(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 810 408 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.12.1997 Bulletin 1997/49

(51) Int. Cl.[6]: **F24F 13/14**

(21) Application number: **97201516.8**

(22) Date of filing: **21.05.1997**

(84) Designated Contracting States:
CH DE DK FR GB LI SE

(30) Priority: **29.05.1996 IT TO960118 U**

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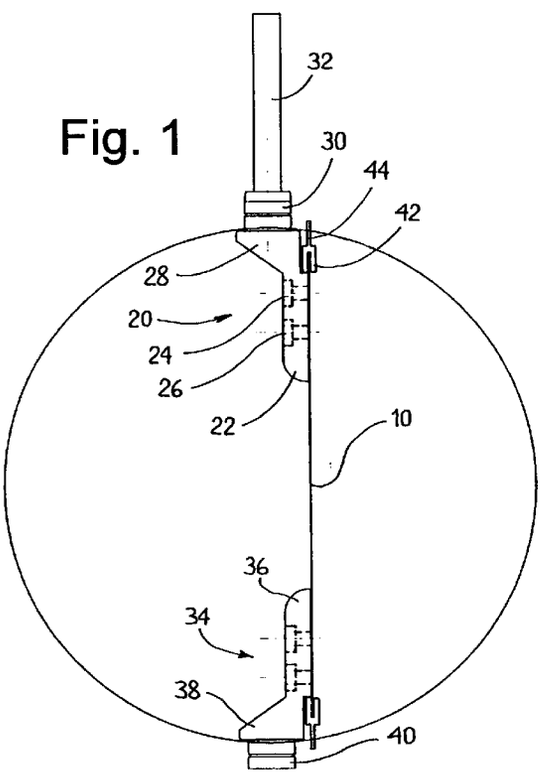
(54) Shutter for ventilation ducts

(57) A rigid, disk-shaped plate (10) is journaled along one diameter on an axis transversal to the duct and projects through at least one hole in the duct wall. Two studs (20, 34) are attached to one side of the plate in respective, diametrically opposite areas of its periphery, and overhang out of the plane of the plate so that a peripheral rim of the plate is left free on both sides. An inner groove of a rubber gasket (42) shaped as an annular band is sheathed on the rim. The studs have coaxial, cylindrical bosses (30, 40) which are rotatably receivable in respective holes in the wall of the duct.

Fig. 1



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Description

This invention is concerned with a shutter for ventilation ducts.

In most ventilation and heating systems, such as used on industrial premises, in tunnels, aboard ships, etc., low-pressure air is generally distributed from a source to a plurality of ventilation ports, via ducts of a few decimeter diameter, which are generally made of metal sheet. Such ducts are generally provided with shutters for adjusting or choking the air flow. These mostly comprise a metal sheet plate which has a surface and shape substantially matching the duct cross-section, is journaled on a transversal shaft in the duct, and can be controlled by an external handle from a position transverse to the duct axis (maximum throttle) to a position displaced by 90° (minimum throttle). The shaft is usually an iron rod which is journaled in opposite holes in the duct wall, and in most cases the plate is attached to the rod by bolt and nut.

Because of the variety of duct cross-sections, shutters of the above-mentioned type have to be prepared in several sizes. This in practice leads to cumbersome and time-consuming assembly operations.

Italian patent application No. TO95U000036 filed on 16 February 1995, entitled "Adjustment shutter for ventilation ducts", shows a shutter comprising a plate of metal sheet with two standard members engaging its periphery, the members being made of a synthetic material and forming a turning pivot by which the shutter is mounted transversally to the cylindrical duct. This approach uses standardized parts for a wide range of duct sizes, and makes it easier to assemble and install shutters. However, this approach can only be used with shutters having no sealing gaskets, and consequently it cannot be used with fully stopping shutters, which must necessarily have rubber gaskets.

It is now the object of the invention to provide a shutter for ventilation ducts which affords substantially the same advantages of standardization of parts and simplification of assembly, also with shutters provided with gaskets.

The above and other objects and advantages, such as will appear from the following disclosure, are attained by the invention with a shutter for ventilation ducts, comprising a rigid, disk-shaped plate, journaled along one diameter on an axis transversal to the duct a projecting through at least one hole in the duct wall, characterized in that the journal axis comprises two studs attached to one side of the plate in respective, diametrically opposite areas of its periphery, which studs overhang out of the plane of the plate so that a peripheral rim of the plate is left free on both sides, and have coaxial, cylindrical bosses which can be rotatably received in respective holes in the wall of the duct.

