Feb. 4, 1941. J. W. CONWAY 2,230,775

DAMPER

Filed April 20, 1939

Fig. 4.

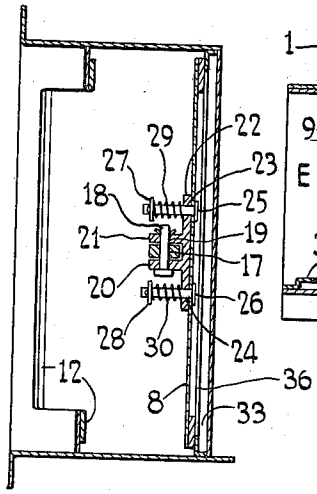


Fig. 1.

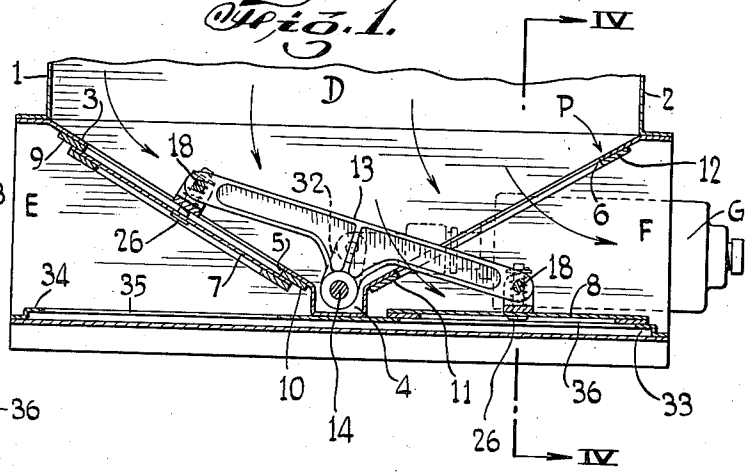


Fig. 2.

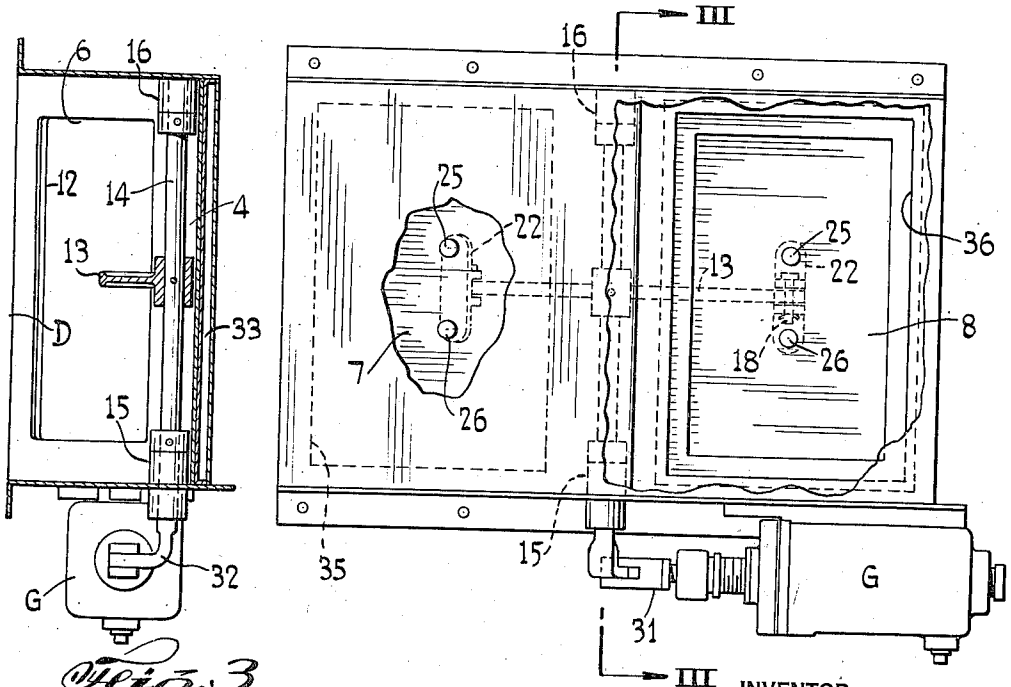


Fig. 3.

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DAMPER

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3 Claims. (Cl. 277—20)

This invention relates to pneumatic fluid control especially air control and more particularly a damper for an air duct.

