

E. A. ORR.
 AUTOMATIC DAMPER.
 APPLICATION FILED DEC. 18, 1911.

1,059,558.

Patented Apr. 22, 1913.

FIG. 1

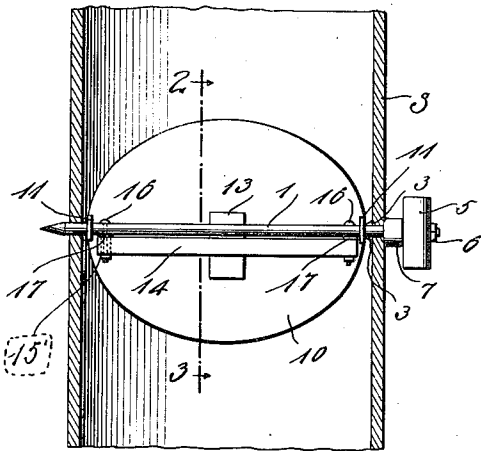


FIG. 2

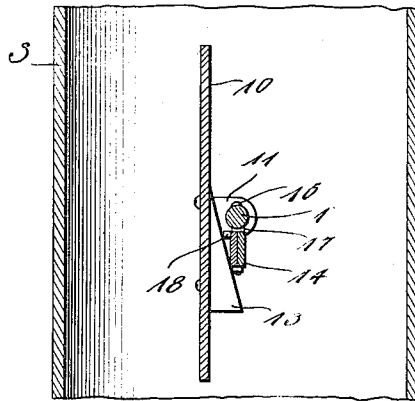


FIG. 3

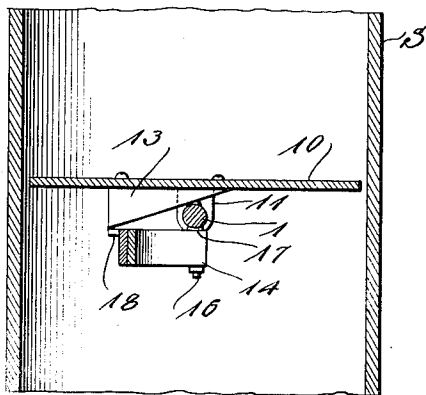


FIG. 4

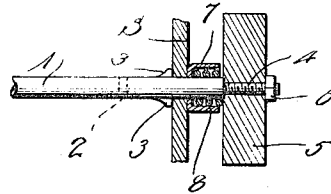


FIG. 5

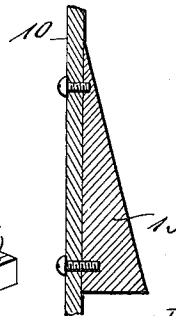
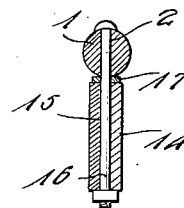


FIG. 6



Inventor

Elbert A. Orr.

Witnesses

J. R. Pierce

N. L. Collamer

by

A. B. Wilson & Co.

Attorneys

UNITED STATES PATENT OFFICE.

ELBERT A. ORR, OF PUEBLO, COLORADO.

AUTOMATIC DAMPER.

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To all whom it may concern:

Be it known that I, ELBERT A. ORR, a citizen of the United States, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Automatic Dampers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to draft regulators, and more especially to those applied to the damper of a stove or furnace; and the object of the same is to utilize a thermal bar to automatically turn the damper plate on its shaft so that the rise or fall of the heat will regulate the draft of the stove or furnace and thereby restore the heat to a predetermined medium. This object is accomplished by the embodiment of my invention set forth in the following specification and claims, and shown in the drawings wherein—

Figure 1 is a central vertical section through a stove pipe showing my improved damper therein and set to leave the pipe open. Figs. 2 and 3 are sections on the line 2—3 of Fig. 1 showing the damper respectively open and closed. Fig. 4 is an enlarged elevation of one end of the damper shaft and a section through the stove pipe and the handle. Fig. 5 is an enlarged sectional detail through the center of the damper plate and the wedge-shaped weight. Fig. 6 is a similar enlarged sectional detail through the damper shaft and one end of a thermal bar. Fig. 7 is a perspective detail of the thermal bar detached.

The drawings conventionally illustrate a stove pipe or thimble S wherein is usually mounted a damper consisting of a sheet iron disk fixed on a shaft extending transversely across the stove pipe or thimble and journaled in opposite sides thereof, one extremity being outside of the same and forming a handle by which the damper may be set. Commonly this handle stands in the plane of the damper plate so that the operator by glancing at the position of the handle may know what is the position of the damper plate within the stove pipe. For purposes of the present invention, it does not matter whether this pipe is the outlet from a stove or furnace or whether the damper be disposed somewhere within the inlet thereto, so

long as the damper controls the draft, and so we may assume that the tubular member S is an upright pipe and the damper plate must hang in a vertical plane therein when the draft is on full head.

