No. 871,118. PATENTED NOV. 19, 1907.

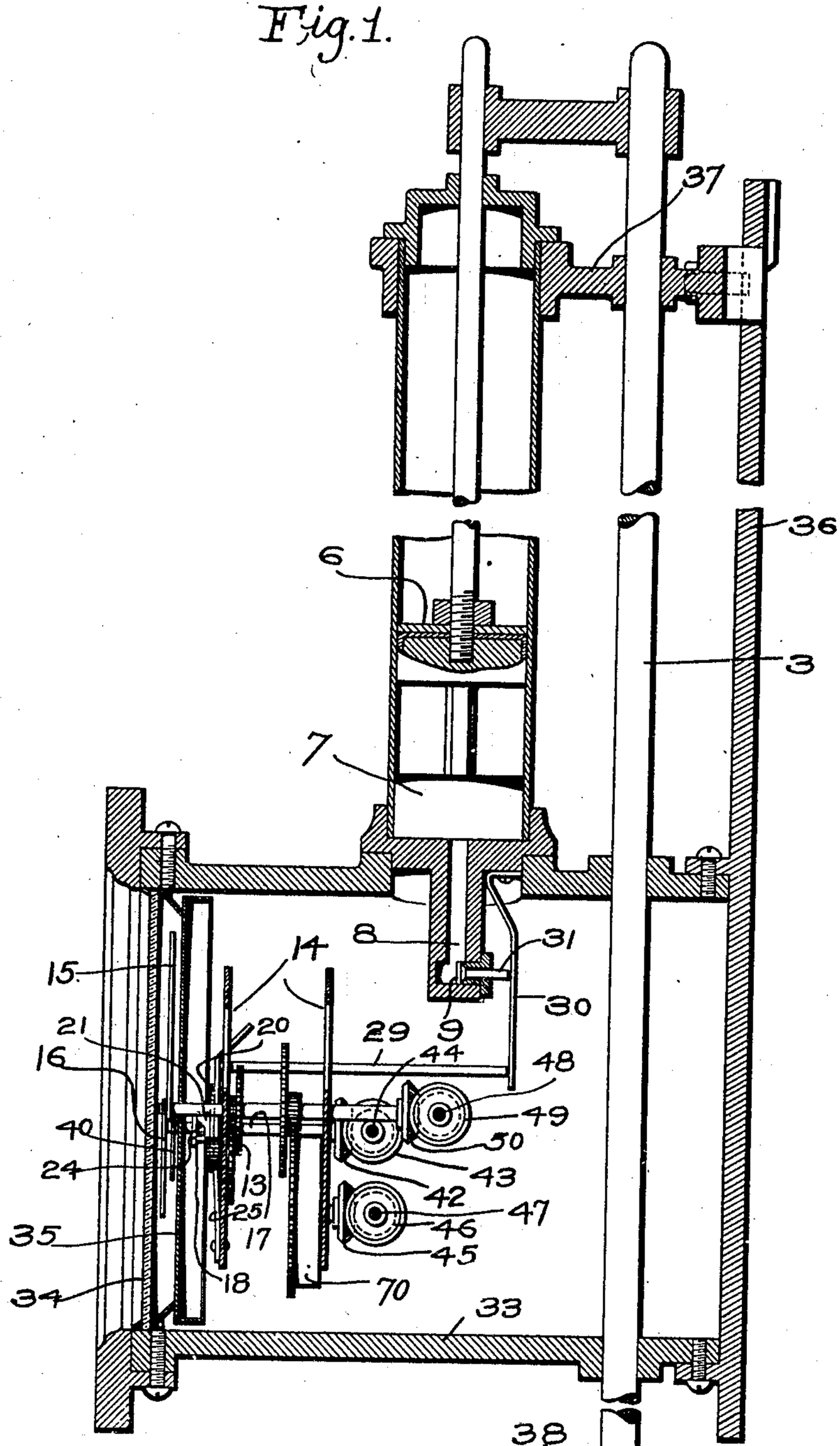
W. R. FORBUSH.

DAMPER REGULATOR.

APPLICATION FILED MAR. 20, 1907.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 3.

