

No. 765,428.

PATENTED JULY 19, 1904.

T. E. HUNT.
AUTOMATIC REGULATOR.
APPLICATION FILED MAY 23, 1902.

NO MODEL.

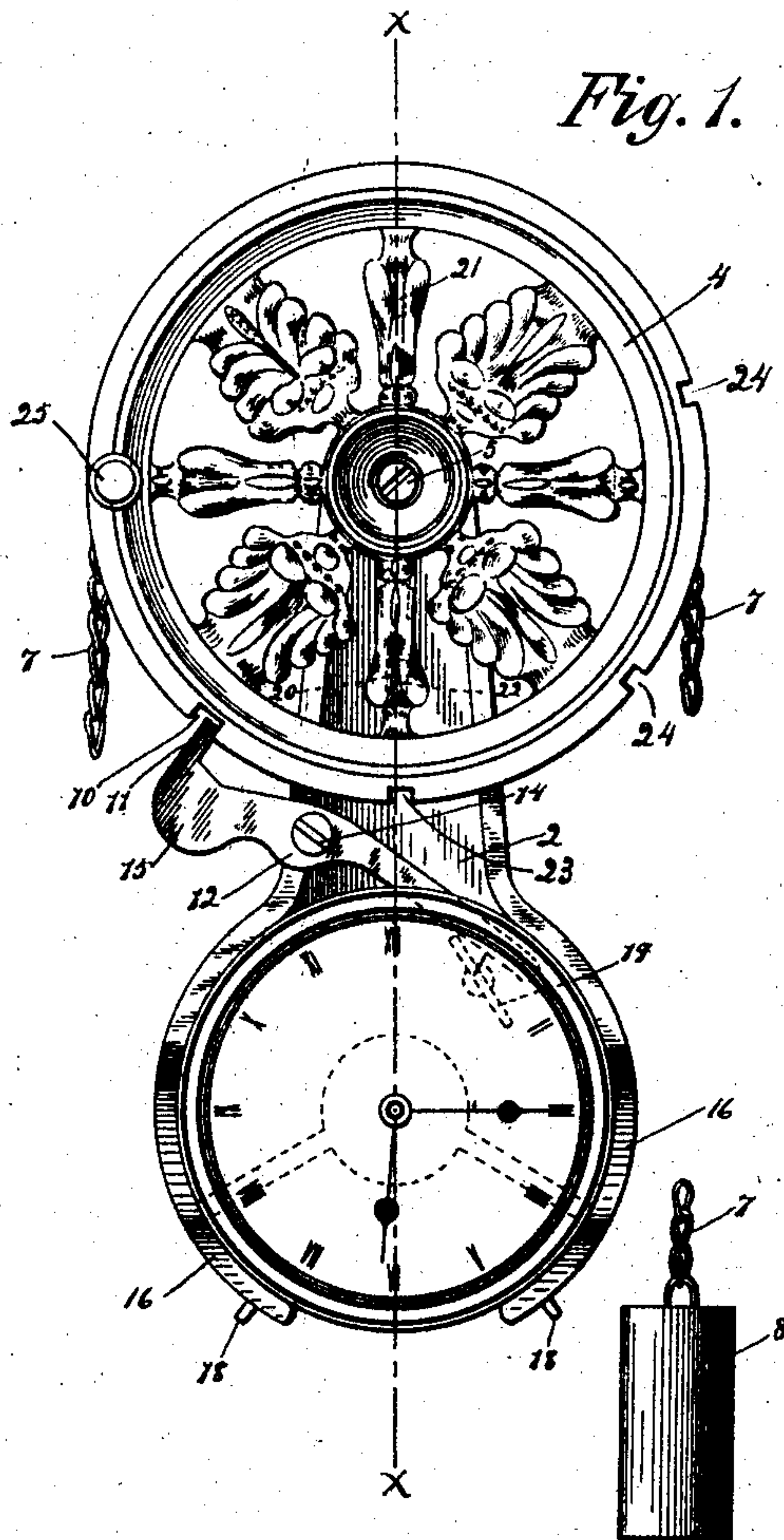


Fig. 2.

