C. J. STUART.

DEVICE FOR CONTROLLING VARIATIONS IN VARIOUS MEDIUMS.

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1,258,164. Patented Mar. 5, 1918.

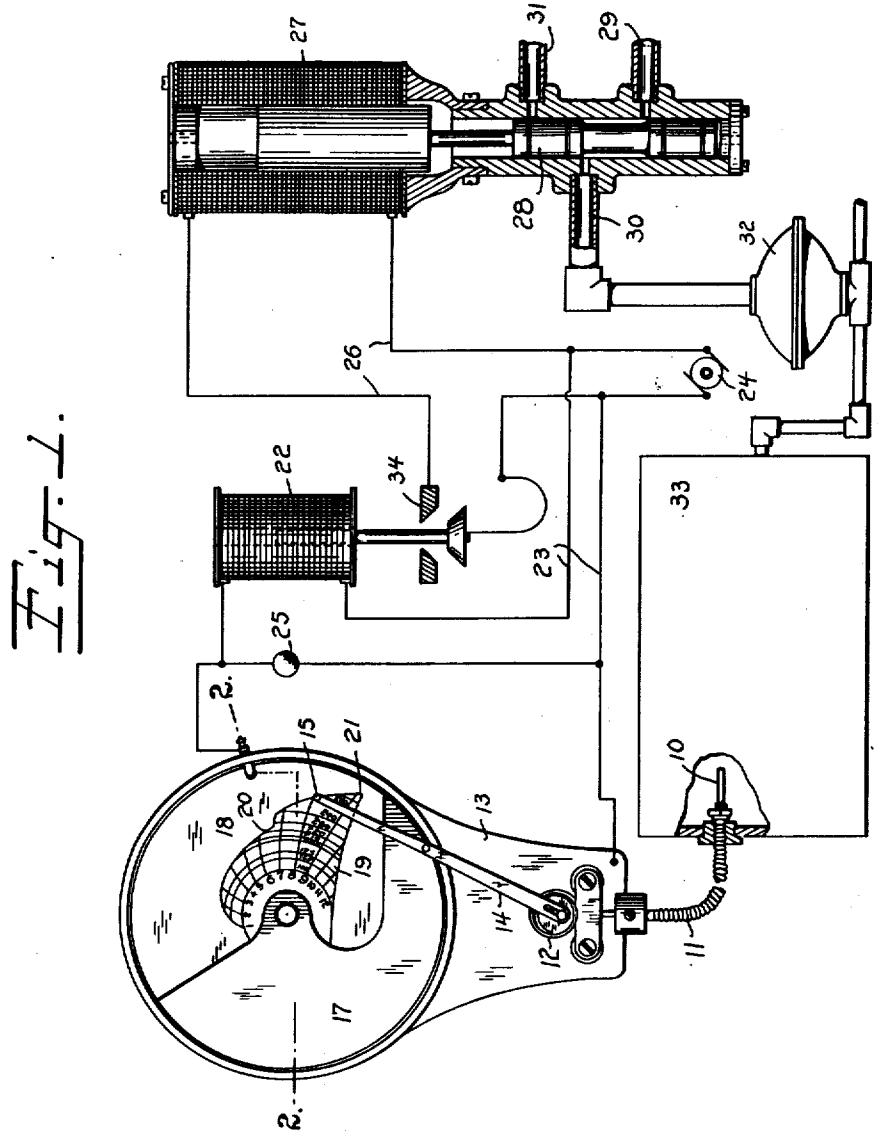


Fig. 1.

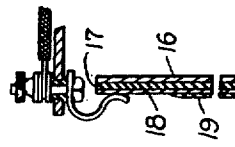


Fig. 2.

WITNESS:

S. G. Taylor.

INVENTOR

Charles J. Stuart,

BY

Ernest Hopkinson

HIS ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES J. STUART, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO AMERICAN RUBBER COMPANY, A CORPORATION OF MASSACHUSETTS.

DEVICE FOR CONTROLLING VARIATIONS IN VARIOUS MEDIUMS.

1,258,164. Specification of Letters Patent. Patented Mar. 5, 1918.

Original application filed June 2, 1914, Serial No. 842,386. Divided and this application filed February 12, 1917. Serial No. 148,274.

To all whom it may concern:

Be it known that I, CHARLES J. STUART, a citizen of the United States, and a resident of Somerville, county of Middlesex, and State of Massachusetts, have invented certain new and useful Improvements in Devices for Controlling Variations in Various Mediums, of which the following is a full, clear, and exact description.

This invention relates to devices for controlling variations in the conditions of various media. It is more particularly directed to a device for reproducing in a fluid medium certain predetermined variations.

One object of the invention is to provide an inexpensive device of the kind mentioned which shall operate to counteract automatically any variations in the medium other than those desired. Another object of the invention is to provide a simple device of the kind described which may be employed in connection with the familiar type of chart recording gage to reproduce variations previously recorded by the recording gage.

This invention is a division of my application, Serial No. 842,386, filed June 2, 1914.

In the accompanying drawing wherein one of the various possible embodiments of the invention is shown:

Figure 1 is a diagrammatic view of the apparatus, and

Fig. 2 is an enlarged detail sectional view on the line 2—2, Fig. 1.

