(No Model.) 3 Sheets—Sheet 1.

J. A. LAKIN.

DAMPER OPERATING MECHANISM FOR HEATING APPARATUS.

No. 322,186. Patented July 14, 1885.

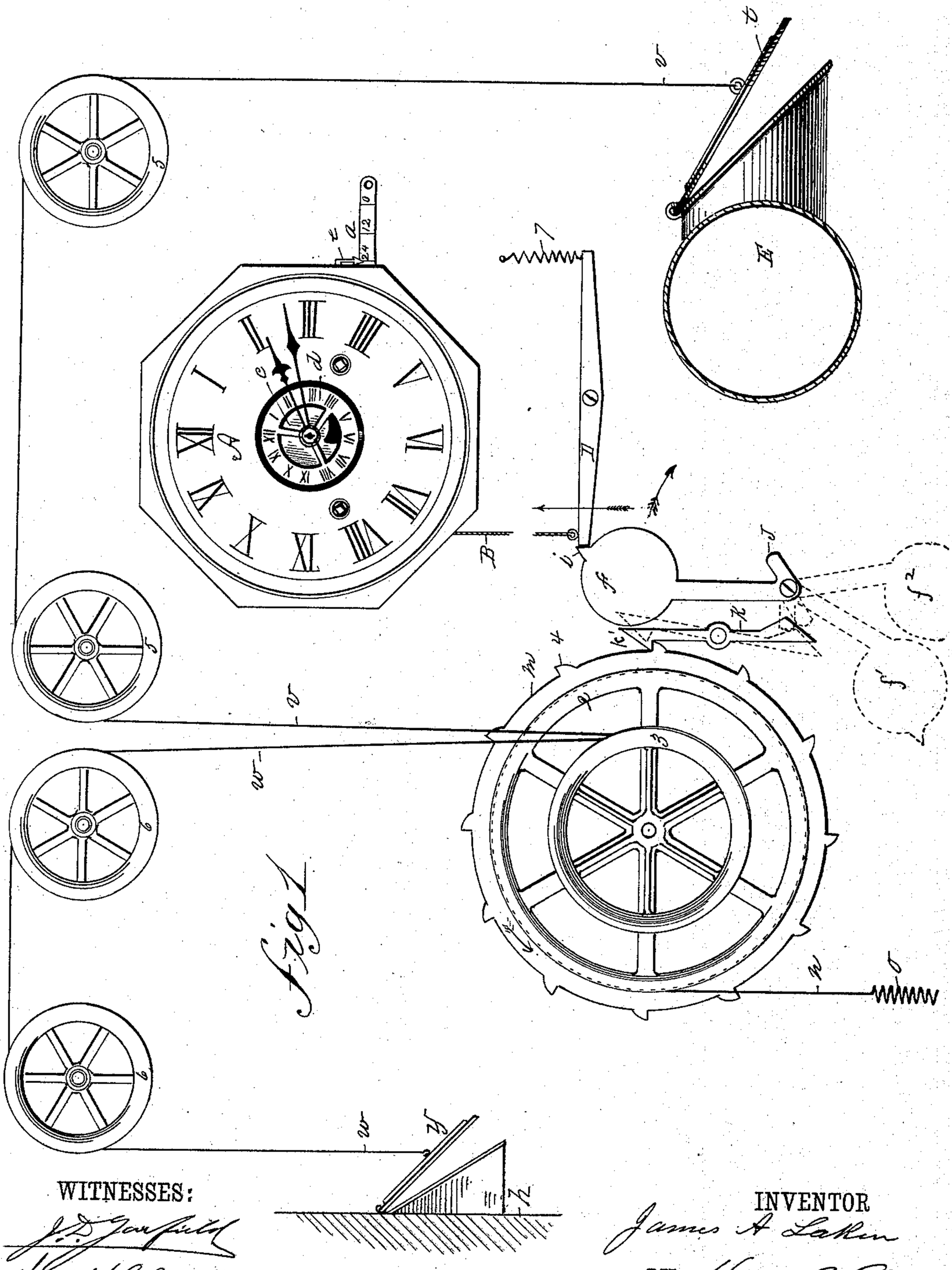

Fig. 1.

