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McNabney et al.

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[45] **Jan. 15, 1974**

[54] **AIR DIFFUSER FIRE DAMPER**

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[73] Assignee: **The Trane Company,** La Crosse, Wis.

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[52] **U.S. Cl.** ..... **98/40 D,** 49/7, 98/86, 137/74

[51] **Int. Cl.** **E05f 15/20,** F24f 13/06

[58] **Field of Search** ..... 98/40 D, 1, 86; 49/3, 7; 137/74

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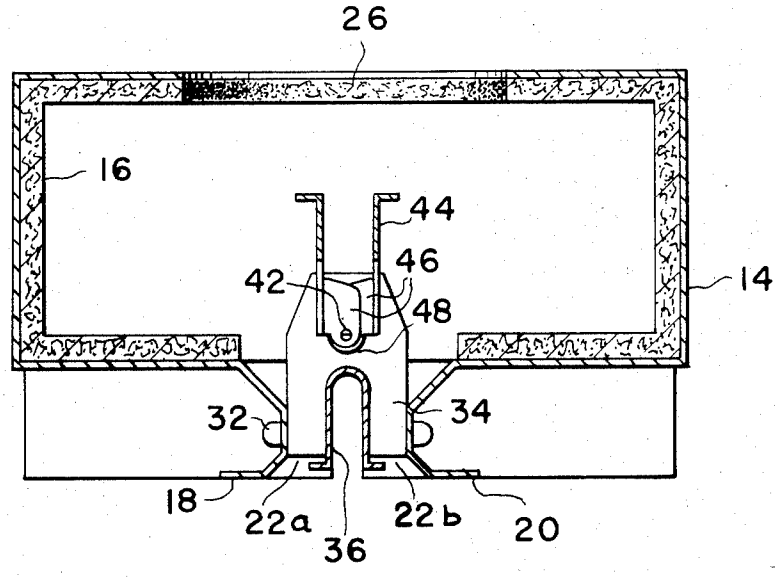
Primary Examiner—William E. Wayner

Attorney—Arthur O. Andersen et al.

[57] **ABSTRACT**

A fire damper apparatus for use with a ceiling mounted air distributor or diffuser. The fire damper is held in the inoperative position against the urging of torsion springs by fusible pins. Melting of the pins allows the damper to rotate into the operative position.

