May 11, 1948. J. A. D'ELIA 2,441,398

COMBINED FLUE AND CHECK DRAFT DAMPER UNIT

Filed July 16, 1943

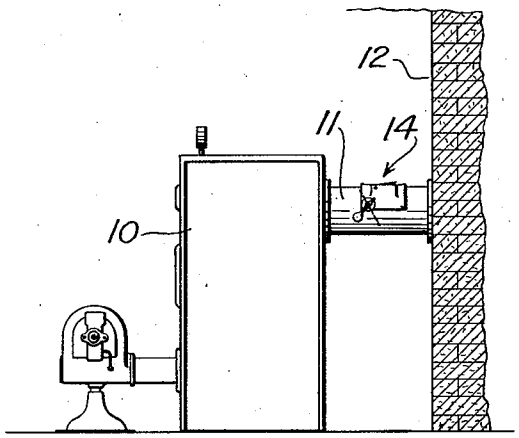


FIG. 1

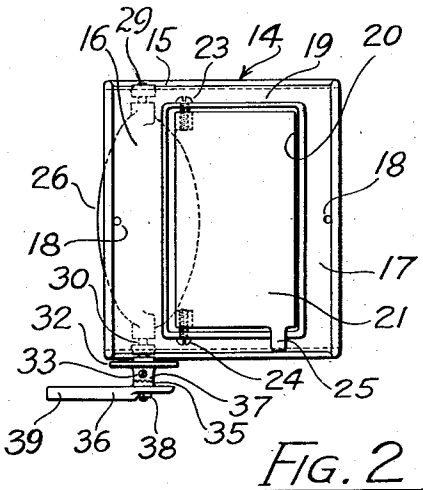


FIG. 2

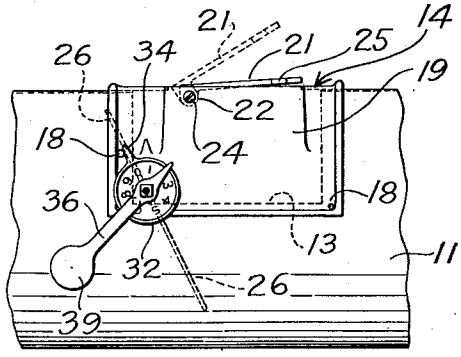


FIG. 3

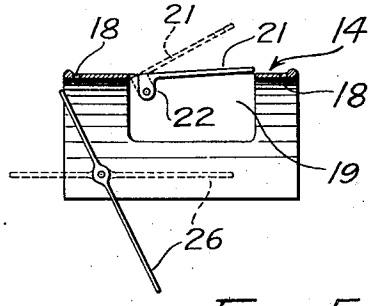


FIG. 5

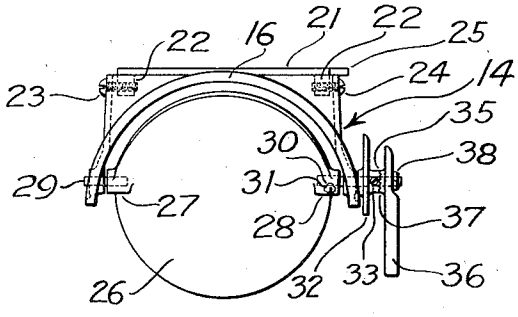


FIG. 4

INVENTOR
JOSEPH A. D'ELIA.
BY John P. Hanrahan
ATTORNEY

Patented May 11, 1948 2,441,398

UNITED STATES PATENT OFFICE

2,441,398

COMBINED FLUE AND CHECK DRAFT DAMPER UNIT

Joseph A. D'Elia, Fairfield, Conn.

Application July 16, 1943, Serial No. 494,971

6 Claims. (Cl. 126—293)

1

This invention relates to new and useful improvements in heating systems and has particular relation to a heat lock or means for regulating the draft in and the effective internal area of a boiler or furnace flue and especially the flue of an oil fired boiler or furnace.

An object of the invention is to provide a means for the purpose stated and which may be applied to existing installations or incorporated in new work and which when once adjusted by the mechanic making the installation needs no further adjustment or attention on the part of the householder.

