Feb. 14, 1928.

1,658,971

L. A. COOK

FURNACE

Filed Feb. 26, 1925

2 Sheets-Sheet 1

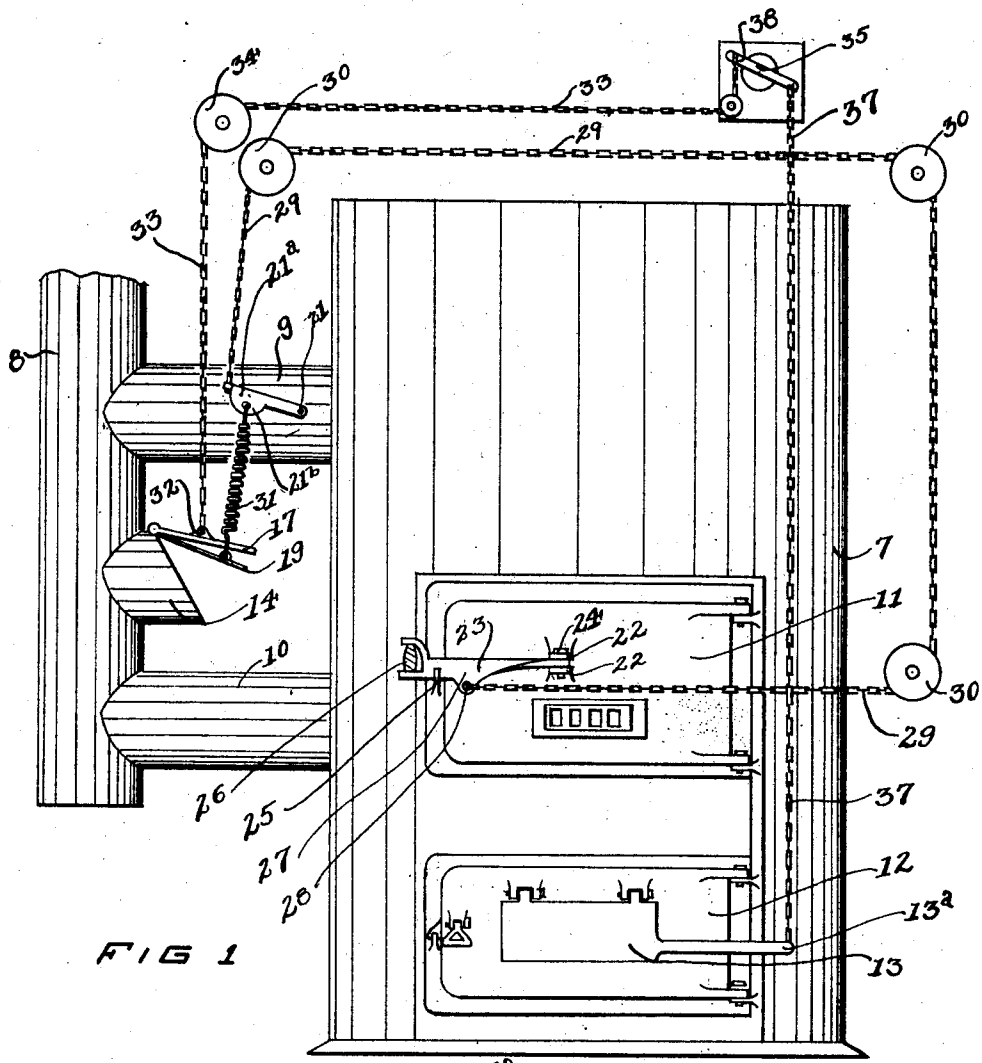


FIG 1

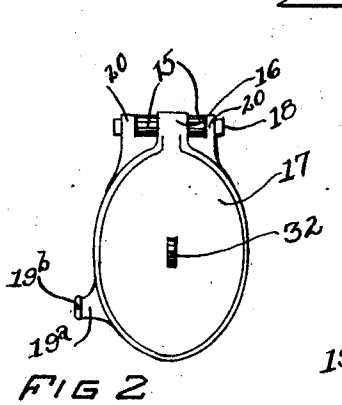


FIG 2

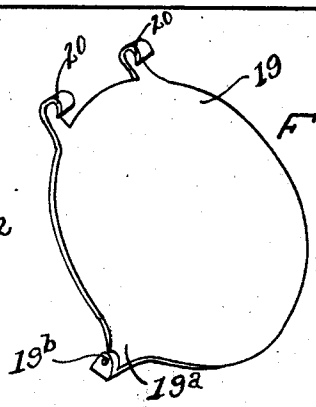


FIG 3

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L. A. COOK

