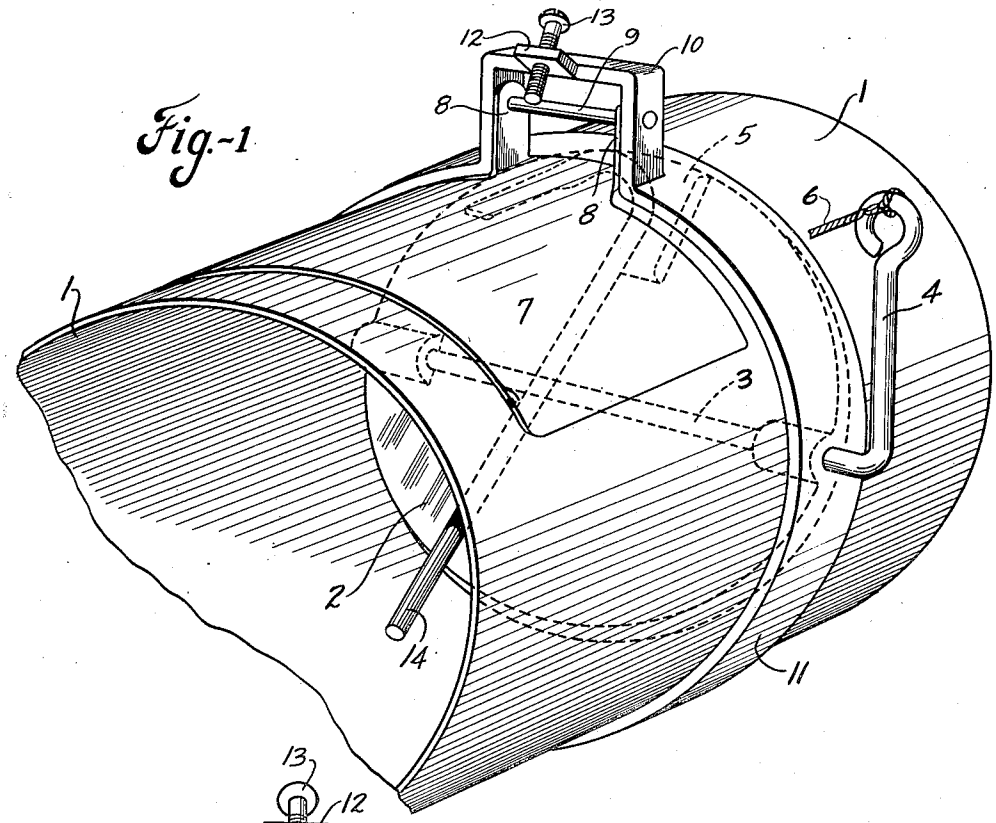
Aug. 5, 1941. J. T. CARLSON 2,251,822

STACK DAMPER REGULATOR

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Fig.-1



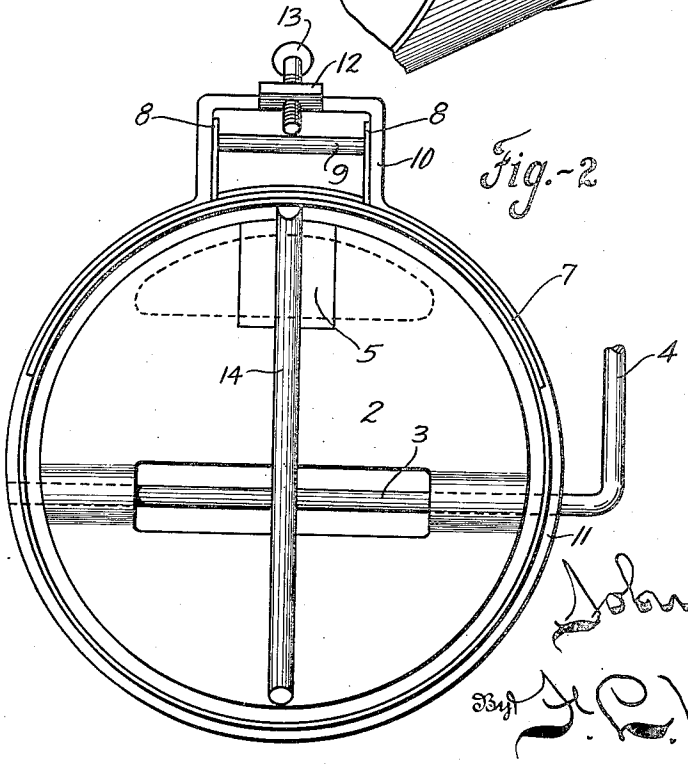


