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2,270,073

FIRE DAMPER

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FIG. 1.

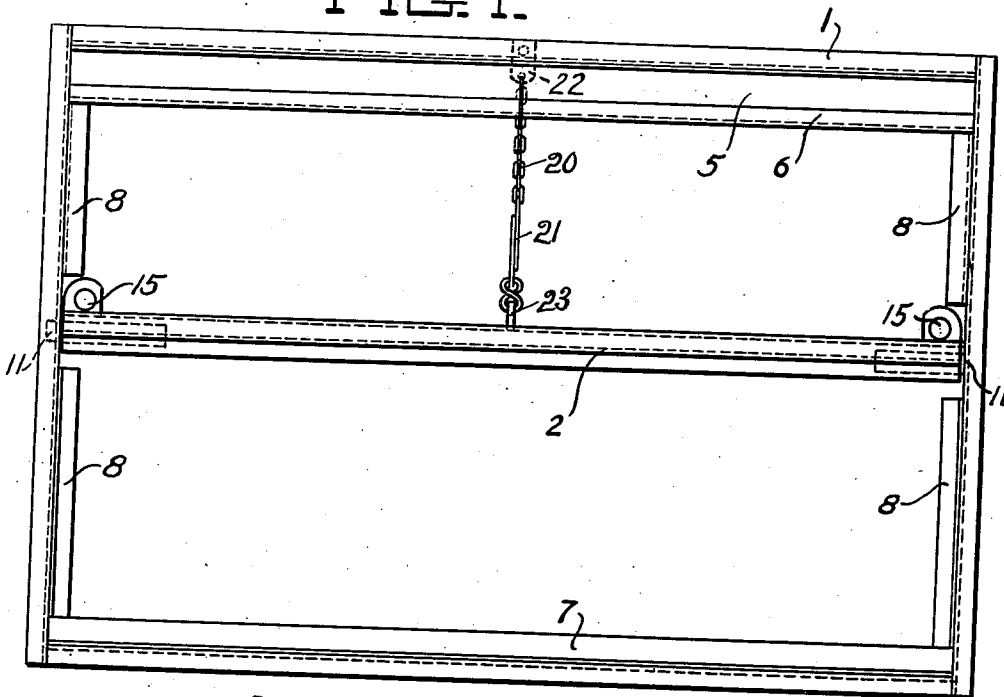


FIG. 2.

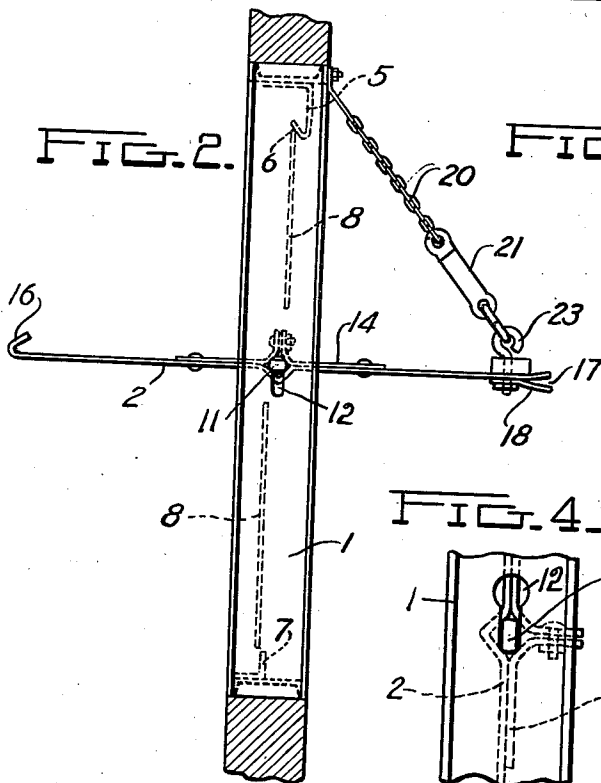


FIG. 3.

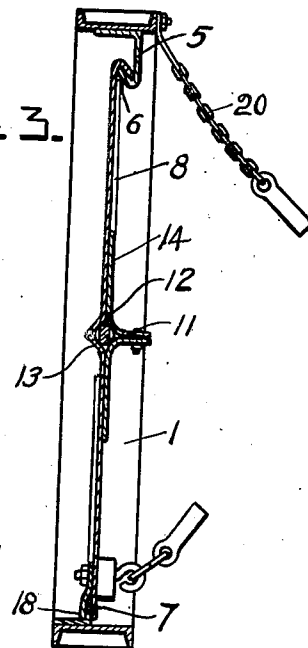
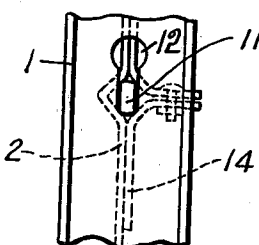


FIG. 4.



