Aug. 6, 1935. C. A. LATIMER 2,010,305

THERMOSTATIC FURNACE REGULATOR

Filed Oct. 4, 1933 3 Sheets-Sheet 1

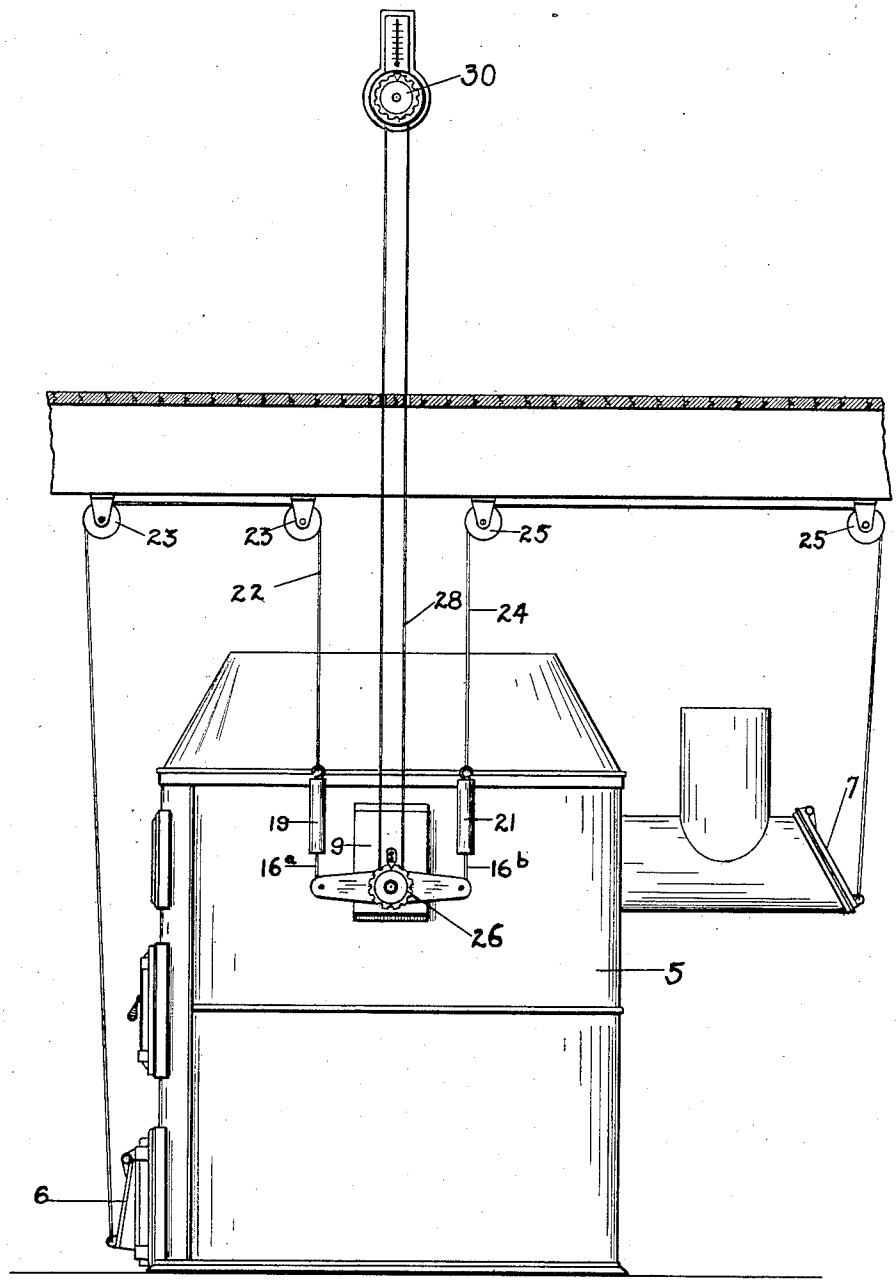


FIG - 1 -

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THERMOSTATIC FURNACE REGULATOR