Fig.-2

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STACK DAMPER REGULATOR

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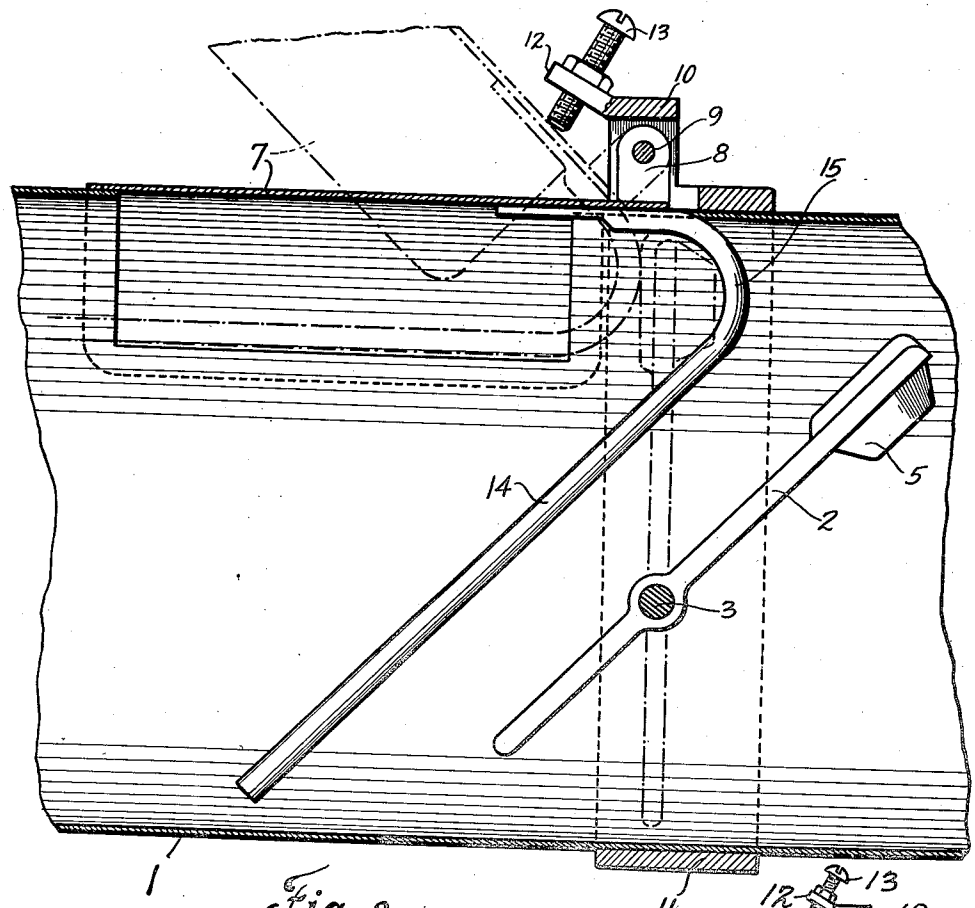


