No. 633,191. Patented Sept. 19, 1899.

E. H. GRIFFITHS & W. C. D. WHETHAM.

MECHANISM FOR CONTROLLING AND INDICATING TEMPERATURE LIMITS.

(Application filed July 1, 1899.)

(No Model.) 2 Sheets—Sheet 1.

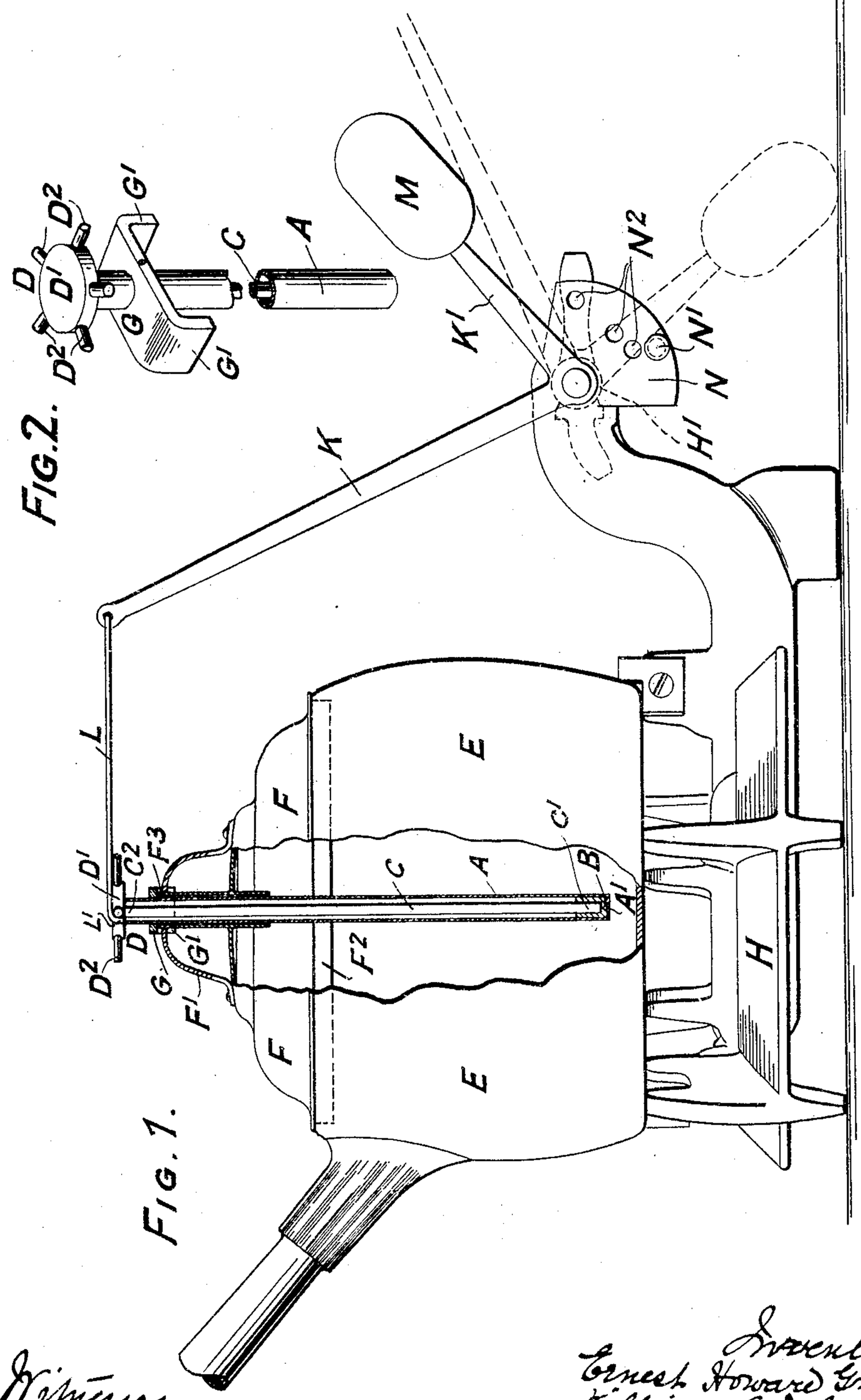

FIG. 2.