4 Claims, 8 Drawing Figures



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SHEET 1 OF 3

FIG. 1

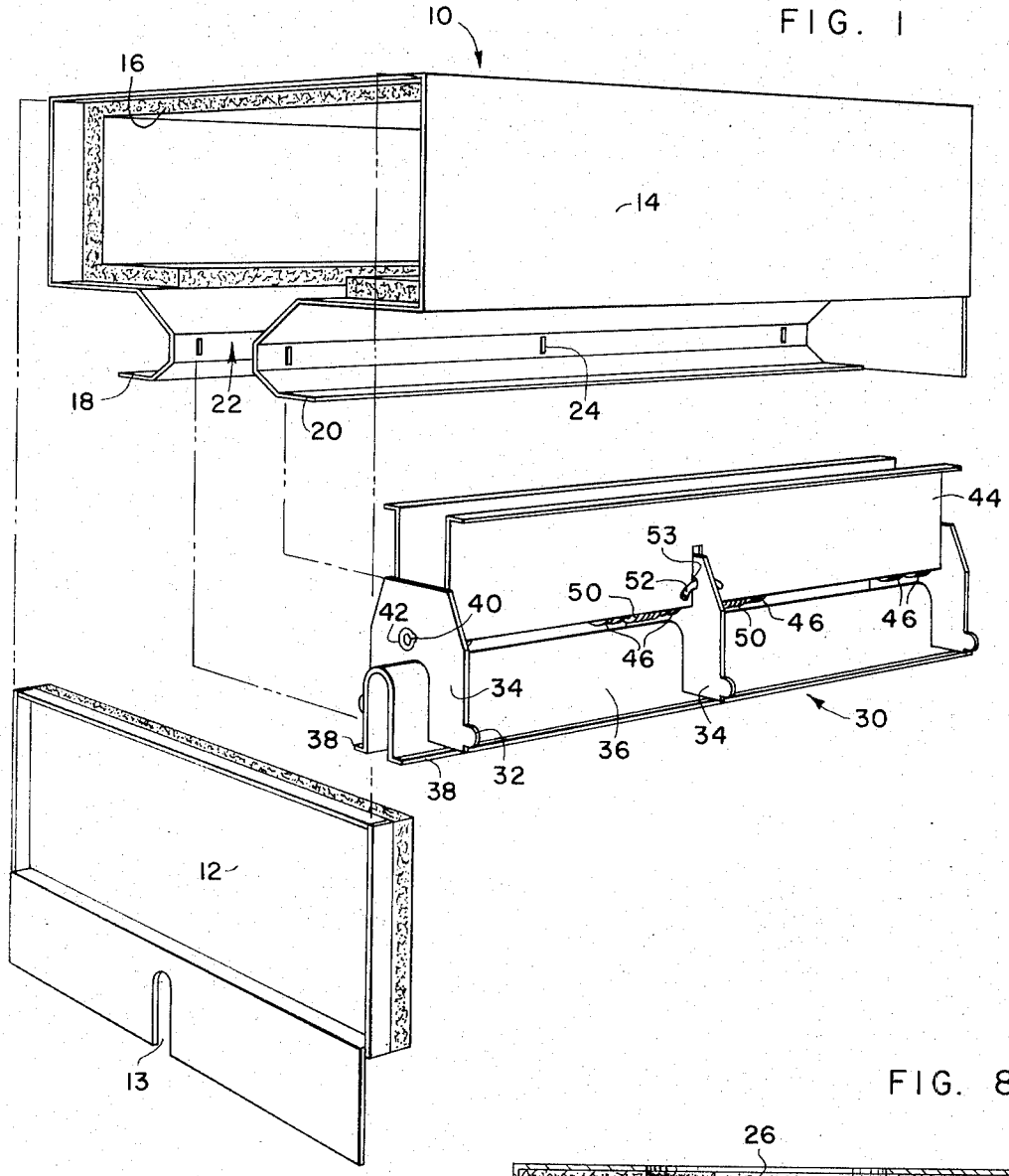


FIG. 8

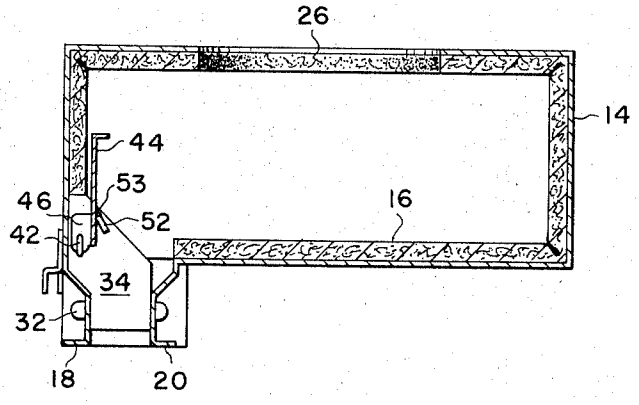


FIG. 2

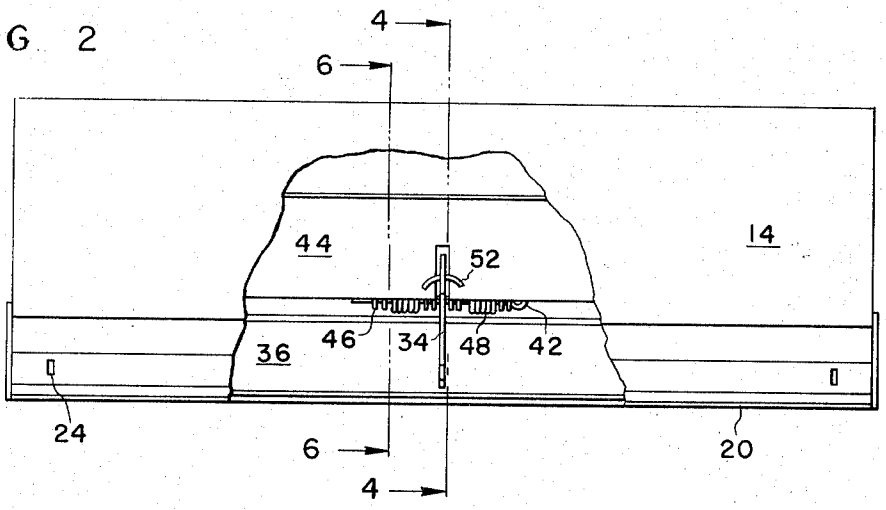


