

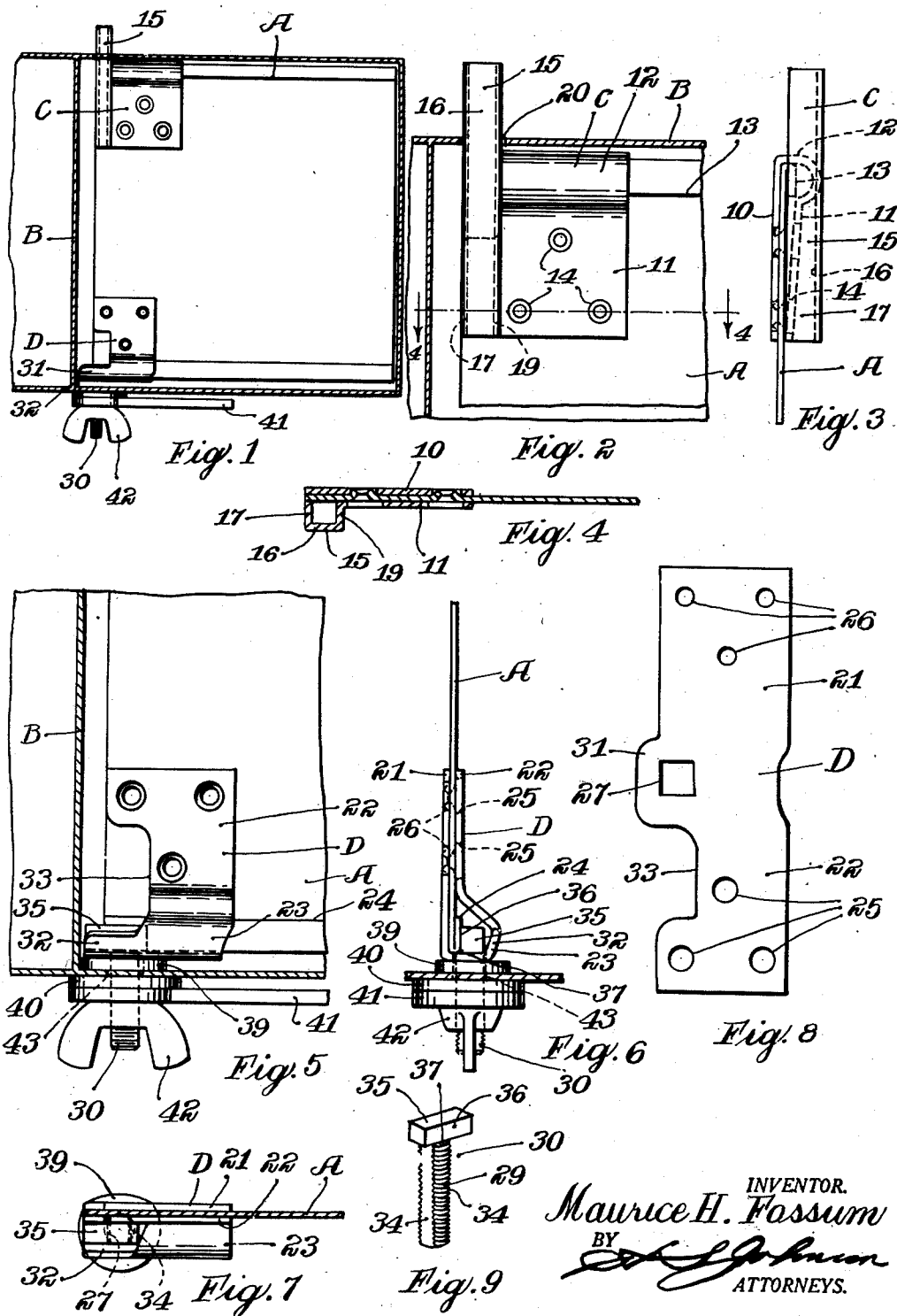
Nov. 14, 1944.

M. H. FOSSUM

2,362,623

DAMPER REGULATOR SET

Filed March 5, 1941



UNITED STATES PATENT OFFICE

2,362,623

DAMPER REGULATOR SET

Maurice H. Fossum, St. Paul, Minn.

Application March 5, 1941, Serial No. 381,783

8 Claims. (Cl. 126—292)

My invention relates to an improvement in damper regulator sets, wherein it is desired to provide a novel means of supporting a damper in an air duct or the like.