FIG. 1.

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FIG. 3.

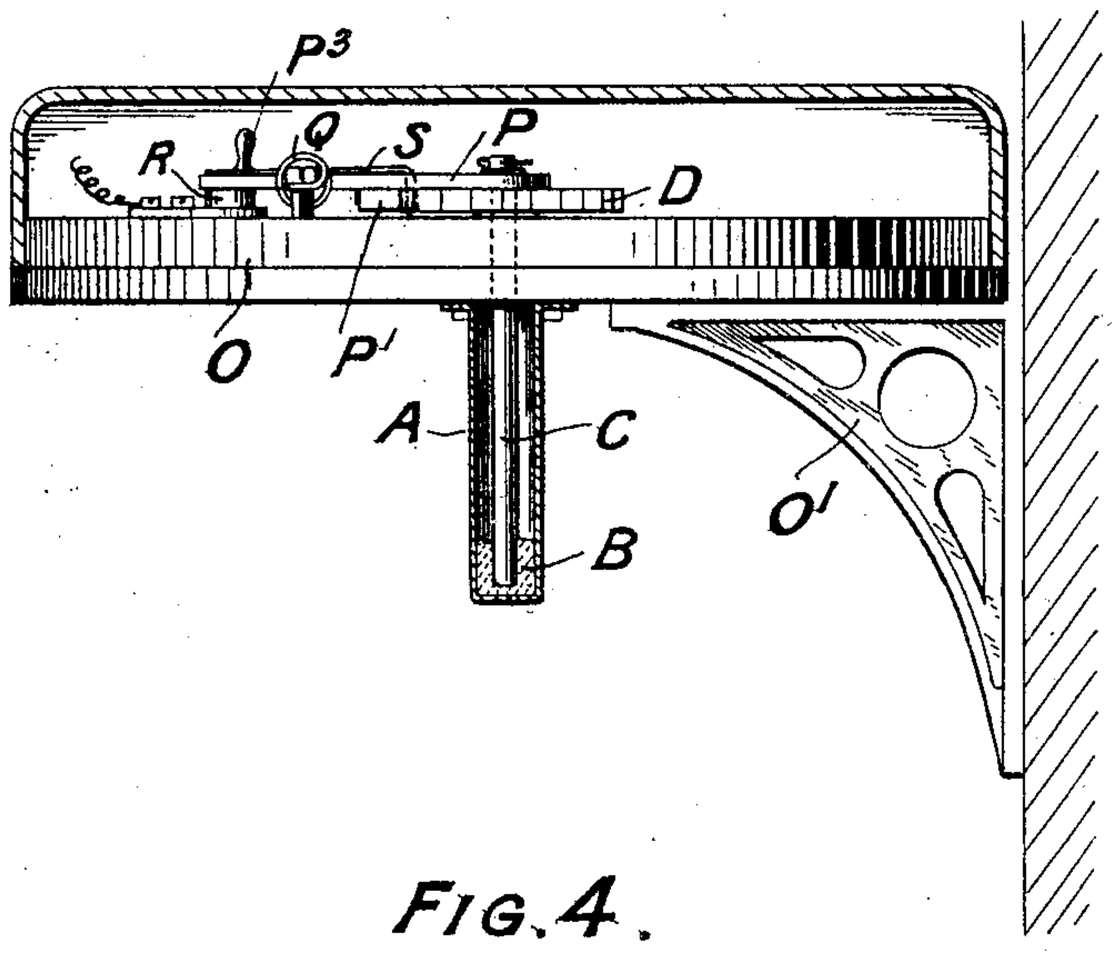
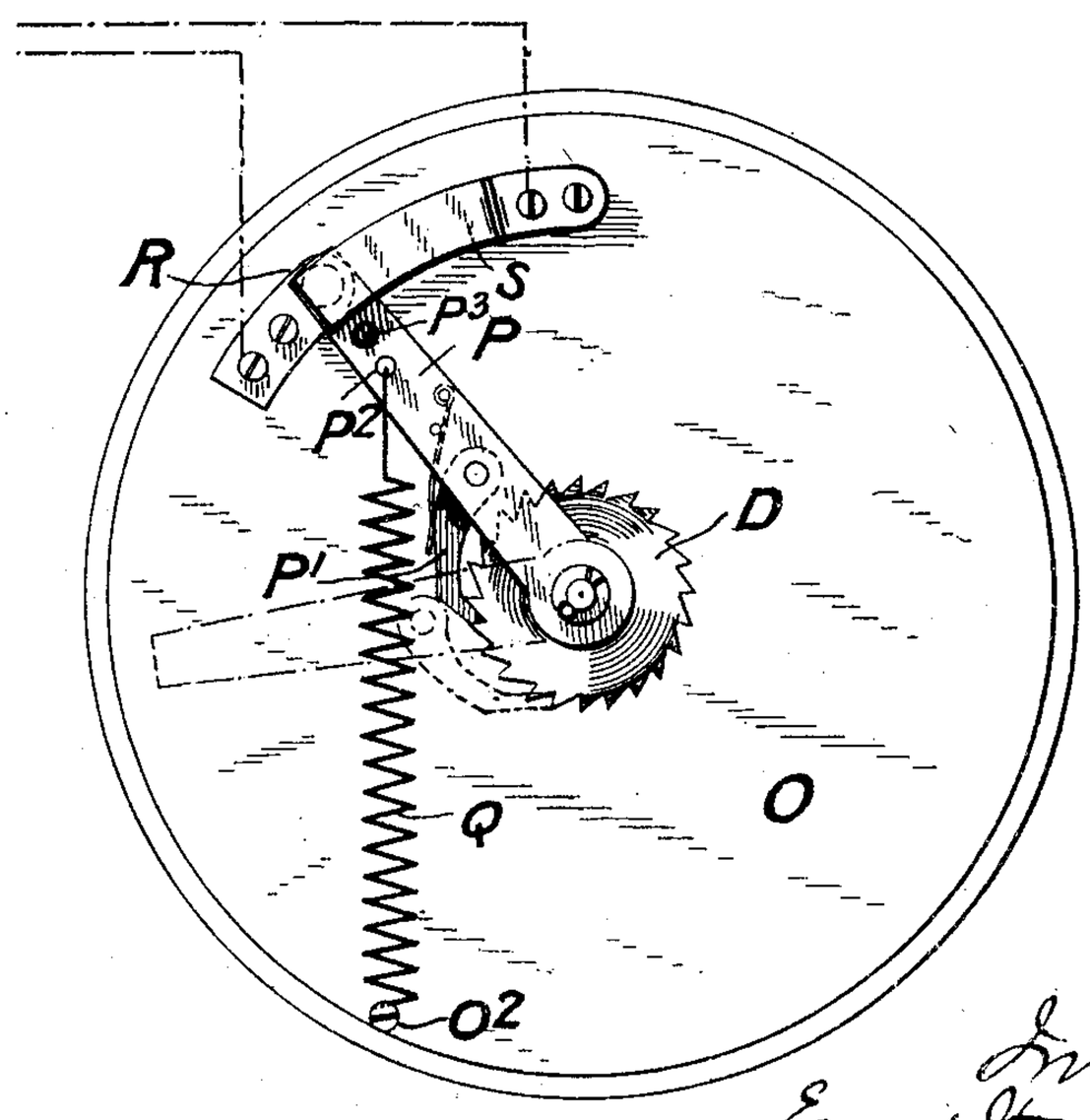


