

Dec. 30, 1930.

G. MUFFLY

1,787,209

REFRIGERATOR CONTROL

Filed Sept. 20, 1928

2 Sheets-Sheet 1

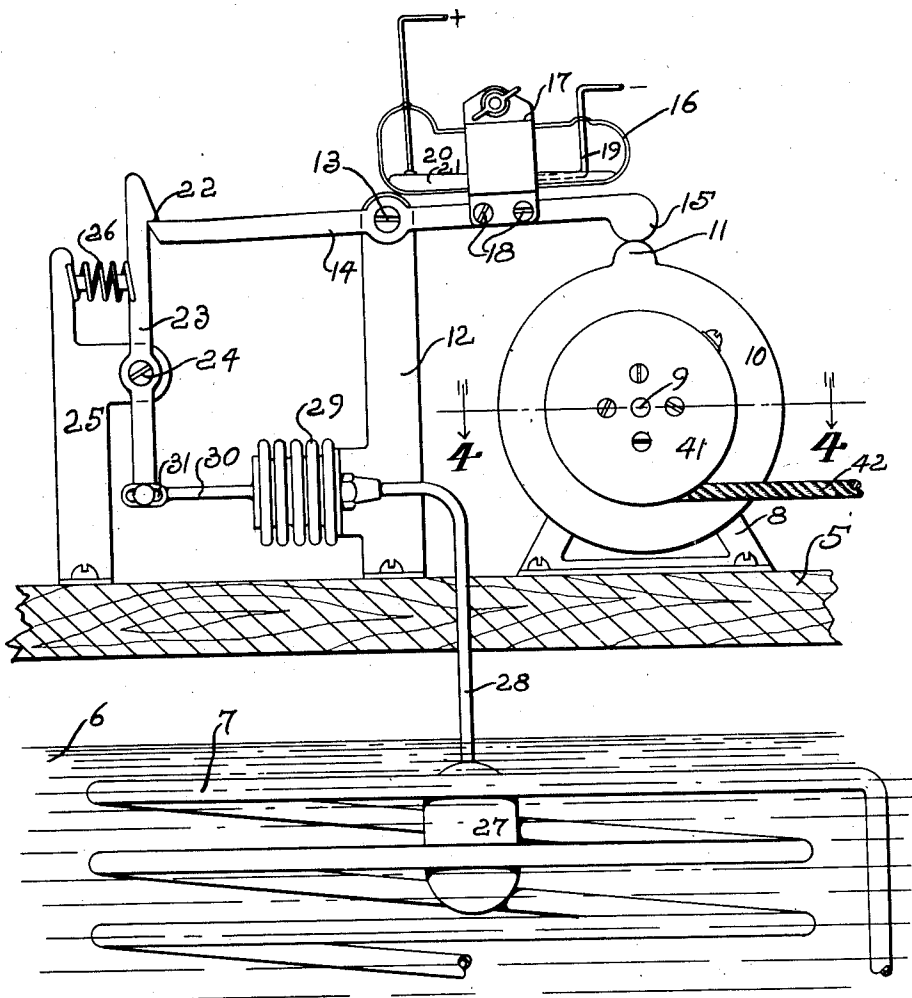


Fig. 1.

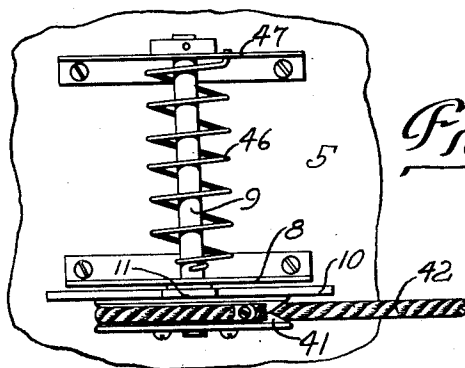


Fig. 4.