The numeral 1 designates the shaft having through it near its extremities a pair of openings 2, beyond one of which is formed a pair of lugs 3, and this extremity of the shaft may be threaded as at 4. Mounted upon said extremity is a handle 5 preferably made of wood or other non-conductor of heat, and the same may be held thereon by means of the threads 4 or by a nut 6 as illustrated. Between the handle and the lugs 3 is a sleeve 7 which loosely incloses a coiled expansive spring 8 as shown. The damper shaft as thus constructed is inserted through alined holes in the stove pipe or thimble and pushed into place until the lugs 3 contact with its inner side and the inner extremity of the spring 8 or the sleeve 7 comes into contact with the outer side of said thimble, and these members inside and outside of the thimble hold the shaft properly disposed within the same and ready to be turned by means of its handle 5.

The damper plate 10 may be of sheet iron or of cast metal, and its contour is such that it will fit the stove pipe or thimble S when turned into a horizontal position across the same. It is essential, however, that the lower edge of the damper shall be heavier than the upper edge, and this may be carried out in a number of ways. A sheet metal body might have its lower edge turned back upon itself to make it of double thickness, a cast metal body might be cast thicker at that part than elsewhere, or the weight described below may be sufficient if properly disposed upon a sheet iron plate which is otherwise balanced. Any suitable means may be employed to cause said damper plate to stand normally upright within the stove pipe S so that the draft through the same shall be unimpeded. At diametrically opposite points the plate 10 has ears 11 bent from or cast with this body and pierced with eyes of a size to loosely surround the shaft 1. In the embodiment of my invention illustrated herewith, a weight 13 of substantially triangular shape is attached to the damper plate 10 near its center so that the heavier end of the weight is disposed toward one edge which of course will be the lower edge of the damper as it hangs

within the pipe; and this weight serves an additional function as described below. Many of these details are given simply for purposes of illustration, but if the ears 11 be employed, the pivotal support of the damper will be a little forward of its front face, and in that event I prefer to use the weight 13 rather than to make the lower edge of the damper plate heavy, because the weight will be applied to and project from the front face of the damper plate and the latter will therefore stand automatically in a truly vertical position, whereas if the lower edge of the plate in this instance were heavier the same would stand in a slightly oblique position.

By my invention, a thermal bar 14 is employed in connection with the parts above described, the same consisting of two metals of different coefficient of expansion such as copper and iron, riveted or otherwise secured together throughout their length so as to make up a normally straight strap or bar of metal having upright bolt holes 15 at its extremities, one of which is elongated longitudinally of the bar as seen at 15' in Fig. 7. Through these holes pass bolts or other fastening devices 16 whose upper ends pass through the holes 2 in the shaft 1, washers 17 being interposed between the shaft and the thermal bar so that the latter may flex laterally as necessary. Finally at about the midlength of one bar one edge is preferably deflected into a lip 18 which projects toward and is adapted to contact with the beveled outer face of the weight 13.

The parts being properly proportioned and connected, the operation of this improved device is as follows: The operator grasps the handle 5 and turns the shaft 1 against the tension set up by the spring 7, until the bolts 16 stand truly vertical and the thermal bar 14 is directly beneath the center of the shaft 1. At this time the ears of the damper plate 10 cause the latter to extend past what might be said to be the rear side of both the shaft and the thermal bar, the weight 13 holding it in upright position and resting against the rear end of the lip 18. Assume now that the heat in the stove becomes excessive, it acts on the thermal bar and the latter bows to the rear between its extremities, the hole 15 at one end turning around one bolt 16 and the slot 15' sliding and turning on the other bolt. The result is that the lip presses against the face of the weight which therefore becomes a wear plate, the damper plate 10 is turned around the shaft 1 without causing the latter to turn within its bearings in the stove pipe, and the heat is partly shut off by reason of this automatic restriction of the draft. If, however, this first automatic deflection of the damper from a truly upright

position does not sufficiently shut off the draft, the continued rise of the heat will cause the further bowing or bending of the thermal bar with the result that the damper plate will be tilted farther and farther to the rear around the shaft 1 until nearly or quite all of the draft flowing through the stove pipe is shut off. As is well known, devices of this character regulate themselves before the extreme thus described has been reached, and therefore if the parts are properly proportioned and set the bowing and straightening out of the thermal member will be very slight and the deflection of the damper plate from a true vertical will correspond.