According to a further advantageous feature, the free rim of the plate is sheathed by a rubber gasket shaped as an annular band having a peripheral groove on the inner side of the band which clasps the free edge of the plate.

A preferred embodiment of the invention will now be described with reference to the attached drawing, given by way of example, in which:

Fig. 1 is a view in side elevation of a shutter according to a preferred embodiment of the invention;

Fig. 2 is a front view of the shutter of Fig. 1; and

Fig. 3 is a front view, partly broken away, to an enlarged scale, of a stud relating to the shutter of Fig. 1.

With reference to Figs. 1 and 2, the shutter according to the preferred embodiment of the invention comprises a disk-shaped plate 10 of punched metal sheet, having two diametrically opposite slots 12, 14 and two holes 16, 18, which are near the respective slots on the same diameter.

A first stud 20, e.g. of sintered metal, has a tongue 22 which is attached to a side of plate 10. As a means of attachment, stud 10 preferably comprises two holes 24, 26, which allow the tongue to be locked to slot 12 and the adjacent hole 16, by means of bolts not shown. A ledge 28 extends from tongue 20, ovehanging out of the plane of plate 10. Ledge 28 has a cylindrical boss 30, which extends into a prismatic tang 32.

A second stud 34 is similar to stud 20, and accordingly comprises a tongue 36 from which a ledge 38 extends, having a cylindrical boss 40. However, stud 34 has no prismatic tang.

Cylindrical bosses 30, 40 of both studs 20, 34 are aligned to form a pivoting axis for the shutter. In use, they are received in matching holes made in the duct wall (not shown).

With further reference to Figs. 1 and 2, the shutter is preferably provided with a rubber gasket 42, which is essential where a flow-stopping capability is required from the shutter, although the gasket can be omitted in other cases. Gasket 42 is an annular band having a peripheral groove along its inner edge, for the insertion of the peripheral free rim of plate 10. Moreover, from the outer edge of the band, a thinner ridge 44 extends, up to a diameter slightly larger than the diameter of the duct un which the shutter is installed. Gasket 42 is preferably vulcanized on one side of disk-shaped plate 10.

As can be seen in Fig. 3, boss 30 of stud 20 (but also boss 40 of stud 34) preferably has a peripheral groove 46, which can receive, by snap-insertion, a spring washer 48 having a vulcanized rubber lining 50. Also, between ledge 28 and the inner wall of the duct, on the one hand, and between the outer wall of the duct and the rubberized washer 48, on the other hand, spacers 52, 54 of a low-friction polymer, such as polytetrafluoroethylene, are interposed.

In the installation of the above-described shutter, studs 20 and 30 are first inserted in holes previously cut in the duct wall, and the above-mentioned spacers and

spring washers. Plate 10 (with gasket) is then assembled with screws not shown. A control knob or other control handle (not shown) is then engaged on prismatic tang 32, say as disclosed in said Italian patent application No. TO95U000036.

The shutter made as described above can fully stop the air flow in the duct when it is placed transversally to the the duct, due to the interference of ridge 44 with the duct wall. The shutter can take intermediate, oblique positions to choke the air flow in any desired degree.

Claims

1. A shutter for ventilation ducts, comprising a rigid, disk-shaped plate (10), journaled along one diameter on an axis transversal to the duct a projecting through at least one hole in the duct wall, characterized in that the journal axis comprises two studs (20, 34) attached to one side of the plate in respective, diametrically opposite areas of its periphery, which studs overhang out of the plane of the plate so that a peripheral rim of the plate is left free on both sides, and have coaxial, cylindrical bosses (30, 40) which are rotatably receivable in respective holes in the wall of the duct.

2. The shutter of claim 1, characterized in that said free rim of the plate is sheathed by a rubber gasket (42) shaped as an annular band having a peripheral groove on the inner side of the band which clasps the free edge of the plate.

3. The shutter of claim 2, characterized in that said rubber gasket has a thin peripheral ridge (44) having a diameter larger than the diameter of the duct.

4. The shutter of claim 2 or 3, characterized in that said rubber gasket (42) is at least partly vulcanized on the plate.

5. The shutter of one of claims 1 to 4, characterized in that one of the studs (20) is provided with a prismatic tang (32) extending in a longitudinal direction from the boss (30), for engagement with a handling member for turning the plate (10).

