(Model.) 2 Sheets—Sheet 1.

A. KELLY.

TEMPERATURE REGULATOR.

No. 457,280. Patented Aug. 4, 1891.

Fig. 2.

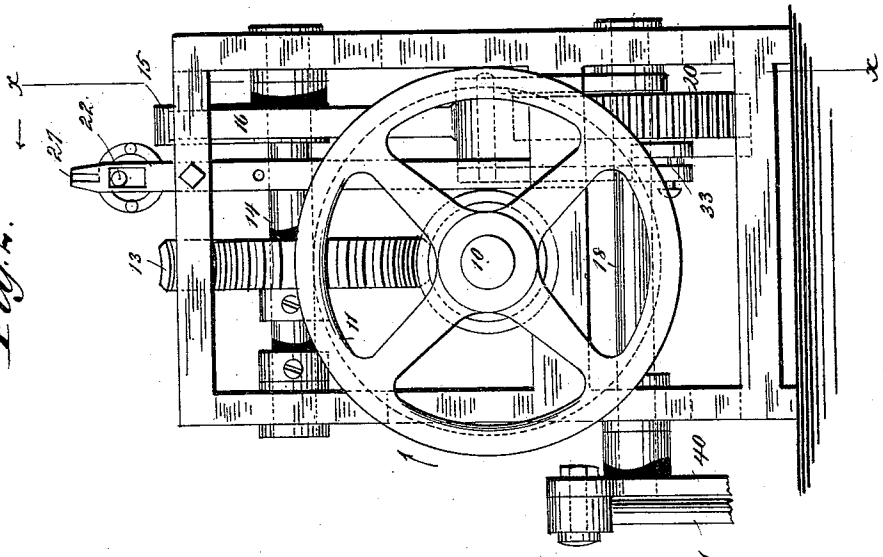
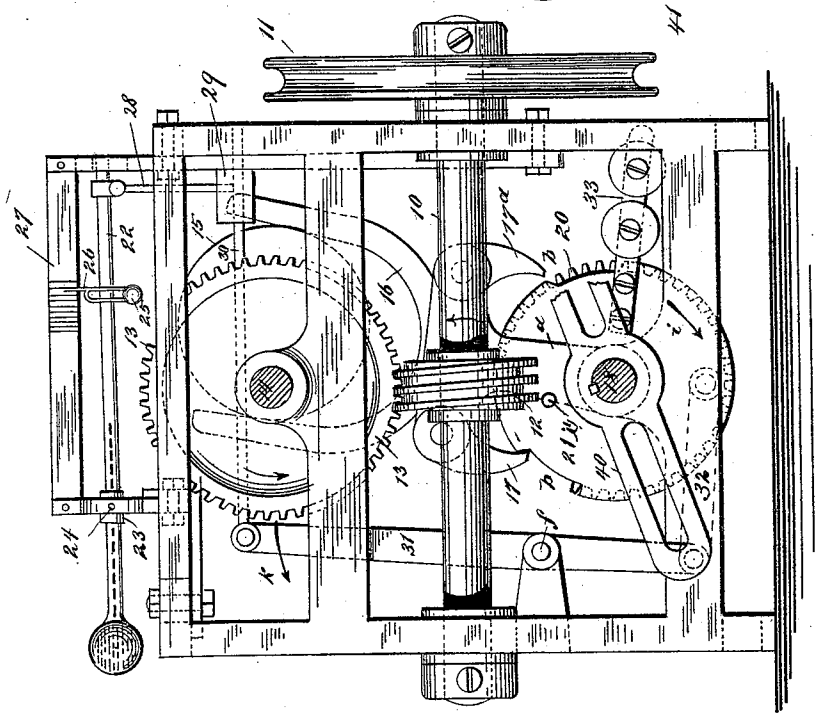


Fig. 1.



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(Model.) 2 Sheets—Sheet 2.