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Filed Feb. 26, 1925 2 Sheets-Sheet 2

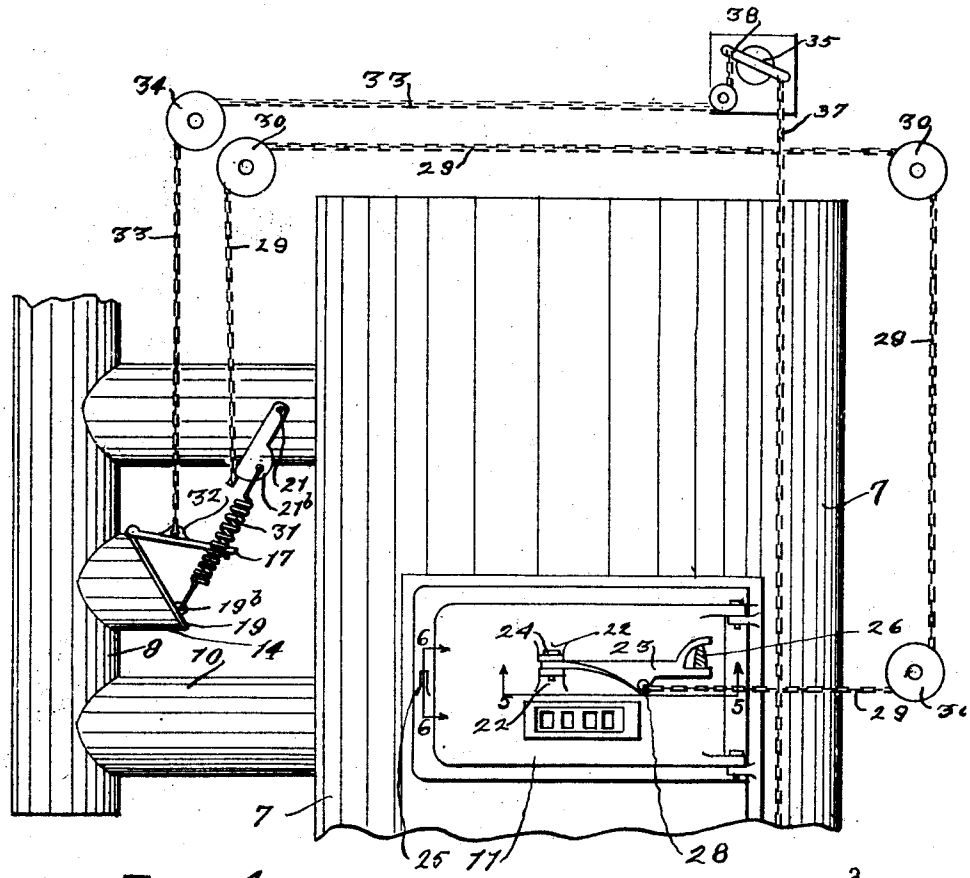


FIG 4

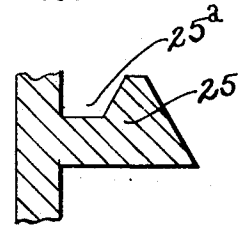


FIG 6

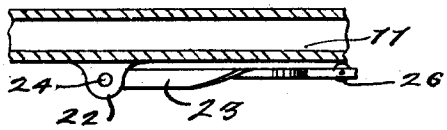


FIG 5

INVENTOR

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Patented Feb. 14, 1928. 1,658,971

UNITED STATES PATENT OFFICE.

