Aug. 13, 1968 J. I. JANETTE 3,396,904

ADJUSTABLE AIR INLET CLOSURE

Filed March 27, 1967 2 Sheets-Sheet 1

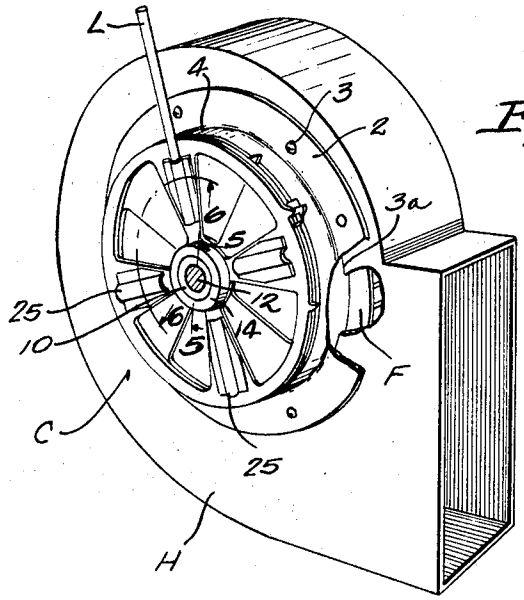


Fig. 1

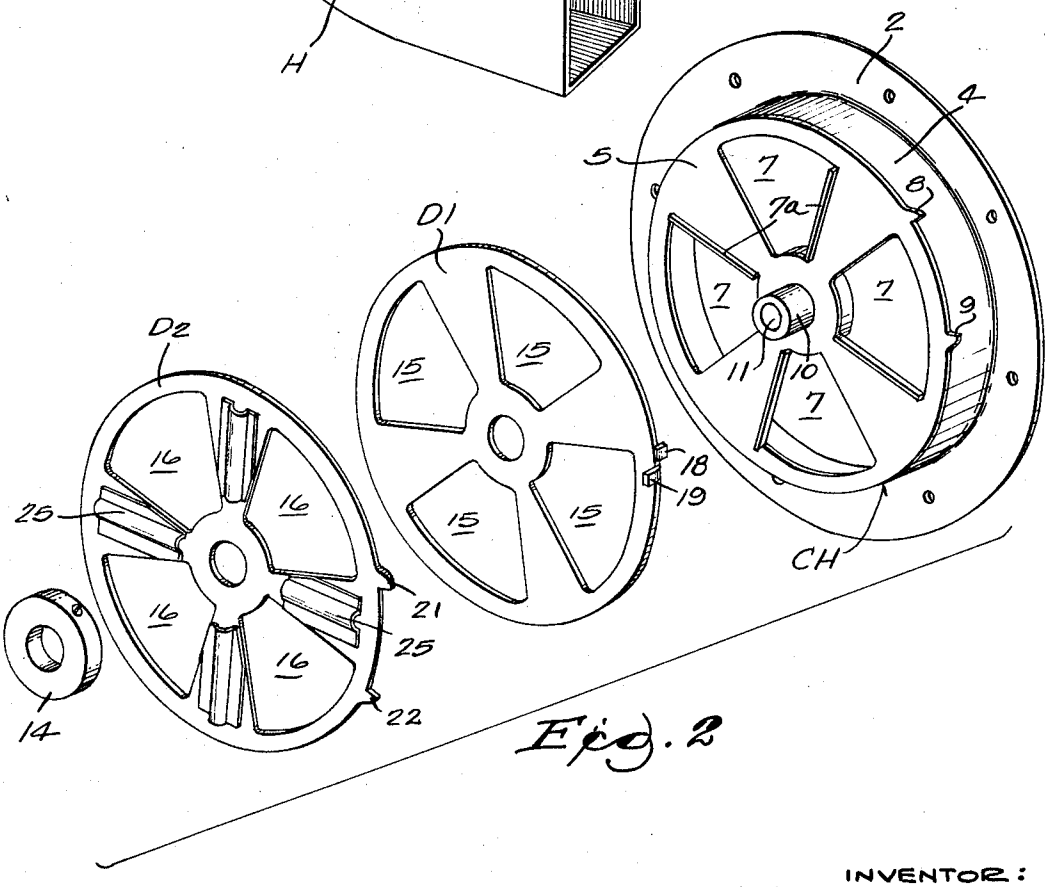


Fig. 2

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ADJUSTABLE AIR INLET CLOSURE