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Fig. 8

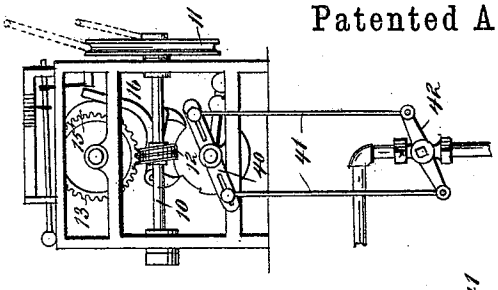


Fig. 5

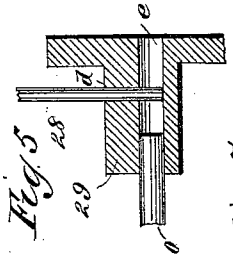


Fig. 7

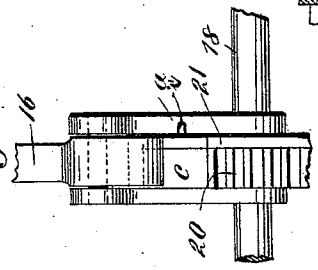


Fig. 4

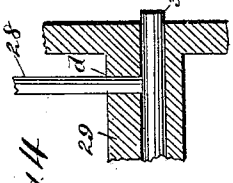
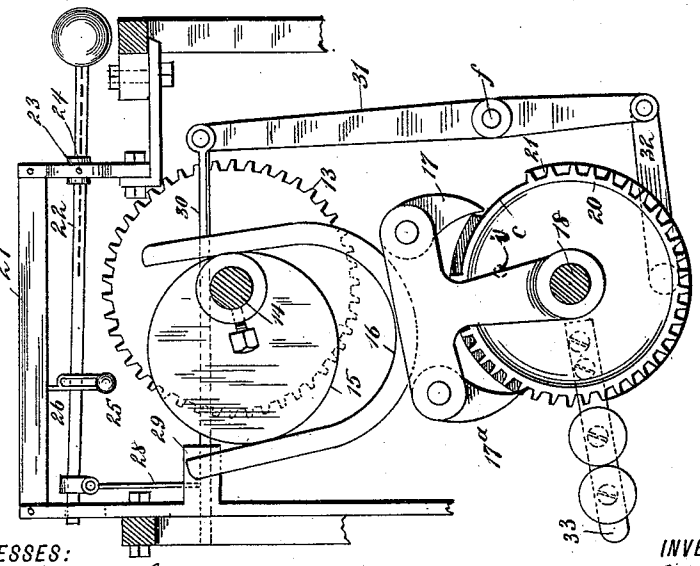


Fig. 6

Fig. 3.



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UNITED STATES PATENT OFFICE.

ADAM KELLY, OF SMITHFIELD, RHODE ISLAND.

TEMPERATURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 457,280, dated August 4, 1891.

Application filed August 21, 1889. Serial No. 321,534. (Model.)

To all whom it may concern:

Be it known that I, ADAM KELLY, of Smithfield, in the county of Providence and State of Rhode Island, have invented a new and Improved Temperature-Regulator, of which the following is a full, clear, and exact description.

This invention relates to an apparatus designed to regulate the temperature of any shop or apartment that is heated by steam, hot water, hot air, or any other heating medium that is conducted to the place to be heated through pipes or conduits, the supply of the heating medium being controlled by a valve.

In carrying my invention into practice I employ a pivotally-mounted thermometer-tube, a ratchet-wheel which controls a valve-operating lever, and connections such that when the temperature rises above or falls below a predetermined normal point the ratchet-wheel will be moved in a proper direction to close or open the valve, as the circumstances of the case require, all as will be hereinafter more fully explained, and specifically pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a face view of my temperature-regulator. Fig. 2 is an end view thereof. Fig. 3 is a sectional elevation on line $x\,x$ of Fig. 2. Fig. 4 is a detail view of a portion of the machine, the parts being shown as they appear when the temperature is below the normal point. Fig. 5 is a similar view, the parts, however, being shown as they appear when the temperature is above the normal point. Fig. 6 is a detail view of the ratchet and valve-lever shaft, the parts carried by said shaft being shown in section on a line that is parallel with the shaft-axis. Fig. 7 is a detail view of a portion of the ratchet, one of its pawls, and the ratchet-shield; and Fig. 8 is a front view of the regulator on a reduced scale, the view being given to illustrate the connection with the valve.

In the drawings, 10 represents the main shaft, which is provided with a driving-pulley 11 and a worm 12, said worm engaging a worm-gear 13, that is mounted on a shaft 14. This shaft 14 carries a cam 15, in connection with which there is arranged a yoke 16, that is provided with pawls 17 and 17^a, the yoke being loosely upheld by a shaft 18, that passes through the lower bifurcated end a of the yoke. Between the arms of the yoke end a I mount a ratchet 20, that is fast on the shaft, and a ratchet cam-disk 21, that is loose on the shaft, the general peripheral face of the cam-disk projecting slightly beyond the extending ends of the ratchet-teeth; but in this general peripheral face I form recesses b and I cut away a portion of the ratchet-teeth, as shown at c. The purpose of the above-described construction will be presently explained.