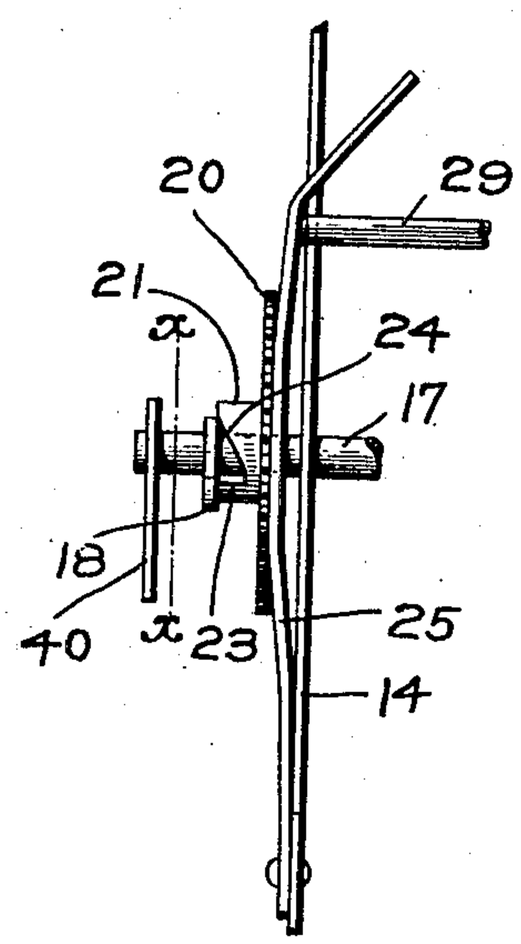


Fig. 2.

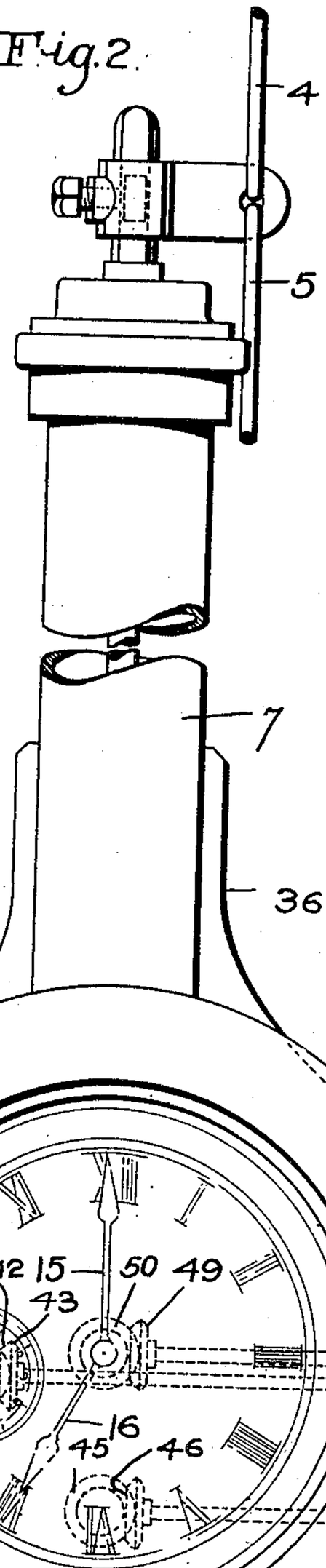
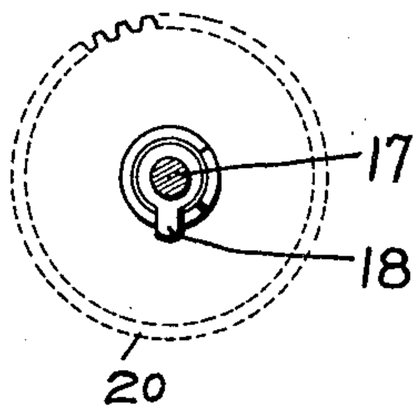


Fig. 4.



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UNITED STATES PATENT OFFICE.

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DAMPER-REGULATOR.

No. 871,118. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed March 20, 1907. Serial No. 363,332.

