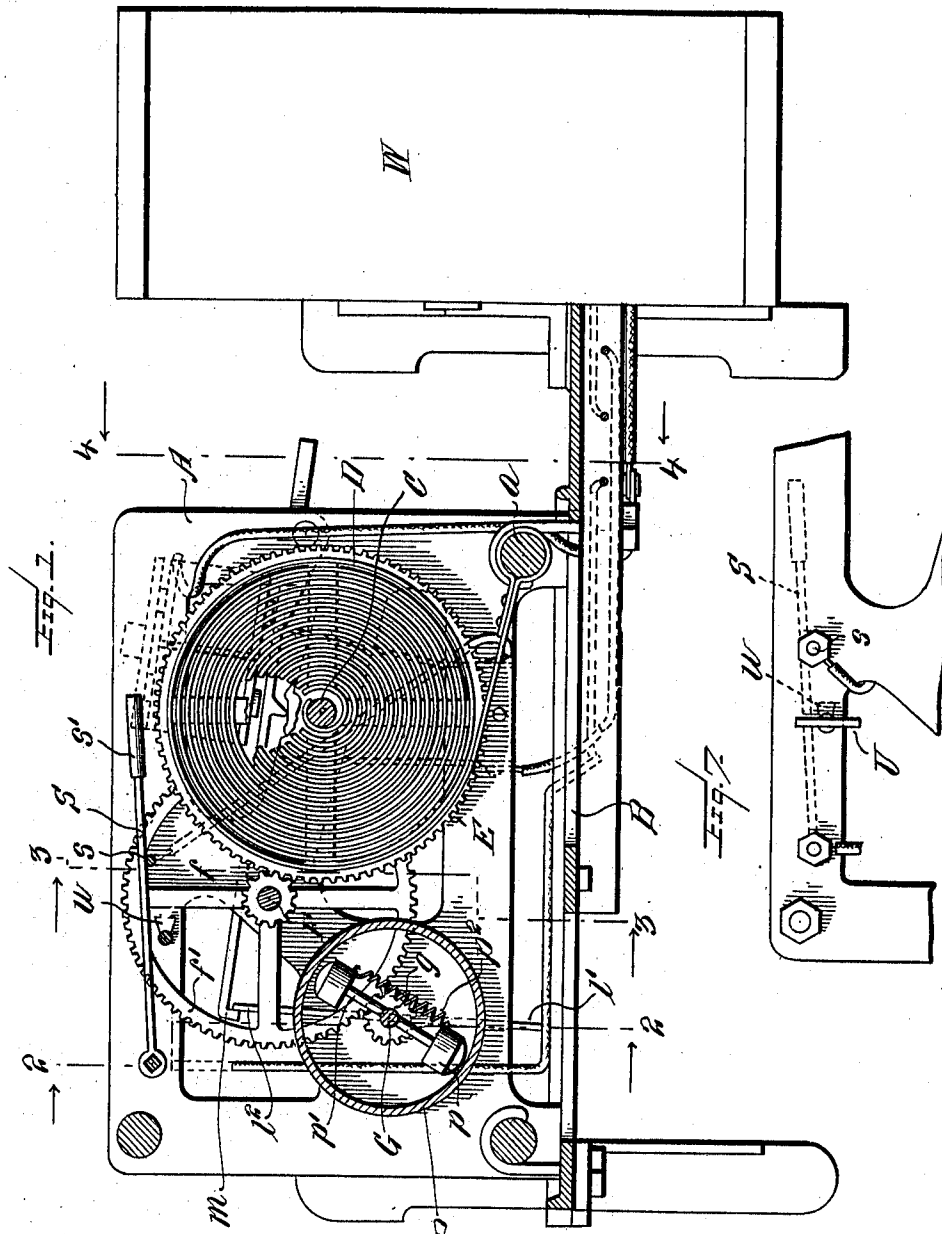


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 THERMOSTATIC DAMPER CONTROLLING APPARATUS.
 APPLICATION FILED MAR. 27, 1908. RENEWED JUNE 23, 1910.

982,331.

Patented Jan. 24, 1911.

