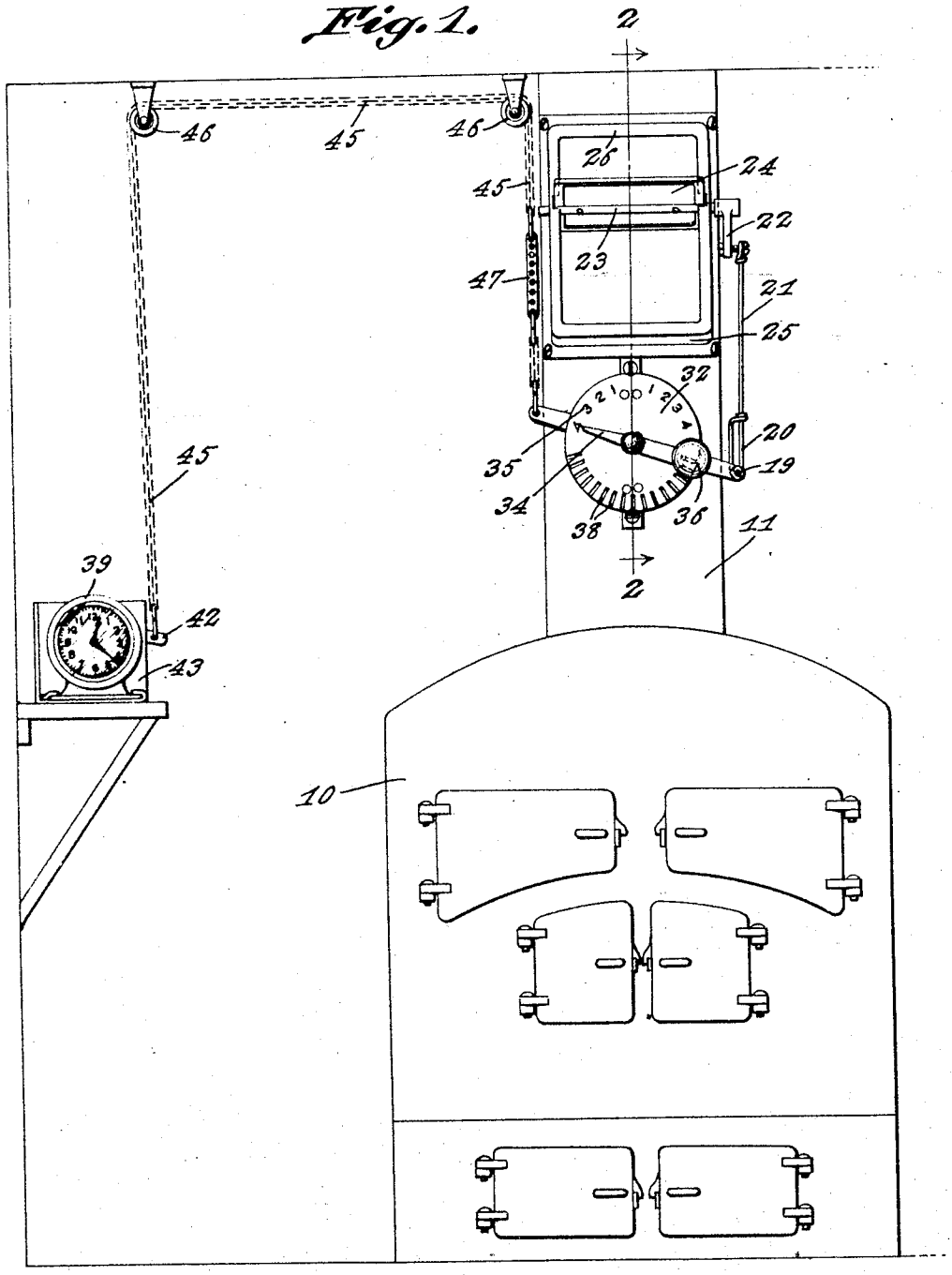
June 10, 1941. J. F. GILDEA 2,244,990

AUTOMATIC DRAFT REGULATOR

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Fig. 1.



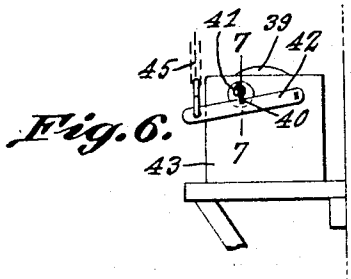


Fig. 6.