To all whom it may concern:

Be it known that I, WALTER R. FORBUSH, a citizen of the United States, residing at Newton, county of Middlesex, and State of Massachusetts, have invented an Improvement in Damper-Regulators, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to damper regulators adapted for opening or closing at the proper time the dampers of a furnace, and the object of the invention is to provide a damper regulator involving an actuating device for the damper which is held in inoperative position by a checking cylinder and a time mechanism for releasing the checking device.

In the preferred embodiment of my invention the checking cylinder is an air cylinder having a piston therein which is connected to the damper-actuating member, and the apparatus is so constructed that a check valve normally prevents the movement of the piston when the damper-actuating member is in its inoperative position, but when it is desired to release the checking mechanism to allow the damper-actuating member to operate the dampers, said check valve is opened by a time mechanism, thereby allowing the air in the cylinder to escape.

I will first describe one embodiment of my invention and then point out the novel features thereof in the appended claims.

In the drawings, Figure 1 is a vertical sectional view through a device embodying my invention; Fig. 2 is a front elevation thereof; Fig. 3 is a detail of the time mechanism for operating the valve; Fig. 4 is a section on the line *x*—*x*, Fig. 3.

The damper-actuating member is herein shown as a weighted member 3 to one end of which are secured the chains 4 and 5 leading to the draft and check dampers of the furnace. Said damper-actuating member is also connected to a piston 6 of the checking device which operates in a cylinder 7. Said cylinder has at one end a port 8 controlled by a suitable check valve 9, and in the present embodiment, said check valve is arranged to open to admit air to the cylinder when the piston is drawn upwardly, and to close to prevent the escape of the air when the piston tends to move downwardly. Where this device is used for controlling the dampers of a house heating furnace, the upward movement of the member 3 will slack the connection 4 leading to the draft damper and draw on the connection 5 leading to the check damper in the smoke pipe so that when the parts are in their elevated position the draft damper will be closed and the check damper opened.

The member 3 is either of itself sufficiently heavy or is provided with a weight 10 of sufficient size to actuate the dampers as the member 3 descends into the position shown in Fig. 1. After the apparatus has been set by raising the piston, the damper-actuating member 3 will remain in this position until the check-valve is released to permit the escape of air from beneath the piston, and as soon as this occurs, the weight of the member 3 is sufficient to operate the damper as above described.

The time of operation of the valve 9 is controlled by a suitable time mechanism which is adjustable so that the damper may be operated at any predetermined time. The time mechanism herein shown may be an ordinary clock mechanism or time train 13 supported by the usual plates 14. This clock mechanism includes the usual arbors on which the hour and minute hands 15 and 16 are supported and the main spring 70 for operating the parts. I have not attempted to show in Fig. 1 the complete clock mechanism because to do so would unnecessarily confuse the drawing. It will be understood that any suitable time train may be employed for my purpose. The clock mechanism also includes an arbor 17 which has fast thereon an arm 18 adapted to rest against the flange 21 of the pinion 20 which is loosely mounted on said arbor 17 and which is connected to the time train as usual. This pinion is acted against by a suitable spring 25 which is secured to one of the plates 14 and which acts to normally hold the pinion to the left Fig. 3 with its flange against the arm 18. The flange 21 is provided with a notch formed by straight cut 23 and the inclined cut 24, so that when during the rotation of the pinion 20 the notch in the flange comes under the arm 18 the spring 25 will shift the pinion to the left Fig. 3.

29 is a connecting member slidably mounted in the plates 14 or in other suitable bearings and bearing at one end against the spring arm 25 and at the other end against a spring actuator 30 which is secured to a fixed

support and which is adapted to engage the stem 31 of the valve 9, as best seen in Fig. 1.

When the parts are in the position shown in Fig. 3, with the arm 18 bearing against the high portion of the flange 21, the spring 25 and consequently the connector 29 are moved to the right and in this position the spring arm 30 is flexed sufficiently to remove the pressure thereof from the stem of the valve. When, however, the pinion 20 has been rotated by the clock mechanism to bring the low portion of the flange formed by the inclined cut 24 under the arm 18 the spring 25 will, owing to its resiliency, move to the left Figs. 1 and 3, thereby relieving the spring 30 and allowing the latter to open the valve 9. When the valve is opened the air will escape from beneath the piston, as will be obvious, thereby allowing the member 3 to drop and thus shifting the dampers of the furnace. For convenience I have mounted the clock mechanism in a suitable casing 33 which has an open front closed by glass 34 through which the dial 35 of the clock mechanism is visible.