Fig.-3

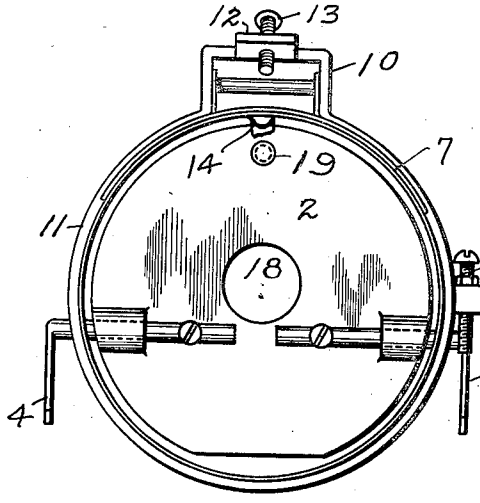


Fig.-4

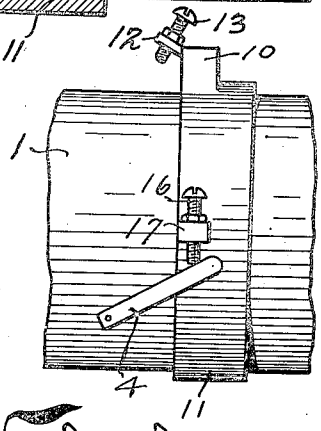


Fig.-5

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Patented Aug. 5, 1941 2,251,822

UNITED STATES PATENT OFFICE

2,251,822

STACK DAMPER REGULATOR

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Application June 5, 1939, Serial No. 277,485

11 Claims. (Cl. 126—293)

This invention pertains to heating and ventilating, and more particularly to a draft regulator for furnaces, boilers, water heaters, and other analogous units, for either domestic or industrial purposes.

It is quite common practice to provide in the smoke pipe or flue leading from a furnace or heater to a chimney, a cut-off damper by which the draft through the pipe or flue may be restricted, and also a check draft damper enabling direct communication of the smoke pipe or flue with atmosphere at a point beyond the heater unit, the opening of which materially reduces the draft effect of the chimney on combustion within the furnace or heater.

These dampers are ordinarily operated either manually or thermostatically to open one and close the other alternately. Such dual controls are ordinarily more or less complicated. In the present instance dual dampers are so related that the actuation of one damper automatically controls the other damper through operative means wholly contained within the stack or flue.

The object of the invention is to improve the construction as well as the mode of operation of flue or stack dampers whereby they may not only be economically manufactured and installed, but will be more efficient in use, uniform in action, interrelated for unison operation, having relatively few parts and unlikely to get out of repair.

A further object of the invention is to provide a unitary draft regulator assembly of compact form wherein dual interrelated dampers are mounted on a section of conventional flue pipe for convenient installation.

A further object of the invention is to provide simple means wholly contained within the flue for effecting unison operation of the respective dampers under influence of a single exterior actuator connection.

A further object is to provide gravity operation for dual interrelated dampers in one direction.

A further object of the invention is to provide a flue damper construction having the advantageous structural features and inherent meritorious characteristics herein mentioned.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described or illustrated in the accompanying drawings.

In the accompanying drawings, wherein is shown the preferred but obviously not necessarily the only form of embodiment of the invention,

Fig. 1 is a perspective view of a portion of a furnace or heater smoke pipe or flue in which the present damper assembly is installed.

Fig. 2 is an end elevation thereof.

Fig. 3 is a longitudinal sectional view of such flue pipe and damper assembly.

Figs. 4 and 5 are respectively a side elevation and end view of a modification of the construction illustrated in preceding figures.

Like parts are indicated by similar characters of reference throughout the several views.

In the illustrated embodiment of the present invention, 1 is a portion of a smoke pipe or flue within which is mounted an oscillatory cut-off damper 2 of the butterfly type. The cut-off damper 2, which is disc shaped, is secured upon a transverse substantially horizontal shaft 3, which may be diametrically disposed relative to the damper disc or preferably below the level of its center as shown in the drawings. The shaft 3 is journaled in the opposite sides of the flue pipe 1, and one protruding end is preferably extended in angular relation to afford an integral operating lever 4. The oscillatory damper disc 2 is weighted at 5 above its axis of oscillation and tends to automatically turn to open position by influence of gravity when permitted to do so by relaxation of the operator cable or wire 6 attached to the operator lever 4.