FIG. 4.



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UNITED STATES PATENT OFFICE.

ERNEST HOWARD GRIFFITHS AND WILLIAM CECIL DAMPIER WHETHAM,
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MECHANISM FOR CONTROLLING AND INDICATING TEMPERATURE LIMITS.

SPECIFICATION forming part of Letters Patent No. 633,191, dated September 19, 1899.

Application filed July 1, 1899. Serial No. 722,552. (No model.)

To all whom it may concern:

Be it known that we, ERNEST HOWARD GRIFFITHS and WILLIAM CECIL DAMPIER WHETHAM, subjects of the Queen of England, residing at Cambridge, England, have invented certain new and useful Improvements in or Relating to Mechanism for Controlling and Indicating Temperature Limits, (for which we have made application for Letters Patent in Great Britain, under No. 5,089, dated March 8, 1899,) of which the following is a specification.

This invention relates to mechanism for controlling and indicating temperature limits, and has for its object to construct a mechanism which will be capable of being readily reset after it has operated.

According to this invention a rotatable member controlled by a force is held inactive by a fusible lock until a temperature has been reached which will bring about the fusing of this lock. Mechanism is provided tending to rotate this member, there being an operative connection between the driving mechanism and the member of such a nature that the apparatus can always be reset without having to renew or re-fuse the fusible lock.

In applying the invention the fusible lock is formed by a small quantity of alloy metal or other suitable substance contained in a tube, one end of which is closed, the rotatable member being a rod, one end of which is immersed in the alloy in the tube. Upon the outer end of the rod may be mounted a ratchet-wheel, a star-wheel, or some other equivalent device which will enable the connection between some mechanism tending to rotate this rod to be reset at any time after a temperature limit has been reached which will bring about the fusing of the alloy, this resetting device being such that no refusion or renewal of the alloy or other parts of the mechanism is necessary in order to restore the apparatus to its operative state.

In the accompanying drawings, Figure 1 is an elevation, partly in section, showing one application of this invention for the purpose of controlling the limit of the temperature employed for heating a liquid such as milk. Fig. 2 is a perspective view of the alloy-containing tube. Fig. 3 is a sectional elevation of the invention as applied for use as an indicator of temperature limits, as in the case of a fire-alarm. Fig. 4 is a plan of Fig. 3, the inclosing-casing of the mechanism being removed.

Like letters indicate like parts throughout the drawings.

The tube A has one end A′, closed and at this closed end of the tube is placed a small quantity B of an alloy metal or other suitable substance which will fuse or become viscous or fluid at a given temperature. A rod C is placed in the tube A in such a manner that one end C′ will be immersed in the alloy B, the latter forming a lock between the tube A and the rod C. Upon the outer end C^2 of the rod C is fixed a ratchet-wheel, star-wheel, or equivalent device D.

In applying the invention to an apparatus such as is shown in Fig. 1 for heating fluids such as milk a saucepan or pot E of ordinary construction is utilized, this pot having a lid F, provided with a handle F′ and a flange F^2, which just fits within the top of the pot E, this lid being of the usual construction. A hole F^3 is bored through the handle F′ and the part of the lid F which lies beneath the handle, the hole being of such a size as to allow the ready passage of the tube A. Attached to the top of the tube A is a strip of metal G, the ends of which are turned down, as at G′, the space between the turned-down ends being approximately equal to the width of the handle F′ of the lid F. If now the alloy-carrying tube A is passed through the hole F^3 in the handle F′ and lid F and the flanges or turned-down ends G′ of the strip G are placed so as to lie at either side of the handle F′, it will be seen that the tube will be rigidly held in relation to the lid F, which in turn will be practically rigidly connected with the pot E, owing to the friction between the flange F^2 and the top of the pot. In this case a star-wheel D is mounted upon the upper end C^2 of the rod C, this star-wheel being constructed, as shown in the drawings, of a disk D′, provided with several radially-projecting fingers D^2.

In the arrangement shown in Fig. 1 the pot E is intended to be heated by the flame from a gas burner or stove H of some well-known

construction, the burner being provided with a cock H′ for controlling the supply of gas thereto. On the spindle of this cock is rigidly mounted a bell-crank lever K K′, the arm K of which has pivotally connected to its free end a link L, having at its free end a hook or bent finger L′. The other arm K′ of the bell-crank lever is provided at its free end with a weight M. The parts are so arranged that when the pot E is on the stand of the burner H the hook L′ on the end of the link L can be engaged with one of the fingers D^2 of the star-wheel D, the weight M being thus held in a raised position and the gas-cock H′ being open. If now the contents of the pot E reach that temperature at which the alloy B in the tube A will fuse, the fusion of this alloy will release the rod C, which the weight M, through the lever K K′ and link L and star-wheel D, is always tending to rotate. The rod C, thus released, will be rotated, when the hook L′ will slide off and become disengaged from the finger D^2 of the star-wheel D, and the weight M, thus released, will fall, thereby turning the lever K K′ and the cock H′ and shutting off the gas. As the alloy will once more become solid directly the temperature falls below the limit, the star-wheel D will once more be rigidly connected to the lid of the pot, and the apparatus can be reset by engaging the hook L′ with another finger on the star-wheel D.

