May 25, 1937. J. E. CARLSON 2,081,269

SNAP ACTION THERMOSTATIC SWITCH

Filed June 16, 1934

Fig. 1.

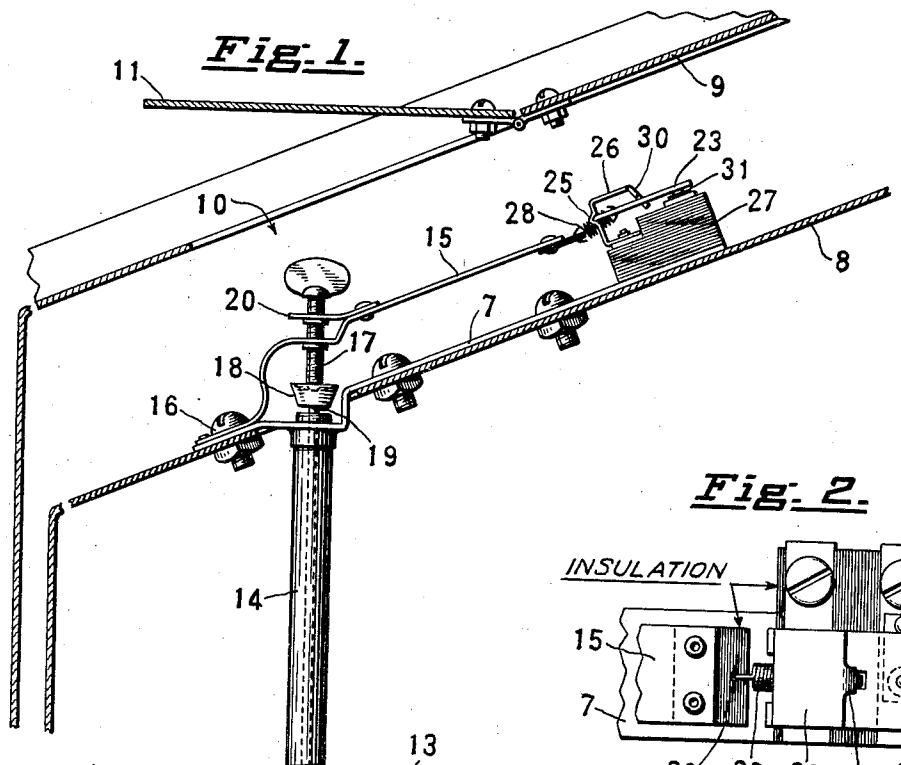


Fig. 2.

Fig. 3.

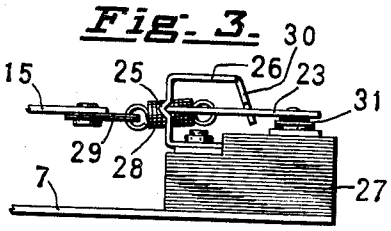


Fig. 6.

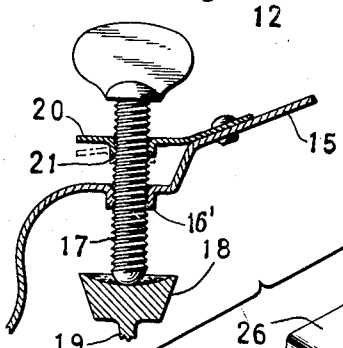
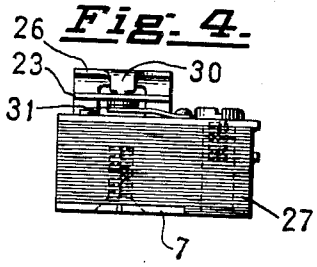


Fig. 5.

Fig. 4.



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SNAP ACTION THERMOSTATIC SWITCH

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Application June 16, 1934, Serial No. 730,936

5 Claims. (Cl. 200—140)

My invention relates particularly to switches which are adapted to be automatically actuated by changes in temperature and which are adjustable to vary the temperature range of action.

A special use for this device is in the control of the temperature of brooders and the like.

A special object is to provide a simple but reliable form of switch which can be made and assembled according to standard specifications and which is extremely sensitive and yet reliable.

Another object is to provide a device of this character which can be adjusted with respect to its temperature range and the parts of which will be certain to stay in their adjusted position.

In the form shown the invention contemplates a bendable spring arm which is anchored at one end and connected at the other end with a switch actuating lever mounted on a substantial knife edge which is provided in a bracket which also serves as a stop to limit the movement of the contact actuating lever. The spring arm is actuated by an expansible disc or bellows containing a temperature sensitive medium such as ether. The actuation of the arm is adjustable by means of a screw threaded member which is connected to the arm in such a manner as to provide in effect a spring tension nut lock so that the screw threaded member may be easily adjusted but will be certain to stay in its proper adjusted position.