Adjacent the oscillatory damper disc 2 is a pivotally mounted flap type damper 7 operative to close a lateral opening in the flue pipe 1. The flap damper 7 is contoured to agree with the curvature of the pipe 1. It is of sufficient size to marginally overlap the portions of the pipe surrounding the opening. While various other mounting means may be employed, the flap damper 7 is shown provided with upstanding ears 8 having pivotal engagement with a pintle rod 9 extending across an inverted bight of arch 10 formed in a pipe band 11 surrounding the pipe 1. The bight or arch 10 has an integral laterally projecting lug 12 which carries an adjustable limit screw 13 against which the flap damper 7 abuts at the limit of its range of opening movement, as is shown by dotted lines in Fig. 3. Fixedly connected with the flap damper 7 and extending within the pipe 1 is a ballast arm 14 having a bend or elbow 15 which projects into the path of swinging motion of the cut-off damper 2. The ballast arm 14 projects in such relation with the damper 7 that it normally tends

to close and hold the damper 7 in closed relation by gravity. By swinging movement of the cut-off damper disc 2 from its open solid line position to its dotted line position shown in Fig. 3, the weighted upper margin of the disc 2 contacts the elbow 15 of the flap damper arm 14. By continuing movement thereof, motion is transmitted from the damper 2 to the damper 7 to thereby raise or open the flap damper as the cut-off damper 2 approaches closed relation. In the final position of adjustment the respective dampers assume their dotted line positions of Fig. 3 wherein the cut-off damper 2 is in closed relation, the flap damper 7 in open position and the weight arm 14 extended in approximate parallel relation with the axis of the pipe. Upon release of operating tension upon the arm 4, the flap damper 7 and arm 14 descending by gravity press the elbow 15 against the damper disc 2 with sufficient force to move the latter beyond dead center, whereupon the cut-off damper will automatically return to open relation under influence of gravity. Thus the two damper elements are arranged and actuated in tandem whereby the power applied to one damper is transmitted thence to the second damper to actuate the respective dampers in reverse directions, thus effecting opening movement of one damper as the other is closed, and vice versa.

Obviously the initial damper arm 4 may be manually adjusted to and fro, or the link 6 may be operatively connected with a remote thermostatic actuating member.

In Figs. 4 and 5 there is shown a variation of the previously described construction wherein the counterweight pad 5 is omitted from the damper 2 and operating arms 4 are provided at opposite sides. An adjustable stop screw 16 in a lug 17 on the band 11 serves to limit the range of movement of the damper 2. The latter is provided with the usual vent hole 18. To reduce friction and afford a camming contact head for engagement with the bend 15 of the arm 14 is a round head bolt 19 positioned in the upper part of the damper 2.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of appended claims.

Having thus described my invention, I claim:

1. A draft regulator assembly including a section of flue pipe having a lateral opening therein, a swinging cut-off damper within the pipe section tending to swing to open position under influence of gravity, operating means for the cut-off damper accessible from the exterior of the pipe section, a swinging closure damper for the lateral opening in the pipe tending to swing to closed position under influence of gravity, and an intermediate motion transmitting device fixedly attached to only one of said dampers by which the closing movement of either damper positively influences the other damper to open position.

2. A draft regulator including a flue pipe section having a lateral opening therein, a pivoted cut-off damper within the flue pipe, a pivoted closure damper for the lateral opening therein, an operator member exteriorly of the flue pipe operatively connected with one of said damper members, and an intermediate motion transmitting device fixedly attached to only one of said dampers by which the operation of the closure damper to closed position exerts a positive opening influence on the cut-off damper.