6. The shutter of one of claims 1 to 5, characterized in that said plate (10) is made of punched metal sheet.

7. The shutter of one of claims 1 to 6, characterized in that the studs (20, 34) are bolted on the plate.

8. The shutter of one of claims 1 to 7, characterized in that said studs (20, 34) are of sintered metal.

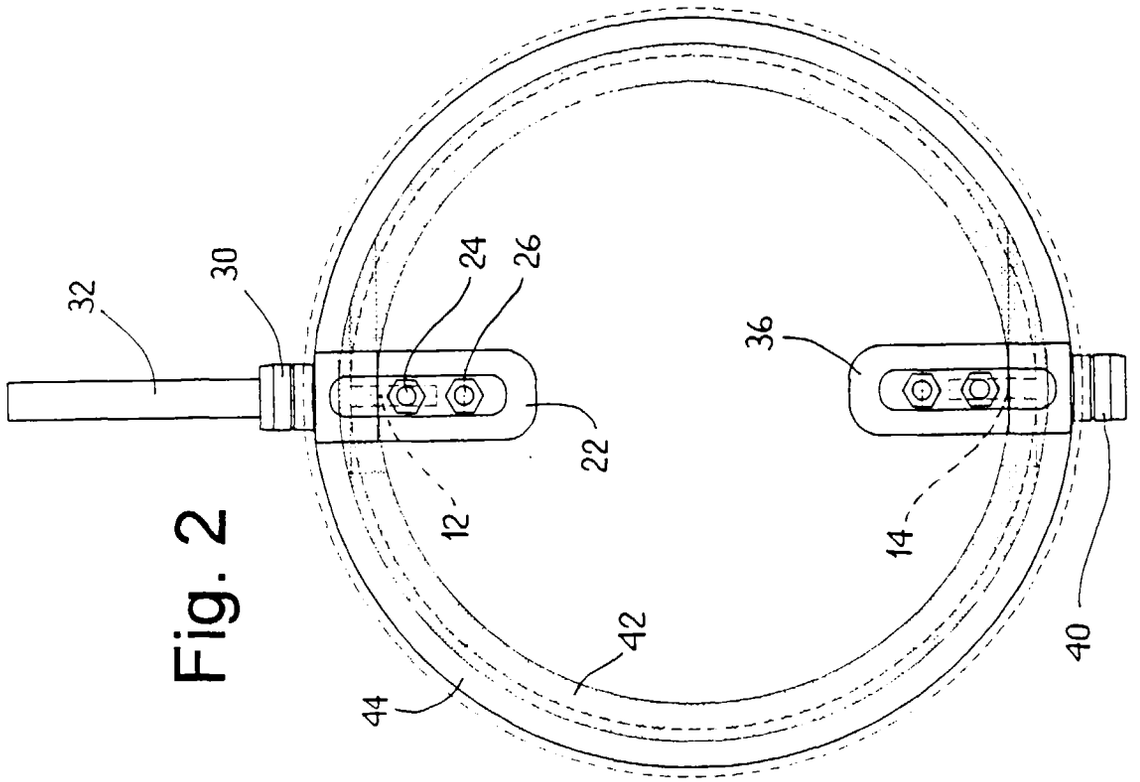
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Fig. 2