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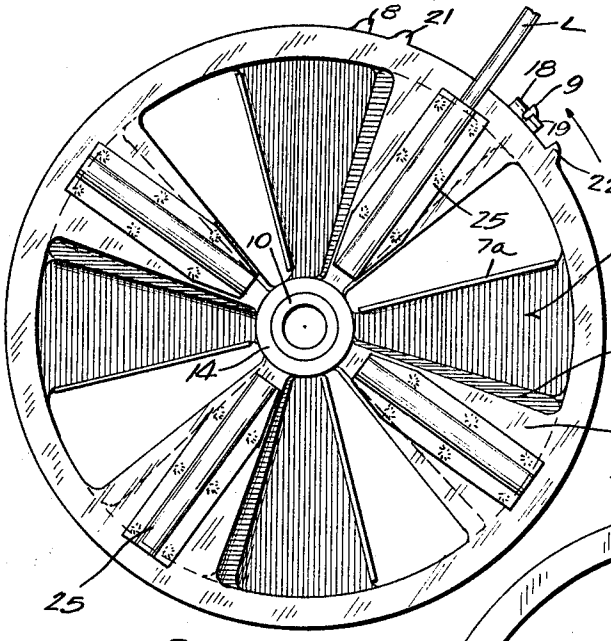


Fig. 3

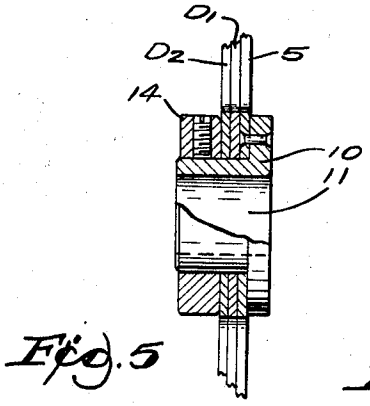


Fig. 5

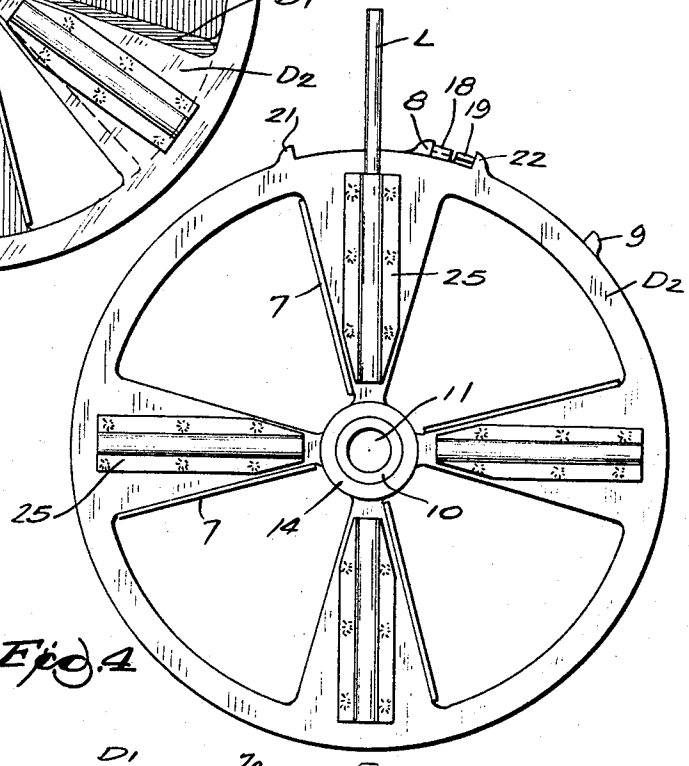


Fig. 4

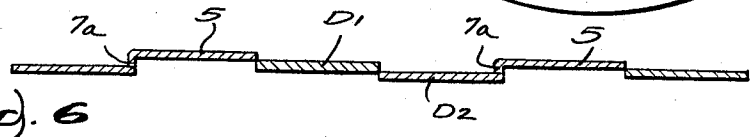


Fig. 6

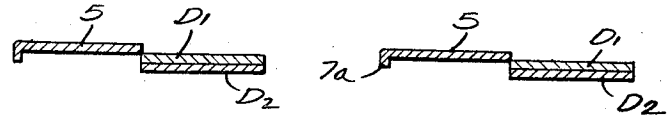


Fig. 7

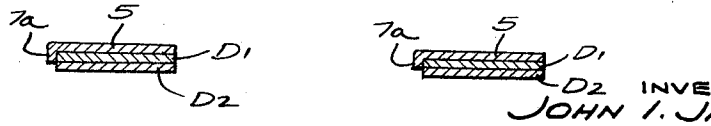


Fig. 8

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ADJUSTABLE AIR INLET CLOSURE

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4 Claims. (Cl. 230—114)

ABSTRACT OF THE DISCLOSURE

An adjustable, iris type air inlet having two adjustable discs of similar perforations for shifting between an open position of exceptionally large air inlet area, and a fully and tightly closed position.