FIG. 3

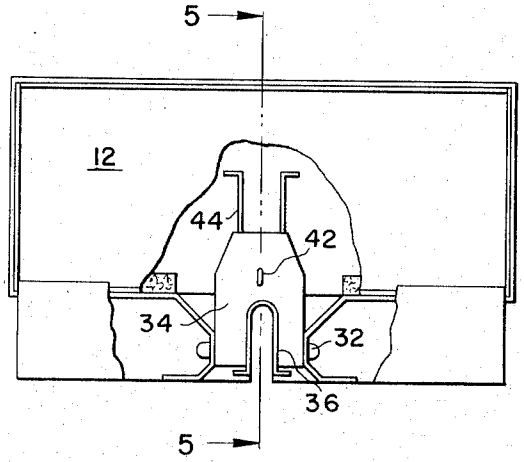


FIG. 4

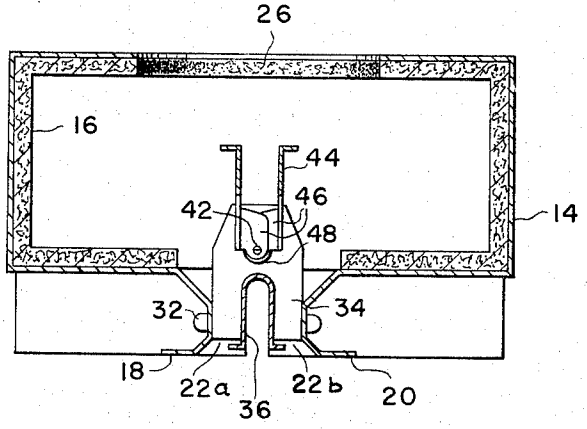


FIG. 5

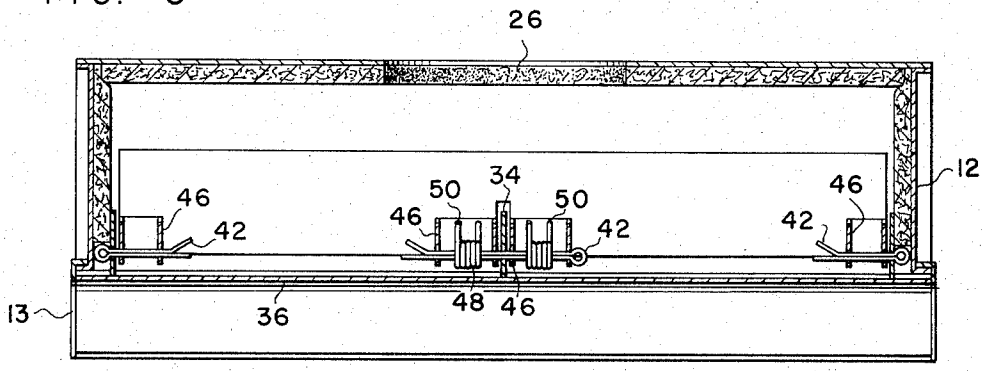


FIG. 6

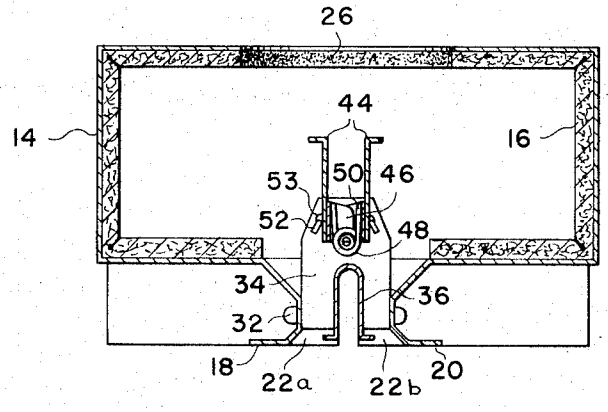
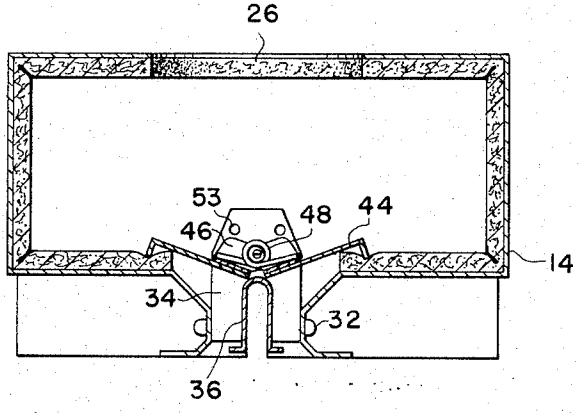