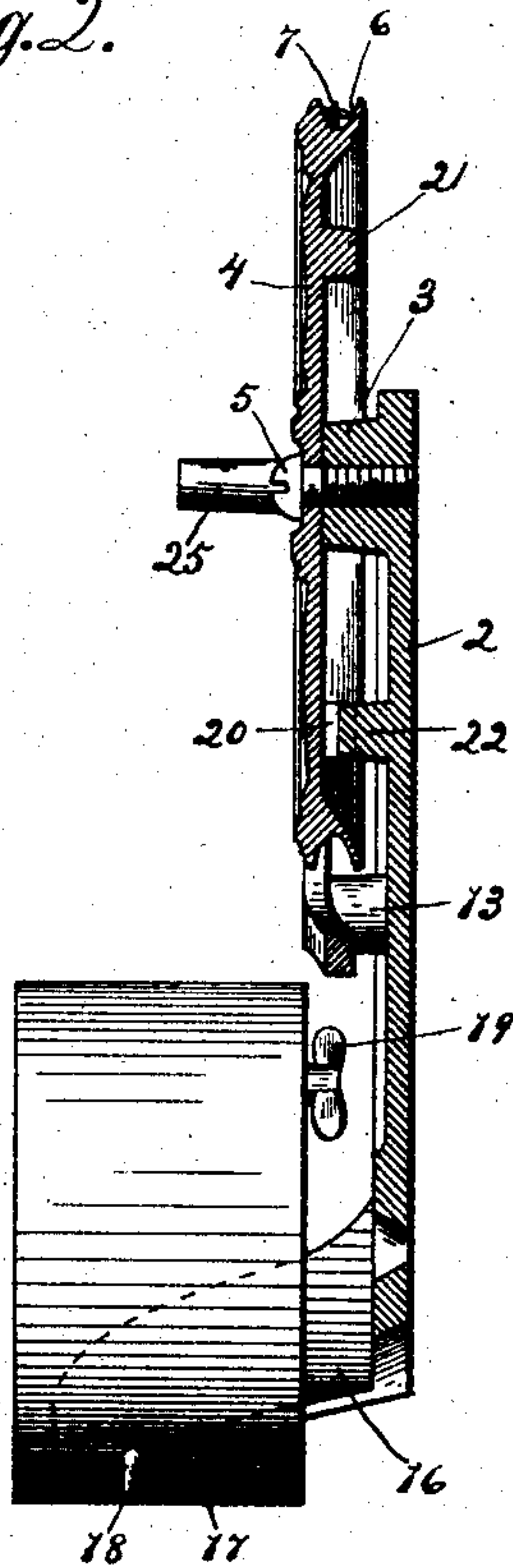
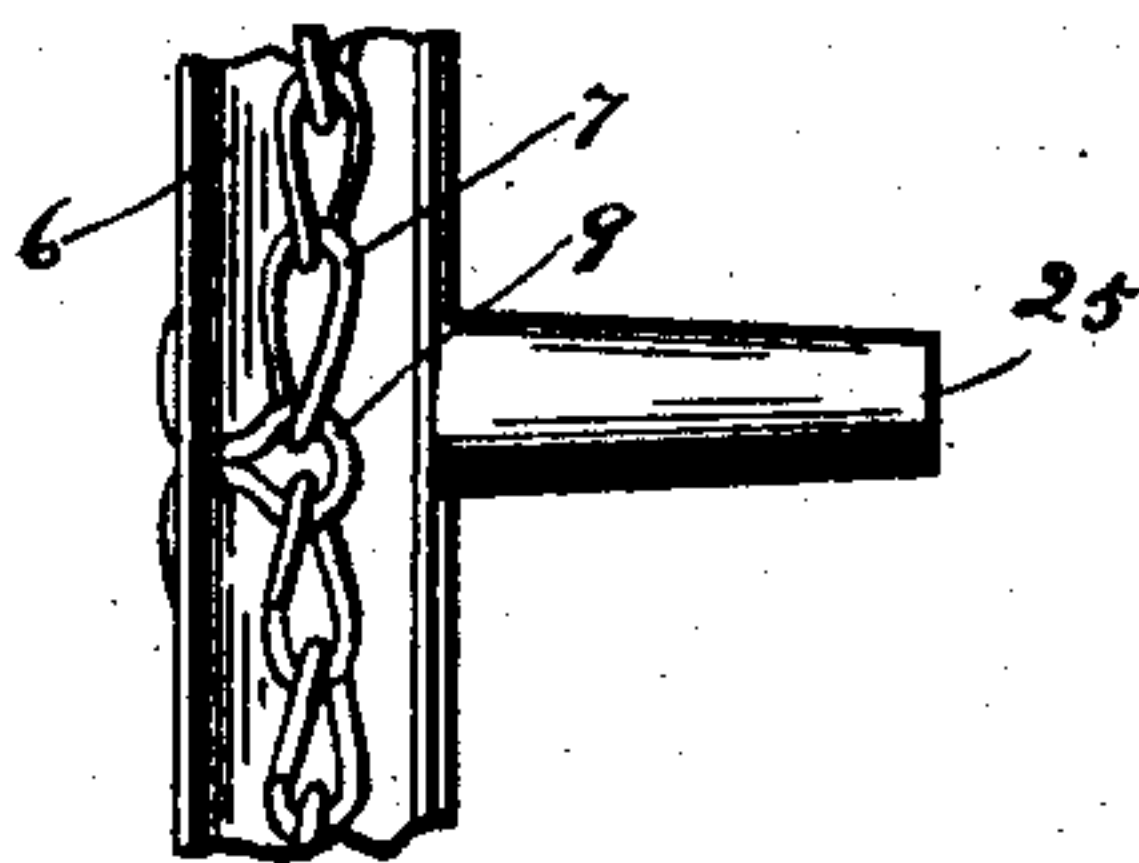