In my previously filed application, Serial Number 291,795, filed August 24, 1939, now Patent No. 2,263,080, November 18, 1941, I disclosed a damper supporting means for supporting a damper within an air duct. While this construction has proven satisfactory and practical in use, I have found that by changing the construction to some extent the device may be made more inexpensively than was thought possible previously. As it is, of course, desirable to construct the device as inexpensively as possible, I have found my construction to be of considerable advantage structurally over my previous device.

It is the object of the present invention to provide a damper regulator set which embodies the use of a clamping plate for the edge of the damper, which clamping plate is folded to provide an enlarged barrel edge of sufficient size to engage the edge of the damper even though the same is folded back upon itself to provide a beaded edge. In combination with this clamp I provide a clamp bolt which may be inserted when the damper is in place and which extends through the folded edge of the clamp.

It is a feature of my invention to provide a damper supporting means including a folded plate having a rounded enlarged barrel portion extending along the folded edge and to cut a portion of the plate away so that a bolt extending through an aperture in the folded edge may be readily inserted and removed. The opposed sides of the folded plate extend closely adjacent one another to clamp the relatively thin damper plate therebetween under spring tension. The opening through which the bolt extends has its axis at substantially right angles to the fold between the opposed sides of the clamping plate and it would be difficult to insert or remove the bolt unless access were provided thereto. In order to permit easy insertion and removal of the pivot bolt one of the sides of the clamping plate is cut away.

It is a further feature of my invention to provide a damper support comprising a clamping plate folded between the ends and having the ends thereof close together and in inclined relationship. The fold between the sides of the clamping plate is enlarged into barrel form. One edge of the barrel extends substantially flush with one side of the clamp. This permits one of the opposed sides to be flat through its entire

area to provide adequate support for the damper clamped thereagainst.

It is a further feature of my invention to provide a pivot bolt having a substantially T-shaped head which is offset slightly to one side of the axis of the threaded shank thereof to provide a shoulder adjacent the bolt head. When the bolt is inserted through its aperture in the fold of the clamp and inserted into place, this shoulder engages the edge of the damper and tends to hold the bolt in place. In other words, when the head of the bolt is in place in the damper support, the bolt adjacent the head will strike the edge of the damper should the bolt tend to become disengaged, to lock the bolt in its proper position.

It is a further feature of my invention that the enlarged barrel formed by the fold in the clamping plate acts to guide the pivot bolt into proper engaging position. As the shank of the pivot bolt is extended through the opening in the fold of the damper support the inclined edges of the enlarged barrel tend to guide the head of the bolt into proper engaging position.

It is an additional feature of my invention to provide a damper support which may be made of sheet material of any desired thickness and which may be inexpensively manufactured and sold.

An additional object of my invention is to provide a damper support having a spacer means, such as a washer or the like, secured integrally thereto, so that it is not necessary to align the washer, the damper support and the opening in the air duct or the like, before the pivot bolt may be passed therethrough. With the present construction it is only necessary to align the damper support with the opening in the air duct and to drop the pivot bolt into place, the construction being such as to guide the pivot bolt into proper engaging position.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawing forming a part of my specification:

Figure 1 is a transverse sectional view through an air duct illustrating my damper and damper supporting means in position.

Figure 2 is a front elevation view of the upper damper support illustrating the construction thereof.

Figure 3 is an end view of the damper supporting means illustrated in Figure 2 showing the construction thereof.

Figure 4 is a transverse section through the

damper support illustrated in Figures 2 and 3, the position of the section being indicated by the line 4-4 of Figure 2.

Figure 5 is a front elevation view of the lower damper supporting means used in conjunction with the damper shown in Figure 1.

Figure 6 is an end view of the damper support means illustrated in Figure 5.

Figure 7 is a cross-sectional view through the damper showing the damper supporting means illustrated in Figures 5 and 6.

Figure 8 is a view of the died out blank from which the lower damper support is constructed.

Figure 9 is a perspective view of the lower pivot bolt.

The damper A is mounted in the air duct B, or the like, through the use of an upper damper supporting means C and a lower damper supporting means D. As will be later pointed out in detail, the damper A is pivotally mounted to swing into open or closed position.

The air duct B and damper A may be of any suitable and desired form and is shown in the drawing as being rectangular in cross section. Obviously my damper supporting means could be used for other forms of dampers than the one disclosed in the drawing.

