This invention relates to time-controlled draft-regulating mechanisms of the type shown and described in my application for Patent No. 696,222, filed May 9, 1912, and the primary object of the present invention is to provide a simplified apparatus of great efficiency and practicability in use, by means of which one or more draft regulating devices such as the doors or dampers of a furnace or stove, may be operated at a predetermined period, principally for the purpose of re-energizing a fire which has been dormant during the night.

By the use of the present invention any one of the doors or dampers of a furnace or stove can be separately or collectively actuated by attachment with one and the same operating element without any change except the adjustment of the connections provided to transmit the movement of the said element to the said doors or dampers.

In the accompanying drawings in the various views of which like parts are similarly designated, Figure 1, represents a perspective view of a furnace with my attachment in its operative position to actuate the fire and draft doors and one of the dampers of the furnace. Figs. 2 and 3, elevations of the operating element of the invention in the two positions it occupies before and after it has performed its function of actuating the doors or dampers with which it is connected. Fig. 4, a plan view of the parts shown in Fig. 2. Figs. 5 and 6, views similar to that shown in Fig. 1, but drawn to a reduced scale, showing two different arrangements of the connections between the operating element and the dampers of the smoke flue and draft door of the furnace. Fig. 7, a view similar to Fig. 1, drawn to a still further reduced scale showing a modified method of operating the fire door of the furnace, and, Fig. 8, an elevation of a modified form of the operating element of my invention.

Referring to the drawings in detail, the operating element of the invention consists in its preferred form as is best shown in Figs. 2 and 3, of an angular supporting frame 2 which is adapted to be rigidly attached to the wall of a furnace or any other suitable upright support. The frame 2 is composed of an upright member 3 and a transverse member 4 which is rigidly secured at the upper end thereof. The last mentioned member has at one of its ends, two forwardly projecting parallel horns 5 for the attachment of an alarm clock 6 which to this end has been provided with loops 7 capable of receiving the horns. The clock is of ordinary construction except that the end of the winding stem of its alarm mechanism is provided with a cross-blade 8 which after the said mechanism has been wound, serves as a temporary stop for the operating lever 9 which is fulcrummed at the opposite end of the member 4, as at 10. A coiled spring 12 connects the arm of the lever opposite to that end which in practice is engaged by the blade 8, with the lower end of the member of the supporting frame 2, and the connection between the latter and the end of the spring is preferably accomplished by means of a short chain 13 which permits of varying the tension of the spring by attaching the hook-shaped end thereof to one or another of its links. The points 14 and 15 at which the opposite ends of the spring are attached to the support and to the lever, are positioned with relation to the fulcrum of the latter so that when the mechanism is set for operation with the end of the lever underneath the blade of the clock mechanism, the said points will lie in a plane close proximity to the fulcrum of the lever, with the result that when the parts are thus adjusted, the spring will exert the minimum of pressure on the clock mechanism.

It will be observed that when the lever is subsequently released, the pull exerted by the spring will increase as the lever reaches its perpendicular position which is determined by its engagement with a stop 16 on the supporting frame 2.

The lever 9 is provided at its opposite ends with two series of apertures 17 and 18 for the attachment of connections hereinafter to be described, at different distances from its fulcrum, and it has at the extreme end of its free arm, another aperture 19 for the attachment of the means provided to operate the fire door of the furnace or stove to which the apparatus is applied. In the form shown in Fig. 8, a second lever 20 is provided which, as in the
construction shown in the prior application for patent above mentioned, serves to release the draft door of a furnace or stove by engagement with its latch. A link 21 connects opposite arms of the two levers and extends when the device is set for action, in a position with relation to the fulcrum of the primary lever 9 similar to that of the spring 12. The lower lever is composed of two adjustably connected members which make it possible to lengthen or shorten the same in accordance with the proportions of the furnace to which the apparatus is applied, and a spring 22 which serves to move the connected levers about their fulcrums is attached at its ends to a ring on the supporting frame opposite to that at which it connects with the link. The operating element is preferably attached to the wall of the furnace or stove as shown in the drawings, but I wish it understood that it may be secured to the wall of the room in which the furnace is located, or to an independent support without in any way changing its method of operation or lessening its efficiency.

In the construction shown in Fig. 1, a spring 23 attached at one end to the wall of the furnace 24, is provided to close the fire door 25 when its opposite extremity is attached to the knob or handle of the same, and a prop 26 is by means of a chain 27, connected in the aperture 19 of the lever 9 to maintain the said door in a partially open position against the action of the spring, when inserted between the edge of the door and the frame in which the latter is hung. The prop has in one of its edges, a series of notches to vary the angle at which the door is held thereby, this construction being similar to that described in the co-pending application. For clearness of illustration, all the flexible connections employed in my invention have been shown in dash-dot lines, it being understood that while the said connections are preferably composed of chains, wires or ropes may be used with equal effect. A chain 28 connected by means of an open link 29 in one of the apertures of the series 18 formed in the arm of the lever opposite to that engaged by the clock mechanism, is run over a pair of sheaves 30 and 31 which are mounted on the ceiling or other overhead support of the room in which the furnace is installed, and its opposite end is attached to the handle of the draft door 32 which is hinged at 33. One of the sheaves 31 is placed at a point rearward of the perpendicular passing through the axis about which the furnace door has its movement, and forward with respect to the perpendicular passing through the point at which the chain 28 is attached to the door, so that when by action of the spring-impelled lever 9, a longitudinal movement is imparted to the chain, it will first of all lift the door to disengage its latch from the seat it normally occupies and subsequently move the door about its hinges to a wide open position. A second chain 34 is permanently attached to the opposite arm of the lever as at 35 in adjacency to the fulcrum of the same. When it is desired to convert the movement of the lever into a movement of one of the draft regulating devices of the furnace, as for example, the flue damper 36, the chain 34 is by means of an open link 37 attached in one or another of the apertures comprised in the series 17 of the arm engaged by the clock mechanism, and its opposite end is connected with the said damper at a point opposite to that at which it is hinged. The chain is run over a pair of sheaves 38 which like those of the chain 28, are attached to a suitable overhead support.