A principal object of this invention is the production of a damper for controlling the flow of pneumatic fluid under pressure or natural draft constructed and arranged in such manner that pneumatic fluid pressure will be the same on both sides of each of two connected dampers.

Other objects and advantages will appear as the description of the particular physical embodiment selected to illustrate the invention progresses, and the novel features will be particularly pointed out in the appended claims.

In describing the invention in detail and the particular physical embodiment selected to illustrate the invention, reference will be had to the accompanying drawing and the several views thereon, in which like characters of reference designate like parts throughout the several views, and in which:

Figure 1 is a vertical cross-sectional view of a device embodying applicant's invention; Fig. 2 is a bottom plan view of a device as shown by Fig. 1; Fig. 3 is a sectional elevational view of the device as shown by Fig. 2 on the plane indicated by the line III—III viewed in the direction of the arrows at the ends of the line; Fig. 4 is a vertical sectional view of the device as shown by Fig. 1 on the plane indicated by the line IV—IV viewed in the direction of the arrows at the ends of the line.

In Fig. 1 a duct D is shown having side walls 1 and 2. Applicant considers this duct as a means for conveying a pneumatic fluid under pressure or natural draft from a source located at some point in a direction opposite to the arrows indicating the flow of fluid in the duct D.

The duct D terminates in a substantially V-shaped partition designated as a whole by P. This partition may be made in any well known or appropriate manner but is shown as constructed of material, preferably metal, 3, which extends from the wall 1 down towards the apex of the V-shaped partition where it is formed somewhat in the form of a trough 4 and then upward again on the other side to a junction with the other wall 2 of the duct D.

In each leg of the V-shaped partition orifices as 5 and 6 are formed. These orifices are for the purpose of allowing the pneumatic fluid in duct D to flow into ducts E and F. These ducts E and F are positioned one in one side leading to one leg of the V-shaped partition and the other leading to the other leg of the V-shaped partition.

By the construction shown, pneumatic fluid under pressure in duct D may flow through the openings 5 or 6 to the ducts E and F.

Applicant desires to have the fluid in D flow through the entire opening 5 or 6 at times and when flowing through one entire opening to not flow at all through the other opening and at times to allow a certain proportion to flow through the opening 5 and another or the same proportion through the opening 6.

In order to accomplish applicant's object in allowing fluid to flow from duct D to ducts E and F applicant has provided dampers 7 and 8. These dampers may be constructed in any suitable and appropriate manner but preferably, as applicant has shown in the drawing of material, sheet metal which is of such size so that a suitable position will completely close an opening such as 5 or 6. In order to have the closing complete, applicant prefers to place resilient material, such as rubber or felt around the mouth of the openings. This resilient material is indicated at 9 and 10 for opening 5 and at 11 and 12 for opening 6.

In order to operate the dampers 7 and 8 applicant provides the two arm rocker 13 positioned on a shaft 14 suitably journalled as at 15 and 16. A damper is connected to each arm of the rocker. This connection is best made as best shown in Fig. 4 in which the rocker arm 13 is shown with an orifice 17 through which a pin 18 extends which also extends through orifices as 19 in lugs 20 and 21 of a plate member 22 which is orificed at 23 and 24 to receive headed studs 25 and 26. The heads of the studs are positioned on one side of the material of the damper 8 and the plate 22 on the other side thereof and in order to make a resilient connection between the material of the damper 8 and the plate 22, the studs 25 and 26 are provided with abutments 27 and 28 between which and the plate 22 are positioned springs as 29 and 30. Each arm of the rocker is connected in the same manner to one of the dampers.

The rocker 13 may be moved in any suitable or appropriate manner but applicant prefers to move it by means of any well known and appropriate pneumatic engine such as designated generally by G which includes a piston rod 31 which is suitably connected to the crank arm 32 attached to the end of shaft 14. In the well known manner the engine G is operative to move the

rocker arm 13 to various positions about the center of shaft 14 so that the dampers 7 and 8 will assume various positions, that is, the engine may be operated so that the damper 7 will entirely close the opening 5 and the damper 8 will entirely uncover the opening 6 or damper 8 may be caused to entirely close opening 6 and damper 7 entirely uncover opening 5 or any position intermediate thereof may be produced.