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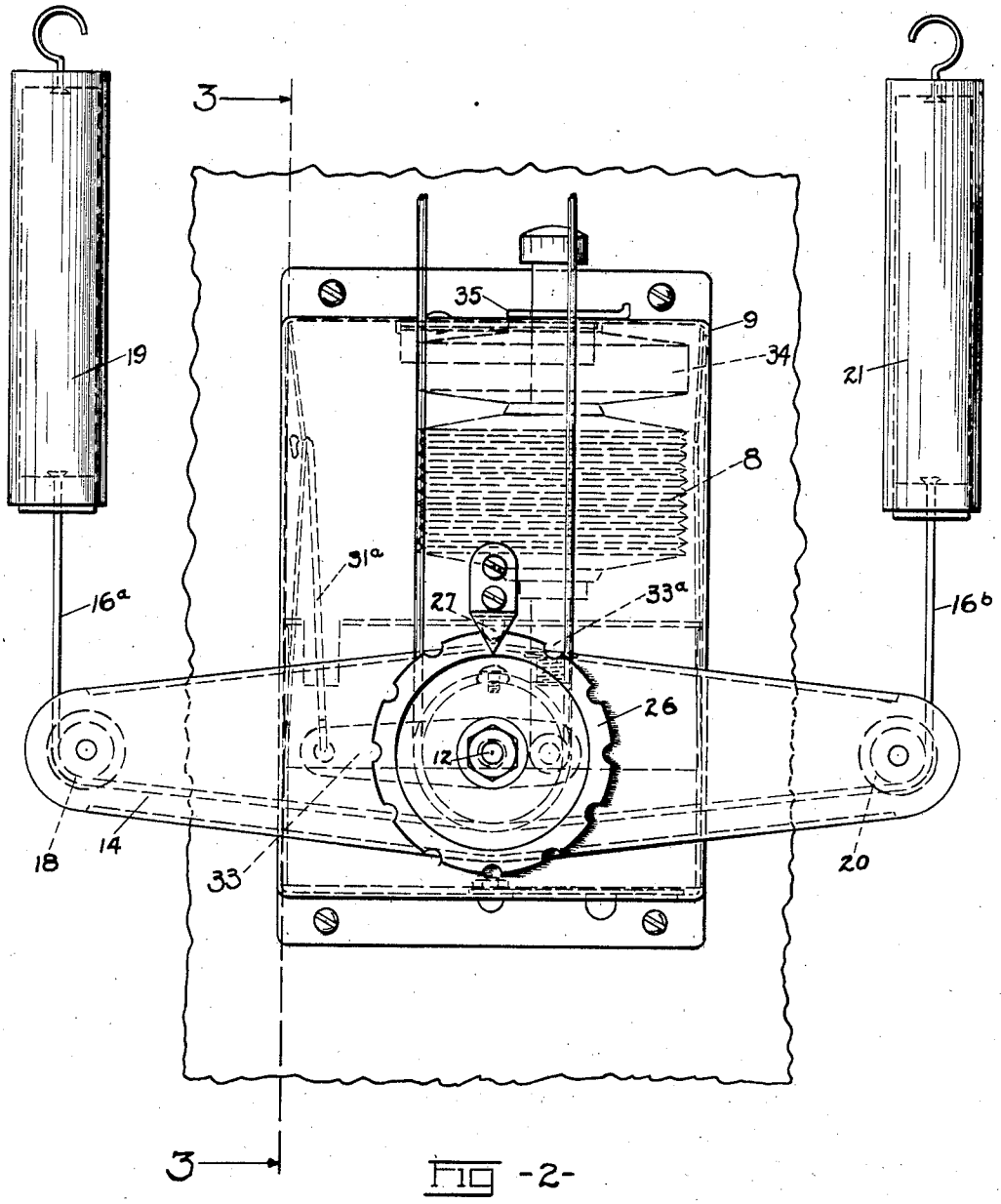


Fig -2-

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THERMOSTATIC FURNACE REGULATOR

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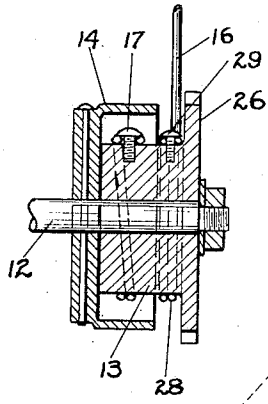