To set the mechanism above described for the purpose of renewing the fire in a furnace at a predetermined period, the alarm clock is set to operate at the desired time and after its alarm mechanism has been wound, the end of the lever 9 is placed under the cross blade 8 of the winding stem, which when placed in a substantially horizontal position will hold the same against the action of the spring. After the spring 23 has been attached to the knob of the fire door, the prop 26 is inserted between corresponding edges of the said door and its frame to hold the former in a partially open position. The end of the chain 34 is attached to the damper 36 which in consequence is held in the open position as shown in Fig. 1, and the end of the chain 28 is attached to the knob of the draft door after the latter has been closed. When at the appointed time the alarm mechanism is actuated, the consequent rotation of its winding stem will cause the blade 8 to release the lever 9 which by action of the spring 12 is moved to its perpendicular position shown in Fig. 3. The consequent pull exerted on the chain 28 will, in the manner heretofore described, unlatch the draft-door 32 and move it to its wide open position, the slack in the chain 34 will cause the damper 36 to close by gravity and the downward movement of the outer arm of the lever will withdraw the prop 26 from between the door frame and the door 25 with the result that the latter is closed by action of the spring 23.

In the form shown in Fig. 3, the mechanism is arranged to operate only the flue damper 36 and the damper 39 of the draft door 32. The chain 34 is to this end arranged as before, but the chain 28 is attached to the first mentioned chain at a point 40 between the two sheaves 38 over which it runs and it is at its opposite end, attached to the
damper 39 which moves about a horizontal hinge at its upper edge. It will be seen that when the lever is moved to the vertical position, the closing movement of the damper 39 will cause the damper 39 to open, it being understood that the first-mentioned damper is the heavier of the two.

In the construction shown in Fig. 6, the chains have been arranged to operate the same dampers when that connected with the draft door exceeds in weight, that of the flu. In this case the chain 28 is connected at one end in one of the apertures 15 in the arm of the lever opposite to that engaged by the clock mechanism and at its opposite end to the damper 39, and the chain 31 connected with the damper 36, is attached to the first-mentioned chain at a point 41 between the sheaves 33 and 42 over which the latter runs.

In the form shown in Fig. 7, the draft door is operated in a manner similar to that of the arrangement shown in Fig. 1, but the fire door is actuated without the use of a spring or prop by connecting its knob with the same arm of the lever to which the chain 28 is attached by means of a second chain 43, and running the latter over a sheave 44 which is placed forward of the perpendicular passing through the edge of the door opposite its hinge. It is obvious that when the lever 9 is moved in the position shown in Fig. 3, the fire door will be moved to the closed position and the draft door will be simultaneously opened. It will thus be observed that by the use of my attachment the one spring can be employed to operate any one or all of the dampers or doors of a furnace or stove, independent of each other and that the extent of the opening movement of the same may be regulated to any desired degree within determinate limits. The arrangement of the points at which the spring 12 is attached to the lever and the support of the operating element with relation to the fulcrum of the lever whereby the said points lie in a plane in close proximity to the said fulcrum when the mechanism is set for action, relieves the alarm mechanism of the clock of the greater part of the pull exerted by the spring without lessening the efficiency of the same to move the lever and the parts connected therewith, to their normal positions of rest when by action of the alarm mechanism, the said lever is released, it being understood that if the said points extended in a plane with the fulcrum, the lever would be at the dead point.

I desire it understood that while I have shown and described the operating mechanism, which includes the clock, lever and spring as its essential elements, in connection with the doors and dampers of a furnace or stove, the said mechanism may be employed for other purposes within the spirit of my invention.

Having thus described my invention what I claim and desire to secure by Letters-Patent is:

In combination, a support adapted to be secured to a wall or other upright surface, a lever fulcrumed thereon and having at points remote from its fulcrum, means for the attachment of flexible connections, a trip engaging an end of said lever for holding it in a substantially horizontal position, and a spring connected at one end to the support at a point beneath the fulcrum of the lever; and at its opposite end to the lever at a point disposed above the fulcrum when the lever is in its said horizontal position, said points of connection of the spring being under the same conditions, at opposite sides of a vertical passing through the fulcrum and in a straight line which closely approaches the same, and the spring being under said conditions expanded to move the lever to a substantially vertical position when released by the trip.

In testimony whereof I have affixed my signature in presence of two witnesses.

OSCAR J. PFEIFFER.

Witnesses:

G. J. ROLLANDER,
L. RHOADES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."