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UNITED STATES PATENT OFFICE

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FIRE DAMPER

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6 Claims. (Cl. 98—1)

This invention relates to fire dampers, particularly of the automatic closing type, for use in ventilating and intake openings of air ventilating flues, or the like.

The object of the invention is the provision of a novel and improved damper of this character, which is normally held open by a fusible connection and is provided with means which, when the damper is closed, automatically locks the damper in such position and at the same time provides a tight joint for opposing edges of the damper.

The invention is fully described in the following specification, and one embodiment thereof illustrated in the accompanying drawing, in which—

Figure 1 is a side elevation of a damper embodying the invention; Fig. 2 is an edge elevation thereof, with the damper blade in open position; Fig. 3 is a vertical section thereof, with the blade in closed and locked position, and Fig. 4 is a detail of the bearing means for the damper.

Referring to the drawing, 1 designates a damper frame for insertion or for building into a ventilating or intake opening of a draft flue, or the like, as well understood in the art, and 2 the damper blade mounted therein.

The frame 1, in the present instance, provides a rectangular opening and is composed of channel-bar stock with its channel facing outwardly. The top member of the frame is provided at its under side with a dependent flange 5, which extends the entire length of the frame opening and has an upturned hook like lip 6 at one side for the purpose hereinafter described. The lower member of the frame is provided at its top side with an upstanding flange 7 forming a comparatively narrow upper or free edge and extending the entire length of the opening.

The blade 2 of the damper is of plate form of a size to overlap and cooperate with the flanges 5 and 7 and with frame flanges 8 at the sides thereof to completely close the frame opening. It is provided at opposite side edges, in axial alignment, with trunnions 11 fitting into respective bearing openings 12 in each upright or side member of the frame 1. The trunnions, in the present instance, seat in a transverse crimp 13 in the blade and are secured therein by plates 14, which are clamped to the trunnions by screws 15. These trunnions are disposed substantially centrally of the top and bottom edges of the blade but in upwardly offset relation to the vertical center of gravity thereof,

so that the tendency of the blade is to close by gravity action.

The bearing openings 12 are of key slot form, being circular at their upper ends for the trunnions to turn in and having narrow slot-like extensions at their lower sides. The trunnions 11 are flattened in the plane of the blade and conform to the bottom extensions of the bearing openings, so that when the blade is in closed vertical position with its upper edge portion in stop side coaction with the edge of the lip 6, the narrow or flattened portions of the trunnions will register with said bearing extensions and drop therein, thus permitting a limited lowering of the blade relative to the frame.

The blade is provided at its upper edge, at the side thereof adjacent to the flange lip 6, with a hook form of lip 16, which closes over the flange lip 6 and when the blade lowers, has hooked or interlocking engagement with such lip, as shown in Fig. 3. The blade at its lower edge is provided with a recess 17 opening outwardly away from the blade axis and extending throughout the length of the blade. This recess is formed, in the present instance, by a plate 18 attached to one side of the edge portion of the blade. When the blade is in vertical or closed position, its edge recess 17 is in vertical register with the bottom flange 7 of the frame, so that when the blade lowers, due to the downward movement of the trunnions in the bearing extensions, the flange will enter such recess and cooperate with the walls thereof to provide a tight joint for the blade.

The blade is retained in open position by a flexible connection 20 having a fusible link member 21 therein. This connection, in the present instance, connects an eye 22 on the top member of the frame to an eye 23 on the lower edge portion of the blade.

