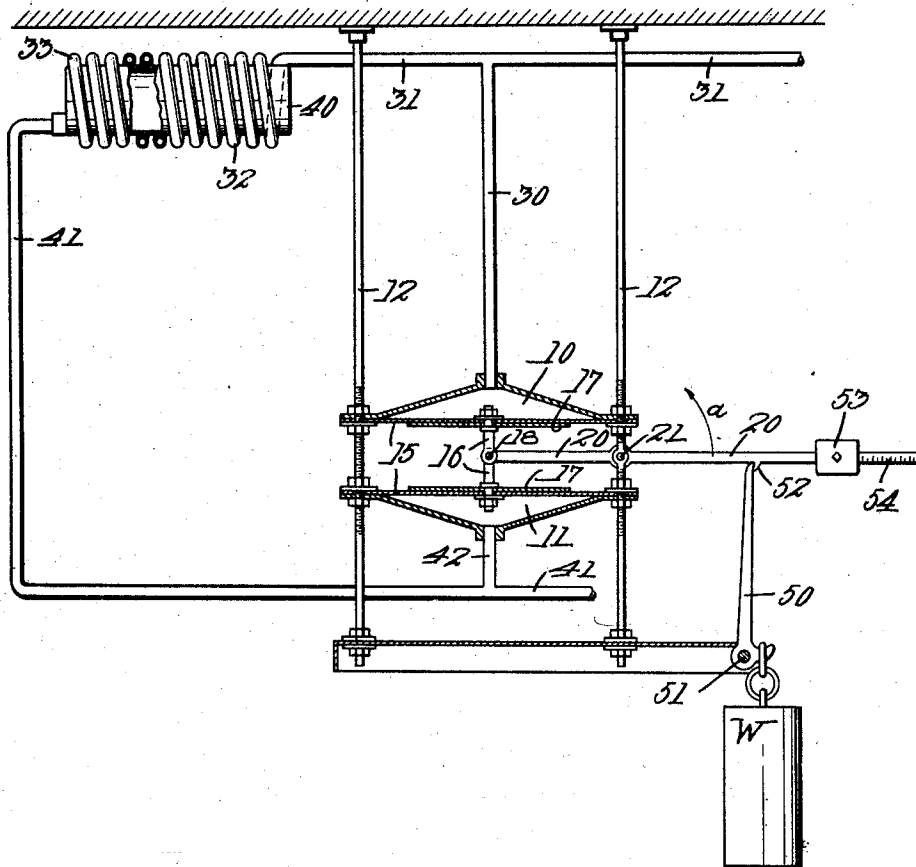


Aug. 18, 1931.

G. I. ROCKWOOD
HEAT ACTUATED MECHANISM
Filed May 5, 1930

1,819,124



Inventor
George I. Rockwood
By Attorneys
Southgate Fay & Hawley

UNITED STATES PATENT OFFICE

GEORGE I. ROCKWOOD, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO ROCKWOOD SPRINKLER COMPANY OF MASSACHUSETTS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

HEAT ACTUATED MECHANISM

Application filed May 5, 1930. Serial No. 450,005.

This invention relates to a heat-actuated mechanism for releasing a weight or initiating other mechanical or electrical effects.

It is the object of my invention to provide a mechanism in which the operation is determined by the rate of rise in temperature of the adjacent atmosphere, but is independent of the actual temperature.

A further feature of the invention relates to the provision of a mechanism in which a definite and predetermined resistance is provided to the operation of the mechanism, so that a definite minimum differential resultant of pressures in two essential parts of the device must be developed before release or actuation of the mechanism controlled thereby.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawing which is a diagrammatic view, partly in section, showing the construction and relation of the several parts of my invention.

Referring to the drawing, my invention in the preferred form comprises a pair of pressure chambers 10 and 11 mounted on supporting rods 12, on which they may be adjustably secured in spaced relation. The chambers 10 and 11 are reversed in position relative to each other and their adjacent faces are closed by flexible diaphragms 15. A stud 16 is secured to the centers of the diaphragms 15 and serves to clamp discs 17 against the outer faces of the diaphragms 15. The center of the stud 16 is also pivotally connected at 18 to one end of a release lever 20 which is pivoted at 21 on one of the supports 12.

The upper chamber 10 is connected by pipes 30 and 31 to one end of a tubular coil 32, the opposite end of which is closed at 33. A receptacle 40 in the form of a closed cylinder, or of some other compact shape, is connected by pipes 41 and 42 to the lower pressure chamber 11. The closed receptacle 40 is preferably but not necessarily of such size and shape that it may be mounted within the coils of the tubular member 32. The pipes 31 and 41 may be extended to connect with pressure

chambers in additional pressure-controlled apparatus if so desired.

The lever 20 when moved in an anti-clockwise direction, as indicated by the arrow *a*, is designed to release a weight or to initiate some other mechanical or electrical effect. For the purposes of illustration, I have shown a trigger lever 50 pivoted at 51 and engaging a lug or projection 52 on the lever 20. A weight *W* may be hung on the lever 50 and when released the fall of the weight may be utilized to produce or initiate any desired effect. A sliding weight 53 is mounted on the lever 20, which may be graduated, as indicated at 54, to show the adjusted position of the weight.

Having described the construction of my improved heat-actuated mechanism, the operation thereof is as follows:

Under normal and even temperature conditions, the fluid pressures in the chambers 10 and 11 will be substantially equal and the parts will remain in the position shown in the drawing, with the lug 52 engaging the trigger lever 50.

