

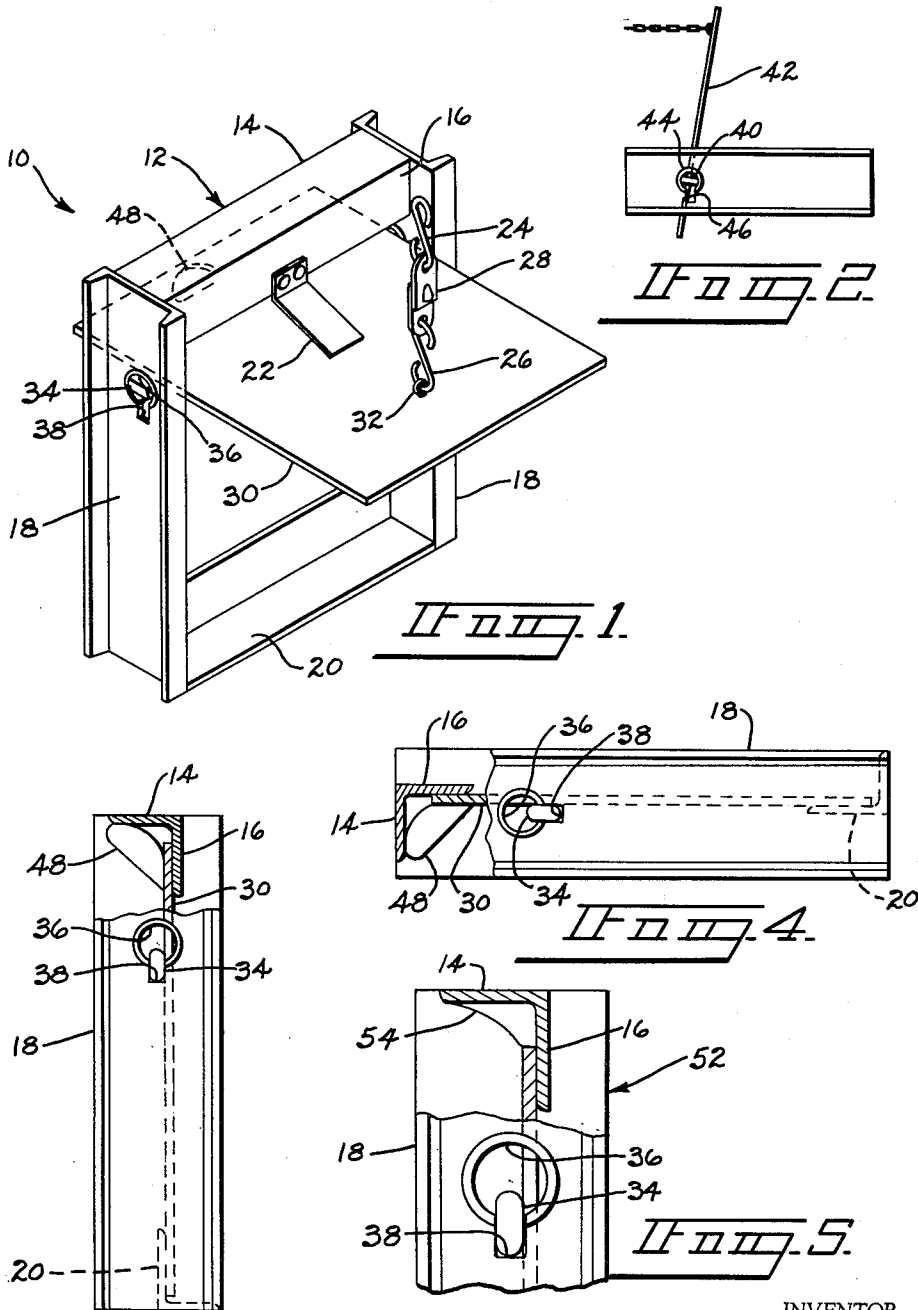
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UNIVERSAL FIRE DAMPER WITH ENGAGING MEANS

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UNIVERSAL FIRE DAMPER WITH ENGAGING MEANS

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This invention relates to a universal fire damper having means for maintaining the damper blade closed when in a closed position, and more particularly to such a damper which will properly function regardless of the angle of installation.