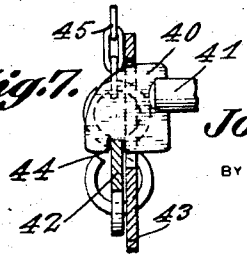


Fig. 7.

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Fig. 2.

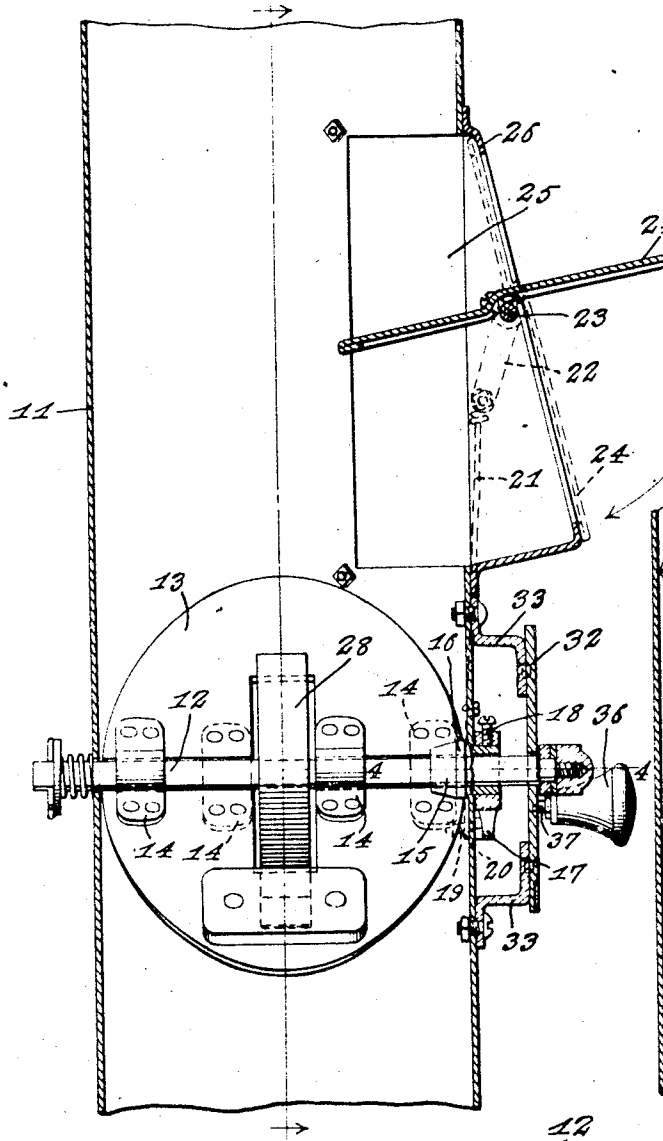


Fig. 3.

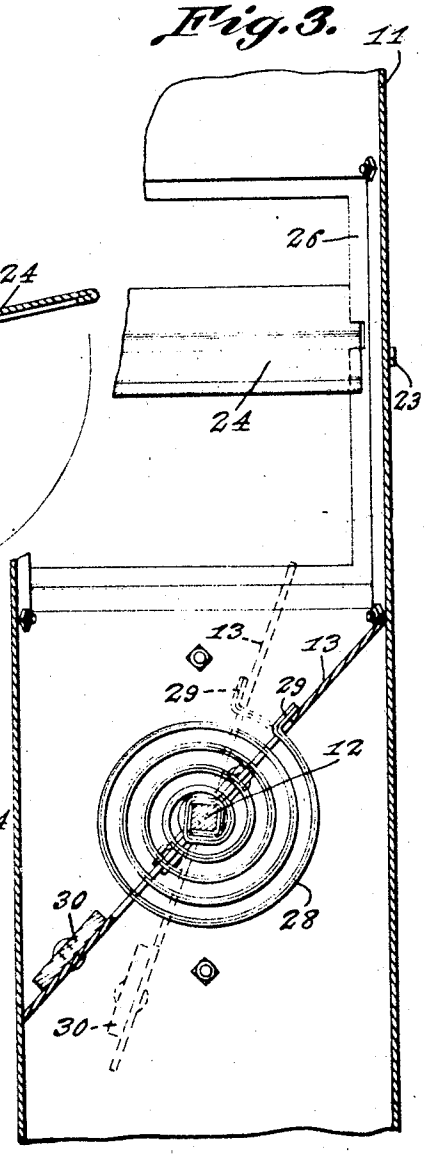


Fig. 4.