If it is desired that in place of completely shutting off the gas the latter may be only partially turned off, and thus the supply of heat to the pot E merely reduced and not entirely stopped, a quadrant-plate N may be mounted adjacent to the cock H′, and by means of a pin N′, which can be inserted in holes N^2 in the plate N, the movement of the lever K K′, and consequently of the cock H′, can be arrested at any desired point. Of course, if preferred, the quadrant-plate N may be mounted upon the lever K K′, a stop-pin being suitably arranged on the burner adjacent to the cock and in such a position that it will come in contact with the pin N′ on the plate N when the latter is moved.

In the construction illustrated in Figs. 3 and 4 the force tending to rotate the rotatable member C is that of a coiled spring. The tube A, containing the fusible lock B, is rigidly attached to a plate O, provided with a flange or bracket O′ for enabling it to be attached to a wall or the like. The rod C carries on its upper end a ratchet-wheel D, and pivoted either on an extension of the rod C or on a concentric pin is a lever P, carrying a spring-controlled pawl P′, which engages with the ratchet-wheel D. A coiled spring Q is attached at one end to the plate O at some point O^2, the other end of the spring being attached to the lever P at some point, such as P^2. The lever P is provided with a projecting pin P^3 for enabling it to be readily moved by the finger. The lever P is entirely or partially composed of insulating material and can be moved about its pivot, so as to be brought between two electric contacts R and S. The contact R consists of a metal stud in the plate O and insulated from this plate. The contact S consists of a metal spring-strip, the end of which lies over the contact-arm. The contacts R and S may be connected up in any electrical circuit—for example, an electric-bell circuit; but the circuit might well include mechanism for performing some operation, such as turning on water-sprays or the like. In its normal position when set the lever P is rotated until it lies between the contacts R and S, the lever being retained in this position by the pawl P′, which engages with the ratchet-wheel D, which is in turn, together with the rod C, held rigidly by the fusible lock B. If now the temperature limit is reached, the alloy B will fuse and the rod C, ratchet-wheel D, and lever P will all be rotated by the spring Q, the removal of the insulating-lever P from between the contacts R and S completing the electrical circuit and ringing the alarm-bell or performing some other operation in accordance with the arrangement of the circuit. As soon, however, as the temperature falls below the limit the apparatus can be reset by merely moving the lever P about its pivot until it again lies between the contacts R and S, the pawl P′ passing smoothly over the teeth of the ratchet-wheel D. The apparatus will now be once more held in readiness for operation, owing to the lock B having again become solid.

It is to be understood that this invention is applicable to many and various purposes, the applications above described, and illustrated in the accompanying drawings, being merely by way of example. The above-described mechanisms may obviously be modified and adapted to meet various requirements. Thus in the case of the application of the invention for use in cooking the lever controlling the gas-supply or other source of heat may be spring-controlled instead of being weighted, or the pot may be carried upon a holder on the end of a rotatable spring-controlled or weighted arm which will be free to turn as soon as the alloy is fused. Again, in the case of the fire-alarm the electrical-contact-controlling lever may be operated by a weight instead of by a spring.

We claim—

1. In an apparatus for controlling and indicating temperature limits the combination of a fixed member, a relatively movable member, a fusible lock between the fixed and movable members, mechanism tending to move the movable member and an operative connection which is between the movable member and the mechanism tending to actuate it and is so constructed that it can be reset without necessitating renewal or refusion of the fusible lock.

2. In an apparatus for controlling and indicating temperature limits the combination

of a fixed member, a relatively movable member, a fusible lock between the fixed and movable members, mechanism tending to move the movable member and a ratchet-and-pawl connection which is between the movable member and the mechanism tending to actuate it and enables the apparatus to be reset without necessitating the renewal or refusion of the fusible lock.

In testimony whereof we have hereto set our hands in the presence of the subscribing witnesses.

ERNEST HOWARD GRIFFITHS.
WILLIAM CECIL DAMPIER WHETHAM.

Witnesses:
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