W. LARSON.

MOTOR FOR HEAT REGULATOR.

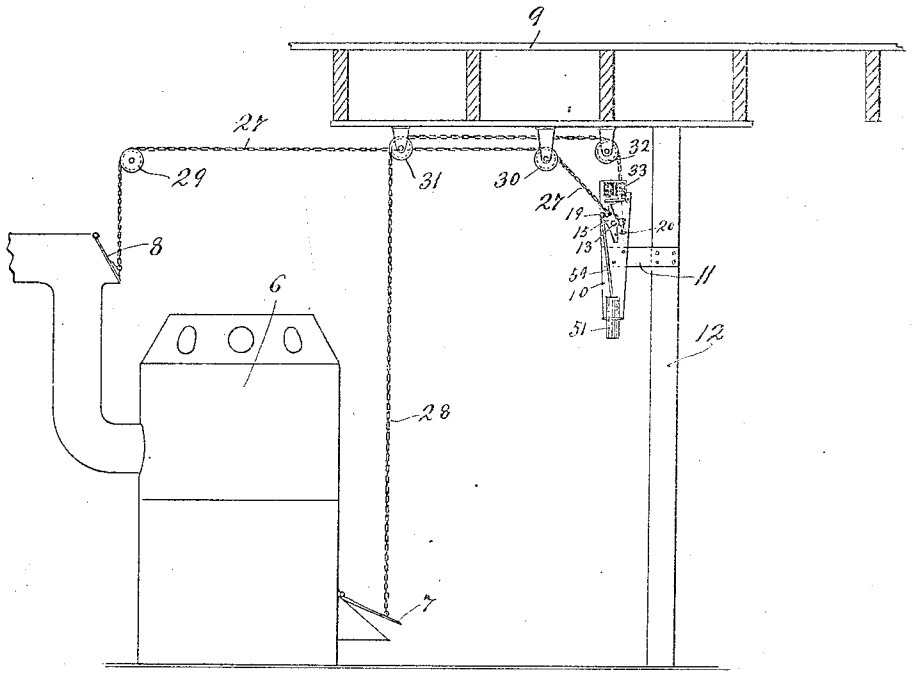
APPLICATION FILED MAR. 12, 1917.

1,293,811.

Patented Feb. 11, 1919.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses.
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2 SHEETS—SHEET 2.