FIG. 7



AIR DIFFUSER FIRE DAMPER

BACKGROUND OF THE INVENTION

Specially designed dampers that are intended to open or close in the event of an uncontrolled fire have been suggested for certain types of air handling equipment. Thus ventilator devices that normally admit outside air frequently employ some type of shut-off device to stop the flow of air into the building in case of fire.

More recently, designers have sought to enhance room appearance and space availability by choosing heating, ventilating and air conditioning systems and equipment wherein the air handling units are as unobtrusive as possible. Accordingly, false or suspended ceilings have gained popularity. In the typical suspended ceiling installation, air distributing terminal units are largely concealed in the plenum between the false ceiling and the actual ceiling, with only a small slot or other similar outlet form being visible from the room below.

Building codes generally require that suspended ceilings meet certain fire codes. When the ceiling includes slot openings from the air terminal unit, it is important that some provision be made to close the slots in the event of fire as the diffuser slots represent an open space between the room and the ceiling plenum.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a device for closing air diffuser slots in the event of fire.

A further object of the invention is to provide a fire damper device that is simple and inexpensive to manufacture and install.

Other objects and advantages of the instant structure will become apparent as the specification proceeds.

The present invention provides a fire damper assembly adapted for installation in a slot type air diffuser. The assembly includes at least one damper blade held in an inoperative position by a fusible pin. Upon melting of the pin, the damper blade is rotated into an operative position under the influence of a torsion spring.

DESCRIPTION OF PREFERRED EMBODIMENTS

The apparatus will be explained in further detail by reference to the accompanying drawings in which:

FIG. **1** is an exploded perspective view of an air diffuser and fire damper assembly,

FIG. **2** is a side view, partially cut away, of an air diffuser with fire damper assembly installed,

FIG. **3** is an end view, partially cut away, of the air diffuser of FIG. **2**,

FIG. **4** is a section view taken along line **4—4** in FIG. **2**,

FIG. **5** is a section view taken along line **5—5** in FIG. **3**,

FIG. **6** is a section view taken along line **6—6** in FIG. **2**,

FIG. **7** is a section view similar to FIG. **6** but with the fire dampers in the closed position, and,

FIG. **8** is an end view, partly in cross-section, showing a slightly modified form of the apparatus.

The major components of the present apparatus include an air diffuser assembly indicated generally at **10** and a fire damper assembly indicated generally at **30.** In FIG. **1** the end panel **12** of diffuser **10** has been removed in order to more clearly show the slot construction of the diffuser **10** and the manner of installation of damper assembly **30.**

The air diffuser assembly includes a generally rectangular box **14** that is preferably lined with a sound dampening material **16.** The lower side of box **14** has channels **18** and **20** depending therefrom, the channels being generally semi-octagonal in cross-section. The channels are arranged in back-to-back, spaced apart relationship defining a linear slot **22** therebetween. Apertures **24** are provided in the vertical portion of channels **18** and **20,** these apertures positioned so as to receive tabs **32** on mounting brackets **34** of the damper assembly **30.** An air inlet port **26** is provided at the top portion of box **14** through which conditioned air is received from a duct or control unit, the conditioned air being distributed to the space to be conditioned through slot **22.**