In the present embodiment of my invention the cylinder 7 is secured to and supported by the casing 33, and said casing is sustained by a backing plate 36 by means of which the regulator may be secured to a wall or other support. I have herein shown said backing piece 36 as having an arm 37 at its upper end which supports the upper end of the cylinder, and through which the actuating member 3 passes and by which it is guided. Said member 3 is also shown as extending through the casing 33 and as being guided thereby. The lower end of said actuating member is shown as having handles 38 thereon by which it may be lifted.

The operation of the invention will be readily understood from the foregoing and may be briefly described as follows: The actuator 3 is lifted by means of the handles 38 thereby raising the piston in its cylinder, this action being permitted by the automatic opening of the valve 9 to admit air to the cylinder. The raising of the member 3 draws on the connection 5 and slacks the connection 4 thereby operating the dampers. The actuating member 3 is held in this elevated position by the automatic closing of the valve 9. As soon, however, as the pinion 20 has been rotated by the clock mechanism to bring the low portion of the flange under the arm 18, the springs 25 and 30 come into play to open the valve 9 thereby permitting the piston to descend thus operating the dampers.

It is, of course, desirable to provide for setting the time mechanism so that the damper may be operated at any predetermined time. For this purpose the arbor 17 is made rotatable so that the position of the arm 18 thereon will be changed, and said arbor is provided with a pointer 40 which coöperates with a dial 41 to indicate the time at which the mechanism has been set in a manner similar to that in which an ordinary alarm clock is set.

For rotating the arbor 17, I have provided the end thereof with a bevel-gear 42 which meshes with a bevel-gear 43 carried by a shaft 44, the end of which projects through the casing 33 so that by applying a suitable key to said shaft the arbor 17 may be adjusted to set the regulator device to operate at any desired time.

For winding the main spring 70, I have provided the shaft thereof with a bevel-gear 45 which is adapted to mesh with a bevel-gear 46 on the shaft 47 which also projects through the casing so that by applying a key to the end thereof, the spring may be wound. Similarly for setting the hands 15, 16 a cross shaft 48 is provided, the outer end of which projects beyond the casing 33 and the inner end of which has fast thereon a bevel-gear 49 which meshes with a bevel-gear 50 on the arbor on which the hands are mounted. The outer ends of the shafts 44, 47 and 48 may if desired be made with thumb-pieces by which they may be turned or they may be squared, as shown, so that they may be operated by means of keys.

I have not attempted to illustrate herein or to describe all forms in which my invention may be embodied, but for the sake of illustrating the invention have merely shown the preferred embodiment thereof.

It is not essential to my invention that the damper-actuating member should be in the form herein shown as any suitable device capable of operating the damper may be employed so long as said member is retained in its inoperative position by a pneumatic check device.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a damper regulator, the combination with a damper-actuating member of a pneumatic check to retain said member in inoperative position, and time mechanism to release the check thereby to allow the damper-actuating member to become operative.

2. In a damper regulator, the combination with a damper-actuating member of a pneumatic check to retain said member in inoperative position, and an adjustable time mechanism to release the check thereby to allow the damper-actuating member to become operative.

3. In a damper regulator, the combination with a damper-actuating member of a cylinder, a piston therein connected to said member, and time mechanism to control the movement of the piston and thereby to control the operation of the damper-actuating member.

4. In a damper regulator, the combination with a damper-actuating member of a cylinder, a piston therein having a port, a check valve to control said port, and automatic means for controlling the operation of the check valve.

5. In a damper regulator, the combination with a damper-actuating member of a cylinder, a piston therein having a port, a check valve to control said port, and time mechanism for controlling the operation of the check valve.

6. In a damper regulator, the combination with a cylinder of a weighted piston therein, a check valve to control the movement of the piston, and automatic means to determine the time of operation of the check valve.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WALTER R. FORBUSH.

Witnesses:
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