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Fig 2

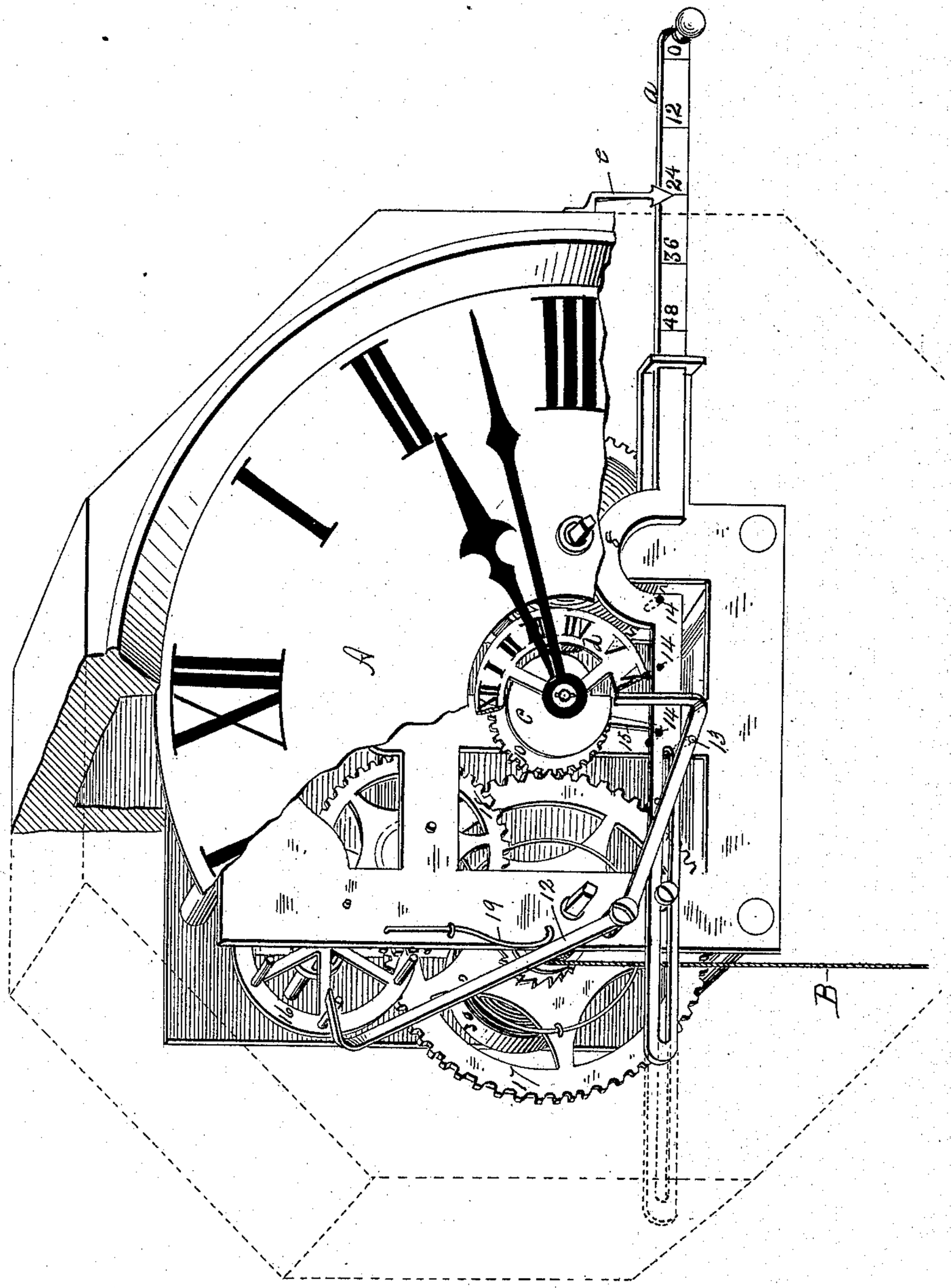

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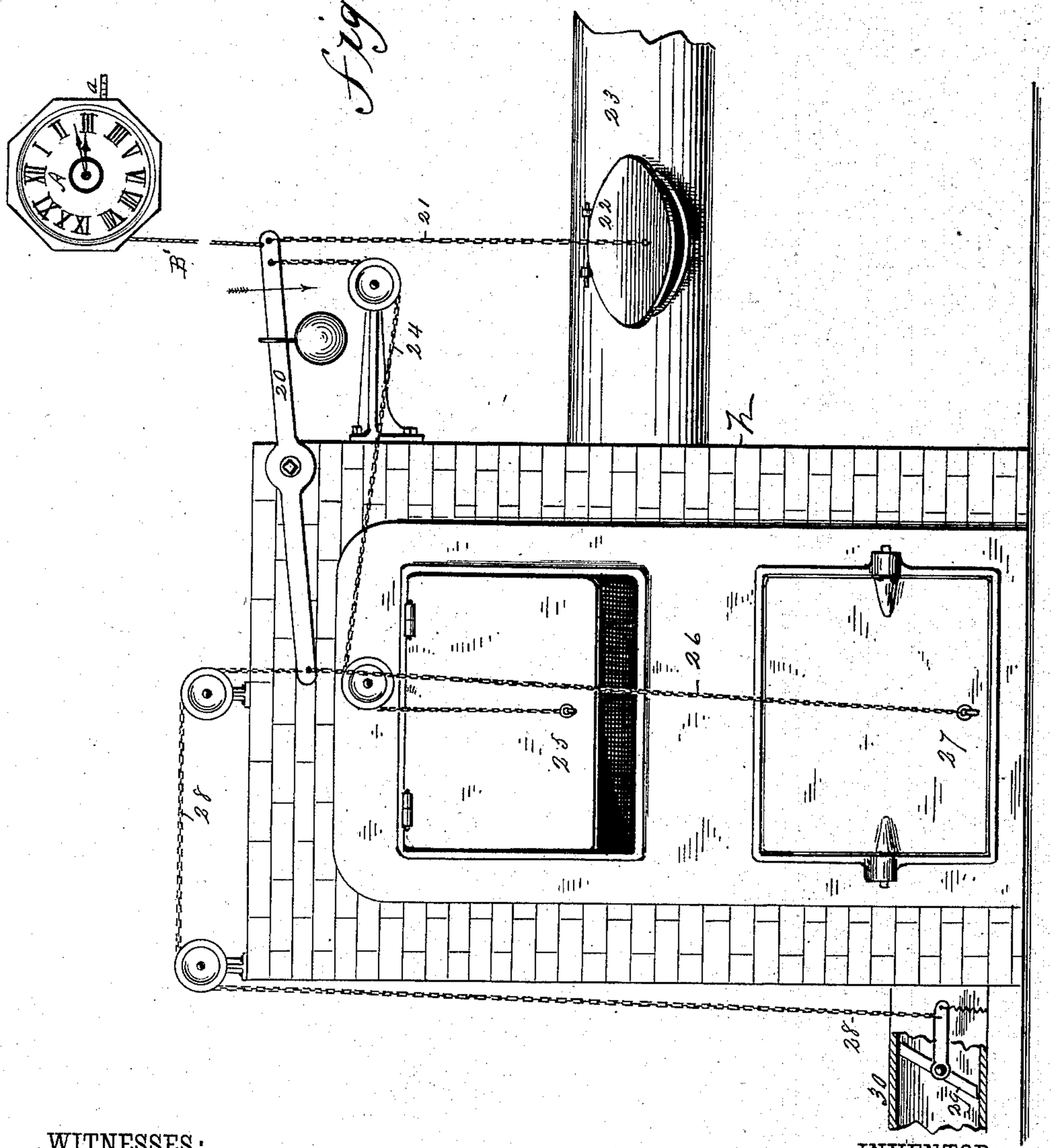
Fig 3.



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UNITED STATES PATENT OFFICE.

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DAMPER-OPERATING MECHANISM FOR HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 322,186, dated July 14, 1885.

Application filed January 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. LAKIN, a citizen of the United States, residing at Westfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Damper-Operating Mechanism for Heating Apparatus, of which the following is a specification.