The fire damper assembly **30** may include an inverted U-shaped center portion **36** having horizontal projections **38.** The projections **38** cooperate with channels **18** and **20** when assembly **30** is installed to provide for air diffusing slots **22***a* and **22***b*. Fixed to center portion **36** are mounting brackets **34,** which can be used in any convenient number according to the length of the slot **22.** Each mounting bracket has a hole **40** drilled in its top center portion through which a cotter pin **42** may be passed. Dampers **44** are provided with flange portion **46** which are similarly drilled to receive cotter pins **42.** Springs **48** are mounted coaxially on cotter pin **42** in the center portion of dampers **44.** It will be understood that if desired, similar springs could be employed at the location of the cotter pins at each end of damper **44.** Springs **48** are of the torsional type, that is, fingers **50** are loaded so as to tend to rotate about the longitudinal axis of the spring, the finger at one end of the coil tending to rotate clockwise the finger at the opposite end of the coil tending to rotate counterclockwise. Accordingly, when dampers **44** are rotated to the upward position, as shown for example in FIG. **1,** springs **48** are biased such that they will cause dampers **44** to rotate about cotter pins **42** to the horizontal position in the absence of a restraining force.

Dampers **44** are held in the upward or open position by wires **52** which pass through aperture **53** and restrain dampers **44** against the force exerted by springs **48.** Wires **53** are made of a fusible material, preferably a fusible metal such as an alloy of lead and tin, although many other specific materials may suggest themselves to those skilled in the art.

Damper assembly **30** is inserted into place in air diffuser assembly **10,** and is held in place by engagement of tabs **32** into apertures **24.** The tabs may be bent over for secure installation. Dampers **44** are held in the vertical position by wires **52.** The air diffuser assembly is generally installed in a false ceiling type of installation with the assembly being supported on gridwork (not shown) which is engaged by notches **13** in end panels **12.** Ceiling tile or the like is installed on the gridwork with the tiles adjacent the diffuser assembly fitting into the open portions of channels **18** and **20.** In such an installation, only slot **22** will be exposed to the room below the false ceiling.

In the event of a fire in the room it is desirable to close off slot **22** for each diffuser to prevent the fire from spreading through the fire resistant suspended ceiling. Accordingly, the heat from the fire causes wires **52** to melt, allowing springs **48** to rotate about the

spring axis, in turn rotating dampers **44** about the coaxial cotter pins **42,** the dampers being urged to a horizontal, closed position as illustrated in FIG. **7.**

While the apparatus has generally been shown and described in terms of a double center slot type of diffuser having slots **22***a* and **22***b*, and therefore two dampers **44,** FIG. **8** illustrates another form to be used with a single slot diffuser. It can be seen that the construction of the fire damper assembly **30** remains unchanged except for the fact that only one damper **44** and one wire **52** is necessary to cover the single slot **22.** In other respects, the structure is comparable to that shown in FIGS. **1–7.**

It can be seen that the present structure provides an effective fire damper apparatus that is of simple and economical construction. The damper assembly can be assembled into the "loaded" configuration and easily inserted into the slot diffuser structure. As such, the apparatus can be easily adapted for installation and application in a variety of known slot type of air diffusers.

While the present apparatus has been described in detail for purposes of clarity, it will be understood that many modifications can be made by those skilled in the art without departing from the spirit of the invention, and that the scope of the invention is to be measured by the appended claims.

We claim:

1. An air diffusing apparatus adapted for installation in a suspended ceiling construction, said apparatus including an air receiving portion having an air inlet and an air outlet, said air outlet including first and second channel members, said channel members being spaced apart to form an air discharge slot therebetween, a plurality of vertical support members disposed in said slot and connected to said channel members; at least one damper blade operably connected to said support members by means of pin fastening means, said pin fastening means providing a rotational axis for said damper blade; at least one torsion spring in operative engagement with said damper blade; a fusible element cooperating with at least one of said support members and said damper blade, whereby said damper blade is rotated to a closed position relative to said air discharge slot by the force of said spring upon destruction of said fusible member.

2. The apparatus of claim **1** wherein said torsion spring is coaxially mounted on one of said pin fastening means.

3. The apparatus of claim **1** including an inverted U-shaped member connected to said vertical support members and running lengthwise of said slot whereby said slot is subdivided into two parallel diffusing slots.

4. The apparatus of claim **3** having two damper blades operably connected to said support members, each damper blade adapted to close one of said parallel diffusing slots.

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