June 29, 1965 E. H. JOHNSON 3,191,241

DAMPER BLADES AND MEANS FOR PIVOTING SAME

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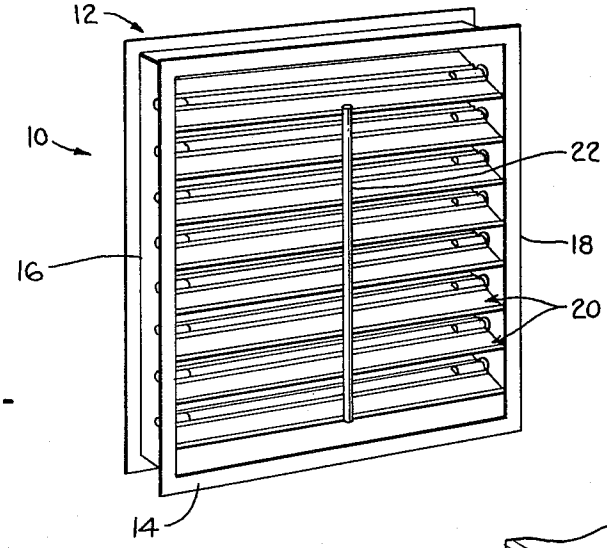


FIG. 1.

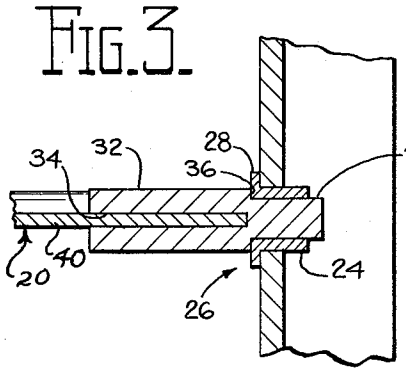


FIG. 3.

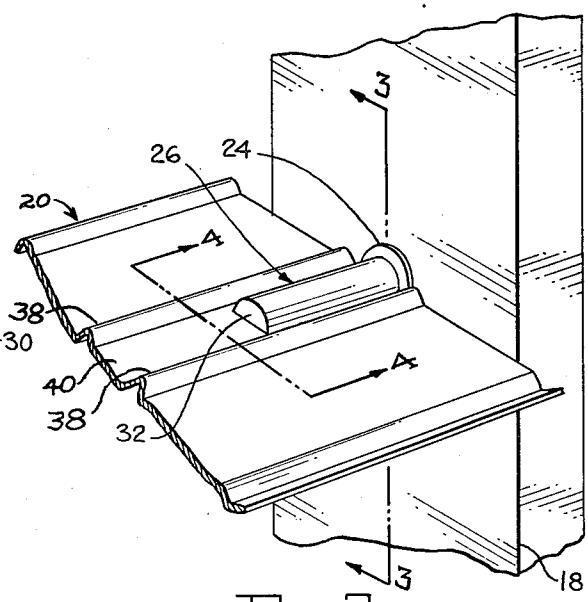


FIG. 2.

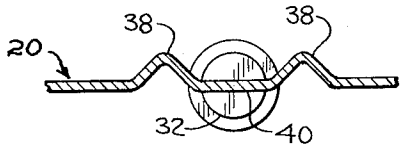


FIG. 4.

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DAMPER BLADES AND MEANS FOR PIVOTING SAME

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2 Claims. (Cl. 20—62)

This application is a continuation-in-part of my copending application Serial No. 810,675, now abandoned.

This invention relates to an improved damper or the like and more particularly to an improved axle for the movable blades of a damper, duct louver, or the like.

Dampers, adjustable louvers, shutters, and the like, basically include a plurality of parallel, rotatable blades having axles extending outwardly from the ends thereof. The axles of the blades are rotatably mounted in sleeve or roller bearings in the side frame member so that the blades can rotate readily with respect to these members.