3 SHEETS—SHEET 1.



WITNESSES:

H. F. Roy & Co.
J. K. Moore

INVENTOR

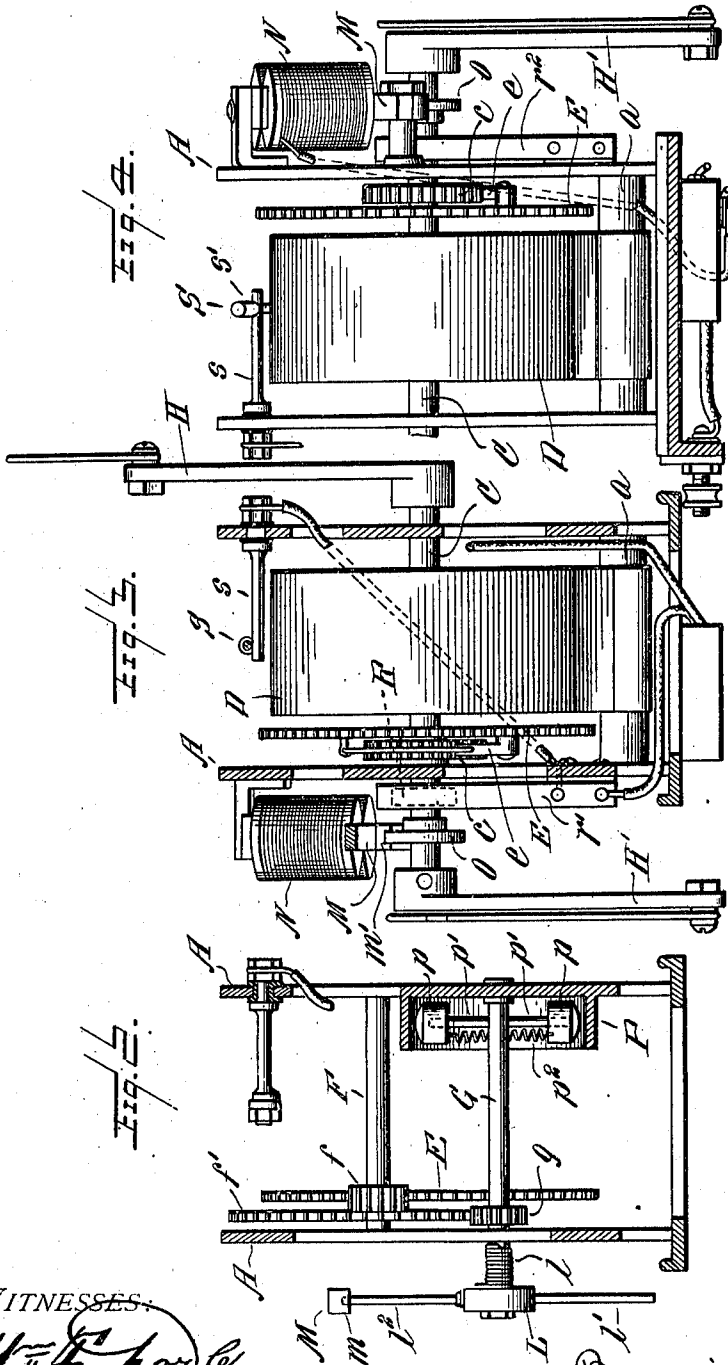
Benjamin C. Wickes
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 Attorneys

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UNITED STATES PATENT OFFICE.

BENJAMIN C. WICKES, OF AUBURN, NEW YORK.

THERMOSTATIC DAMPER-CONTROLLING APPARATUS.

982,331.

Specification of Letters Patent.

Patented Jan. 24, 1911.

Application filed March 27, 1908, Serial No. 423,747. Renewed June 23, 1910. Serial No. 568,490.

To all whom it may concern:

Be it known that I, BENJAMIN C. WICKES, citizen of the United States, residing at Auburn, in the county of Cayuga and State of New York, have invented certain new and useful Improvements in Thermostatic Damper-Controlling Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists in the novel features hereinafter described reference being had to the accompanying drawings which illustrate one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following description and claim.

