotor or fan 20 is journaled for rotation on this axis. This fan may be of any typical construction.

Each end wall carries shutter means, only one of which is illustrated and the other of which is suggested, as will presently appear. The visible shutter means, indicated in its entirety by the numeral 22, comprises first and second plates or equivalent members 24 and 26 respectively. These plates are each of C-shaped design and are generally congruent, except that the second plate 26 has a free end extension 28 beyond the free end or edge 30 of the plate 24. The opposite ends of the plates are commonly pivoted to the wall 14 on a pivot 32 which is eccentric to and parallel with the axis of the housing and fan. In the normal open position of the plates (FIG. 2), they are generally congruent and lie concentric with and in uncovering relation to the inlet opening 18, thus giving the inlet opening its maximum effective area. FIGS. 3 and 4 show two other stages of the shutter means. In FIG. 3, the plate 24 is in an intermediate position while the plate 26 remains in its open position. In FIG. 4, the plate 24 is moved beyond the intermediate position and

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picks up and moves the plate 26 to the intermediate position. The plate 24 may be moved reversely from the position of FIG. 4 to a position in which it becomes generally congruent with the intermediately positioned plate 26 and thereafter, continued reverse movement of the plate 24 will return both plates to the open position of FIG. 2. The manner in which these various positions are achieved will be described below.

The wall 12 of the housing 10 carries a pair of bearing brackets 34 which journal a rockshaft 36 on an axis spaced radially outwardly from and parallel to that of the housing. This rockshaft extends at opposite ends beyond the opposite end walls of the housing and at the end clearly visible in the drawings has rigid thereon a depending arm 38 and has at its other end a similar arm 40 for cooperation with the shutter means (not shown) at that end of the housing. The plate 24 rigidly carries a bracket 42 which has therein a slot 44 generally lengthwise of the arm 38 in the open position of the two plates. A pin 46 in the free end of the arm 38 constitutes a follower riding in the slot 44. An upstanding arm 48 rigid on the rockshaft provides means for rocking the rockshaft to swing the plate 24 about its pivot 32. Extraneous supporting structure, such as that indicated at 50, carries a slotted member 52, and the slot in this member is intersected by a slot 54 in the arm 48. Releasable securing means 56 cooperates with the member 52 and arm 48 for selectively securing the arm in any one of several positions. In the present case, the securing means comprises a bolt and wing nut; although, any other suitable means could be employed. Likewise, the structure 50 could be mounted on or be a part of the fan housing, or otherwise.

When the fastening means 56 is released, the arm 48 may be used to rock the rockshaft 36 so as to incur swinging of the plate 24 out of and reversely back to the open position shown in FIG. 2. Because of the interconnection between the plates, the operating means just described need be connected only to the plate 24. Part of the connecting means comprises a first one-way lost-motion means indicated generally by the numeral 58, and this comprises the free end or edge 30 of the plate 24 and a lip 60 formed on the extension 28 of the plate 26. The action of this means will be evident from a comparison of FIGS. 2, 3 and 4. When the plate 24 is swung from the position of FIG. 2 to that of FIG. 3, its edge 30 engages the lip 60 on the plate 26. Thus, the plate 24 is able to move alone to the FIG. 3 position; that is, the plate 26 remains in its open position while the plate 24 moves to the intermediate position illustrated. Of course, the plate 24 could be moved to an infinite number of positions between the position of FIG. 2 and that of FIG. 3. In the condition of FIG. 3, the means 58 becomes operative to connect the plates 24 and 26 so that when the plate 24 is swung further or beyond the intermediate position of FIG. 3, as to the position of FIG. 4, the means 58 causes the plate 24 to pick up the plate 26, thereby causing the plate 26 to follow in trailing relation to incur substantially the intermediate position formerly occupied by the plate 24 while the plate 24 moves to the currently disclosed maximum position, which may be established either by a stop 62 on the wall 14 or which may occur as a result of the mechanical linkage involved in the arms 38 and 48 and the design of the slots 44 and 54. As shown in FIG. 4, the design of the linkage referred to accomplishes substantially the position of FIG. 4 and further movement of the rockshaft 36 in a counterclockwise direction would incur reversal of movement of the plate 24. In its broadest aspects, the shutter means 22 is capable of control by means other than those illustrated.