LOUIS A. COOK, OF AKRON, OHIO, ASSIGNOR TO HIMSELF AND ORRON C. ROSS, OF AKRON, OHIO.

FURNACE.

Application filed February 26, 1925. Serial No. 11,737.

This invention relates to draft regulators for furnaces and to new and novel controlling means therefor.

Draft regulators have been constructed to operate by an opening or closing movement of the furnace door. These devices as ordinarily constructed are objectionable inasmuch as the fuel door must be opened or partly opened before the draft checks and dampers are operated and as a result smoke and gas escape each time the door is opened.

An object of this invention is to provide an automatic check and damper control which will be operatively connected to the latch on the fuel door whereby the latch must be operated and the pipe damper and check draft closed before the fuel door can be opened and to thereby provide convenient, efficient means for preventing the escape of smoke and gas into the furnace room.

An additional object is to provide new and improved draft regulating means which is operated by the latch on the furnace door whereby the door will be entirely closed before the check damper is opened and the flue damper is closed and to thereby provide means for preventing the escape of smoke and gas during the closing movement of the fuel door.

A further object is to provide a draft regulating device which is connected to the latch on the fuel door so that the draft check must be opened in order to secure the door in a closed position and to thereby prevent unintentional over-heating of the furnace.

A still further object is to provide a new and improved check damper whereby the same may be operated as above set forth without interfering with an additional controlling device.

The above objects are accomplished and additional ends are attained by the novel construction, combination and arrangement of parts hereinafter described and illustrated in the accompanying drawings, wherein I have shown a preferred form of the invention, it being understood that the invention is subject to various adaptations and that changes and modifications may be made or resort had to the substitutions which come within the scope of the appended claims.

In the drawings which form a part of this application like characters of reference are used to designate like parts as the same may appear in any of the several views and in which:—

Figure 1 is a front elevational view of a furnace equipped with an improved regulating device constructed in accordance with this invention.

Figure 2 is a front elevational view of the check damper.

Figure 3 is a perspective view of one of the check damper lids employed in carrying out this invention.

Figure 4 is a fragmentary view showing in front elevation the upper portion of a furnace equipped with a draft regulating device constructed in accordance with this invention.

Figure 5 is a sectional view of a portion of the furnace door taken as indicated by the lines 5—5 of Figure 4.

Figure 6 is a sectional view taken as indicated by the lines 6—6 of Figure 4.

Proceeding now to a detailed description of the invention with reference to the particular adaptation thereof disclosed in the drawings, the numeral 7 is used generally to denote a furnace and the numeral 8 denotes a smoke pipe adapted to lead to a chimney. The numeral 9 denotes a flue leading from the top of the fire pot to the smoke pipe 8 and the numeral 10 denotes the ordinary down draft flue which connects with the flue 9 at a point within the furnace casing and extends downwardly within the casing then outwardly and connects with the flue 8 at a point in spaced relation below the flue 9. The numeral 11 is used to denote the fuel door and the numeral 12 the ash door. The numeral 13 denotes an intake draft door which is hingedly mounted to control the draft opening in the ash door 12. The numeral 14 denotes a check draft pipe which is of ordinary construction and which is preferably mounted on the smoke pipe 8 at a point between the flues 9 and 10. The check draft pipe 14 provides an opening whereby air may be admitted to the smoke pipe 8 to check the draft through the furnace. The outer axial end of the pipe 14 is inclined and is provided on the upper end thereof with suitable ears 15 which are spaced apart to receive the lug 16 on the draft lid 17. The lugs 15 and the ears 16 are provided with alined bores through which is entered a suitable bolt or pin 18 to hingedly connect the lid 17 to the pipe 14.