The invention relates to automatic damper regulating apparatus in which a spring motor is employed for moving the dampers into "draft open" and "draft closed" positions, said motor being controlled by a thermostatic device located in an apartment to be heated.

The object of the present invention is to provide means for insuring the stopping of the apparatus with the dampers in "draft closed" position, when or a little before the spring is unwound, so that in case of the stopping of the apparatus through the failure of an attendant to rewind the spring of the motor, the dampers shall always be left finally in a position of safety, thus preventing the possibility of injury to the furnace, or an explosion which might otherwise occur.

In the accompanying drawings, Figure 1 represents a vertical sectional view of a spring motor for actuating the dampers, a portion of the spring being broken away to show parts located in rear thereof. Fig. 2 is a vertical sectional view of the motor on line 2—2 of Fig. 1, looking in the direction of the arrows. Fig. 3 is a similar view on line 3—3 of Fig. 1 and Fig. 4 a similar view on line 4—4 of Fig. 1. Fig. 5 is a rear elevation of the motor, with battery case detached. Fig. 6 is a diagrammatic view showing the electric circuits between the thermostat and the motor. Fig. 7 is a detail of part of the mechanism.

In the drawings A, A represent the front and rear plates of the motor frame, secured

to a suitable base B, and carrying the working parts.

C represents the main shaft, mounted in the plates A, A and provided with the motor spring D, one end of which is secured to the shaft, and the other end to the cross bar *a* of the frame. The shaft C is provided with the usual ratchet wheel *c* engaging a pawl *e* carried by the driving gear wheel E which is connected by a speed multiplying train of gearing, (comprising in this instance shaft F carrying pinion *f* and gear *f'* rigidly mounted thereon, said pinion meshing with gear E) with a shaft G, provided with a pinion *g*, meshing with gear *f'*. The main shaft C (in this instance) is provided with actuating devices for the dampers comprising oppositely disposed crank arms H H', one of which (H) is connected with the main draft damper by flexible connections not shown, so as to open the same when in one position and close it when in a position directly opposite, and the other arm H', is similarly connected to the check draft damper, and arranged to open the latter when the draft damper is closed and vice versa, in a well known manner.

Detent mechanism is provided for arresting the damper actuating arms H, H' in two opposite positions with respect to their axis of rotation. This detent mechanism includes a collar L secured to the shaft G by a spring connection *l*, to avoid shock, and provided with oppositely disposed radial arms *l'*, *l''*, and a pivoted lever M, provided adjacent to one end with a projection or detent *m* constructed to engage said arms to arrest the motor, and stop the damper actuating mechanism in "open draft" or "closed draft" positions. The lever M is tripped by an electromagnet N, secured to the motor frame, to release the arm *l'* or *l''* with which it is engaged, and said trip arm is held up to permit a half revolution of shaft G, by a disk O mounted on shaft C, and provided with opposite notches or recesses *o* *o* between which are concentric portions *o'* *o'* for engaging a projection *m'* on the lever M as clearly shown in Fig. 5. When the circuit is made through the magnet N as hereinafter explained, the lever is raised thus lifting the projection *m'* out of one of the notches *o*, and freeing the arm *l'* or *l''* from the detent *m*. The revolution of the shaft C carries

one of the concentric portions o' of the disk O beneath the projection m' and holds the detent lever M up until the projection m' can drop into the opposite notch o , when the lever falls, and the detent engages one of the arms l' , l^2 and stops the motor after permitting a half revolution of the shaft C carrying the damper actuating arms H, H'. The shaft G is provided with a suitable retarding device, which in this instance consists of a pair of centrifugal blocks p , p loosely mounted on arms p' , p' and adapted to engage a stationary friction ring P, said blocks being held in retracted position by a spring p^2 . The shaft C is also provided with a contact arm R which engages alternately spring contacts r' , r^2 secured to an insulating block r , which is supported by the motor frame.