Background of the invention

The invention pertains to air inlet closures having a plurality of adjustable panels constrained for pivotal folding and movably interconnected.

Prior art devices of this general type have been proposed but usually employ a single rotary plate in conjunction with a fixed plate or damper. Such a device is shown in the U.S. Patent No. 2,109,239, issued on Feb. 22, 1938 to C. Scholl. Furthermore, some of the prior art devices often were incapable of tightly sealing the inlet, when in the closed position, and were inefficient in that respect. Still other devices, in order to adjust over a wide range of exposed areas, required numerous or complicated parts.

Summary of the invention

The present invention provides an adjustable air inlet having a plurality of similarly apertured panels or discs which are pivotally foldable for movement together between a tight, fully closed position and a fully open position which provides an exceptionally large air inlet area for the amount of space in which they are situated. A more limited aspect of the invention relates to an inlet of the above type in which the movable discs are interconnected with each other and with the housing by means of stops so as to provide for proper movement and positioning of the various parts. Still another aspect relates to the provision for insuring a tight air sealing relationship between the members when in a closed position yet which permits smooth and easy operation of the device.

These and other objects and advantages of the present invention will appear as this disclosure progresses.

Brief description of the drawings

FIGURE 1 is a perspective view of an air inlet closure embodying the present invention as applied to a blower housing, and showing the closure in the fully closed position;

FIGURE 2 is a perspective exploded view of the closure;

FIGURE 3 is a side elevational view of the closure of FIGURE 1, but showing the adjustable discs in a partially open position;

FIGURE 4 is a view similar to FIGURE 3 but showing the closure in a fully open position;

FIGURE 5 is a cross sectional view taken along line 5—5 in FIGURE 1, but on an enlarged scale;

FIGURE 6 is a sectional view taken generally along line 6—6 in FIGURE 1, and

FIGURES 7 and 8 are views similar to FIGURE 6 but showing the closure in the half open and fully open positions, respectively.

Referring in greater detail to the drawings, the closure C is secured to the side of a blower housing H with which it finds particular utility. The housing contains a rotatably driven fan F which sucks air into the housing through the closure and forcibly discharges it out the generally tangentially arranged air discharge outlet 1.

The closure includes a radially extending attaching flange 2 by means of which it is secured to the housing with screws 3, in alignment with the opening 3*a* in the side of the housing. An annular, axially extending sleeve 4 is rigidly secured, as by welding for example, to the flange. A flat end formed by fixed disc 5 is in turn rigidly secured, as by welding, for example, to one end of the sleeve and defines a series of generally pie or segment shaped apertures 7 circumferentially spaced thereabout. It will be noted that the apertures 7 constitute about two-thirds of the entire cross sectional area of the sleeve 4 or disc 5. The fixed disc 5 forms a flat end for the housing and has a pair of stops 8 and 9 extending radially beyond its periphery and circumferentially spaced apart.

The fixed disc also has formed along one of the edges of each of its apertures 7, an outwardly and axially extending flange 7*a*. As will appear, the flange 7*a* acts to seal against the outer disc D2 when the closure is closed.

A hub 10 is fixed to the central portion of disc 5 and extends therethrough and has a hole 11 through it in which the shaft 12 of the fan F is journalled.

The cylindrical sleeve 4 together with its fixed end plate 5 having apertures 7, constitutes a cylindrical closure housing CH with a flat end to which are mounted on the hub 10, the two adjustable, aperture discs, to be described.

A pair of rotatably adjustable discs D1 and D2 are oscillatable on the hub and held captive thereon and against fixed disc 5 by the collar 14 fixed to the end of the hub.

The adjustable discs D1 and D2 have segment shaped apertures 15 and 16, respectively, which are of similar size and shape to the apertures 7 of the flat ends 5 of the housing.

The inner disc D1 has a pair of stops 18 and 19 extending in opposite radial directions from the periphery of the disc and located adjacent one another. Stops 18 and 19 may, of course, be formed as a single stop extending axially to either side of disc D1. These stops are arranged to oscillate with their disc and between the spaced stops 8 and 9 on the flat end 5 for abutting engagement therewith when swung fully in one direction or another.

The outer disc D2 had a pair of stops 21 and 22 extending radially from its periphery at circumferentially spaced locations which coincide generally with stops 8 and 9 of the fixed disc. These stops 21 and 22 are arranged on opposite sides of stops 18 and 19, and are adapted to abut against the stop 19 of the inner disc, when disc D2 is swung to one position or the other. Thus, as outer disc D2 is oscillated by the control lever L fixed thereto, in any one of a series of brackets 25, the disc D2 after a certain degree of rotation, carries with it the inner disc D1 by the abutting stops on the movable discs.