If the dampers are in the position as shown in Fig. 1 the fluid pressure in duct D is acting equally on one side of each of them, that is, the upper side as seen in the figure, so that as far as the pneumatic fluid under pressure in D is concerned the two dampers are balanced one against the other but unless special constructions are provided the other side of each of the dampers could well be subjected to different pressures, that is, if the under side of damper 7, as viewed in Fig. 1, were exposed merely to atmospheric pressure and if the under side of damper 8 was exposed in duct F then there would be a pressure upon the under side of damper 8 in excess of that upon the under side of damper 7.

In order to provide that dampers 7 and 8 shall have a balanced pressure on the under side thereof, applicant provides a supplementary damper 33 provided with a wall 34 which wall has two openings 35 and 36 therein, one, positioned to cooperate with damper 7 and the other positioned to cooperate with damper 8. With the dampers in the position as shown by Fig. 1, if damper 7 has atmospheric pressure on the under side thereof damper 8 will also have atmospheric pressure on the under side thereof because the under sides of the dampers are both in communication with the space 33 and so with each other so that the dampers are also balanced as to the pressure on the under side thereof.

If the rocker 13 is moved so that openings 5 and 6 are only partially uncovered then both dampers will have the same pressure on the upper side thereof and will also have the same pressure on the under side thereof as they will both be positioned in ducts both of which are being supplied with pressure from the same source, that is, the duct D.

By constructing a damper in the form illustrated and described excessive resistance to change of position thereto is largely avoided because the dampers are at all times in what is practically a balanced condition so that a minimum force is required to move the dampers from one position to another position and to hold the dampers in the new desired position. This is especially an advantageous construction when the dampers are arranged so that the control thereof causes them to "float," that is, to move to various positions uncovering more or less of one opening 5 or 6 and covering the other more or less in accordance with slight changes in the relative proportions of the fluid in duct D, that is desired in either duct E or F.

Although I have particularly described one particular physical embodiment of my invention and explained the operation, construction and principle thereof, nevertheless, I desire to have it understood that the form selected is merely illustrative, but does not exhaust the possible physical embodiments of the idea of means underlying my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a pneumatic fluid control, in combination: a supply duct containing pneumatic fluid under pressure; a substantially V-shaped partition terminating the duct, said partition formed with an opening in each leg of the V-shaped partition; two delivery ducts, one leading away from each leg of the V-shaped partition; a shaft journalled at substantially the apex of the V-shaped partition and on the fluid pressure side thereof; a two arm rocker positioned on the shaft, one arm adapted to extend through one opening and the other through the other opening; two dampers one attached to each arm the arrangement being such that when the rocker is in one position one opening is closed and the other open and whereby when the rocker is in another position the one opening is open and the other opening is closed; a chamber formed with a wall adjacent the dampers, said wall formed with two openings each respectively establishing communication between one of said delivery ducts and said chamber, each adapted to cooperate with a damper to be closed thereby; whereby when the one opening in the partition is closed by a damper the opening in the wall adjacent the other damper is closed and free communication exists between the sides of the dampers not exposed to the fluid pressure.

2. In a pneumatic fluid control, in combination: a supply duct; a source of pneumatic fluid under pressure supplied to said supply duct; a partition terminating said supply duct; two receiving ducts one leading in one direction from said partition and the other leading in substantially the opposite direction from the said partition, said partition formed to extend substantially across each receiving duct, and said partition formed with two openings, one opening into each receiving duct; two dampers each adapted to close one opening; means for operating the dampers and means for equalizing the pressure on the sides of the dampers opposite to those exposed to the pneumatic fluid pressure, when either of the dampers closes the opening with which it cooperates.

3. In a fluid control, in combination: a rocker shaft; a rocker arm attached to said shaft, said rocker arm extending on both sides of said shaft; dampers one attached to each end of said rocker arm; a supply duct; a partition terminating said duct, said partition provided with exits one on each side of said rocker shaft; means for operating said rocker arm whereby said dampers are alternatively brought over said exits; two delivery ducts, one extending in each direction away from said partition whereby pneumatic fluid under pressure in said supply duct is conducted away through either one or the other exits; a chamber including a wall separating the said chamber from each of the ducts, said wall provided with openings each establishing communication between said chamber and one of the said ducts adapted to cooperate with said dampers whereby there is always free communication between the back faces of a damper closing an exit and the damper not closing an exit whereby a balance is maintained.

JOHN W. CONWAY.