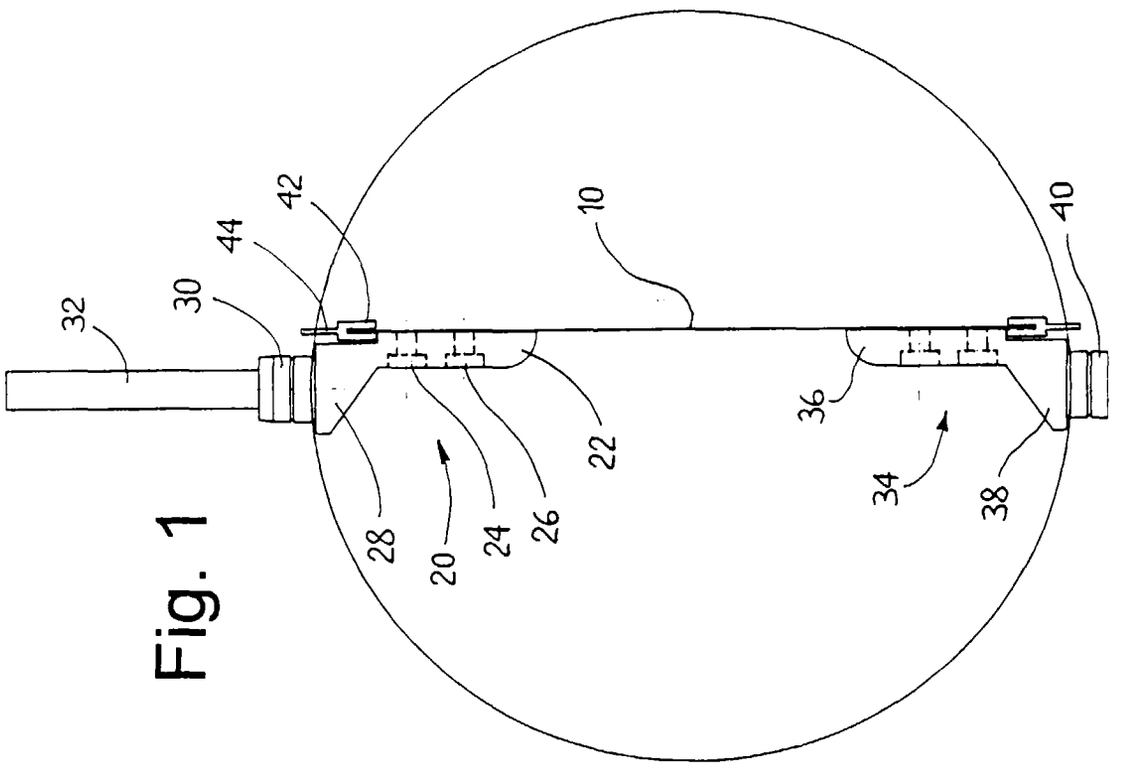
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Fig. 1

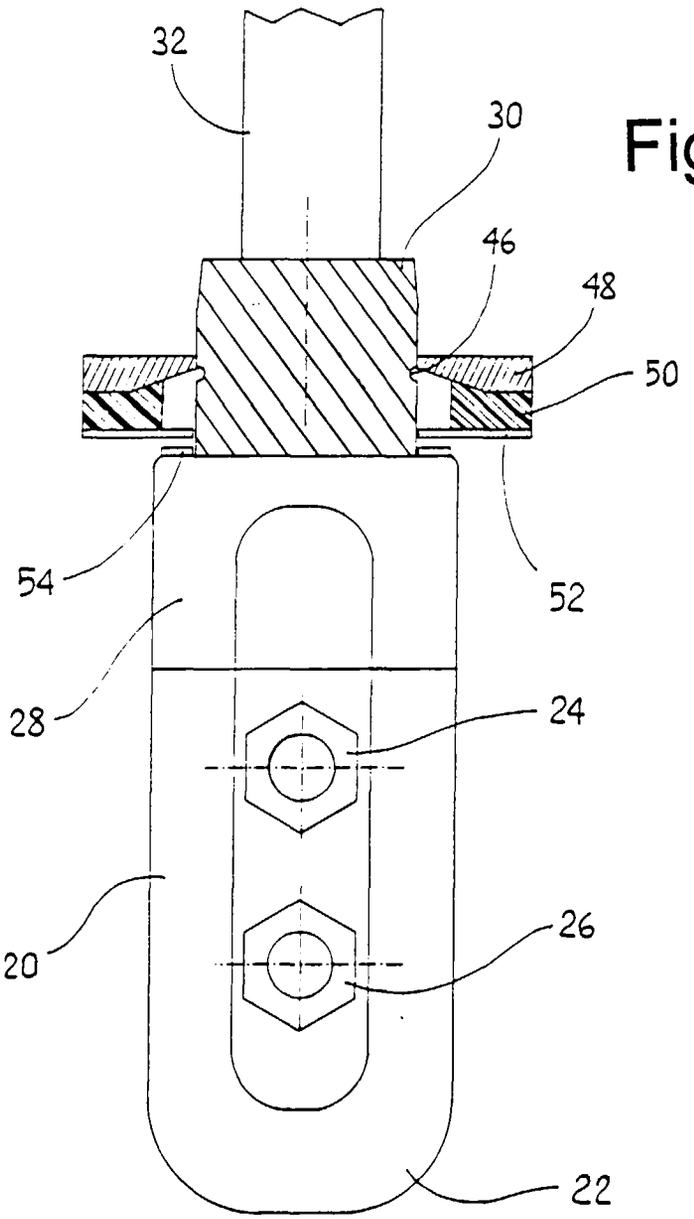

Fig. 3