Briefly stated, my invention consists of an article preferably in the form of a chart having a contour thereon corresponding to predetermined desired variations in a medium and permitting compensations for variations in the medium other than the desired variations.

The device is shown as adapted for control of the temperature of a vulcanizer. Referring now to the drawing, there is shown a recording thermometer of the usual and well known type in which the sensitive gas or liquid filled bulb 10 is connected by flexible tubing 11 to a helical or spiral form of pressure tube 12 which is fixed to the metal frame 13 of a familiar type of recording instrument. The recording pen arm 14 of conducting material is connected to the pressure tube, and to the end thereof pen 15, of conducting material is attached.

In carrying out my invention, I provide an article resembling a chart revolubly mounted on the clock face 16 consisting of a disk 17 of insulating material to which is fixed a plate 18 of conducting material which underlies and extends outwardly on all sides of a sheet 19 of non-conducting material, the edge 20 of which determines the degree of temperature and the period. For the sake of clearness, I have indicated the degrees of temperature on the chart by concentric division lines and the period by radial division lines, the chart in this embodiment being rotated by clockwork as is usual in gages of this type. The chart is removably secured to the clock face and revolves as a unit with it.

The plate 18 of conducting material and the recording pen 15, which constitute make and break contact, are put in circuit with controlling devices operating a valve regulating a source of heat, as will be presently described. Assuming the heat to be commenced and the pin started at the initial time which will be the point, on sheet 19, marked 1, as long as the pin travels on the non-conducting sheet, the heat is admitted to the vulcanizer or other heating chamber which it is desired to control, but as soon as the temperature rises too rapidly the pen arm carries the pen off the sheet of non-conducting material in a direction from the center toward the periphery and onto the plate of conducting material, thus establishing an electric circuit which operates the valve to shut off the heat medium. As soon as the temperature lowers, the pen arm carries the pen back onto the non-conducting material again at a point in advance of the point at which the pen left the material due to the travel of the chart by the clock devices of the recording instrument and breaks the circuit, thus leaving the valve uncontrolled so that the action of gravity or pressure causes a movement of the valve and permits the passing of the heating medium to the heating chamber.

In the drawing the edge 20 of the sheet of non-conducting material on the particular chart shown is curvilinear and corresponds to the record curve which has been traced by a recording pen in recording the degree and period of heat to which the articles, in this case, rubber articles, have been subjected. In practice the pen fluctuates along

this edge so that the make and break operation goes on practically continuously, that is, the heat medium is shut off and applied, perhaps, every minute or two. In this way, the predetermined path of temperature and period is faithfully followed automatically. Besides following the path it naturally follows that at a predetermined point at which the heating operation shall stop, the heating medium is finally cut off and not reëstablished, this occurring at the point marked 21.

The operating devices used in connection with the present embodiment include a relay 22 in a circuit 23 with a source of electricity 24 and with the make and break contacts 15 and 18, a condenser or suitable incandescent lamp 25 shunted across the make and break contacts to prevent arcing, and an electro-magnetic valve device in a circuit 26 controlled by the relay. The valve device consists of a solenoid 27 operating a valve 28 which, as the current flows, allows air pressure, from some source, to enter at port 31 and flow through port 30 to a diaphragm valve 32 which cuts off the heating medium from the heating chamber 33 and as the current is broken, drops by gravity allowing air pressure on the diaphragm valve to be exhausted through ports 30 and 29 which are appropriately arranged for this result. The air pressure being exhausted the diaphragm valve opens and allows the heating medium to flow to the heating chamber.

In operation, when the pen 15 is in contact with the plate of conducting material, the current flows from the source of electricity through the pen and through the plate 18 of conducting material and through the relay 22 which establishes the circuit through the terminals 34. The current will then flow through the valve solenoid 27 which moves the valve to shut off the heating medium until the contact of the pen with the conducting material is broken, whereupon the relay will break the circuit at the terminals 34 and no current will flow around the solenoid 27 of the valve which then permits passage of the heating medium to the heating chamber.

The embodiment of the invention illustrated, of course, may be used to maintain a constant temperature at the bulb by simply stopping the clockwork mechanism so that any particular point on the edge 20 will be constantly intersected by the swinging pen 15, said point corresponding to the desired temperature in the heating chamber.

As many apparently widely different embodiments of this invention may be made without departing from the spirit thereof, it is to be understood that I do not intend to limit myself to the specific form of the invention as set forth except as indicated in the appended claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. An article of the kind described having a contour thereon corresponding to predetermined desired variations in a medium and permitting a control-member to operate therewith to make compensations for variations in the medium other than the desired variations.

2. An article of the kind described having a contour thereon corresponding to predetermined desired variations and permitting motion of the control-member across the contour to make compensations for variations in the medium other than the desired variations.

3. An article of the kind described having a contour thereon formed by the junction of a conducting and a non-conducting element, said contour corresponding to a desired sequence of variations in a given medium.

4. A disk-shaped article resembling a chart having a contour thereon formed by the junction of a metallic and a non-metallic element, said contour corresponding to a desired sequence of variations in a given medium.

5. A disk-shaped article resembling a chart, comprising a non-conducting element and a metallic element attached thereto, the contour formed by the edges of said metallic element with said non-conducting element corresponding to a desired sequence of variations in a given medium.

Signed at Boston, Massachusetts, this 1st day of February, 1917.

CHARLES J. STUART.