Another object is to provide a device as indicated and which is of simple and inexpensive construction, contains no parts likely to get out of order and which will have a long useful life.

Other objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein a satisfactory embodiment of the invention is shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawing:

Fig. 1 is a side elevational view showing an oil fired furnace with the device of the invention mounted in the flue thereof;

Fig. 2 is a top plan view of the device of the invention alone;

Fig. 3 is a side elevational view of the such device as mounted on a short section of flue;

Fig. 4 is a view partly in front elevation and partly in section showing the device of the invention; and

Fig. 5 is a longitudinal sectional view through the device of the invention.

The present invention comprises a device adapted to be mounted in a furnace or boiler flue and which in a single unit includes means for regulating the amount of draft in said flue and for partially blocking the same to prevent the too rapid escape of hot gases therethrough. Heretofore it has not been uncommon to place bricks and the like in flues for the purpose of partially blocking the same and various means have been provided for admitting air to flues for the purpose of checking the draft therethrough.

Referring in detail to the drawing at 10 is indicated on a small scale an oil fired heating unit, the flue 11 of which is connected with a chimney 12. Generally speaking the size of the

2

flue openings of the heating units and the sizes of flues used with said units are not particularly adapted for the particular units. Thus in many instances with a small fire and a large flue having considerable draft a good part of the heat generated is lost to the householder. This is true since the heated gases are, under the named circumstances, taken up the chimney before extraction therefrom of that portion of the heat which should be, has been extracted from such gases.

According to the invention flue 11 is provided in a side, preferably in an upper side, with an opening 13 and disposed on the flue over such opening is the present heat lock or unit generally designated 14. This unit as herein disclosed comprises a cast body 15 hollow and open at one side and somewhat elongated in side elevation. It includes transversely arcuate end portions 16 and 17 receiving the ends of the opening 13 in the flue. The lower edges of body 15 overlie the upper edges of the opening 13 and the entire body is secured on the flue as by screws 18 or the like.

Intermediate its ends body 15 is provided with a generally rectangular portion 19 opening through its upper side and means are provided for partially or wholly closing the opening 20 through said portion. Such means comprises a door or plate-like cover 21 including mounting lugs 22 into which are threaded screws 23 and 24 respectively. These screws pass freely through the side walls of portion 19 and are threaded into lugs. When in closed position cover 21 is at a slight slant and its free edge portion is at the upper side of the casting portion 19. A finger piece 25 on one edge of the cover lies against the upper edge of the rectangular portion 19 preventing the cover from moving into the cast body and providing means by which the cover may be manually moved.

Mounted in the arcuate portion 16 of the body 15 is a damper or valve 26. Damper 26 is circular or substantially so and is at opposite edges above its center provided with lugs 27 and 28 in the former of which is fixed a short bearing member 29 rotatably mounted in a side wall of the body 15. A somewhat longer bearing member or shaft 30 is fixed in the lug 28 as by a set screw 31. This shaft passes out through a side wall of the body 15 and at the outer side of such body has fixed thereto a disc 32 the latter being secured in place as by a set screw 33 passing through a hub portion.

At one point along its edge the disc 32 is provided with a pointer 34 and on its outer face

the said disc may be provided with indicating data as the numerals shown. Preferably the disc is secured to the shaft 30 in such relation that the pointer 34 of the disc is in alignment or parallel with the damper or valve 26. This is as shown. The outer or free end of the above mentioned hub portion of disc 32 is toothed or roughened as at 35 and a lever 36 on shaft 30 beyond said hub portion and turnable about said shaft has a toothed or roughened portion 37 meshing with the teeth 35 of the said disc hub.

A nut 38 threaded onto the outer end portion of shaft 30 is threaded against the outer side of lever 36 to maintain the teeth 37 of the latter engaged with the teeth 35 of the disc 32. In this way the disc, shaft 30 and the lever 36 are secured against casual relative movement. Lever 36 is weighted at its outer end as shown at 39.

The party installing the present device checks to determine the draft in the chimney and when such test shows the draft to be greater than required for the burner capacity to be used he sets the door or cover 21 accordingly. Thus such door is opened to an extent sufficient to cut the draft down to what it should be and the said door is then secured in the partly open condition. This last is accomplished by tightening either or both of the screws 23 and 24.

