Oct. 7, 1941. M. FISHER 2,258,506

THERMOSTATIC DAMPER MECHANISM

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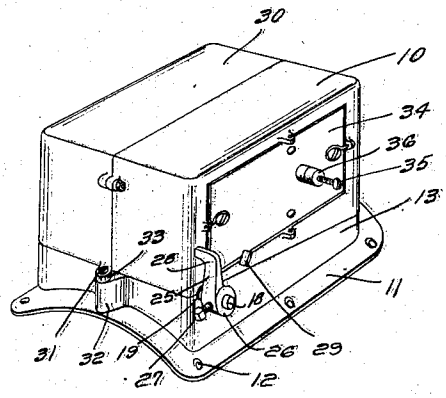

Fig. 1

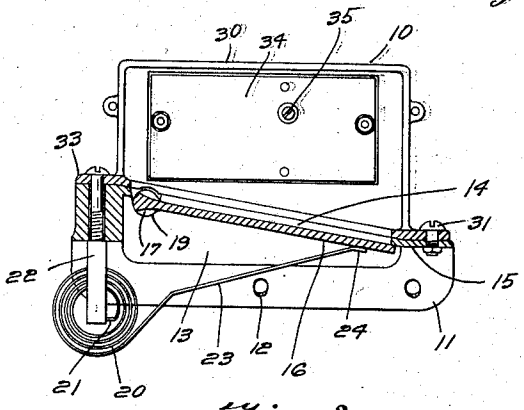

Fig. 2

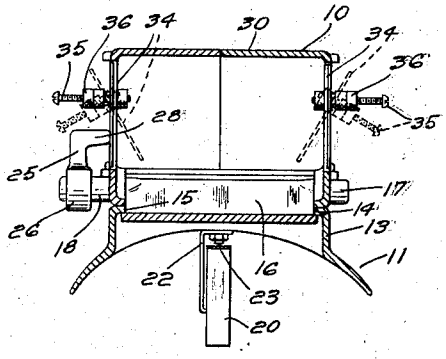

Fig. 3

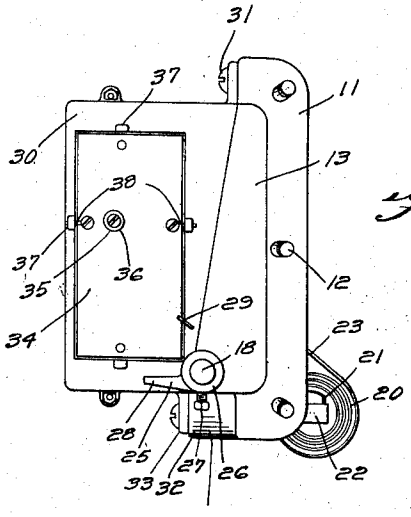

Fig. 4

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THERMOSTATIC DAMPER MECHANISM

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3 Claims. (Cl. 236—93)

Damper controls as usually positioned in the smoke-stacks of boilers, and particularly boilers for domestic use, are adapted to be manually turned, or to be mechanically moved by pressure or temperature control means. These controls are disadvantageous in that they do not depend directly on the temperature of the hot flue gases, and do not function as safety valves in the event of explosions in the boiler and in the flues resulting from ignition of incompletely combusted gases.

It is the principal object of my invention to provide a damper control which opens automatically in response to an increase in temperature of the flue gases, this novel control being further provided with simple means for regulating the extent of movement, and being arranged so as to immediately assume a closed position in the event of an explosion or other accumulation of pressure gases in the boiler and the boiler flues.

Another object of my invention is to provide a supplementary damper control for a manually adjustable mechanism for permitting a regulated flow of air into the smoke stack to control the total draft.

With the above and other objects and advantageous features in mind, my invention consists of a novel arrangement of parts more fully disclosed in the detailed description following, in conjunction with the accompanying drawing, and more specifically defined in the claims appended thereto.

In the drawing:

Fig. 1 is a perspective view of the novel damper, the arrangement being for horizontal mounting on a smoke-stack pipe;

Fig. 2 is a side view, partly in section;

Fig. 3 is a vertical transverse section thereof; and

Fig. 4 is a side view of the novel damper as it appears when mounted vertically.

Referring to the drawing, the boiler may be of any standard type and equipped with the usual smoke flue; the novel damper assembly 10 is mounted therein, the preferred mounting being in a horizontal position; a vertical position may be used if desired, but the horizontal mounting is more suitable for the average installation.

The novel damper assembly 10 includes a base 11 of generally arcuate rectangular form with a plurality of openings 12 for riveting to a smoke-stack pipe, the base having an upstanding cage 13 provided with a central opening 14, the side and top edges of the cage being cast to provide flanges 15 around the opening 14 to serve as abutments for the edges of a damper 16, which damper is provided with two pivot rods 17, 18 at its upper edges, the pivot rod 18 being elongated for a purpose hereinafter described, the pivot rods extending outwardly through arcuate openings 19 in the cage sides.