The upper damper supporting means C includes a pair of relatively inclined clamping plates 10 and 11 which are connected by means of an enlarged barrel edge 12. As best illustrated in Figure 3 of the drawing, the plate 10 is substantially flat throughout the entire area and the enlarged barrel fold is all to one side of this plate. The rounded barrel edge is provided with a certain amount of spring tension, so that the plates 10 and 11 have a tendency to clamp the damper plate A therebetween. The plates 10 and 11 normally incline together at the edge thereof opposite the folded edge 12. Thus, the thicker the damper used, the more nearly parallel the plates 10 and 11 will come, the plates 10 and 11 grip the damper tightly along their free edges, but more loosely engage it near the fold 12.

The damper plate A extends between the opposed plates 10 and 11, and as the edge of the damper A is folded or beaded, as illustrated at 13, the barrel shaped fold provides ample room for this edge or bead. The plate 11 holds the damper A tightly against the flat plate 10. By punching through the openings 14, the damper material is punctured to form spurs which extend into the opening 14 in the plate 10, thus holding the damper from lateral movement with respect to the support C.

Extending along an edge of the plate 11 and forming an integral part thereof, I provide a channel 15 which extends substantially beyond the folded edge 12. This channel 15 includes a channel base 16 which is substantially parallel to the plate 11 and with a pair of opposed slides 17 and 19, which provide a pivot for the damper A.

The channel 15, as illustrated, extends beyond the folded edge 12 and is cut separate from the plate 10 so as not to be bent with the plates 10 and 11 when forming the fold 12. With this construction a pivot is provided which is integral with the damper support C and which is designed to extend through a suitable aperture 20 in the duct B.

The damper support D is best illustrated in Figures 5, 6, 7, and 8 of the drawing. This support comprises a single sheet of material best illustrated in Figure 8 of the drawing. The sup-

port is folded between its ends to provide a substantially flat clamping plate 21 and an inclined clamping plate 22 which is connected to the clamping 21 by a barrel-shaped fold 23. The barrel-shaped fold 23 extends along the lower edge of the clamp and encloses the lower edge of the damper A. The upper free edges of the plates 21 and 22 grip the damper A tightly, but these plates are wider apart adjacent the fold 23. Obviously even though the damper A is provided with a beaded or folded edge 24, as illustrated in Figure 6 of the drawing, the barrel edge 23 will readily accommodate this edge. The enlarged shape of the fold also may be used to provide a spring tension between the clamping plates 21 and 22.

The inclined clamping plate 22 urges the damper A under spring tension against the flat clamping plate 21. The thicker the damper which is sandwiched between the plates 21 and 22, the more nearly will the plate 22 be parallel to the plate 21. To hold the damper A to the support D, it is only necessary to punch through the openings 25 in the plate 22 forcing the material punched from the damper A as spurs or projections into the openings 26 in the plates 21. These spurs or burrs of metal hold the damper from lateral movement with respect to the clamp.

A multisided hole 27 is provided in the fold 23 to accommodate the shank 29 of the pivoted bolt 30. In order that the pivot bolt may be inserted into place after the damper has been properly aligned with the pivot bolt receiving apertures in the air duct, the plates 21 and 22 have a laterally extending lip 31 on one edge thereof which forms a channel 32 to receive the pivot bolt 30. Furthermore, so that the pivot bolt 30 may be inserted and removed a notch 33 is cut in the edge of the plate 22, the bolt 30 may be inserted or removed without difficulty. As the plate 21 is flat throughout its entire area and as the entire fold 23 is preferably to one side of the plane of the plate 21, by providing the notch 33 in the plate 22, the bolt 30 may be readily removed.

The pivot bolt 30 is provided with flattened sides 34 which engage the sides of the multisided opening 27 to insure rotation of the clamping support D, and accordingly the damper A, together with the pivot bolt 30. A substantially T-shaped head 35 is provided on the clamping bolt, which head engages in the channel 33 and which assists in causing rotation of the support D in unison with the clamping bolt 30.

One side of the bolt head 35 is cut away to provide a shoulder 37 adjacent the head 35. This shoulder 37 engages the marginal edge of the damper A when the bolt is in place, thus preventing removal of the bolt when it is once in position. The inclined walls of the channel 32 acts to guide the head 35 of the bolt 30 into place and once it is in position the shoulder 37 engages beneath the edge of the damper A to hold the bolt locked in engaging position.