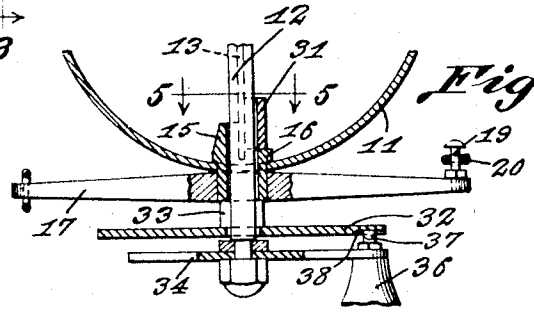
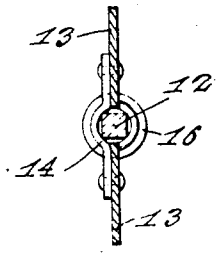


Fig. 5.



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UNITED STATES PATENT OFFICE

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AUTOMATIC DRAFT REGULATOR

John F. Gildea, Coaldale, Pa.

Application October 25, 1938, Serial No. 236,957

1 Claim. (Cl. 236—93)

This invention relates to automatic draft regulators and has for an object to provide apparatus which will maintain a fire at a predetermined rate of combustion and prevent overheating of the heater, furnace, stove, or the flue.

A further object is to provide apparatus which will reduce heat losses through the chimney, use less fuel and reduce chimney fire hazards.

A further object is to provide apparatus which will maintain the fire at a lower temperature through the night hours, for example, and will automatically increase draft for a higher temperature required through the day.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claim without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming part of this specification,

Figure 1 is a front elevation of automatic draft regulating apparatus, constructed in accordance with the invention, and shown applied to a coal burning furnace.

Figure 2 is a longitudinal sectional view taken on the line 2—2 of Figure 1 showing the thermostat control damper plate and check draft damper.

Figure 3 is a longitudinal sectional view taken on the line 3—3 of Figure 2 showing the thermostat in elevation.

Figure 4 is a detail cross sectional view taken on the line 4—4 of Figure 2 showing the dial and pointer for manually adjusting the dampers to operate through a predetermined heat range.

Figure 5 is a detail cross sectional view taken on the line 5—5 of Figure 4 looking in the direction of the arrows.

Figure 6 is a rear elevation of the alarm clock operated control for adjusting the dampers to increase the heat.

Figure 7 is an enlarged cross sectional view taken on the line 7—7 of Figure 6 showing the cam on the end of the alarm winding key.

Referring now to the drawings in which like characters of reference designate similar parts in the various views, 10 designates a conventional coal burning furnace and 11 the flue thereof. In carrying out the invention a shaft 12 of substantially rectangular cross section is disposed transversely in the flue and projects at the ends exteriorly of the flue. An elliptical damper plate 13 is rotatably mounted on the shaft and is composed of two semi-elliptical half sections secured together by straps 14 which pass loosely around the shaft and rotatably mount the damper plate on the shaft.

A bushing 15 is loosely mounted on the shaft near the front end thereof and projects through the flue 11 as best shown in Figures 2 and 3. The bushing is provided with a collar 16 which engages against the inner surface of the flue and one side of the bushing is cut away as shown best in Figure 5 to permit the adjacent strap 14 passing across the cutaway portion of the bushing to connect both half sections of the damper.

A lever 17 is fixed midway of its ends to the projecting end of the bushing through the medium of a set screw 18, best shown in Figure 2. The lever is provided at one end with a pin 19 which is received in the lower looped end 20 of a link 21 which is connected at the upper end to a crank 22 carried by the projecting end of the pivot shaft 23 of a check damper 24 which controls a draft opening in the flue above the damper plate 13. The draft opening is formed by a casing 25, the open front end of which is sloped downwardly and outwardly and is provided with a stop flange 26 against which the check damper 27 seats in fully closed position.

A thermo-metal coil 28, formed of a bi-metal spring, is fixed at one end to the shaft 12, as best shown in Figure 3, and the free end of the coil is bent at a right angle to provide a hook 29 which overlaps the upper face of the damper plate 13, on one side of the shaft 12. A weight 30 is fixed to the damper plate on the opposite side of the shaft 12 and constantly tends to hold the damper plate in fully open position.

It will be observed that the strap 14, shown in Figure 3, clamps both semi-elliptical sections of the damper plate against the uncut away portion 31 of the bushing so that the damper plate 13, bushing 15, lever 17, link 21 and check damper 24 move as a unit under impulse of the thermo-metal coil 28, or weight 30, while the shaft 12 remains stationary. The purpose of the shaft 12 is to change the position of the thermo-metal coil 28 when the apparatus is not running or even when running so that the damper plate 13 will be normally held at a predetermined adjusted open position, as will now be explained.