3. A draft regulator including a flue pipe having a lateral opening therein, a closure damper for the opening, a cut-off damper within the pipe, said dampers being mounted for unison movement in reverse relation by which one damper is closed simultaneously with the opening movement of the other damper, and an intermediate motion transmitting device fixedly attached to only one of said dampers by which the closing movement of either damper positively influences the other damper to open position.

4. A draft regulator including a flue pipe section having a lateral opening therein, a cut-off damper for the flue, a ballast weight therefor located above its center of oscillation and tending to move the damper to open position by gravity, a pivotally mounted closure damper for the lateral opening in the pipe, a ballast weight therefor tending to move said damper to closing relation by gravity, means exteriorly of the pipe for moving one of the dampers in opposition to gravity, and a thrust member interiorly of the pipe for actuating the other damper by the movement of the first damper and in unison therewith.

5. A draft regulator including a flue pipe section, a circular cut-off damper pivotally mounted therein for swinging motion about a transverse axis in spaced relation below its diametrical axis, and a weight carried by the damper above its axis of oscillation tending to move the damper to open position by gravity.

6. A draft regulator including a flue pipe, a cut-off damper pivotally mounted therein for swinging motion about a non-diametrical transverse axis, and an integral weight body comprising a component part of the cut-off damper located above the transverse axis thereof and tending to move the damper to open position by gravity.

7. A draft regulator including a flue pipe, a cut-off damper pivotally mounted therein for swinging motion about a non-symmetrical transverse axis, said damper being so constructed and its axis of oscillation so disposed that the preponderance of its area is disposed above its axis of oscillation whereby the damper tends to automatically move to open position by gravity.

8. A draft regulator including a flue pipe having a lateral opening therein, a closure damper therefor, a band surrounding the pipe adjacent to the opening including an arch shaped bight, a pintle pin traversing the arch shaped bight, ears on the closure damper pivotally engaging the pintle pin, and an adjustable stop carried by the arch shaped bight engaged by the damper at the limit of its opening movement, and means for actuating the damper.

9. A draft regulator including a flue pipe having a lateral opening therein, a swinging closure damper therefor, an arm carried by the damper in angularly disposed relation thereto interiorly

of the pipe, including an elbow bend therein projecting beyond the plane of the axis of oscillation of the swinging damper perpendicular thereto, beyond which the arm extends in the general direction in which the damper extends from said axial plane, and actuating means within the pipe having contact engagement with the elbow bend of the arm for actuating the closure damper.

10. A draft regulator including a flue pipe section having a lateral opening therein, a pivotally mounted unbalanced cut-off damper in the pipe section so constructed and arranged as to tend to remain in open position, a pivotally mounted unbalanced closure damper for the lateral opening in the pipe section so constructed and arranged as to tend to remain in closed position, operator means exteriorly of the pipe section for actuating the cut-off damper to closed position, a thrust member rendered effective by closing movement of the cut-off damper to move the closure damper to open position, the construction and arrangement being such that the unbalanced closure damper exerts opening force on the unbalanced cut-off damper through the said thrust member when the operating means for the cut-off damper is ineffective to maintain the cut-off damper in closed position.

11. A draft regulator including a flue pipe section having a lateral opening therein, a pivotally mounted unbalanced cut-off damper in the pipe section so constructed and arranged as to tend to remain in open position, a pivotally mounted unbalanced closure damper for the lateral opening in the pipe section so constructed and arranged as to tend to remain in closed position, the pivots of the respective dampers being in substantially the same transverse plane of the pipe section, operator means exteriorly of the pipe section for actuating the cut-off damper to closed position, a thrust member rendered effective by closing movement of the cut-off damper to move the closure damper to open position, the construction and arrangement being such that the unbalanced closure damper exerts opening force on the unbalanced cut-off damper through the said thrust member when the operating means for the cut-off damper is ineffective to maintain the cut-off damper in closed position.

JOHN T. CARLSON.