Fig. 1 is a cross section and side elevation of one form of device embodying my invention.

Fig. 2 is a plan view of the switch contact members.

Fig. 3 is an edge view of the same.

Fig. 4 is an end view of the switch contact members.

Fig. 5 is an exploded perspective view of the tip of the spring arm, the contact actuating lever and the bracket support for the latter.

Fig. 6 is a detail cross sectional view showing the adjusting and clamp mechanism.

A plate 7 supports the various parts involving my invention and is adapted to be supported, for instance, in the housing of a brooder on a wall 8 and a cover 9, the latter being provided with an opening 10 and lid 11 which provide access to the device.

The temperature sensitive element 12 is in the form of a multiple plate disc of suitable type forming a reservoir for the expansible fluid. This is supported by a yoke 13 which in turn is supported by a tube 14 suspended from the plate 7.

The main spring arm 15 is anchored at 16 to base plate 7.

An adjusting screw 17 has a threaded seat 16' in the arm 15 and has a cup-like member 18 at its lower end which engages the upper end of the rod 19 whose lower end rests on the upper face of the expansible disc 12.

An additional support for the screw 17 is provided by a supplemental spring arm 20 which is secured to the arm 15 and provided with a threaded seat 21 for the screw. When the parts are assembled the arm 20 is pressed down toward the threaded seat 16' when the screw is inserted. When pressure on the arm 20 is released the spring tension takes up all the play which may exist between the threaded seat 16' and 21 and the screw 17 and prevents the screw from accidental turning.

The switch action is directly or indirectly effected by the movement of the lever 23 which has knife edge 24 seated in grooves 25 in the bracket 26. This bracket is supported by an insulating block 27 which in turn is mounted on the upper end of the base plate 7.

A spring 28 connects the lever 23 with the tip of the spring arm 15. An insulating piece 29 may be provided to serve as the anchor for one end of the spring 28 to insulate the spring 28 from the arm 15. Bracket 26 is provided with a stop shoulder 30 for limiting the movement of the lever 23.

In the form shown the switch lever 23 makes contact in one position with a spring supported contact 31.

The actuation of the switch is effected by the expansion and contraction of the disc 12 which by means of the rod 19 raises the spring arm 15 to open the circuit and the spring arm 15 returns the parts to close the circuit when the disc 12 contracts.

It will thus be seen that the parts are simple in construction and unlikely to get out of order even with rough uses.

By adjusting the screw 17 the tension on the spring arm 15 and on the disc 12 may be varied so as to alter the action of the switch to control the opening and closing of the circuit at the desired temperatures.

I claim:

1. A thermostatic switch having a pressure device, an arm for actuating a switch, an auxiliary spring arm having one end secured to the first arm, an adjusting screw having threaded engagement in both arms and a push rod interposed between said screw and said pressure device.

2. A thermostatic switch device including a

base plate, a thermal expansion device suspended from the base plate, a spring arm having one end secured to the said base plate and having a bowed portion immediately above the thermal expansion device, an insulating block carried by the base plate, a stationary switch contact carried by said block, a supporting member carried by said block and having an abutment shoulder, a switch member hinged to said support and coacting with said contact and said abutment, a spring connecting the movable end of the spring arm and the switch member, and an adjusting screw passing through the bowed portion of said spring arm and coacting with the thermal expansion device to vary the action of the spring arm and the connected switch member.

3. A thermostatic switch including an arm movable in response to temperature change and having an end portion thereof unsupported, a fixed wall substantially normal to said arm, a tension spring passing through said wall and connected to the unsupported end portion of said arm, a plate held against said wall by said spring for pivotal movement, abutments secured with respect to said wall on each side of said plate for limiting movement of the plate, a support for said wall and abutments, the abutment remote from said support being connected to said wall in a manner to extend over and shield and protect the plate and its pivotal engagement.

4. A thermostatic switch including an arm movable in response to temperature change and having an end portion thereof unsupported, a fixed wall substantially normal to said arm, a tension spring passing through said wall and connected to the unsupported end portion of said arm, a plate held against said wall by said spring for pivotal movement, abutments secured with respect to said wall on each side of said plate for limiting movement of the plate, a support for said wall and abutments, the abutment remote from said support cooperating with said plate by means of a projection and recess remote from the plate pivot and shaped to prevent any lateral shifting of said plate along its pivotal axis.

5. A temperature responsive switch having an arm for actuating a switch, a short spring arm having one end secured to the first arm, an adjusting screw having threaded engagement with both arms and a temperature responsive mechanism connected to said adjusting screw for moving the arms and actuating a switch.

JOHN E. CARLSON.