When the rockshaft 36 is reversed so as to incur reverse

swinging of the plate 24, the plate may move alone back to the intermediate position in which it becomes generally congruent with the plate 26, since the connection at 58 is effective in only one direction. That is to say, the edge 30 moves away from the lip 60. At this time, a second one-way lost-motion means 64 becomes effective. This means comprises a rim 66 or equivalent stop on that edge of the plate 26 having the larger radius. In other words, its back edge. The plates, when generally congruent, are nested, so that the back edge 68 of the plate 24 abuts the rim 66 just described. Hence, when the plate 24 is continued in its reverse swinging the edges 66 and 68 cooperate to establish the means 64 whereby the plate 24 picks up the plate 26 so that both plates return simultaneously to their open position (FIG. 2).

As already indicated, the two plates 24 and 26 are capable of occupying an infinite number of positions among those referred to above.

The invention is simple in construction and easy to operate and the shutter means comprises essentially the two moving plates 24 and 26. Features of the invention other than those outlined will readily occur to those versed in the art, as will many variations of the preferred embodiment of the invention disclosed, all of which may be resorted to without departure from the spirit and scope of the invention.

What is claimed is:

1. In combination with a wall having a circular opening, shutter means comprising: first and second generally congruent complementary C-shaped plates parallel to the wall and having a common open position generally congruent to each other and concentric with and in uncovering relation to the opening; means commonly pivoting the plates at the same end of each to the wall for swinging thereof in traversing relation to the opening to vary the area of said opening; first one-way lost-motion means operative between the plates to enable swinging of the first plate alone to an intermediate position overlying the opening and effective upon further swinging of said first plate to pick up and swing the second plate in trailing relation substantially to said intermediate position as said first plate travels beyond said intermediate position; and second one-way lost motion means between the plates enabling reverse swinging of the first plate alone back to the intermediate position and generally congruent with the second plate and effective upon further reverse swinging of said first plate to said open position to pick up and swing the second plate also back to said open position.

2. The invention defined in claim 1, in which: the first one-way lost-motion means includes a portion on the second plate at the unpivoted end thereof extending beyond the proximate end of the first plate, a lip on said portion engageable by said proximate end of said first plate when said first plate is swung beyond said intermediate position; and the second one-way lost-motion means includes a rim on that edge of the second plate that has the larger radius, and said rim being engageable by the proximate edge of said first plate when said one plate is returned to said open position.

3. The invention defined in claim 1, in which: the first one-way lost-motion means includes a portion on the second plate at the unpivoted end thereof, extending beyond the proximate end of the first plate, and a lip on said portion engageable by said proximate end of said first plate when said first plate is swung beyond said intermediate position.

4. The invention defined in claim 1, in which: the second one-way lost-motion means includes a rim on that edge of the second plate that has the larger radius, and said rim being engageable by the proximate edge of said

first plate when said one plate is returned to said open position.

5. The invention defined in claim 1, including: stop means on the wall engageable with and for limiting movement of the second plate between said open and first positions.

6. The invention defined in claim 1, including: bearing means associated with the wall and providing a pivot on an axis radially outwardly of and parallel to that of the opening; an arm rockable on said pivot and extending into proximity to the first plate; means on the first plate including a slot disposed generally lengthwise of the arm in the open position of the plates; and a follower carried by the arm and running in the slot whereby rocking of the arm causes swinging of said first plate.

7. In combination with a wall having a circular opening, shutter means comprising: first and second generally congruent complementary C-shaped plates parallel to the wall and having a common open position generally congruent to each other and concentric with and in uncovering relation to the opening; means commonly mounting the plates on the wall for movement thereof in traversing relation to the opening to vary the area of said opening; first one-way lost-motion means operative between the plates to enable movement of the first plate alone to an intermediate position overlying the opening and effective upon further movement of the said first plate to pick up and move the second plate in trailing relation substantially to said intermediate position as said first plate travels beyond said intermediate position; and second one-way lost-motion means between the plates enabling reverse movement of the first plate alone back to the intermediate position and generally congruent with the second plate and effective upon further reverse movement of said first plate to said open position to pick up and move the second plate also back to said open position.

8. In combination with a wall having an opening, shutter means comprising: first and second plates parallel to the wall and having a common open position in which one plate overlaps the other alongside and in uncovering relation to the opening; means commonly mounting the plates on the wall for movement thereof in traversing relation to the opening to vary the area of said opening; first one-way lost-motion means operative between the plates to enable movement of the first plate alone to an intermediate position overlying the opening and effective upon further movement of said first plate to pick up and move the second plate in trailing relation substantially to said intermediate position as said first plate travels beyond said intermediate position; and second one-way lost-motion means between the plates enabling reverse movement of the first plate alone back to the intermediate position and overlapping the second plate and effective upon further reverse movement of said first plate to said open position to pick up and move the second plate also back to said open position.

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