Fig. 3.



WITNESSES:

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THOMAS E. HUNT, OF BLUE ISLAND, ILLINOIS, ASSIGNOR TO QUAKER MANUFACTURING COMPANY, OF CHICAGO HEIGHTS, ILLINOIS, A CORPORATION OF ILLINOIS.

AUTOMATIC REGULATOR.

SPECIFICATION forming part of Letters Patent No. 765,428, dated July 19, 1904.

Application filed May 23, 1902. Serial No. 108,677. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. HUNT, a citizen of the United States, residing at Blue Island, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Regulators, of which the following is a specification.

This invention relates to devices for automatically setting a machine in motion or to machines adapted to be automatically set in motion at a predetermined time, and particularly to devices for automatically regulating the draft in heating-furnaces.

The particular object of my invention is to produce a simple comparatively inexpensive time-controlled regulator of this character comprising few parts, positive in operation, and which will, in combination with the mechanism of an ordinary alarm-clock or other means for imparting a slight motion at a predetermined time, be automatically set in motion to do work.

I am aware of the existence of other somewhat similar devices based upon much the same general principles as the one herein shown and described; but these devices are designed to be attached to the furnace itself or are limited in location to the furnace-room and being once set up and adjusted cannot be readily changed in location and readjusted.

A further object of my invention, therefore, is the construction of a device which may be mounted in its entirety upon a suitable portable plate, and thus be capable of location not only at any convenient point within the furnace-room, but even within another room or chamber.

A still further object of my invention is to so construct the automatic mechanism as to permit of the ready operation or adjustment of the device by hand, and this without the necessity of having access to the device itself—in other words, to make the device hand-operable from any point where access can be had to the operating cords or chains.

I shall proceed to describe my device in connection with automatic draft regulation;

but it will be apparent that my regulator may be employed for many other purposes, such as to control mechanism for supplying feed to stock and poultry, starting the flow of water, making or breaking electrical circuits, and to start or stop machinery of various kinds.

My invention consists generally in a preferably portable device comprising a clock having an alarm-winding key, a wheel, means for rotating said wheel, a lever in operative relation to said key, and means upon said wheel cooperating with said rotating means to hold said wheel and said lever in engagement.

My invention further consists in a simple pulley to one end of the cord of which is attached an operating-weight and the other end of which cord is suitably fastened to the damper to be raised, the lever to be operated, the valve to be opened, or the starting or stopping mechanism, in combination with novel means for temporarily checking the rotation of said pulley and means for automatically releasing said checking means at a predetermined time.

My invention further consists in means for making my device hand-operable at any time and at any point where the operating chain or cord is accessible apart from its automatic operation.

My invention further consists in a portable plate, preferably of the design and construction hereinafter fully described, upon which all of the various members comprising my complete device are suitably mounted, permitting of the removal of my regulator from one point to another and of its speedy adjustment for operation at almost any desired location; and my invention further consists in the various details of construction and in combinations of parts, all as hereinafter described, and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a front elevation of my complete

device, unexposed parts being shown by dotted lines. Fig. 2 is a vertical central section substantially on the line *xx* of Fig. 1. Fig. 3 is a detail.