FIG -4-

FIG -3-

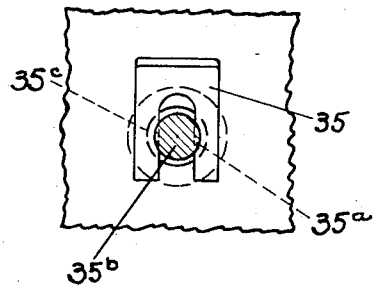


FIG -5-

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UNITED STATES PATENT OFFICE

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THERMOSTATIC FURNACE REGULATOR

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Application October 4, 1933, Serial No. 692,093

7 Claims. (Cl. 236—16)

This invention relates to a thermostatic furnace regulator which automatically controls the position of the draft damper and the check damper in accordance with the temperature in the region of the thermostatic unit, which is preferably located within the hot air jacket of the furnace.

Important objects of the invention are to provide an improved regulating unit which is adapted to all service conditions and in connection therewith to provide improved means for adjusting the same for various heat requirements. These and other features of the invention will be more particularly explained in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of a furnace equipped with the invention;

Figure 2 is an enlarged view of the controlling unit;

Figure 3 is a section taken substantially on the line 3—3 of Figure 2;

Figure 4 is a detailed sectional view of the control sheave; and

Figure 5 is a transverse section on the line 5—5 of Figure 3.

As illustrated in the drawings, the invention is associated with a hot air furnace 5 having a draft damper 6 and a check damper 7. The control unit comprises a thermostatic bellows 8 adapted to be filled with liquid which vaporizes at a predetermined temperature and preferably located within a compartment 9 which is in communication with the hot air chamber of the furnace. A drum or sheave 13 is mounted for rotation on the shaft 12 and is partly or wholly housed within a hollow cross head 14. Cable 16 is wrapped about the sheave 13 and is secured against creeping by a screw 17 or other suitable means. One end of this cable, as indicated at 16a, passes about a sheave 18 in one end of the cross head 14 and is secured to a counterweight 19. The other end of the cable, as indicated at 16b, passes about a sheave 20 in the other end of the cross head 14 and is secured to a counterweight 21. The counterweight 19 is suspended from a cable 22 which passes over sheaves 23 and is connected to the draft damper 6. The counterweight 21 is suspended from a cable 24 which passes over sheaves 25 and is connected to the check damper 7. Each of the counterweights 19 and 21 is preferably provided with a removable plug so that weight may be added sufficient to nearly balance the respective damper.

When sufficient heat has been developed to vaporize or expand the liquid in the bellows 8, it moves downwardly to and carries with it a shaft extension 33a on the bottom of the bellows, the lower end of which is secured to one end of an arm 33. The arm 33 is secured intermediate its ends to the shaft 12, and movement imparted to the arm 33 is transmitted correspondingly to the arm 14. Such downward movement of the bellows operates through the connections described to open the check damper 7 and close the draft damper 6. Upon condensation of the vapor in the bellows 8, causing the bellows to contract or move upwardly, it is apparent that the above described movement is reversed thereby to close the damper 7 and open the damper 6.

In the daytime it is desirable to maintain a higher temperature than at night. Also, in cold weather, more heat is required to maintain a livable temperature in the building than in mild weather. For this reason, provision is made for adjusting the relation between the position of the sheave 13 and the position of the cross head 14. This is done by adjusting the sheave 13 circumferentially on the shaft 12. For this purpose a disc 26 is integrally or otherwise secured to the sheave 13 and is provided with peripheral notches adapted to be selectively engaged by a latch 27. By adjusting the sheave 13 and disc 26 in a clockwise direction, as represented in Figures 1 and 2, the check damper 7 is raised and the draft damper 6 is allowed to move toward closed position without any change in the position of the cross head 14. On the other hand, if the sheave 13 and disc 26 are adjusted in an anti-clockwise direction, the draft damper 6 may be opened and the check damper 7 allowed to close without any change in the position of the cross head 14. Thus, the control device may be adjusted so that a higher or lower temperature, or in other words, a greater or less movement of the cross head 14, will shut off the draft.

Usually, when it is time for the sheave 13 and disc 26 to be adjusted, it will be expedient for the attendant to go to the basement to attend to the firing of the furnace. In case, however, it is not necessary to attend to the firing of the furnace, provision is made for making the adjustment from the living room above the furnace. For this purpose a cable 28 is wrapped about the sheave 13 and secured thereto by a screw 29 or the like. This cable 28 passes up through the floor and about a similar sheave, as indicated at 30 in Figure 1. Adjustment of the sheave 30 will effect a corresponding adjustment of the sheave 13.