When said screws are tightened while the door 21 is held partly open, as in the dotted line positions of Figs. 3 and 5, the door is secured in such partly open position since the heads of the screws are tightened against the outer sides of the rectangular portion 19 of the casting 15. Thereafter the householder does not attempt any adjustments of the door 21 but on the contrary permits it to remain in the position to which it is adjusted by the mechanic or other experienced party making the initial installation. The door being partly open admits air to the flue 11 effectively checking the draft therein so that the latter is only that required for the particular installation made.

Somewhat similarly the party making the installation adjusts the position of the damper 26. This damper does not have a snug fit in the flue and in fact the flue is of considerable greater internal diameter than the exterior diameter of the damper. This is to permit of the escape of gases up the flue about the damper at all times. The position of the damper after proper installation depends on the consumption capacity of the burner of the particular installation. Thus if the burner has a capacity of three gallons per hour the damper is more open than in an instance where the burner has a capacity of only one or two gallons per hour.

In making an adjustment the nut 38 is loosened and the lever 36 adjusted about shaft 30 relative to the disc 32. The position of the damper within the flue is indicated by the pointer 34 on the edge of the disc. As the lever is adjusted to place its weight 39 at different angles to the damper and locked to the damper by tightening of nut 38 to interlock the teeth 35 and 37 the weight is more or less effective to hold the damper partly open. The damper is movable through 90 degrees as from a position transversely of the flue to a position parallel with the central axis thereof as suggested by the dotted lines in Fig. 5.

After lever 36 has been adjusted to properly locate the weight 39 further adjustment is to be avoided. The nut is simply tightened to lock the lever to the hub of the disc 32 and the latter being fast shaft 30 and such shaft being fast with

the damper the lever and its weighted end will normally maintain the damper at the proper angle. Obviously the damper will retard the flow of gases from the furnace of the chimney. This holding back of the flow of heated gases results in a greater proportion of heat being extracted from them and results in an economy of fuel consumption.

It is particularly noted that the damper is not absolutely fixed in position. It is merely counterbalanced by a weight so that any force to overcome such weight may cause the damper to move to a fully open position, as to the dotted line position of Fig. 5. In case of temporary failure of an oil burner a small explosion may occur. The damper of the invention in such instance is more or less free, being restrained only by weight 39, to swing to fully open position when engaged by the force of the explosion so that such force is free to escape without damage to any part of the device of the invention or the heating unit with which it is used.

When the force of the explosion passes the weight returns the valve or damper to its previously set position. The damper of the invention will be retained in position partly closing the flue 11 after the flame of the oil burner is shut off and will thus serve to retain the heated gases in the heating unit and prevent the free flow of air or the like therethrough such as would result in a rapid cooling of the fire bricks, etc., of the unit.

From the above it will be seen that the present invention provides means for affecting a savings in fuel consumption. Further the means of the invention does not require any constant attention or any adjustments by the householder. I have a simple and compact means for my purpose and a means which does not include operating parts likely to get out of order and require the attention of a service man.

Having thus set forth the nature of my invention, what I claim is:

1. A regulator including a body having a concave side adapted to be mounted on a flue over an opening in the latter, a damper, pivot means mounting said damper on said body at the hollow side thereof and with the damper projecting from such side whereby the damper is disposed in a flue when the body is mounted thereon, said pivot means extending to one side of said body and rigid with said damper, a disc on said extending portion of the pivot means and rigid therewith, means on said disc and indicating the relation of the latter to said damper, said disc having a toothed hub portion, a lever on and turnable about the extending portion of said pivot means, teeth on said lever for interlocking with the teeth of said hub portion, a nut on said extending portion of said pivot means and adapted to be tightened to secure the teeth of the lever in interlocking relation with the teeth of said hub portion to fix the relation of the lever to the pivot means, damper and disc, and said lever weighted at its outer end whereby depending on its fixed relation to the damper it biases the latter toward open position.

2. A regulator including a body having a concave side adapted to be mounted on a flue over an opening therein, said body having an opening therein, a door in said opening, means pivotally mounting said door, said door being of less area than said opening, a finger piece on said door for manipulation thereof and extending therefrom beyond an edge thereof a distance to engage said

body at a side of said opening to prevent complete movement of said door through said opening, and means for securing said door against casual movement when in a position of open adjustment.