T represents the thermostatic controller (see Fig. 6) of which t is the thermostatic element, and t' , t^2 are the contacts cooperating therewith. Two electric circuits lead from the thermostat to the magnet N as shown in the diagrammatic view, Fig. 6. The first circuit is from contact t' by wire 1, to the spring contact r' thence by contact R (when in engagement therewith) thence through the frame of the motor (here represented by wire 2) to magnet N, thence by common return wire 3 to battery W, and common return wire 4 to the thermostatic element t . The other circuit is from contact t^2 of the thermostat by wire 5 to a switch arm or lever S which is preferably a spring arm, and is normally in contact with the contact stud s , secured to but insulated from the motor frame, thence by wire 6 to spring contact r^2 , thence by way of contact arm R (when in contact therewith) to the magnet N, returning through common return wires 3 and 4 and the battery W to the thermostatic element t . The free end of switch S is so arranged as to be in the path of the outer coil of spring D when the latter expands, the expansion of the spring thereby raising the switch arm S from the contact s , as indicated in dotted lines, and breaking circuit No. 2 passing therethrough, as clearly shown in the drawing, Fig. 6. The spring engaging portion of switch arm S is preferably provided with a sleeve of insulating material as indicated in the drawing at s' . The parts herein described and shown are so arranged that the circuit through switch S is the one which moves the damper actuating arms into "open draft" position, while the circuit through contacts t' and r' moves the arms into the "closed draft" position.

In the operation of the device, the expansion of motor spring D will cause its outer coil to engage the switch S, and open circuit No. 2, at that point just before the spring has unwound to the point where it

will no longer have the power to properly operate the damper actuating devices. If at the time the switch S is operated by the spring the parts are in the position shown in Fig. 6, the contact arm R being in engagement with spring contact r^2 , the dampers will be in "closed draft" position, and no conditions dangerous to life or property can arise. In such case the thermostat is powerless to further operate the motor, as the circuit No. 1 is open at the contact r' and circuit No. 2 is open at switch S. In case, however, the expansion of spring D should open the switch S at a time when the dampers are in "open draft" position, the contact arm R will in such case be in engagement with the spring contact r' and circuit No. 1 may be closed by the thermostat. In such case dangerous conditions both to life and property might arise were the motor to be thrown out of operation, but circuit No. 1 being closed at contacts R, r' , the increase of temperature caused by the draft being open, will cause the thermostat to make contact at t' , thus closing circuit No. 1, and causing the motor to operate to move the dampers to "closed draft" or safe position. At the same time the contact arm R moves from contact r' to contact r^2 and circuit No. 2 being broken at the switch S, no further operation of the motor can occur, as circuit No. 1 is broken at r' . In other words should the attendant neglect to rewind the spring D of the motor, the unwinding of the spring will open circuit No. 2 by means of switch S. If the dampers are in "closed draft" or safe position no further operation of the dampers can occur, but if they are in "open draft" or danger position, one more operation of the motor can occur under the control of the thermostat which will move the dampers to the "closed draft" or safe position. Hence under any circumstances the last operation of the device will necessarily leave the dampers in the "closed draft" or safe position in which no dangerous condition can occur.

In some instances, it is desirable to operate the switch S by hand, for example when the dampers are opened by the thermostat, and the attendant desires to close them to rake the fire or for other purposes. I, therefore, provide the button U, shown in detail in Fig. 7, pivotally mounted in the main frame and having an arm u (of insulating material, or having an insulating switch engaging portion) which may be turned on its pivot so as to raise the switch arm S and break the circuit temporarily when desired. What I claim and desire to secure by Letters Patent is:—

In a damper regulating mechanism, the combination with damper actuating mechanism, a spring motor for operating the same, a thermostatic controlling device for

said motor and actuating devices, electric connections between the thermostatic controlling device, and said motor, including separate circuits for causing the movements
5 of the dampers into open draft and closed draft positions and a safety cut-out switch in the circuit for causing the dampers to be moved into open draft position, having a part in position to be operatively engaged

by said spring when the latter is unwound 10 for operating said switch by the unwinding of the spring, substantially as described.

In testimony whereof I affix my signature, in the presence of two witnesses.

BENJAMIN C. WICKES.

Witnesses:

P. J. MURPHY,
C. D. FOWLER.