This invention relates to improved mechanism for automatically operating to open and close the doors and to regulate the cold-air supply and the draft of furnaces and other similar heating apparatus, the object being to provide means for retaining the combustion-controlling devices of heating apparatus in a fixed position for a predetermined period of time, and which, at the end of said period, will automatically operate said devices for varying the heat of the furnace.

In the drawings forming part of this specification, Figure 1 illustrates a combination of mechanical devices connected with the dampers of heating apparatus embodying my invention. Fig. 2 is a view, partly in section, of the clock and damper controlling mechanism directly connected therewith. Fig. 3 illustrates a modification of the arrangement of the intermediate connections between the clock and the furnace-dampers and the manner of connecting more parts with the clock than is shown in Fig. 1.

In the drawings, A is a clock, provided with the usual alarm-dial, *d*, alarm-cam *c*, and substantially the ordinary alarm-train, consisting of the spring-and-drum wheel 17 and the wheels 18 and 16. A trip-lever, 12, is pivoted on the clock-frame, one end of which lever is adapted to engage with the stop-pins on wheel 16, and the other end of it to bear on the edge of the cam *c* when free to do so. A spring, 19, operates to disengage the upper end of the lever 12 from the pins on wheel 16, and to hold its lower end against cam *c*, or to incline it to move upward. A sliding bar, *a*, is properly supported on the clock in such manner as to permit its being easily moved back and forth. The bar *a* is provided with graduated marks, as shown, near which are the figures 48, 36, 24, and 12, indicating so many hours. A pointer, *e*, attached to the clock-case, has its end hanging in front of bar *a* as a guide, indicating where to move the bar, for a purpose hereinafter set forth. The lower edge of bar *a* is straight, excepting at one point, 8, where it is given a curved or other out-of-line form, and a series of pins, 14, is inserted in the bar projecting rearwardly. A pin, 13, is inserted in lever 12, which pin reaches under bar *a*, and while the bar is in the position shown in Fig. 2 prevents the lower end of said lever from bearing on cam *c*, and its upper end from swinging away from the pins on wheel 16. The hour-hand wheel 10 of the clock A has an arm, 15, attached to it, which is adapted at each revolution of said wheel to engage with one of the pins 14 and slide-bar *a*. The usual spring, 30, on wheel 17 is arranged, in operating the devices shown in Fig. 1, to wind the cord B onto the drum on the shaft, thus drawing in the cord; but in other arrangements of the intermediate devices operating between the clock and the furnace, as in Fig. 3, said devices are adapted to be let go by freeing the cord-train in the clock and letting the cord run out.

In Fig. 1, *h* indicates a side of the furnace, and *y* an air-door, adapted by opening it to reduce the draft and cause the fire to burn less violently, and E indicates a part of the smoke-pipe leading from the furnace, on which is a short arm on which is pivoted an air door or damper, *t*, also adapted by opening it to reduce the draft on the furnace.

The above-named dampers *y* and *t* illustrate certain kinds of such devices; but it is obvious that other descriptions of oscillating or of sliding dampers may be operated by the mechanism herein shown. The doors or dampers *y* and *t* have attached to them, respectively, the cords *w* and *v*, which run over the pulleys 6 and 5, and thence to the wheel *m*, and are attached to the periphery of a ring, 3, formed on one side of the arms of said wheel. A cord, *n*, is attached to the rim of wheel *m*, and a spring, *o*, attached to any convenient object below the wheel, is attached to the last-named cord. A stop-lever, *k*, is pivoted near the rim of wheel *m*, having a hook, *k'*, on one end, adapted to engage with the teeth 4 on said wheel and prevent it from being rotated when the parts are in the position shown in Fig. 1. A lever, *f*, having an overhanging disk-shaped

or other suitable head, on which is a projection, *i*, and having an arm, J, thereon, is pivoted by the side of the stop-lever *k*. The lever *f* is adapted to swing over, causing the arm J to strike the lower end of lever *k*, bringing said two levers to the positions shown in dotted lines *f* in Fig. 1, whereby lever *k* is disengaged from wheel *m*, and the latter is free to rotate by the action of spring *o* and the weight of the dampers *y* and *t*, letting the latter close, when lever *f* will swing to a perpendicular at f^2, bringing arm J away from the lower end of lever *k*, leaving the latter free to again swing into engagement with the teeth on wheel *m*. A lever, D, is pivoted under the clock A, to one end of which is attached the spring 7, and to its opposite end is attached the end of the cord B, which winds onto the drum of the wheel 17 in the clock A. Lever D is placed in such position as to bring one end thereof directly before the projection *i* on lever *f* and hold the latter upright until the wheel 17 operates drawing-up cord B, when the end of said lever is lifted, letting lever *f* fall, as aforesaid.