A washer or spacer element 39 is preferably spot welded or otherwise affixed to the lower surface of the fold 23 between the plates 21 and 22. The lower surface of the fold 23 is preferably substantially flat to correspond with the upper surface of the washer and by securing the washer 39 directly to the supporting bracket or clamp D, there is no necessity for aligning a washer with the pivot bolt openings before inserting the pivot bolt.

A washer 40 preferably encircles the pivot bolt

30 externally of the duct B and an operating lever 41 is inserted onto the shank 29 and is held in place by a wing nut 42. The aperture through the operating lever 41, to accommodate the pivot bolt 30, is so shaped as to cause rotation of the pivot bolt in unison with the operating lever 41.

In assembling the set, the holes 20 and 43 are punched in alignment through the duct B with any suitable instrument, these holes extending coaxially through the top and bottom of the duct. The supports C and D are attached to the damper A in the manner described. The damper A is inserted into the duct in tilted position until the pivot 15 aligns with the hole 20, whereupon the pivot 15 is inserted through the hole 20 and the damper may be moved into upright position. The pivot bolt 30 is inserted in its aperture 27, dropping through the washer 39 into engagement with the inner surface of the duct. When the hole 43 aligns with the bolt 30, the bolt drops through the hole 43, and may be drawn into proper position. The washer 40, handle or crank 41, and nut 42 are then placed in position on the bolt 30, and the assembly is complete.

In accordance with the patent statutes, I have described the principles of construction and operation of my damper regulator set, and while I have endeavored to set forth the best embodiments thereof, I desire to have it understood that these are only illustrative of a means of carrying out my invention and that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A damper support comprising a pair of opposed clamping plates connected together by an enlarged tubular fold along one edge thereof, said enlarged fold being positioned entirely on one side of one of said clamping plates, said enlarged fold having an aperture therethrough, a pivot bolt having shank designed to extend through said aperture, a head on said pivot bolt, the other of said clamping plates having a notch therein positioned substantially in registry with said aperture and through which the head of said pivot bolt may extend in inserting and removing the same.

2. A damper support comprising a pair of clamping plates connected by an enlarged tubular fold along one edge thereof, a pivot bolt extending through said fold adjacent one end thereof, a notch in the head of said pivot bolt, said notch designed to engage the edge of the damper positioned between said clamping plates.

3. A damper support in combination with a damper, said damper support comprising a pair of clamping plates in closely spaced relation connected by an enlarged tubular fold along one edge thereof, said fold being of an interior width substantially greater than the space between said

plates, said tubular fold having an aperture therein, a pivot bolt extending through said aperture and through said duct having its axis substantially parallel to the plane of said clamping plates, a head on said bolt in said tubular fold, and a damper clamped between said clamping plates.

4. A damper clip comprising a pair of opposed clamping plates in closely spaced relation connected by an enlarged tubular fold along one edge thereof, said tubular fold being of a width substantially greater than the space between said plates, said tubular fold having an aperture therethrough near one end thereof, and pivot bolt means extending through said tubular fold, said pivot bolt having a head of a width greater than the distance between said plates positioned in said tubular fold, the damper being secured between said opposed clamping plates.

5. A damper support comprising a pair of opposed clamping plates connected by an enlarged tubular fold along one edge thereof, said tubular fold containing the edge of the damper, the tubular fold having an aperture therethrough near one end thereof, a notch in one of said clamping plates adjacent said one end, and a pivot bolt extendable through said aperture, said pivot bolt having a head of a size to pass through said notch in said one clamping plate during insertion and removal.

6. A damper support comprising a pair of opposed clamping plates connected together by an enlarged tubular fold along one edge thereof, said folded edge forming a tube and extending entirely on one side of one of said clamping plates, a pivot bolt extending through said tubular fold to pivotally support the damper, a head on said bolt positioned in said tubular fold, and washer means secured integrally to said tubular fold coaxial with said pivot bolt.

7. A damper support comprising a pair of clamping plates connected by a tubular fold along one edge thereof, one end of said tubular fold projecting beyond said clamping plates to form a channel, an aperture through said fold, and a pivot bolt extending through said aperture to pivotally support the damper.

8. A damper support comprising a pair of opposed clamping plates connected together by an enlarged tubular fold along one edge thereof, said tubular fold having an aperture therethrough, a pivot bolt extending through said aperture and including an enlarged head designed to engage in said tubular fold, one of said clamping plates having a notch therein through which said head may pass for insertion and removal of said pivot bolt, and a washer integrally secured to said tubular fold in alignment with said aperture therein.

MAURICE H. FOSSUM.