The numeral 19 denotes a lid which is preferably composed of sheet metal or other suitable material of light weight. The lid 19 is provided at the upper end thereof with upwardly projecting ears 20 which are bent around the pin 18 to hingedly connect the lid 19 to the pipe 14. The lid 19 is preferably composed of cast iron or other heavy material and the lids 17 and 19 are mounted in superposed relation for turning movement on the same axis.

A damper is mounted on a pin 21 and is operatively positioned in the pipe 9 whereby the same when operated will close or partly close the flue 9 and direct the smoke and gas through the flue 10 into the smoke pipe 8. The furnace door is provided with outwardly projecting spaced parallel lugs 22 on which is mounted a latch 23. The latch 23 and the lugs 22 are provided with alined vertical bores in which is mounted a pin 24 to hingedly connect the latch 23 to the furnace for turning movement in a horizontal plane. The latch 23 is of sufficient length to project laterally past the forward edge of the door and be entered in the slot 25^a in the lug 25 on the door frame. The latch 23 may be provided at the outer end thereof with suitable handle 26. The lugs 22 are spaced apart and the bore in the latch 23 is of sufficient size to permit an upward and downward movement of the latch 23 whereby the same may be lifted to enter or remove the same from the slot 25^a in the lug 25. The latch 23 is preferably provided at a point intermediate its length with a downwardly projecting lug 27 in which is formed an eye 28. The numeral 29 denotes a chain or other flexible connecting member which is mounted in the eye 28 and which is operatively positioned over suitable sheaves 30 and is connected to the lever 21^a on the damper pin 21. The lever 21^a is provided with an enlarged portion 21^b to provide a weight which will normally move the damper on the pin 21 to an open position. The lid 19 is provided at a point adjacent the lower end thereof with a laterally projecting ear 19^a, having an upturned end 19^b to which is secured the lower end of the spring 31. The upper end of the spring 31 is connected to the lever 21^a. The coil spring 31 is of sufficient stiffness to operate the lid 19, but does not possess sufficient strength to operate the lid 17. The lid 17 is provided with a centrally positioned ear 32 to which is attached one end of a chain 33 which passes over suitable sheaves 34 with the other end thereof connected to one end of the lever 38 on the controlling device 35. The device 35 may be a thermostatic control or may be manually or otherwise operated. The chain 37 is connected to the other end of the lever 38 and the other end of the chain is connected to the arm 13^a on the intake draft door 13. The chains 33 and 37 are connected to the controlling device 35 so that the lid 32 will be opened when the draft damper 13 is closed and so that the door 13 will be open when the lid 32 is in a closed position. The chain 29 is arranged to close the damper on the pin 21 and open the draft door 19 when the latch 23 is in a closed position as shown in Figure 1 and is arranged to open the damper on the pin 21 and close the lid 19 when the latch 23 is swung outwardly in the position shown in Figure 4. While the chain 29 may be connected to the lever 23 to operate as desired, I prefer to arrange the same so that a 90° movement of the latch 23 will be sufficient to close the lid 19 and open the damper on the pin 21.

In use, with the furnace draft positioned as shown in Figure 1, the door is opened by grasping the handle 26 and disengaging the lever 23 from lug 25 and swinging the lever in a forwardly projecting position, whereupon the weight 21^a operates the damper on the pin 21 and causes a closing movement of the lid 19. The latch 23 is then used as a handle to open the fuel door 11, inasmuch as the damper on the pin 21 has been opened and the lid 19 is closed, the pressure within the furnace is relieved and the door can be opened without gas and smoke escaping therethrough. Likewise the door is swung to a closed position before the latch 23 has exerted a pull on the chain 29, so that the damper on the pin 21 is open and the check 14 is closed during a closing movement of the door 11. After the door is closed the latch 23 is swung into the notch 25^a on the lug 25, thus opening the check draft 14 and closing the damper on the pin 21.

Should the control device 35 be operated to open the door 13 and close the lid 17, the weight of the lid 17 is sufficient to stretch the spring 31 and close both lids 17 and 19 and an operation of the latch 23 will not interfere with the drafts being controlled by the device 35 but will open the damper on the pin 21 without movement of the lid 19.