A disc 32 is secured to the flue through the medium of Z-shaped brackets 33, best shown in Figure 2. The shaft 12 extends through the disc and outside of the disc is equipped with a pointer 34, one end of which is movable over a scale 35

on the disc, best shown in Figure 1. The opposite end of the lever is equipped with a grip 36 and on the opposite side thereof from the grip is equipped with a projection 37 which is interchangeably received in grooves 38 formed in the disc diametrically opposite the scale 35.

By pulling outward on the grip 36 the pointer and shaft are moved endwise against the tension of a spring 8 on the other end of the shaft to disengage the projection from one of the notches whereupon rotation of the pointer to indicate any desired numeral on the scale may be effected. Upon release of the pointer the spring 8 forces the projection 37 to enter one of the grooves diametrically opposite the selected numeral and yieldably latch the pointer against further movement. During rotation of the pointer the shaft 12 to which the pointer is fixed, is rotated to bodily rotate and change the position of the thermo-metal coil 26, so that the free end thereof may hold the damper plate 13 in any desired adjusted open position. When the shaft is rotated to dispose the free end of the coil near the flue, expansion of the coil under influence of heat in the flue will close the damper plate quicker than where the free end of the coil is disposed near the axis of the flue, and vice versa.

The damper plate and the check damper are connected to operate oppositely to each other, that is, when the damper plate opens the check damper closes and vice versa. Thus when the check damper opens to draw air from the room the damper plate will close to cut off draft to the flue through the fire box. Thus the apparatus reduces heat losses through the chimney and reduces chimney fire hazards. At the same time the thermo-metal coil will respond to fluctuations in flue temperature to control the damper plate and the check damper to maintain a predetermined rate of combustion and prevent overheating of the furnace.

It is desirable that the apparatus be automatically adjusted to maintain the fire at a low temperature through the night hours, for example, and to automatically increase the draft for a higher temperature required during the day. For this purpose a clock 39, of the alarm type, is provided with a flat cam head 40 on the alarm spring winding key 41, shown in Figure 7. A lever 42, shown best in Figure 6, is pivoted in one end on a bracket 43 disposed in rear of the clock and is received intermediate its ends, on the top edge, in a notch 44 formed in the bottom edge of the cam head 40 when the head is disposed in substantially vertical position. The free end of the lever is connected to a chain 45 or other flexible connector, which is trained over guide pulleys 46 secured to a ceiling and connected to the free end of the beforementioned lever 17 which is connected to the damper plate 13. A perforated link 47 is interposed in the chain so that the chain may be interchangeably hooked into the perforations to lengthen or shorten the chain.

When the cam head 40 is disposed in the notch 44 of the lever 42 the chain will hold the lever 17 in position to maintain a predetermined draft through the damper plate 13 and fire box, during the night hours. At a predetermined time in the morning the cam head 40 will be turned to horizontal position and permit the lever 42 to swing upward and slack the chain 45 so that the lever 17 is swung downward by the counterbalancing weight 30 of the damper plate. In this position of the parts the check damper will be closed while the damper plate will be open to permit great increased draft through the fire box thereby promoting a quick higher rate of combustion.

Since the operation of the device has been described as the description of the parts progressed it is thought that the invention will be fully understood without further explanation.

What is claimed is:

In a draft regulator the combination with a flue, of an endwise slidable shaft extending transversely of the flue and projecting at both ends exteriorly of the flue, a damper on the shaft having bearings slidably receiving the shaft, said damper having a central portion cut away on opposite sides of the shaft, a bi-metal thermostat spring coil in said cutaway portion of the damper connected at one end to the shaft and slidably overlapping the damper at the other end, a stationary dial exposed exteriorly of the flue, a lever fixed to one projecting end of the shaft and movable over the dial, a projection on the lever, notches on the dial interchangeably receiving the projection, a helical spring on the other projecting end of the shaft bearing against the flue and yieldably holding the projection in one of said notches, said shaft being adapted to be pulled endwise by the lever against the tension of said helical spring to disengage said projection from one of the notches and engage the projection another notch to adjust the damper to a pre-determined open position, a bushing fixed to the damper and rotatably mounted in the flue, said bushing loosely mounting the projecting end of said shaft adjacent to said lever, a second lever fixed to the bushing, and a time controlled means connected to the last-named lever for moving the damper independently of the thermostat coil.

JOHN F. GILDEA.