Fig. 2

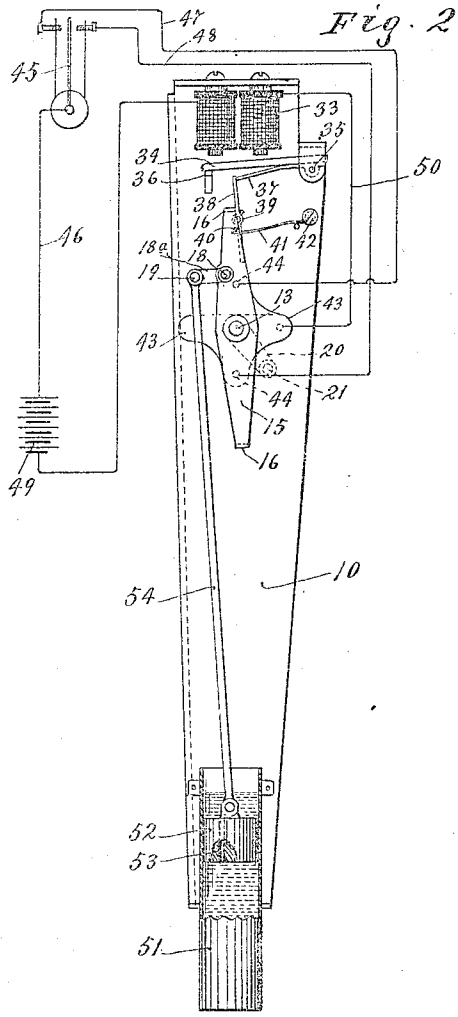


Fig. 3

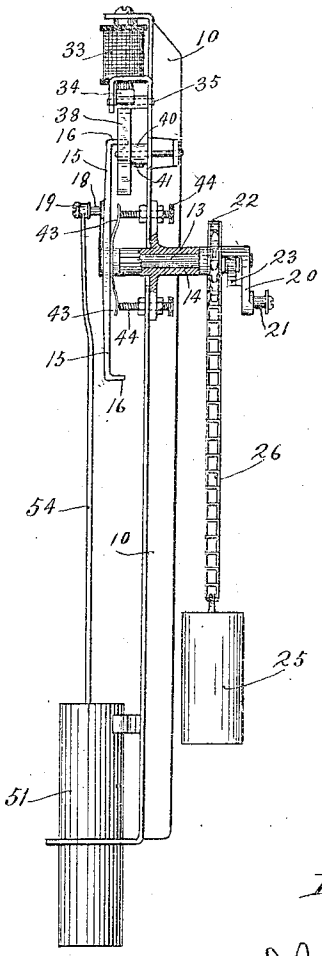


Fig. 4

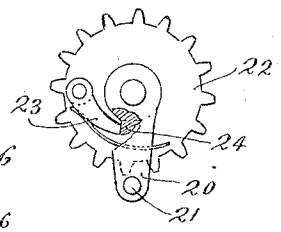


Fig. 5

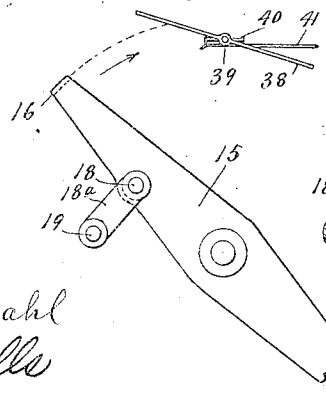
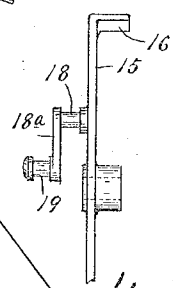


Fig. 6



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UNITED STATES PATENT OFFICE.

WILLIAM LARSON, OF MINNEAPOLIS, MINNESOTA.

MOTOR FOR HEAT-REGULATORS.

1,293,811. Specification of Letters Patent. Patented Feb. 11, 1919.

Application filed March 12, 1917. Serial No. 154,421.

To all whom it may concern:

Be it known that I, WILLIAM LARSON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Motors for Heat-Regulators; 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 has for its object to provide an extremely simple and highly efficient motor especially adapted for use in connection with a thermostat for regulating heat by manipulating the dampers of a furnace or other heater. Generally stated the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The invention is illustrated in the accompanying drawings wherein like characters indicate like parts throughout the several views. Referring to the drawings:

Figure 1 is a view chiefly in elevation, but with some parts in vertical section, showing the manner in which the motor is adapted to be installed and connected to the draft and check dampers of an ordinary furnace or heater;

Fig. 2 is a side elevation of the motor, some parts being sectioned and illustrating, diagrammatically, electrical connections between the same and a thermostat;

Fig. 3 is an edge elevation of the motor shown in Fig. 2, some parts being sectioned;

Fig. 4 is a detail showing a pawl and ratchet connection between the driving shaft and weight-actuated wheel of the motor;

Fig. 5 is a fragmentary view in side elevation illustrating the action of certain of the parts of the motor; and

Fig. 6 is an edge elevation of the driver lever shown in Fig. 5.

The numeral 6 indicates a furnace or heater having the usual draft damper 7 and check damper 8. The numeral 9 indicates the first floor structure of a building, it being assumed that the furnace is located in the basement.

All of the parts of the motor proper are preferably mounted upon an upright base, preferably in the form of a sheet metal plate 10 having a laterally bent flange to fasten the same. This base 10 as shown, is secured to a bracket 11, which, in turn, is supported by a post 12.

The driving shaft 13 of the motor is horizontally disposed and is journaled in the sleeve-like bearing of a bearing bracket 14 that is rigidly secured to the base 10. To the front end of the driving shaft 13 is rigidly secured an arm 15 that projects in diametrically opposite directions and, at its ends, has laterally turned stop flanges 16. At one point concentric to its journal, the driver arm 15 is provided with a crank pin 18. This crank pin 18, at its outer end, has a crank arm 18^a that is rigid in respect thereto and in respect to the arm 15, but is offset from the said arm 15. At its extended end, the crank arm 18^a is provided with an outwardly projected crank pin 19.

At its rear end, the shaft 13 has a crank arm 20 equipped with a crank pin 21 that is at a point diametrically opposite to the crank pin 18. Loosely mounted on the shaft 13 between the sleeve of the bracket 14 and the hub of the crank 20, is a driving wheel, as shown, in the form of a sprocket 22. This sprocket 22 is equipped with a spring-pressed dog 23 that engages with a lug 24 on the hub of the crank arm 20 and causes the said shaft and crank to rotate with the said wheel in one direction under the action of a weight 25 attached to the lower end of a sprocket chain 26 that runs on and is secured to said sprocket 22. The crank pin 18 is connected to one end of a chain or cable 27, and the crank pin 21 is connected to one end of a similar chain or cable 28. The chain 27 runs over suitable guide sheaves 29 and 30 and the chain 28 runs over suitable guide sheaves 31 and 32, which guide sheaves are mounted on suitable overhead supports, such as the floor structure 9. The extended end of the chain 27 is connected to the check damper 8, and the extended end of the cable 28 is connected to the draft damper 7 of the furnace. Obviously, these two cranks, under rotation of the shaft 13, will open and close the two dampers 7 and 8 in alternate order, this being the usual operation of the motor of a heating system.