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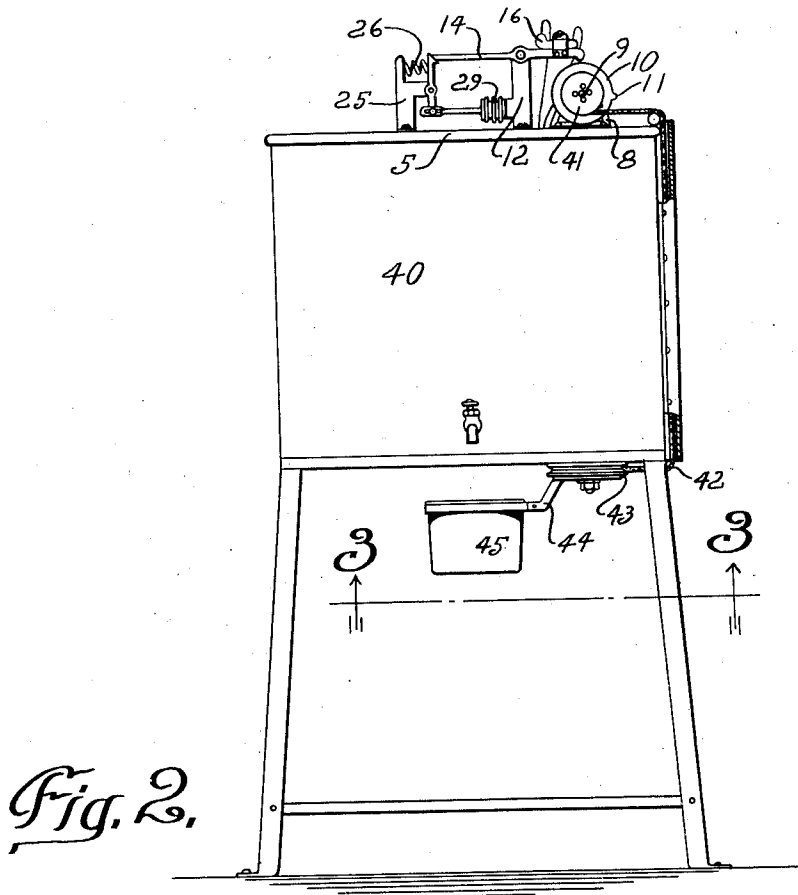
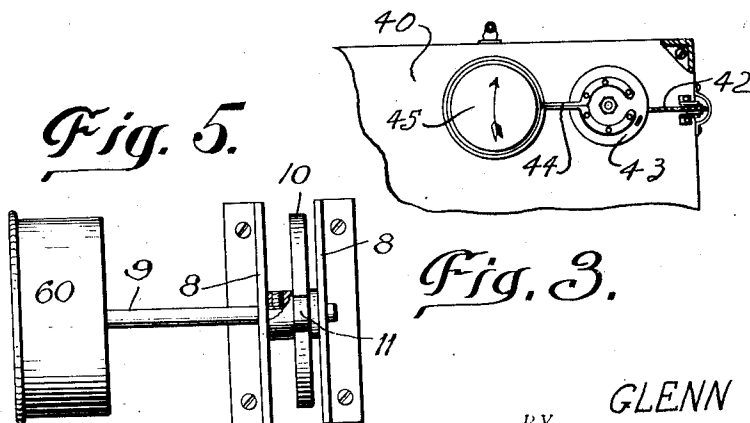
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2 Sheets-Sheet 2



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REFRIGERATOR CONTROL

Application filed September 20, 1928. Serial No. 307,107.

My invention relates to controls for refrigeration systems and has for one of its primary objects the provision of means whereby the control may be positively operated to cause the system to begin refrigerating at a predetermined time, together with means whereby the system may be caused to cease refrigerating in response to a predetermined temperature to which the part to be refrigerated is brought.

More specifically, my invention contemplates the thought of a control which will operate to cause the system to begin refrigerating at a particular time—such as during the night when an economical electrical rate may be obtained—together with means which will cause the discontinuance of refrigeration when the desired refrigerated temperature is reached.