In order that the temperature of the bellows 8 may vary directly with the temperature within

the hot air jacket of the furnace, a bonnet or deflector 31 is hingedly mounted on the upper end of the case 9. The deflector 31 is connected by a link 31a to the opposite end of the cross arm 33 in such manner that upon expansion of the bellows 8 the link 31a is moved upwardly forcing the lower portion of the deflector in toward the bellows, thereby shielding the bellows from additional heat. It will further be seen that upon contraction of the bellows the deflector 31 is swung outwardly, Figure 3 showing the position of the deflector half way of its full movement.

In order to insure a wider range of adjustment, an opening 32 may be provided in the bottom of the casing 9 and controlled by an adjustable flap or damper 33c. By increasing the effective area of the opening 32, the effect of the rising temperature within the hot air chamber upon the temperature of the bellows 8 will be retarded, with the result that a greater amount of heat is supplied to the living rooms before the draft is closed.

As a safety device, a weight 34 is mounted on the top of the bellows 8 and is held in place against the top of the case 9 by a fusible bracket 35, which is slotted to engage an annular groove 35a on a stud 35b, which is fixed to the upper end of the bellows and extends upwardly through the weight 34 and an aperture 35c in the top of the case 9. Upon fusion of the bracket 35, the weight 34 drops, and through the bellows 8 swings the arm 33 in a clockwise direction (Figure 1) to open the damper 7 and close the damper 6. Thus danger of damaging the building by fire is obviated.

While I have shown and described in considerable detail the preferred form of the invention, it is apparent that the same may be considerably modified without departing from the scope of the appended claims.

What I claim is:

1. In a furnace regulator, a thermostat, a shaft rotatable by the thermostat in response to a predetermined variation in temperature, a cross head on said shaft provided with an outer sheave on each arm thereof, draft control means including an inner sheave, a cable anchored to said inner sheave and passing about said outer sheaves, and means for adjusting the inner sheave circumferentially relative to the shaft.

2. In a furnace regulator, a thermostat, a shaft rotatable by the thermostat in response to a predetermined variation in temperature, means for adjusting the proportion of the furnace generated heat which reaches the thermostat, a cross head on said shaft provided with a sheave on each arm thereof, draft control means including a cable anchored to the shaft and passing about said sheaves, and means for adjusting the cross head circumferentially of the shaft.

3. In a regulator for a furnace having a check and a draft damper, a thermostat connected to operate said dampers in response to temperature variations, a weight adjacent said thermostat and adapted when released to actuate said thermostat to open said check damper and close said draft damper, and a mounting for said weight adapted to release same at a predetermined temperature.

4. In a regulator for a furnace having a check and a draft damper, metallic bellows adapted to expand under the influence of heat and connected to operate said dampers, a weight at the upper end of said bellows adapted when released to cause said bellows to open said check damper and close said draft damper, and a fusible mounting for said weight for releasing same at a predetermined temperature.

5. In a regulator for a furnace having check and draft dampers, a thermostat, a shaft rotatable by said thermostat in response to variations in temperature, a cross head on said shaft provided with a sheave on each end thereof, an inner sheave rotatably carried by said shaft, cables connected to said inner sheave and said check and draft dampers and trained over said outer sheaves, and means to rotate said inner sheave whereby to initially adjust said check and draft dampers.

6. In a regulator for a furnace having check and draft dampers, a thermostat, a shaft operable by said thermostat, a cross head carried by said shaft, cables connected to said check and draft dampers and having a common central control whereby the initial position of said check and draft dampers is adjusted, and means carried by said cross head for varying the effective length of said cables to open or close said dampers.

7. In a regulator for a furnace having check and draft dampers, a thermostat, a shaft operable by said thermostat, a cross head carried by said shaft, anchoring means rotatably carried by said shaft, cables connected to said anchoring means and extending to said check and draft dampers, means to initially set said anchoring means relative to said shaft whereby to adjust the initial position of said check and draft dampers, and means, carried by said cross head, to vary the effective length of said cables to open or close said dampers in accordance with the expansion of said thermostat.

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