Heretofore, the axles have been attached to the blades by two methods. According to one method, each blade is formed with a groove extending centrally and longitudinally thereof. An axle is laid in each end of the groove with a portion thereof extending beyond the end of the blade for insertion into the bearing. The axle is then welded to the blade. It will be appreciated that when six or more blades are used in a single louver section, this method is time consuming and costly; further, skilled, highly-paid workmen are necessary. In addition, the welds detract from the finished appearance of the entire unit.

According to the second method of attaching the axles, each blade is again formed with a groove, with the axle placed in each end of the groove with a portion extending beyond the end of the blade, for insertion into the bearing. A metal strap is then placed over a portion of the axle and the blade, holes are pierced in the strap and the blade, and the strap is then riveted to its with the axle frictionally held between the strap and the body of the blade. Although this method requires less skilled help than the welding technique, nevertheless, it is time consuming and expensive, and additional material is required for the straps. Although this method results in a more attractive louver than one produced by the welding technique, the axles occasionally loosen between the blade and the strap and cause considerable trouble since the blades will not rotate properly thereafter.

The present invention relates to an improved axle assembly for a damper or the like. The axle includes a portion extending beyond the end of a blade for insertion into a bearing surface of a side frame member, and a slotted portion with a longitudinally extending slot which fits over a portion of either end of the blade. A shoulder is formed between the bearing portion and the slotted portion to prevent separation of the axle and the blade. In addition, guide means are provided on the blade on each side of the slotted portion of the axle to assure that the axle is properly aligned longitudinally with respect to the blade and also to prevent lateral movement of the axle on the blade. The new axle can be simply tapped over the end of the blade in association with the guide means and thereby eliminate the costly and time consuming steps of welding or riveting according to the methods discussed above. In addition, the new damper has a more attractive appearance than dampers with welded or riveted blades. Further, the axle functions properly even if it becomes loose on the blade.

It is, therefore, a principal object of the invention to provide an improved damper or the like which is less expensive to manufacture, and which can be produced more rapidly than dampers presently in use.

Another object of the invention is to provide a damper or the like which is more reliable in operation and will function satisfactorily even if the axles become loose on the blades.

Other objects of the invention will be apparent from the following detailed description of preferred embodiments thereof, reference being made to the accompanying drawings, in which:

FIG. 1 is an overall view in perspective of a damper constructed according to the invention;

FIG. 2 is a detailed, fragmentary view in perspective of a portion of a damper blade, a portion of a side frame member, and an axle according to the invention;

FIG. 3 is a cross-sectional view taken along the line 3—3 of FIG. 2; and

FIG. 4 is a fragmentary sectional view taken on line 4—4 of FIG. 2.

While the invention is shown specifically embodied in a damper, it is to be understood that it can be equally well used with adjustable louvers, shutters, and the like.

Referring to FIG. 1, a damper designated by the numeral 10 includes an upper frame member 12, a lower frame member 14, a left side frame member 16, and a right side member 18. Blades 20, turned in unison by a connector 22, are mounted rotatably in sleeve bearings 24 (FIGS. 2 and 3) by axles 26. The bearings 24 are affixed in the side frame members 16 and 18 by any suitable means, such as a force fit or welding. The bearings 24 have flanges or spacers 28 adjacent the inner surfaces of the side frame members 16 and 18 to prevent the ends of the louver blades 20 from rubbing against the side frame members.

Each of the axles 26 can be made by any conventional metal stock of round, square, or other cross-sectional shape. The axle includes a round bearing portion 30 which extends beyond the end of the blade 20 and is inserted in the bearing 28, and also includes a slotted portion 32 having a slot 34 into which the end of the blade 20 is inserted. The slot 34 extends substantially to a shoulder 36 which is approximately flush with the end of the blade 20. The shoulder limits the extent to which the axle 26 can be inserted into the bearing 24 and prevents the axle 26 from working off the end of the blade 20 if it should become loose. In cases where the bearing 24 does not have the spacer 28, the slot 34 can stop well short of the shoulder 36 so that the shoulder will be positioned slightly away from the end of the blade 20 and thereby act as a spacer to prevent the end of the blade 20 from rubbing on the side frame members 16 and 18.