I desire it to be understood that my invention may be applied to refrigeration systems of various types or kinds and that the particular adaptation herein shown is merely illustrative of one possible kind.

With the above and other objects in view, my invention consists in the arrangement, combination and construction of the various parts of my improved device as described in the specification, claimed in my claims and shown in the accompanying drawing, in which:

Fig. 1 is a side elevation of a refrigerating coil and control mechanism which may be utilized in one form of my invention.

Fig. 2 is a side elevation of a refrigerated water cooler, showing my invention applied thereto.

Fig. 3 is a view taken on line 3—3 of Fig. 2.

Fig. 4 is a detail view taken on line 4—4 of Fig. 1.

Fig. 5 is a view similar to Fig. 4 showing a construction for clock operation of my device.

I have shown a support 5, which may be the top for a water cooler 40 containing liquid 6 within which is immersed a refrigerating coil 7 for cooling the same.

Positioned on the support 5 is a bracket 8 carrying a rotatable shaft 9 upon which is secured a wheel 10 having a cam or protuberance 11 thereon. The wheel 10 may be suit-

ably operated by any desired means. For instance it may be controlled by a clock or other suitable time mechanism so that the cam 11 will reach the point illustrated once every twenty four hours or at any other or desirable time interval.

I have here shown it in Figs. 1 to 4 adapted to be manually operated. That is to say, the shaft 9 is provided with a pulley 41 to which is connected one end of a cable 42, which cable extends along the side of the cooler 40, passing over another pulley 43, and having its other end connected thereto. Also connected to the pulley 43 is a bracket 44 which supports a waste water pail 45. It is customary to empty these pails once each day, usually in the evening. To empty it, the attendant swings it from beneath the water cooler, thereby rotating the pulley 43 in the direction indicated by the arrow in the water cooler, thereby rotating the pulley 43 in the direction indicated by the arrow in Fig. 3. This rotation will act, thru cable 42, to rotate pulley 41 and wheel 10, together with its cam 11. After the pail has been emptied and swung back under the cooler there will be a natural tendency for the cable to slacken, which tendency I overcome by providing a coil spring 46, as illustrated in Fig. 4, around the shaft 9, one end of the spring being secured to the shaft and the other end being secured to supporting bracket 47. The pull on the cable 42, which is brought about by swinging pail 45 from beneath the cooler, will tend to unwind the cable from pulley 41 to also wind or place tension upon the spring 46. When the pail is returned to its position beneath the cooler, the spring 46 will tend to unwind, thus winding the cable upon the pulley 41, maintaining the same taut and, at the same time, returning wheel 10 and its cam 11 to the position shown in Fig. 2.

Also mounted on the support 5 is a bracket 12 on the top of which is pivotally mounted as at 13 an arm 14. The arm 14 is provided with an end 15 which is adapted to contact with the cam 11, when the latter is brought to the position shown in Fig. 1, so as to raise that end of the arm thereby tilting the bulb 16 which is secured to the arm by means of a bracket 17 fixed to the arm by screws 18. The bulb 16

carries a pair of electrical leads 19 and 20. These leads may extend to a suitable source of power and to a suitable operating mechanism for the refrigeration system, so that when the leads are brought into circuit the system will be operated and when the circuit between the two is broken the system will remain idle. A mercury drop 21 within the bulb acts to connect the leads 19 and 20 when the end 15 of the arm 14 is raised by the cam 11.

The arm 14 may be held in this position by a jaw 22 provided on the arm 23 which is pivoted as at 24 to a supporting bracket 25. The jaw 22 is normally held pushed toward the arm 14 by a coiled spring 26. Thus, after the cam 11 has raised the end 15 of the arm 14 to make the connection between the leads 19 and 20, the connection will be maintained even after the cam 11 has moved on and away from the end 15. This condition will continue until the refrigeration system is operated for a sufficient length of time to cool the liquid 6 or other part being refrigerated to the desired point. As soon as the desired temperature has been reached, it is desirable to break the electrical connection and stop the operation of the system.