5 Referring now to the drawings in detail, the numeral 2 refers to a portable plate, for cheapness preferably a casting and for strength, lightness, and utility of substantially the configuration shown. This plate is designed
10 to carry all the members comprising my complete device, so that the same may be readily mounted at any convenient point either in the furnace-room or in any other room or chamber above the furnace-room.
15 The use of this plate also permits the ready removal of my device from one point to another when desired and of its readjustment in the new location. At or near the upper end of the plate 2 is the boss 3, threaded to
20 receive the stud-screw 5, which constitutes the axle upon which the disk or wheel 4 is adapted to rotate. This disk 4 is also preferably a casting and is made as light in weight as is consistent with the requisite strength.
25 The disk 4 is provided with a peripheral groove 6 to retain the cord or chain 7, to one end of which is attached the operating-weight 8. The other end of the chain 7 is designed to be attached in any suitable manner to the
30 damper, lever, or other mechanism which the regulator is designed to operate. It will be apparent that I may employ as many idler-pulleys as may be necessary to apply the force at a proper point and in a proper direction. If
35 more than one damper is intended to be operated by my device, the employment of a divided chain and one or more idler-pulleys is obviously necessary. These are mere details of application, however, and form no part of my
40 invention.

The chain 7 is preferably attached at one point on the periphery of the disk 4, as by a ring or loop 9, suitably mounted within the groove 6. This point of attachment should
45 be at the uppermost point of said disk when the latter has passed through approximately one-half of its arc of rotation. To check the rotation of said disk at that position, when it will be held subject to the force caused by the
50 potential energy of the suspended weight 8 and from which position upon being released it will rotate under action of said weight to do the maximum work, I have shown a notch 10 in the periphery of said disk, adapted to be
55 engaged by a suitable hook or detent 11 at one end of the lever 12, pivotally mounted upon a boss 13 on the plate 2 and retained thereon by a suitable stud-screw 14. It will be noted that I have weighted the lever 12 at
60 the hook end in order that the hook or detent 11 will be normally free of the notches in said disk. This is an important element of my invention and is designed primarily to facilitate hand operation of the device apart from
65 its automatic features, as will be subsequently

made clear. This weight 15, however, while sufficiently heavy to keep the hook or detent normally free of said notches, must not be so heavy but what the action of the weight 8 and the tendency of the disk to rotate under
70 this action will hold said hook or detent in engagement with the notch to check said disk against rotation at that point.

At the lower extremity of the plate 2 I have shown two forwardly-extending arms 16 16, 75 which form substantially a divided circular shelf adapted to fit and snugly hold an alarm-clock of usual circular pattern and construction. The inner edges of said arms are preferably recessed to provide the inwardly-pro- 80 jecting shoulders 17, which engage the short legs 18 18, with which such clocks are usually provided, to retain said clock more firmly in place. It is evident that I may provide a single circular shelf with suitable slots or holes 85 for the legs of the clock instead of providing the arms 16 16, as these arms really constitute the ends of a circular shelf from which a central segment has been cut away. As is well known, these clocks are usually provided 90 with a detachable flat-faced lever-key for winding the spring which operates the alarm mechanism. This lever-key 19 projects beyond the rear wall or casing of the clock and during the operation of the alarm mechanism 95 rotates in a direction contrary to that of winding. The shape and movement of this key peculiarly adapt it for use as a trip-lever to disengage the pawl or detent 11 from the notch in the disk, the lever 12 being so 100 shaped and mounted that its free end rests against the flat face of the alarm-winding key when the pawl is in engagement with the notch. It is evident that the first quarter-rotation of the key during the operation of 105 the alarm mechanism will trip the lever 12, disengage the pawl 11, and permit of the free rotation of the disk under action of the weight. While the employment of the usual alarm-winding key will suffice to operate the trip- 110 lever, as described, this construction, however, is subject to some objections, among which are the facts that the ordinary key continues to rotate with the alarm mechanism after having done the required work and that 115 in stopping its position of rotation may be such that the removal of the clock and readjustment of the key may be necessary to permit of a proper arrangement of the lever 12 with said key. I have referred to this key 120 as being usually detachable, and I may provide a special key the movement of which is limited to a one-half revolution. This special key, however, forms no part of this invention and may be made the subject of a subse- 125 quent application.