When the apparatus is set to cause the furnace-dampers to be operated by the clock within a few hours, or less than twelve, the sliding bar *a* is not brought into action, but is moved to the left to bring the out-of-line space 8 over the pin 13 far enough to let the end of lever 12 rise up and rest on the edge of the cam *c*. Lever 12 being left thus, the dial *d* is set at the hour it is desired that the furnace-dampers shall be operated, and meanwhile the upper end of lever 12 is engaged with the pin on wheel 16, preventing the train of three wheels from turning, lever D having been brought against projection *i* on lever *f*. Said train is now wound up, and the devices operate, as aforesaid, upon the furnace-dampers, when the hour arrives to which the dial *d* was set, by the dropping of the lower end of lever 12 into the deep part of cam *c*, and letting the said train run and lift up the end of lever D.

The furnace-dampers are set to any desired degree of opening by turning wheel *m*, either before or after setting the clock.

The purpose of the sliding bar *a*, with its space 8 therein, is to provide a suitable stop to prevent the operation of the dampers until after twelve, twenty-four, or more hours, as indicated by the figures on the bar. Therefore, when it is desired that the dampers shall be closed twenty-four hours after the dial *d* is set, bar *a* is drawn to the right until pointer *e* stands at 24. The subsequent rotation of the hour-hand wheel 10 causes the arm 15 to be brought at each revolution against one of the pins 14, whereby at the proper time, as above described, the trip-lever 12 is let rise against cam *c*, and is by the latter made to let off the train at the proper time.

In Fig. 3 the lever 20 is connected with the oscillating damper 29 in the cold-air pipe 30 by the chain 28, with the feed-door of the furnace 25 by the chain 24, with the air-door 27 thereof by the chain 26, and with an air-door, 22, on the smoke-pipe 23 by the chain 21, and by the movement of the outer end of said lever in the direction indicated by the arrow, when permitted by the running out of cord B′ from the clock A, the movement of the damper is controlled, as aforesaid. The weight on lever 20 is a counterbalance to the weight of the dampers.

The lever 20 and its weight are substantially the equivalents of the wheel *m* and the spring *o*, and the devices in Figs. 1 and 3 illustrate different means for carrying out this invention without departing therefrom.

What I claim as my invention is—

1. A damper, a weight or its equivalent arranged to move the same when free to do so, a series of levers and connections (as cords or chains) for controlling said weight, and a clock mechanism engaging one of the levers, all in combination, substantially as described.

2. The combination, with a clock, a pivoted lever actuated thereby, and a shifting bar, whereby the clock may operate the lever after a period of more than twelve hours, of a trip-lever arranged to engage said bar and a train of mechanism leading therefrom to the damper to be operated, substantially as set forth.

3. In a clock, the combination, with the dial *d*, the cam *c*, and a trip-lever adapted to engage with said cam, of a sliding bar arranged, as described, to be moved by the clock and to control the trip-lever, so that said bar is capable of being adjusted to permit said cam to rotate one or more times before acting on said lever, substantially as set forth.

4. In combination with the clock A, its train of wheels 16 17 18, lever 12, and cam *c*, the hour-wheel 10, having arm 15 thereon, the bar *a*, having means thereon, substantially as described, for the engagement of said hour-wheel therewith, and the out-of-line space 8 in said bar, and the pin 13 in lever 12, arranged to move into said space at the proper time, substantially as set forth.

5. In combination, the trip-lever 12, having pin 13 thereon, the sliding bar *a*, having the space 8 therein, into which the pin 13 is allowed to swing by the movement of the bar, the clock A, and means, substantially as described, for moving said bar periodically, substantially as set forth.

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Witnesses:
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ASA P. RAND.