As viewed in FIGURE 1, when the closure is closed, flange 7*a* extends axially to adjacent the outer disc and thus seals the axial space, which space is required to accommodate the thickness of the inner disc D1, between the fixed disc 5 and outer movable disc D2. In this closed position, the discs D1 and D2 together block off or close completely the apertures 7 of the housing.

When it is desired to open the closure to admit air, the handle is oscillated the desired amount, thus first acting to oscillate outer disc D2. Its stops 21 or 22 do not as yet contact the stop means on inner disc D1.

When disc D2 has been oscillated a sufficient degree so that its solid spokes completely overlie the solid spokes of disc D1 (FIGURE 7), the closure is then half open and the stop means of discs D1 and D2 then have come into abutting relationship with one another.

Further opening movement of outer disc D2 causes it to carry the inner disc along with it, due to their abutting stop means. The discs D1 and D2 then move together, to any degree, until the closure is fully open as shown in FIGURE 4, or in FIGURE 8.

To close the closure, the outer disc D2 is swung in the opposite direction, and it acts first to partially close the openings 7 in end 5. Continued swinging of disc D2 causes the stop means between the discs D1 and D2 to again abut and disc D2 then carries with it the inner disc D1 to any degree desired until a fully closed position is again reached.

The outer disc D2 is provided with a series of lever receiving brackets 25 into which the lever L is detachably inserted so that lever L can be attached in one of several positions, depending on the installation.

The inner disc D1 is preferably formed from a material, such as aluminum, which is different from the steel discs 5 and D2. This reduces wear due to the sliding steel-to-steel contact. The lever can be connected by means not shown, to the fuel regulating means of a furnace (not shown) or the like, with which the blower is used to furnish air thereto.

Résumé

With the two oscillatable and adjustable discs D1 and D2, a considerably greater open area can be obtained for a given size closure. The device closes tightly and operates smoothly in a foolproof manner.

I claim:

1. An adjustable air inlet closure comprising, a housing having a plurality of circumferentially spaced apertures therethrough, an inner disc and an outer disc concentrically mounted on said housing and having similarly shaped apertures spaced circumferentially therearound, said discs being oscillatably mounted on said housing between an open position in which the disc apertures are all aligned with said apertures in said housing and a closed position in which one disc covers part of the apertures in said housing and the other disc covers the remaining part of the apertures in said housing, an axially extending flange formed along one side of the apertures in said housing to provide an air seal between said housing and said outer disc when said discs are in said closed position, and stop means on said housing and on said discs for disengageable abutting relationship with one another as said discs are rotated, whereby rotation of one disc beyond a predetermined amount causes rotation of the other disc.

2. An adjustable air inlet closure comprising, a housing having a plurality of circumferentially spaced apertures therethrough, an inner disc and an outer disc concentrically mounted on said housing and having similarly

shaped apertures spaced circumferentially therearound, said discs being oscillatably mounted on said housing between an open position in which the disc apertures are all aligned with said apertures in said housing and a closed position in which one disc covers part of the apertures in said housing and the other disc covers the remaining part of the apertures in said housing, and stop means on said housing and on said discs for disengageable abutting relationship with one another as said discs are rotated, whereby rotation of one disc beyond a predetermined amount causes rotation of the other disc, said stop means includes, a pair of circumferentially spaced stops extending from said housing, a stop on said inner disc and located circumferentially between and abuttable against the spaced stops on said housing, and a pair of circumferentially spaced stops extending from said outer disc and one on either side of the stop on said inner disc and abuttable thereagainst.

3. Adjustable air inlet mechanism comprising a generally cylindrical closure housing having a flat end with a plurality of circumferentially spaced apertures therethrough, an inner disc and an outer disc concentrically and pivotally mounted at their center on said flat end and having segment shaped apertures spaced circumferentially therearound, said discs being oscillatable between an open position in which the disc apertures are all aligned with said apertures in said flat end of said housing and a closed position in which one disc covers part of the apertures in said flat end and the other disc covers the remaining part of the apertures in said flat end, and stop means on said flat end and on said discs for disengageable abutting relationship with one another as said discs are rotated, whereby rotation of one disc beyond a predetermined amount causes rotation of the other disc, said stop means includes a pair of circumferentially spaced stops extending from said housing, a stop on said inner disc and located circumferentially between and abuttable against the spaced stops extending from said outer disc and one on either side of the stop on said inner disc and abut.able thereagainst.

4. The closure set forth in claim 3 including an axially extending flange formed along one side of the apertures in said housing to provide an air seal between said housing and said outer disc when said discs are in said closed position.

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