If there is a slow rise in temperature, the liquid or gaseous fluid in the coil 32 and in the receptacle 40 will expand at so nearly the same rate that the weight 53 on the lever 20 will hold the lever stationary. Even under a gradual rise in temperature, the pressure in the upper chamber 10 will increase slightly more rapidly than in the lower chamber 11, due both to the greater surface of the outer coil 32 and to the more protected position of the inner receptacle 40. For both of these reasons, more time is required to heat a given volume of fluid in the receptacle 40.

Such a slight difference in pressure, caused by a gradual rise, would not equal the predetermined differential resultant necessary to raise the weight 53 and release the lever 50. This minimum predetermined resultant may be selectively varied by adjustment of the weight 53.

If, however, there is an abrupt rise in the temperature of the atmosphere surrounding the coil 32 and the receptacle 40, the pressure in the coil 32 and chamber 10 will rise much more rapidly than the pressure in the recep-

tacle 40 and chamber 11, due to the greater surface of the coil and the more exposed position thereof. This difference in pressure due to an abrupt rise in temperature of the atmosphere is sufficient to overcome the weight 53 and release the lever 20.

It will be evident that the adjustment of the weight 53 away from the pivot 21 will necessitate an increase in the differential resultant acting on the lever 20 and will thus necessitate a more abrupt change in temperature before the device operates. On the other hand, an adjustment of the weight 53 to the left or toward the pivot 21 will make the mechanism more sensitive and responsive to a less abrupt change in temperature.

While I have shown the lever 20 acting to directly release the weighted lever, this is for purposes of illustration only and the lever 20 may be utilized to initiate any other mechanical or electrical effect.

Obviously a single coil 32 and receptacle 40 may be connected to a plurality of pressure chambers 10 and 11 and thus control a series of levers 20 spaced at desired distances from each other.

It is desirable that the receptacle 40 be placed inside of the coil 32 so that the two elements may be exposed to substantially the same temperature conditions, but satisfactory operation may often be secured when the receptacle 40 is not surrounded by the coil 32, so long as the two elements are so closely adjacent as to be similarly effected by a rapid rise in temperature.

On a rapid drop in temperature, the pressure in the chamber 10 will be less than in the chamber 11 but this negative difference in pressure is inoperative, as it merely crowds the lever 20 down against the end of the lever 50 and no other effect takes place.

The relative capacities of the coil 32 and the receptacle 40 may be substantially varied but the capacity of the coil is commonly not greater than that of the receptacle.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. A heat-actuated mechanism comprising opposed fluid-operated devices assembled and mounted to afford simultaneous exposure thereof to substantially identical atmospheric conditions, mechanism controlled by the differential resultant of a relatively abrupt change in the temperature of the atmosphere thereof, and means to predetermine the minimum effective differential resultant.

2. A heat-actuated mechanism comprising opposed fluid-operated devices assembled and mounted to afford simultaneous exposure thereof to substantially identical atmospheric conditions, mechanism controlled by the differential resultant of a relatively abrupt

change to the temperature of the atmosphere thereof, and means to predetermine the minimum effective differential resultant, said latter means being adjustable to vary the predetermined minimum.

3. A heat-actuated mechanism comprising opposed fluid-operated devices, a separate fluid container connected in a closed system with each of said devices, said separate containers being assembled and mounted to afford simultaneous exposure thereof to substantially identical atmospheric conditions and being differently responsive to an abrupt rise in temperature of the atmosphere surrounding both of said devices, mechanism controlled by the differential resultant of said abrupt temperature rise on two devices, and means to predetermine the minimum effective differential resultant.

4. The combination in a heat-actuated mechanism as set forth in claim 3, in which the more responsive container is more advantageously exposed to the surrounding atmosphere.

5. The combination in a heat-actuated mechanism as set forth in claim 3, in which the more responsive container has a substantially larger surface area exposed to the surrounding atmosphere.

6. The combination in a heat-actuated mechanism as set forth in claim 3, in which the more responsive container has a substantially larger surface area exposed to the surrounding atmosphere and is also more effectively exposed to the atmosphere.

7. The combination in a heat-actuated mechanism as set forth in claim 3, in which one container is in the form of a coiled tube and the other container is in the form of a compact receptacle.

8. The combination in a heat-actuated mechanism as set forth in claim 3, in which one container is in the form of a coiled tube and the other container is in the form of a compact receptacle positioned within the coils of said tube.

9. The combination in a heat-actuated mechanism as set forth in claim 3, in which each container is in direct contact with the atmosphere and under substantially the same atmospheric conditions.

10. A heat-actuated mechanism comprising two pressure chambers, separate diaphragms covering said chambers and both connected to a control member, mechanism controlled by said member, and heat-responsive containers each connected to one of said pressure chambers and having different heat-receiving characteristics, said containers being assembled and mounted to afford simultaneous exposure thereof to substantially identical atmospheric conditions and said control member being actuated by the differential resultant of the fluid pressures on said diaphragms.

11. The combination in a heat-actuated mechanism as set forth in claim 10, in which means is provided to hold said control member from movement until a predetermined differential resultant is developed.

12. The combination in a heat-actuated mechanism as set forth in claim 10 in which said control member comprises a lever and in which a weight is movably mounted on said lever, by selective adjustment of which the predetermined minimum differential resultant may be varied.

In testimony whereof I have hereunto affixed my signature.

GEORGE I. ROCKWOOD.