While I have shown and described direct contact between the alarm-winding key of an alarm-clock and the operating-lever of my regulator as a means for tripping said oper- 130

ating-lever at a predetermined time, I do not desire to be limited to this specific construction nor to the use of a clock, as any other mechanism which may be suitably mounted upon a portable plate, and thus capable of removal in its entirety from one point to another and of ready readjustment, and which will accomplish the desired end may be employed, so far as my invention is concerned.

Upon the face of the disk 4 I have shown the oppositely-located rearwardly-projecting lugs 20 and 21, adapted upon rotation of the disk to strike the stop 22, suitably mounted upon the plate 2. In this manner the arc of rotation of said disk is positively limited to one semirotation, or an arc of approximately one hundred and eighty degrees. These lugs 20 and 21 are so located upon the disk 4 that when the detent 11 is in engagement with the notch 10, as shown in Fig. 1, said disk upon being released will make one semirotation before being stopped by the engagement of the lug 21 with the stop 22, thus lifting the resistance-load through the greatest distance or doing the maximum of work for which the device is adapted. It will be noted that I have shown a second notch 23 in the periphery of the disk 4. The purpose of this notch 23 is merely to limit the rotation of the disk 4 to a smaller arc when desired. For instance, the chain may be divided at a suitable point in such a manner that one part thereof may be attached to the damper of a furnace below the grates and another to a check-draft which has cut off the flow of gases in the chimney, pipe, or flue. It is obvious that the parts of the divided chain may be so arranged and adjusted that the rotation of the disk through an arc of, say, ninety degrees will serve to operate one of these dampers without affecting the other, while the rotation of the disk through an arc of, say, one hundred and eighty degrees will operate both. I thus prefer to provide the additional notch 23 for use when it is desired to reduce the arc of rotation. In fact, if a scale of adjustment is desired still additional notches 24 24 may be provided.

I have referred to my regulator as being hand-operable apart from its automatic operation. It will be apparent that if it is desired at any time to operate my device by hand it is necessary merely to slightly pull the chain in a direction to raise the weight 8, which will release the detent 11 and permit of the rotation of said disk to do the required work. It is obvious, furthermore, that it is not necessary to have access to the device itself in order to accomplish this result, as the detent may be released at the furnace or at any other point where access may be had to the operating-chain. To facilitate the adjustment of the device for either hand or automatic regulation, I have shown a small boss or handle 25 conveniently located on the front face of the

disk. For automatic regulation the disk is turned in a direction to raise the weight until stopped by the engagement of the lug 20 on the disk with the lug 22 on the plate. At this point the notch 10 is in position for engagement with the pawl 11, which is inserted therein and retained by action of the weight 8. The chain 7 is taut and suitably attached to the horizontally-pivoted draft door or damper of the furnace or to the other mechanism to be operated. The alarm mechanism is "set" in the usual manner for any desired hour and minute, the key being so adjusted that one of its flat faces lies parallel to the contiguous face of the operating-lever. The operation of the alarm mechanism at the proper time causes the rotation of the lever-key, tripping the operating-lever and releasing the disk, which, under action of the weight 8, rotates until stopped by the engagement of the lug 21 with the stop 22. The rotation of the disk will operate through the chain to do the required work.

Many modifications of the minor details of my regulator will doubtless readily suggest themselves to those skilled in the art to which it appertains, and I therefore do not desire to limit my invention to the specific details of construction herein shown and described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a suitable support, of a clock having an alarm-winding key, a wheel, means for rotating said wheel, a normally disengaged lever fulcrumed on said support in operative relation to said key, and means upon said wheel coöperating with said rotating means to hold said wheel and said lever in engagement.

2. The combination, with a suitable support, of a clock provided with an alarm-winding key, a wheel, means for rotating said wheel, a normally disengaged lever pivoted on said support, and means upon said wheel coöperating with said rotating means to hold said lever in suspended engagement with said wheel.

3. The combination, with a suitable support, of a clock having an alarm-winding key, a wheel, means for rotating said wheel, a lever fulcrumed on said support with its opposite ends in operative relation to said pulley and key, respectively, and means upon said wheel coöperating with said rotating means to hold said lever in suspended engagement with said wheel.