While I prefer the construction shown in the drawings in which the member 17 is in the form of a lid, it will be seen that the main function of the lid 19 is to act as a weight to overcome the spring 31 and that the member 17 may be varied in form without departing from the spirit of the invention.

While I have shown and described my invention as applied to a heating furnace, it is to be understood that it can be applied to boilers or any form of heating device wherein it is necessary or desirable to regulate the drafts as herein set forth.

While I have shown a furnace having two smoke flues 9 and 10, it is obvious that the invention can be applied with equal advantage to furnaces having but one smoke flue.

Having thus illustrated my invention and described the same in detail, what I claim as new and desire to secure by Letters Patent is:—

1. In a furnace, in combination, a smoke pipe, a draft opening in said pipe, a lid for said opening, a fuel door, a catch on the door frame, a latch hingedly connected to said door at a point intermediate its length and arranged to swing in a horizontal plane, said latch operable to engage said catch to hold said door in a closed position, a flexible connecting member secured to said latch at a point in spaced relation to said hinge, said connecting member passing over sheaves with the other end thereof operatively connected to said lid.

2. In a furnace, a smoke pipe, a damper in said pipe, a fuel door, a catch on the door frame, a latch hingedly connected to said door at a point intermediate its length to swing in a horizontal plane, said latch operable to engage said catch to hold said door in a closed position, a flexible connecting member secured to said latch at a point in spaced relation to said hinge, the other end of said member connected to said damper whereby the same will be operated by a swinging movement of said latch.

3. In a furnace, in combination, a smoke pipe, a flue leading directly from the smoke outlet of said furnace, to said pipe, a secondary flue leading downwardly and outwardly from said outlet and connected to said pipe at a point below said first named flue, a damper in said first named flue, a weighted operating arm on said damper, a check opening in said pipe, a lid for said opening, a fuel door, a catch on the door frame, a latch hingedly connected to said door, at a point intermediate its length, to swing in a horizontal plane, said latch operable to engage said catch to hold the door in a closed position, a flexible connecting member secured to said latch at a point in spaced relation to said hinge, the other end of said member connected to said arm and means connecting said arm to said lid whereby an outward swinging movement of said latch will open said damper and close said lid.

4. In a furnace, in combination, a smoke flue, a normally open damper in said flue, a weighted operating arm on said damper, a check opening associated with said flue, a pair of superimposed lids hingedly connected to said flue, said lids being operable to close said opening, the upper lid being relatively heavier than the lower lid, a fuel door, a latch hingedly connected to said door to swing in a horizontal plane, a flexible connecting member secured to said latch at a point adjacent the free end thereof, the other end of said flexible member connected to said arm and means connecting said arm to said lower lid, said means including a coil spring and independent means to operate said upper lid.

5. In a furnace, a smoke pipe, having an opening, a lid operable to close said openings, said lid hinged adjacent one side of said opening and means connected to the furnace door for operating said lid, said means including a coil spring, a weight hingedly connected to said pipe for swinging movement to and from said lid, said weight being sufficient to overcome said spring and independent means to operate said weight.

6. In a furnace, a check draft comprising a pipe having an opening, and a lid for said opening, said lid hingedly connected to said pipe, means to operate said lid, a coil spring interposed in said operating means and additional means to close said lid, said means comprising a weight adapted to bear against said lid and overbalance said spring and independent means controlling the operation of said weight.

7. In a furnace, a pipe having a draft opening, superimposed lids hinged to said pipe and arranged to cover said opening, yieldable operating means for said lower lid, and independent means to operate the upper lid, the weight of the upper lid being sufficient to overcome said yieldable means.

8. In a furnace, a fuel door having a frame, a catch on said frame, a latch hingedly connected to said door, said latch adapted to engage said catch and hold the door in a closed position and a flexible member connected to said latch at a point adjacent the free end thereof, the other end of said member adapted to be attached to draft checking means associated with the smoke flue of said furnace.

In testimony whereof I have hereunto set my hand.

LOUIS A. COOK.