Dampers of the type with which the present invention is concerned are employed in various ducts and are provided with fusible links which melt to enable the damper blades to close if fire or high heat is present in the ducts. A damper of this type, as more fully disclosed in U.S. Patent No. 2,270,073, has had to be modified if used in a horizontal position rather than a vertical one which required that the installation position be determined before the damper was made so that the damper could properly be designed and manufactured therefor. This frequently required additional correspondence between the manufacturer and the customer or the manufacturer's agent and also sometimes resulted in an inoperable damper due to misunderstandings or changes in the installation. The cost of the damper also was substantially more because of the necessity that it be tailor made for each installation.

The present invention relates to an improved fire damper having means for holding the damper blade closed when in the closed position regardless of the angle at which the damper is intended to be used. This eliminates all the additional correspondence, inquiries, and extra work in manufacture of the damper and the possibility of rejection due to wrong information about or changes in the installation.

It is, therefore, a principal object of the invention to provide a universally-applicable damper having the advantages set forth above.

Other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being made to the accompanying drawing, in which:

FIG. 1 is a view in perspective of a damper embodying the invention;

FIG. 2 is a somewhat schematic view in elevation on a smaller scale of a conventional fire damper heretofore known when used in a horizontal position;

FIG. 3 is a view in elevation with parts broken away and with parts in cross section of the fire damper according to the invention, shown in a closed position;

FIG. 4 is a view similar to FIG. 3 but on a smaller scale with the damper in a horizontal position; and

FIG. 5 is a fragmentary view similar to FIG. 3 of a slightly modified damper.

Referring to the drawing and more particularly to FIG. 1, a damper embodying the invention is indicated at 10 and includes a frame 12 adapted to be disposed laterally in a duct through which gas flows, such as a ventilating duct or an intake opening of an air-ventilating flue. The frame 12 includes an upper or end frame member 14 having a depending flange 16, side frame members 18, and a lower or end frame member 20. These are suitably connected together, as by welding, for example. The depending flange 16 of the end frame member 14 has a stop 22 affixed thereto and depending therefrom and a hook 24 which is connected to a second hook 26 by a fusible link 28, which is well known in the art. The lower hook 26 is connected to an end portion of a damper blade

30 by means of a suitable loop 32 in order to hold the blade 30 in an open position against the stop 22.

The damper blade 30 has non-circular axles or trunnions 34 extending outwardly beyond the side edges thereof and through generally circular bearing openings 36 in the side frame members 18. As shown, the trunnions 34 have generally rectangular cross sections with rounded edges to facilitate pivotal movement in the openings 36. The openings 36 also have axle-receiving notches 38 located on the sides opposite the frame member 14. When the blade 30 is in any position but a closed one, the axles 34 ride in the openings 36 with the edges of the axles contacting the edge of the opening. When the damper reaches a closed position, however, as shown in FIG. 3, the axle 34 extends into the notch 38 and prevents the damper blade 30 from being opened again until manipulated by hand.

With the dampers heretofore known, the axles 34 have moved into the notches 38 solely by means of gravity or the weight of the damper blade 30 after reaching its closed position. While such operation has been generally satisfactory, the damper had to be modified if it was to be used in a horizontal position, as shown by a conventional damper in FIG. 2. In such an instance, an axle 40 of a blade 42 had to be affixed thereto so as to be perpendicular to the plane of the blade, rather than parallel to it as is true of the axle 34 of FIG. 1. At the same time, an axle-receiving opening 44, while similar to the opening 36 of FIG. 1, had to have an axle-receiving notch 46 positioned below the opening 44, in a position displaced 90° to that of the notch 38 in FIG. 1. Hence, the axle 40 had to be moved 90° and the notch 46 had to be moved 90° when the damper was to be used in a horizontal position in order for the weight of the blade 42 to move the axle into the notch. Consequently, when an order was received by the manufacturer for a fire damper, it was necessary to ascertain from the customer or the manufacturer's agent whether the damper was to be used in a horizontal position or in a vertical position, unless such was specified on the order, which was seldom the case. This required additional correspondence back and forth, or phone calls, causing both considerable expense and delay in filling the order. Sometimes the installation was changed after the order was given with the result that the damper would not work when reaching the installation site. Additional costs were also incurred in the actual manufacture of the damper because each one had to given special care to assure that the axles and notches were in the proper position.