It is apparent that the blade may be set in open position by attaching the fusible connection 20, 21, thereto, as shown in Figs. 1 and 2, and that when a fire occurs at one side or the other of the damper, the heat generated thereby and passing through the damper will fuse the link 21, thus permitting the damper blade to drop by gravity action to closed position. When the blade has moved to complete closed position, the flat sides of the trunnions 11 will have turned into register with the bottom slot extensions of the bearing openings 12 to permit a lowering of the blade by reason of the trunnions dropping in such extensions. At the same time the lips 16 at the upper edge of the blade

will have moved over the stop lip 6 of the frame flange 5 and the recess 17 will have moved into vertical register with the bottom flange 7 of the frame, so that as the blade lowers the lip 16 will move into locking engagement with the lip 6 and the recess 17 will move downward over and into engagement with the bottom flange 7. This provides a tight edge closing feature for both the upper and lower edges of the blade when closed and also locks the blade against any swinging or opening movements until it has been raised for such purpose to place its trunnions within the circular portions of the bearing openings.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent, is:

1. In a damper of the class described, a frame forming a damper opening, a damper blade mounted for vertical gravity swinging movements in said opening, bearing means for supporting the blade for swinging movements in the frame, said means including flattened trunnions on one and socket means in the other of said frame and blade, said socket means having portions in which the trunnions may turn to permit predetermined swinging movements of the blade and having portions into which the trunnions may lower to permit predetermined lowering movements of the blade when in substantially vertically disposed closed position, said frame and blade having interengaging means for interlocking coaction of one of the edges of the blade with the frame when the blade has said lowering movement relative to the frame, and releasable means for holding the blade in open position.

2. In a damper of the class described, a frame forming a damper opening with upper and lower flanges therein, a damper blade mounted for vertical gravity swinging movements in said opening, bearing means for supporting the blade for swinging movements in the frame, said means including flattened trunnions on one and socket means in the other of said frame and blade, said socket means having portions in which the trunnions may turn to permit predetermined swinging movements of the blade and having portions into which the trunnions may lower to permit predetermined lowering movements of the blade when in substantially vertically disposed closed position, means whereby interlocking engagement of the upper and lower edges of the blade with the frame flanges will occur when the blade has said lowering movement relative to the frame, and releasable means for holding the blade in open position.

3. In a damper of the class described, a frame forming a damper opening and having at the inner side of its top wall a hook-like flange, a damper blade mounted for vertical swinging movements in said opening and movable by gravity action from open to closed position, bearing means for said blade comprising flattened trunnions and key sockets with the trunnions turning in one portion of the socket during opening and closing movements of the blade and movable vertically by gravity when the blade has moved to

vertically closed position, the upper edge of said blade having a hook flange which stands over and moves to interlocking engagement with the hook flange of the frame when the blade has a lowering movement in the frame, and means for holding the blade in open position and operable by predetermined temperature conditions to release the blade.

4. In a damper of the class described, a frame forming a damper opening and having a depending flange throughout the length of its upper wall with an upturned lip at its lower edge and having an upstanding flange on its bottom wall, a damper blade pivotally mounted for vertical swinging movements in said frame and normally closing by gravity action, bearing means for said blade comprising key sockets and flattened trunnions turnable from one position to another in the sockets during swinging movements of the blade and vertically movable therein by gravity action therein when the blade is in closed position, said blade having means at its upper and lower edges for interlocking engagement with said upper and lower frame flanges when the blade has a lowering movement in the frame, and means releasable by predetermined temperature conditions for holding the blade in open position.

5. In a damper of the class described, a frame having a damper opening, a blade pivotally mounted for vertical swinging movements in said frame opening and movable by gravity to closed position, bearing means for the blade at each side of the frame, said means including a key hole form bearing opening in one member of said blade and frame and a flattened trunnion in the other permitting the blade to have pivotal movements when swinging from open to closed position, and vice versa, and when in closed position to have a limited lowering movement relative to the frame by reason of the trunnions dropping into the narrow slot portions of the key hole openings, said frame having flanges at the upper and lower portions of its opening, and said blade having parts at its upper and lower edges for close fitting interlocking engagement with the respective flanges when the blade is in closed lowered position, and means for holding the blade in open position under predetermined heat conditions.

6. In a damper of the class described, a frame forming a damper opening and having a depending flange throughout the length of its upper wall provided at its lower edge with an upturned lip and having an upstanding flange along its bottom wall, a damper blade pivotally mounted for vertical swinging movements in said frame and normally closing by gravity action, bearing means for said blade having interengaging parts which permit pivotal opening and closing movements of the blade about a fixed axis and lowering movements of the blade from said fixed axis position only when the blade is in substantially vertical closing position, said blade having means at its upper and lower edges for interlocking engagement with said upper flange lip and said lower flange when the blade has a lowering movement in the frame to lock the blade against any further swinging movement of the blade until it has been raised from interlocking engagement with said flanges, and means operable to hold the blade in open position and responsive to predetermined heat conditions to release the blade.

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