3. A regulator including a body having a concave side adapted to be mounted on a flue over an opening therein, said body having an opening therein, a door in said opening, means pivotally mounting said door, said door being of less area than said opening, a finger piece on said door for manipulation thereof and extending therefrom beyond an edge thereof a distance to engage said body at a side of said opening to prevent complete movement of said door through said opening, and said pivot means including a screw passing through a wall of said body and threaded into a portion of said door whereby on tightening of said screw said door is secured against casual movement in a desired position of open adjustment.

4. A regulator including a body having a concave side adapted to be mounted on a flue over an opening therein, said body having an opening therein, a door for closing said opening, means pivotally mounting said door for pivotal movement toward and from closed position, means for securing said door in open position, a damper, a pivot means mounting said damper on said body at the hollow side thereof and with the damper projecting from such side whereby the damper is disposed in a flue when the body is mounted on the latter, and adjustable means yieldingly biasing said damper from normal relation to the longitudinal axis of said flue.

5. A regulator including a body having a concave side adapted to be mounted on a flue over an opening therein, said body having an opening therein, a door in said opening, means pivotally mounting said door, said door being of less area than said opening, a finger piece on said door for manipulation thereof and extending therefrom beyond an edge thereof a distance to engage said body at a side of said opening. to prevent complete movement of said door through said opening, means for securing said door against casual movement when in a position of open adjustment, a damper, means mounting said damper on said body at the concave side thereof and with the damper projecting from such side whereby the damper is disposed in a flue when the body is mounted on a flue, said pivot means extending to one side of said body and rigid with said damper, a weighted lever turnable about said pivot means at one side of the body, and means to secure said weighted lever to said pivot means in the desired angular relation of the weight to the damper whereby to bias the latter toward open position.

6. A regulator including a body having a concave side adapted to be mounted on a flue over an opening therein, said body having an opening

therein, a door in said opening, means pivotally mounting said door, said door being or less area than said opening, a finger piece on said door for manipulation thereof and extending therefrom beyond an edge thereof a distance to engage said body at a side of said opening to prevent complete movement of said door through said opening, said pivot means including a screw passing through a wall of said body and threaded into a portion of said door whereby on tightening of said screw said door is secured against casual movement in a desired position of open adjustment, a damper, pivot means mounting said damper on said body at the concave side thereof and with the damper projecting from said side whereby the damper is disposed in a flue when the body is mounted thereon, said pivot means extending to one side of said body and rigid with said damper, a disc on said extending portion of the pivot means and rigid therewith, means on said disc and indicating the relation of the latter to the damper, said disc having a toothed hub portion, a lever on and turnable about the extending portion of said pivot means, teeth on said lever for interlocking with the teeth of said hub portion, a nut on said extending portion of said pivot means and adapted to be tightened to secure the teeth of the lever in interlocking relation with the teeth of said hub portion to fix the relation of the lever to the pivot means, damper and disc, and said lever weighted at its outer end whereby depending on its fixed relation to the damper it biases the latter toward an open position.

JOSEPH A. D'ELIA.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
37,781	Turner	Feb. 24, 1863
208,800	Dunklee	Oct. 8, 1878
591,317	Alden	Oct. 5, 1897
676,120	Bruss	June 11, 1901
1,034,507	Powers	Aug. 6, 1912
1,048,197	Mueller	Dec. 24, 1912
1,055,935	Mignery	Mar. 11, 1913
1,067,989	Knowles	July 22, 1913
1,105,959	Bruss	Aug. 4, 1914
1,286,489	Anderson	Dec. 3, 1918
1,372,333	Becker	Mar. 22, 1921
1,377,475	Haas	May 10, 1921
1,411,745	Rosenberg	Apr. 4, 1922
1,470,425	Curtis	Oct. 9, 1923
1,572,687	Schmelz	Feb. 9, 1926
1,672,758	Given	June 5, 1928
1,943,342	Mortimer	Jan. 16, 1934
2,011,103	Frantz	Aug. 13, 1935
2,251,822	Carlson	Aug. 5, 1941