The extreme simplicity of this device will commend itself to the manufacturer and purchaser, and it may be constructed when the stove or furnace is first installed or applied thereto later as an attachment. In thrusting the shaft 1 through the alined holes in the stove pipe, the lugs 3 engage against the inner side of the pipe so that the expansive spring 8 acts as a tension device on the outer side of the pipe whether it is surrounded by the sleeve 7 or not. I prefer to employ a handle of wood or other non-conductor of heat, either screwed onto the shaft or held thereon by a nut as shown, but it should be set in alinement with the bolt holes 2 through which pass the bolts that sustain the thermal bar—the obvious purpose being to permit the operator to know by the position of the handle what is the position of the thermal bar and hence the normal position of the damper plate. A striking feature of the present invention consists in the fact that although the position of the plate is automatically adjusted by the thermal bar, at no time is the operator deprived of the privilege of setting the plate by turning the handle.

What is claimed as new is:

1. The herein described damper comprising a rod adapted to extend across the passage which is to be controlled by the damper, a plate pivotally mounted on said rod, means for holding it normally in position to open said passage, and a thermal bar connected at its extremities with said rod and having its body lying alongside the damper plate and adapted when deflected by heat to turn said plate out of its normal position.

2. The herein described damper comprising a shaft adapted to be journaled across the passage which is to be controlled by the damper, means for holding the shaft in any position to which it may be set, a plate movably mounted on the shaft, and a thermal bar connected at its extremities with said shaft and having its body lying alongside the damper plate and adapted when deflected by heat variations to turn the plate on the shaft.

3. The herein described damper comprising a shaft adapted to be journaled across the passage which is to be controlled by the damper, a handle on one extremity thereof, a spring tension device for holding the shaft in any position to which it may be set, a plate movably mounted on the shaft, means for holding it normally in position to open said passage, and a thermal bar connected at its extremities with said shaft and having its body lying alongside the damper plate and adapted when deflected by heat variations to turn the plate on the shaft.

4. The herein described damper comprising a rod adapted to extend transversely of the passage which is to be controlled by the damper, a plate movably mounted on the rod, bolts extending transversely through said rod, a flat thermal bar standing alongside the plate and having holes passing edge-wise through it and receiving said bolts, one of the holes being elongated longitudinally, and a lip projecting laterally from said bar toward the plate.

5. The herein described damper comprising a shaft adapted to be journaled across the passage which is to be controlled by the damper, means for setting the shaft and holding it in any position to which it may be set, a plate movably mounted on the shaft, and a thermal bar connected at its extremities with said shaft and having a projection adapted to turn the plate on the shaft when the bar is deflected by heat variations.

6. The herein described damper comprising a shaft adapted to extend transversely of the passage which is to be controlled by the damper, a plate having ears at opposite sides pierced with eyes loosely engaging the shaft, bolts extending transversely through said shaft, a flat thermal bar standing alongside the plate and having holes passing edge-wise through its extremities and receiving said bolts, one of the holes being elongated longitudinally, and a lip projecting laterally from the center of said bar toward the plate.

7. In a stove pipe damper, the combination with a shaft adapted to extend transversely across an upright pipe, two bolts

passing vertically through the shaft within the pipe, and a thermal bar standing normally parallel with the shaft and having holes through its extremities receiving said bolts, one of the holes being elongated longitudinally; of a damper plate pivoted on said shaft, and a weight for holding the plate normally upright and alongside said bar.

8. In a stove pipe damper, the combination with a shaft adapted to extend transversely across an upright pipe, and a thermal bar connected at its extremities with said shaft and standing normally parallel with and below the same; of a damper plate having ears pierced with eyes loosely engaging the shaft, and a weight for holding the plate normally upright, the weight being secured to the plate in such position that the weight swings normally into contact with said bar.

9. In a stove pipe damper, the combination with a shaft adapted to be journaled across an upright pipe, means for setting the shaft in various positions, and a flat thermal bar connected at its extremities with said shaft and having a lip projecting laterally from its center; of a damper plate movably mounted on the shaft, and a weight for holding the plate normally upright, the same being secured to the plate in position to be struck by said lip.

10. In a stove pipe damper, the combination with a shaft adapted to extend across an upright pipe, and a flat thermal bar connected at its extremities with said shaft and having a lip projecting laterally from it; of a damper plate movably mounted on the shaft, and a triangular weight for holding the plate normally upright, the same being secured to the face of the plate with its heavier end downward and its outer side adapted to contact with said lip.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ELBERT A. ORR.

Witnesses:

C. D. MILLOBOLD,
WILL J. ORANGE.