The numeral 33 indicates electromagnets secured to an upper end flange of the base 10. The numeral 34 indicates an armature that is pivoted to the back at 35, the free end of which is limited in its downward movement by a stop 36 fixed on said base. This

armature 34 is subject to the magnets 33 when the latter are energized, and it is provided with an escapement stop in the form of a stop finger 37 rigidly secured thereto at one end and normally lying in the path of movement of an escapement lever 38 that is secured to one end of a small spindle 39 rotatively mounted in a suitable bearing on the base plate 10.

Rigidly secured to the spindle 39 adjacent to the rotary escapement lever 38 is a flat hub or stop plate 40 that is normally engaged by the free end of a leaf spring 41, one end of which is rigidly secured to a stud 42 on the said base plate. The hub of the main arm 15 carries spring contacts 43 that are engageable with contact screws 44 that are supported by, but insulated from, the base 10 and bearing bracket 14.

The numeral 45 indicates a thermostat of the usual well known construction. This thermostat has three leads 46, 47 and 48. A battery, or source of electrical energy 49 is interposed in the lead 46 and this lead is connected to one terminal of the electromagnets 33 and the other terminal of said electromagnets being grounded in the base 10 through a wire 50. The leads 47 and 48 connect one to each of the contact screws 44. The exact arrangement and operation of this electrical feature of the apparatus is well known and, as it does not *per se*, constitute a part of the present invention, need not be further considered, other than to state that the circuit through the electromagnets will be closed whenever the contacts 43 engage the contact screws 44.

With the crank pin 21 turned downward and the crank pin 18 turned upward, the draft damper 7 will be open and the check damper 8 will be closed, as shown in Fig. 1. This is the position of the parts shown in Figs. 1, 2 and 3, at which time the uppermost end lug 16 of the arm 15 engages the escapement lever 38 above its pivot 39 and holds the upper end of said escapement lever against the end of the stop flange 37 of the armature 34. When the electromagnets 33 are energized by manipulation of the thermostat under increased temperature, the armature 34 will be raised, thereby carrying its finger 37 above and out of the path of movement of the upper end of the escapement lever 38, and then the weight 25 will become active to move the said arm 15 and cranks carried thereby. The initial movement of the arm 15 breaks the magnet circuit and causes the armature 34, immediately, to drop so that its finger 37 will stand in position to stop the upwardly moving opposite end of the said escapement lever. When the arm 15 is thus intercepted, the crank pin 21 will be raised and the crank pin 18 lowered, thereby closing the damper 7 and opening the damper 8. The parts will then remain in this position until the magnet circuit is again closed by lower temperature acting through the thermostat.

When the rotary escapement lever 38 is moved by the arm 15, it will be given an approximately half rotation, and this half rotation will be completed by the action of the spring 41 on the flat hub 40. Fig. 5 shows the position of this escapement lever when not engaged by the arm 15, and here it will be noted that in this position of said escapement lever, it cannot interfere with the return movement of the armature and its stop flange to normal position, but nevertheless, its upwardly projected end is held within the line of movement of the laterally bent lug at the upper end of said arm 15. The said arm will, therefore, engage the said escapement lever and move the same into contact with the stop finger 37, whereupon the said parts will be stopped until again released.

The spring-pressed dog 23 permits the weight 25 to be raised and the sprocket 22 to be rotated backward, as then required, without moving the driving shaft 13 or its cranks.

To prevent too limited movement of the arm 15, when released, and under the action of the weight 25, I provide a dashpot 51 which is secured to the lower portion of the base 10 and contains a liquid, preferably oil. Working within this dashpot is a piston 52 which has a leakage passage, such as a small perforation 53. This piston 52 is connected by a long crank rod 54 to the heretofore noted crank pin 19 of the main arm 15.

The arm 15 is preferably, and as shown, in the form of an arm but it might take other forms. It, together with its shaft, may be properly designated as a crank drive or carrier, because it drives or carries the cranks or elements for manipulating the dampers, or for doing other useful work.

What I claim is:

1. In a motor of the kind described, the combination with a rotary drive movable in a constant direction and having diametrically projected stop arms, of a rotary escapement lever having diametrically extended arms, the arms of said drive having lateral projections for direct engagement of the arm with said escapement lever, an escapement stop engageable directly with the free ends of the arms of said escapement lever to normally hold said lever against rotation, and tripping means for said escapement stop.

2. In a motor of the kind described, the combination with a rotary drive movable in a constant direction and having diametrically projected stop arms, of a rotary escapement lever having diametrically extended arms, the arms of said drive having lateral projections for direct engagement of

the arm with said escapement lever, an escapement stop engageable directly with the free ends of the arms of said escapement lever to normally hold said lever against rotation, tripping means for said escapement stop, and a spring device yieldingly operative on said escapement lever to hold the same within the path of movement of the lateral projection of the arms of said drive, when said escapement lever is released from said escapement stop.

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

WILLIAM LARSON.

Witnesses:
CLARA DEMAREST,
BERNICE G. WHEELER.

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