Referring now to Fig. 2, a thermostatic coil 20 has its inner end 21 locked to a removable support bracket 22 secured to the rear of the cage, the thermostatic coil having its other end formed as a spring finger 23 which extends upwardly and terminates in an arcuate tip 24 adapted to slidingly contact the rear of the damper 16. A stop element 25, see Fig. 3, includes a hub portion 26 mounted on the pivot bar 18 and adapted to be locked there in selected position in any desired manner, as by a set screw 27, the hub having a finger 28 extending therefrom, the finger being bent so as to contact a fixed stop 29 on the damper assembly, whereby the novel stop element may be set in desired position, and will turn with downward movement of the damper until the finger 28 contacts the stop 29 to lock the damper against further downward movement.

Referring now to Figs. 3 and 2, it will be noted that the damper is pivotally mounted on the rods 17 and 18, and that its centre of gravity falls outside the pivot point, movement of the thermostatic coil 25 upon increase in temperature of the flue gases traversing the stack will permit a movement of the damper 16 under the influence of gravity, and thus open the damper to allow entrance of air into the flues. In the event of an accumulation of gases under pressure in the boiler and flues, or of an explosion in the boiler and flues, the increased pressure functions to move the damper 16 upwardly into a closed position, as there is no locking of the damper end due to mechanical connection with the thermostatic element.

The above described thermostatic damper control is entirely automatic in operation. For many installations, it is desirable to also use an auxiliary draft control, the preferred construction embodying all the mechanism in one unit.

Thus, a housing 30 is detachably secured to the cage 13, as by screws 31 engaging suitable threaded bosses 32 on the cage and passing through eyes 33 on the housing, two dampers 34 being pivotally mounted in the sides so as to be normally retained in closed position by their own weight, each having a threaded bolt 35 extending outwardly therefrom equipped with man-

ually adjustable threaded disk weights **36**, whereby the dampers may be adjustably set so as to swing open to a desired extent to control the actual volume of air passing through the thermostatically controlled damper **16**. As shown in Fig. 3, the dampers **34** may be set vertically, the housing having a plurality of pivot eyes **37** and the dampers having removable pivot pins **38** for this purpose.

The offset arrangement of the cage so as to permit gravity movement of the damper **16** whether the control is mounted horizontally or vertically, and the interchangeable mounting of the side dampers **34** to correspond, facilitate the installation to accommodate any type of smoke stack. In large units for heavy duty, two or more thermostatic coils may be used, and if desired, the housing **30** may be replaced by two smaller damper housings inserted in the smoke stack direct, or the flanges **11** may be extended sufficiently to form supports for the dampers, thus affording parallel instead of series flow of air to the smoke-stack through the side dampers and the thermostatic damper.

The parts are simply constructed, are readily assembled and function excellently, as there are no unnecessary structural elements, whereby positive action of the thermostatically controlled damper is insured, both for regulating the entrance of room air into the flues in proportion to the temperature of the flue gases, and for shutting the damper in the event of rapid increase of pressure or of explosion, whereby escape of flue gases into the boiler room is effectively prevented. Moreover, the opening movement of the damper is simply and positively regulated by setting the stop finger to prevent excess opening movement.

While I have described a specific constructional embodiment of my invention, it is obvious that changes in the parts, in the materials used for the parts, and in their relative mountings, may be made to suit the requirements for different boiler installations, without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In a damper arrangement for a smoke stack, a casing having a base and a cage upstanding therefrom, the top of said cage having an air inlet opening, a thermostat coil having one end secured to the casing and depending therefrom to be positioned in the smoke stack, the other end of the coil being free and contiguous said air inlet opening, and a damper freely pivotally mounted in said cage to extend across said opening and adapted to swing downwardly under the influence of gravity to open said opening, said damper resting on and being slidably engaged by said free end of the coil, said cage having side and end walls, one end wall being of substantially less height than the other end wall and the side walls sloping correspondingly to permit opening downward movement of the damper by gravity when the casing is set in either horizontal or vertical position.

2. In a damper arrangement for a smoke stack, a casing having a base and a cage upstanding therefrom, the top of said cage having an air inlet opening, a thermostatically actuated damper pivotally mounted in said cage overlying said air inlet opening and for controlling passage of air through said opening, a housing on said cage having an upper wall, side and end walls, air inlets in said side walls, and adjustable draft operated auxiliary dampers for said air inlets pivotally mounted in said side walls.

3. In a damper arrangement for a smoke stack, a casing having a base and a cage upstanding therefrom, the top of said cage having an air inlet opening, a damper freely pivotally mounted in said cage for controlling passage of air through said opening, said damper being gravity actuated, a thermostatic coil having one end secured to the casing and the other end free and slidably supporting the damper, and an adjustable air inlet control for said opening comprising a housing on said cage overlying said cage inlet opening and having air inlet means, and adjustable draft operated auxiliary damper means pivotally mounted in said housing and controlling flow of air through said air inlet means, said cage having an upper wall, side and end walls, one end wall being of substantially less height than the other end wall and the side walls sloping correspondingly to permit opening downward movement of the damper by gravity when the casing is set in either horizontal or vertical position.

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