Referring to FIG. 4, the blade 20 includes two offset portions or positioning means 38 which extend symmetrically and longitudinally with respect to the blade 20 and are spaced apart a sufficient distance so that the slotted portion 32 of the axle 26 can be inserted on a central portion 40 of the blade 20. The ridges 38 keep the axle 26 centrally located on the blade 20 and also maintain it parallel to the longitudinal extent of the blade.

If the axle 26 should become loose on the blade 20, the ridges 38 prevent the axle from moving laterally and throwing the blade out of alignment. The ridges 38 also act to stiffen the blade against bending and enable the use of thinner metal for the blades without sacrificing longitudinal strength.

The new damper on the like can be assembled easily and rapidly. The slotted axles 26 are first affixed to the blades simply by tapping them onto the blades, with the slot 34 engaging the blade portion 40 between the guide ridges 38 which serve, as above stated, to establish and maintain the proper lateral disposition of the axle and blade and to maintain alignment. The blades 20, with the axles 26 properly positioned and affixed thereto,

are then placed in a jig and the side frame members **16** and **18** assembled therewith by pushing them adjacent the ends of the blades **20** with the bearings **24** placed over the bearing portions **30** of the axles **26**. The side frame members are held in these positions while the upper and lower frame members **12** and **14** are welded, bolted, or otherwise affixed to the side frame members to complete the assembly of the damper **10**. Only a few steps are required and no highly skilled help is necessary except for the final assembly of the side and upper and lower frame members. This results in considerable savings in manufacturing costs and, because assembly is more rapid, less manufacturing facilities and overhead are allotted to each louver.

The damper or the like according to the invention basically comprises a blade, guide means extending longitudinally of said blade, an axle having a bearing portion, a slotted portion engaging said blade and cooperating with said guide means, and a shoulder between said bearing portion and said slotted portion, and a side frame member having a bearing surface adapted to receive said bearing portion.

Various modifications of the above described embodiments of the invention will be apparent to the reader. However, it is to be understood that such modifications can be made without departing from the scope of the invention as defined in the appended claims.

I claim:

1. A damper or the like comprising a blade; positioning means on said blade extending longitudinally and generally centrally thereof; an axle having a cylindrical bearing portion, a slotted portion of uniform cross section throughout its length, and a shoulder therebetween, said slotted portion having a slot engaging an end of said blade, the entire length of the edges of the slot extending longitudinally of said slotted portion and being contiguous with and parallel to said positioning means over substantially the entire length of said slotted portion, said positioning means being effective to prevent lateral movement of said slotted portion of said axle on said blade and to maintain said slotted portion in a fixed position parallel to the longitudinal extent of said blade and in a central portion thereof, said bearing portion of said axle extending beyond the end of said blade, and said shoulder of said axle extending laterally outwardly beyond said bearing portion; a side frame member; a bearing in said side frame member to receive said bearing portion of said axle; and a flange on an inner end of said bearing and cooperating with said shoulder for spacing the end of said blade from said side frame member.

2. A damper or the like comprising a blade; positioning means on said blade extending longitudinally and generally centrally thereof; an axle having a bearing portion, a slotted portion of uniform cross section throughout its length, and a shoulder therebetween, said slotted portion having a slot extending longitudinally from the end of the axle opposite the bearing portion to said shoulder and engaging an end of said blade adjacent said positioning means, the entire length of the edges of said slot extending longitudinally of said slotted portion and being parallel, said positioning means including offset portions on each side of said slotted portion which are substantially contiguous with and parallel to substantially the entire length of the edges of said slot and effective to prevent lateral movement of said slotted portion of said axle on said blade and to maintain said slotted portion of said axle in a fixed position parallel to the longitudinal extent of said blade and in a central portion thereof, said bearing portion extending beyond the end of said blade; a side frame member; and bearing means in said side frame member to receive said bearing portion of said axle.

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