To overcome the above difficulties, the damper blade 30 has been provided with a frame-engaging part or cam 48 which is suitably affixed to or forms a part of the upper edge of the damper blade 30. The part 48 is positioned in a manner such that when the blade 30 swings to the closed position, the part 48 contacts the inner surface of the end frame member 14 and forces the blade 30 to move away from the frame member 14 and toward the notch 38. As shown in FIGS. 3 and 4, the part 48 engages the frame member 14 and forces the axle 34 into the notch 38 regardless of whether the damper 10 is employed in a horizontal or vertical position. The damper blade 30 then remains in that position until the blade 30 is manipulated toward the open position and at the same time is pushed toward the frame member 14.

While the operation of the damper 10 is believed to be apparent, it will be briefly reviewed. The blade 30 is held in an open position against the stop member 22 by the hooks 24 and 26 and the fusible link 28. At this time, the axles 34 lie crosswise in the openings 36 and are capable of rotating freely therein. If fire or heat should occur in the duct associated with the damper 10 to the

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extent that the fusible link 28 melts, the damper blade 30, which is of heavy metal, slams shut due to its own weight, and when nearing the closed position, the frame-engaging part 48 contacts the frame member 14 and pushes the blade 30 away from the frame member 14. This forces the axles 34 into the notches 38 as the blade approaches its closed position, the rounded edges of the axles helping to facilitate this movement. When the axle has been extended fully into the notch, the damper blade cannot be opened by gas pressure in the duct. As illustrated in FIG. 4, the damper operates equally well in a horizontal position.

A damper 52 of FIG. 5 is similar to that of FIGS. 1, 3, and 4 except that an engaging part or cam 54 is associated with the end frame member 14 rather than the blade 30. The part 54 pushes the axles 34 into the notches 38 in the same manner as the part 48.

Modifications of the above described embodiment of the invention will be apparent to those skilled in the art, and it is to be understood that such modifications can be made without departing from the scope of the invention, if they are within the spirit and tenor of the accompanying claims.

I claim:

1. In a fire damper comprising an end frame member, two side frame members, a damper blade, non-circular axles extending beyond the edges of said blade, said side frame members having axle-receiving openings and axle-receiving notches associated with said openings on the sides thereof opposite the end frame member, and fusible link means adapted to hold said blade in an open position except when heat of a predetermined magnitude exists in a duct associated with said damper, the improvement comprising engaging means associated with one of said damper blade and said end frame member to contact the other of said end frame member and said damper blade when said damper blade moves to its closed position, to move said damper blade away from said end frame member and to push said axles into said notches regardless of the angle of installation of said frame members.

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2. A fire damper comprising an end frame member, two side frame members, a damper blade positioned within said frame members, non-circular axles extending beyond side edges of said damper blade, said side frame members having axle-receiving openings and axle-receiving notches communicating with said openings on the sides thereof opposite the end frame member, stop means connected to one of said frame members and positioned to limit the extent to which the damper blade is opened whereby when said damper blade is released, it will close due to its own weight, fusible link means adapted to hold said blade in an open position against said stop means except when heat of a predetermined magnitude is in the environment adjacent said link means, means associated with one of said damper blade and said end frame member to contact the other of said damper blade and said end frame member, when said damper blade moves to its closed position, to move said damper blade away from said end frame member and to push said axles into said notches regardless of the angle of installation of said frame members.

3. In a fire damper comprising an end frame member, two side frame members, a damper blade, non-circular axles extending beyond the edges of said blade, said side frame members having axle-receiving openings and axle-receiving notches associated with said openings on the sides thereof opposite the end frame member, and fusible link means adapted to hold said blade in an open position except when heat of a predetermined magnitude exists in a duct associated with said damper, the improvement comprising said damper blade having frame-engaging means positioned to contact said end frame member when said damper blade moves to its closed position, to move said damper blade away from said end frame member and to push said axles into said notches regardless of the angle of installation of said frame members.

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