Above the shaft 14, or in any other convenient position, I mount a thermometer-stem 22, said stem being held by a sleeve 23, that is provided with trunnions 24, said trunnions riding in bearings carried by the main frame, and upon the thermometer-stem I mount an adjusting-weight 25, which has a pointer 26 that operates in connection with a scale 27. (See Fig. 1.) To the extending end of the stem 22 I connect a depending rod 28, the lower end of said rod riding in a vertical aperture d, formed in a bracket 29, in which bracket there is a horizontal aperture e, that is arranged to receive one end of a transverse rod 30, this rod being pivotally connected to the upper end of a lever 31, that is fulcrumed at f, the lower end of the lever being connected to the cam disk or plate 21 by a link 32. The cam disk or plate 21 is provided with a weighted lever-arm 33, the tendency of said arm being to carry the cam-disk in the direction of the arrow marked i and shown in Fig. 1. This movement is, however, limited by a pin i', which projects from the face of the shield 21 and bears normally against the yoke 16, as shown, so that while the weighted arm 32 moves the rod 30 in one direction the yoke 16 moves it in the other. In other words, said rod is held in normal position, Fig. 1, by the weighted arm 32, acting through the medium of shield 21, link 32, and lever 31; but, on the other hand, the rod 30 is moved to the left and thus withdrawn from its normal position beneath the depending rod 28 by movement of the yoke 16 to the left, in which case the latter turns the shield 21 by means of engagement with the pin i'. To

one end of the shaft 18 I secure a lever 40, which is connected by one or two links 41 with a lever 42, that is secured to the valve-stem, one link being sufficient if the distance between the levers 40 and 42 is small, but two links being employed when such distance is great.

In operation a rotary motion is imparted to the shaft 10 from any proper source of power, and then when the temperature is normal the pawl 17 will ride over the untoothed section of the ratchet 20, while the pawl 17^a will ride on the peripheral face of the shield 21 out of contact with the ratchet-teeth. Should the temperature, however, fall below the normal point, the globe end of the stem 22 will overbalance the end to which the depending rod 28 is secured, and such rod will be raised clear of the bracket-recess *e*, thus permitting the weighted lever 33 to act to carry the cam-disk 21 in the direction of its arrow *i*, which movement of the cam-disk will leave a section of the ratchet-teeth exposed upon the right, Fig. 1, through the right-hand cam-disk recess *b*, and then as the yoke 16 is rocked by its cam 15 the ratchet 20, and with it the shaft 18, will be advanced step by step and the valve will be opened. At every throw of the yoke 16 the lever 31 will be borne upon by the adjacent yoke-arm and carried in the direction of the arrow *k*, Fig. 1, this movement of the lever acting to draw the rod 30 outward from beneath the rod 28, so that as soon as the temperature is raised to the normal point the said rod 28 will be free to drop down in front of the rod 30, and then the pawl 17^a will come into play to impart a reverse motion to the ratchet and the valve will be closed.

Now, although I have described a specific connection between the tilting thermometer-stem and the valve, I desire it to be distinctly understood that such connections could be made in many ways without departing from the spirit of my invention, the essential feature of which is a tilting thermometer-stem, as hereinbefore set forth.

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

1. In a temperature-regulator, the combination of a pivotally-mounted thermometer-tube, a detent carried by it, and valve-operating mechanism which said tube controls, the same consisting of a counterbalanced cam-disk having a pin projecting from its face, a sliding rod, and a lever for connecting said disk and rod, a mutilated pinion, and a pawl-carrying yoke mounted on a shaft 18, substantially as shown and described.

2. In a temperature-regulator, the combination of a pivotally-mounted thermometer, a detent carried by it, a counterbalanced cam-disk having a pin on its face and recessed, as specified, and also mounted loosely on the valve-operating shaft, a mutilated gear fast on the latter, a pawl-carrying yoke loose on the same shaft, lever mechanism for connecting the latter, a cam 15, working between the arms of said yoke, the gear 13, working with the latter, the driving-shaft 10, and its worm engaging said gear, substantially as shown and described.

3. In a temperature-regulator, the tilting thermometer-tube and a weighted pointer and detent carried by it, in combination with valve-operating mechanism consisting of a sliding rod, the cam-disk having peripheral recesses and a lateral pin, the lever mechanism connecting such disk with the aforesaid rod, the pawl-carrying yoke, the shafts 10 and 18, and cam and gearing, substantially as shown and described.

4. In a temperature-regulator, the combination, with a shaft 18, from which the valve is operated, of a mutilated pinion fast thereon, a counterbalanced cam-disk loosely mounted on the shaft and having peripheral openings or recesses and projections, as described, a rocking pawl-carrying yoke mounted on the shaft, a pin on said shield, which is adapted to engage the yoke, a weighted lever 33 and the lever connected at one end with the shield and a sliding rod attached to its other end, and a tilting thermometer-tube having a detent projecting into the path of said rod, substantially as shown and described.

ADAM KELLY.

Witnesses:
ANDREW J. KELLY,
JAMES HARRIS.