In order to bring about that result I dispose a bulb 27 in the water 6 which bulb is partially filled with a gaseous liquid, such as sulphur dioxide which gasifies in the presence of heat and liquefies in the presence of cold. When the water 6 has been chilled to the desired and predetermined point the sulphur dioxide or other like material in the bulb 27 will become liquefied. The bulb 27 communicates by a pipe 28 with a bellows 29 which has one end thereof provided with an arm 30 connected by a slot 31 with the lower end of the arm 23.

The bellows 29 normally tends to contract and as the material in the bulb 27 liquefies pressure which normally tends to extend the bellows 29 will be relieved with the result that the bellows will contract, moving the arm 30 to the right as viewed in the drawing until the arm 23 has been caused to move on its pivot 24 to release the jaw 22 from the arm 14. As soon as this release is effected the weight of the bulb 16 will cause the end 15 of the arm 14 to lower with the result that the mercury drop 21 will be moved away from the lead 20 and the connection between the leads 19 and 20 broken so as to stop the operation of the refrigeration system.

Even though the temperature of the water 6 may later rise to such point as to liquefy the material in the bulb 27 and expand the bellows 29 causing the arm 23 to tend to return to the position shown in the drawing, it will not be possible to reestablish the connection between the leads 19 and 20 until the cam 11 has again reached the point where it contacts with the end 15 of the arm 14.

so as to raise the said end and lower the opposite end thereof into engagement with the jaw 22. Thus the system cannot be placed into operation except at certain predetermined intervals which may be determined by the number of cams or like devices employed, in the event automatic operation is to be employed, or in any event, by the frequency of contact of the cam or cams with the end 15.

In Fig. 5 I have shown a construction wherein the operation of my improved device may be clock controlled. In this view a clock 60 is diagrammatically illustrated, the same being connected through the shaft 9 with the wheel 10 which carries the cam 11, so that operation of the clock will result in rotation of the shaft. In this construction I have shown a pair of brackets 8 serving to carry the outer end of the shaft 9. The clock may be of the twenty four hour type or, if the clock is of the twelve hour type, it may be so connected with the wheel 10 that the cam 11 will contact with the end 15 of the arm 14 once for every double revolution of the clock hour hand. It will be readily understood, of course, that the frequency with which the cam 11 contacts with the end 15 so as to start the refrigerating mechanism may be regulated to suit the convenience and desires of the user.

It will be readily apparent that the mechanism herein shown and described is merely illustrative of two ways of accomplishing the desired result and that any one of a number of different devices may be employed for accomplishing the same result. I therefore do not wish to limit myself to the construction shown but have hereunto appended claims which set forth the true scope of my invention.

What I claim is:

1. A control for refrigerating systems comprising means for commencing the operation of an alternately operative device at predetermined intervals and means for automatically stopping the operation of such device in response to conditions produced by such operation.

2. A control for refrigerating systems comprising an electrical connection adapted to be alternately made and broken, means for making the connection at definite predetermined intervals and means for breaking it in response to temperature variation of the system.

3. A control for refrigerating systems comprising an electrical connection adapted to be alternately made and broken, a time controlled element adapted to cause the making of the circuit at pre-determined intervals, means for maintaining the circuit until a pre-determined temperature has been reached in the part being refrigerated and then breaking the same.

4. A control for refrigerating systems comprising an electrical connection adapted to be alternately made and broken, time controlled mechanism adapted to cause the making of the circuit at pre-determined intervals, means for maintaining the circuit until a pre-determined temperature has been reached in the part being refrigerated and then breaking the same.
5. In combination, a refrigerated body, a refrigerating system for refrigerating the body, a temperature controlled device for stopping operation of the system, and a clock controlled device, independent of the temperature controlled device for starting the operation thereof.

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