4. The combination, with an ordinary alarm-clock and the alarm-winding key thereof, of a wheel provided with detent-engaging means, a normally free detent-lever fulcrumed to overbalance its power end, and means upon said wheel for holding the detent of said lever in suspended engagement with said wheel and for rotating said wheel.

5. The combination, with a clock provided

with an alarm-winding key, of a wheel having detent-engaging means, a detent-lever fulcrumed to overbalance its power end and having its opposite ends in operative relation to said wheel and key, respectively, and means for holding the detent of said lever in suspended engagement with said wheel and for rotating said wheel upon release of said engaging means.

6. The combination, with a clock having an alarm-winding key, of a wheel provided with detent-engaging means, a detent-lever fulcrumed to overbalance its power end in operative relation to but normally free of both wheel and key, and means for holding the detent in frictional engagement with said wheel and for rotating said wheel upon release of said detent.

7. The combination, with a clock having an alarm-winding key, of a notched pulley, a pivoted detent-lever in operative relation to but normally tending to become free of both pulley and key, and a weighted connection with said pulley adapted to hold said lever in engagement therewith and in operative relation to said key and to rotate said pulley upon release of said engaging means.

8. The combination, with a portable support, of a clock having a rear alarm-winding key, a pulley provided with pawl-engaging means, a rocking catch-lever weighted to keep the catch thereupon out of contact with said pulley and pivoted independently of said pulley and clock, and means tending to rotate said pulley for forcing its pawl-engaging means against said catch and thereby supporting the latter by frictional contact only against the gravity force of said weight.

9. The combination, with a portable support for all of the movable mechanism, of a pulley provided with notches, a lever pivoted intermediate of its ends and independently of said pulley, a clock having an alarm-winding key, in operative position with relation to one end of said lever, and means upon said pulley for forcing it into a friction-hold engagement with the other end of said lever and for holding said first-mentioned end in position to be struck by said key when rotated.

10. The combination, with a clock having a rear alarm-winding key, of a combination bearing-plate and clock-rest, a pulley, a lever fulcrumed between its ends and provided at one end with a catch, the catch end overbalancing the power end and said lever being normally out of engagement with both pulley and clock, means upon said pulley for engaging said catch, and means also on said pulley for supporting the catch end of said lever with a simple friction hold.

11. The combination, with a clock having a rear alarm-winding key, of a bearing-plate having a clock-rest thereupon, a notched pul-

ley, a lever pivoted between its ends and provided at one end with a pulley-engaging catch or detent and a weight normally holding said catch out of engagement with said pulley, and means upon said pulley for holding the catch in positive frictional engagement therewith against the force of said weight.

12. The combination, with a clock provided with an alarm-winding key, of a bearing-plate having a forked clock-rest, a pulley provided with a crank-handle and a series of notches, cooperating means upon said pulley and plate limiting the rotation of said pulley, a lever pivoted intermediate of its ends on said plate and in operative relation to said key, said lever being provided with a weighted detent at one end and normally supported at its power end against said pulley in a disengaged position, and means upon said pulley for holding the detent of said lever in engagement with one of said notches.

13. The combination, with a clock provided with an alarm-winding key, of a bearing-plate provided with a bifurcated clock-rest having clock-leg-retaining shoulders, a crank-handle pulley, means upon said pulley for engaging a catch, means upon said pulley and plate limiting the rotation of the former, a lever pivoted upon said plate in operative relation to said key, a catch upon one end of said lever and the other end thereof normally resting in a disengaged position against said pulley, and a weighted flexible connection with said pulley for rotating same and for holding said catch in frictional engagement with said wheel.

14. The combination, with a clock, provided with an exterior alarm-winding key, of a bearing-plate for the operating mechanism having a bifurcated clock-rest, the latter being provided with offsets or shoulders cooperating with the legs of said clock to hold the latter against a sliding movement upon said rest, a crank-handle pulley, means upon said pulley for engaging a detent in various graduated positions, means upon said pulley and plate limiting the rotation of the former, a lever pivoted upon said plate in operative relation to said key, a detent upon one end of said lever and both ends of said lever normally resting disengaged from said pulley and clock, a weighted flexible connection for rotating said pulley and for holding said detent in frictional engagement therewith.

In testimony of the foregoing I have hereto set my hand, this 17th day of May, 1902, at Chicago, Illinois, in the presence of two subscribing witnesses.

THOMAS E. HUNT.

Witnesses:

S. R. DAWSON,
MINNIE B. SNITKOFF.