June 17, 1952 A. J. HUCK 2,600,652

CONTROL SWITCH

Original Filed April 24, 1947 2 SHEETS—SHEET 1

Fig. 1.

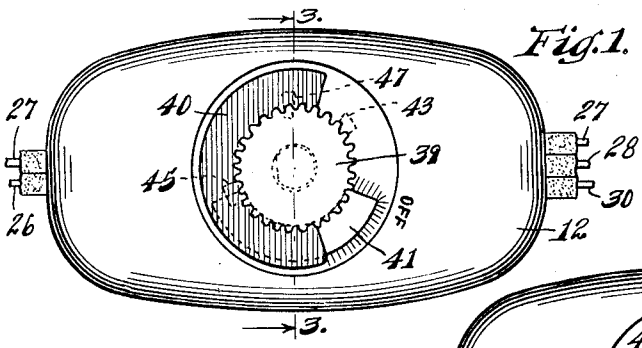


Fig. 2.

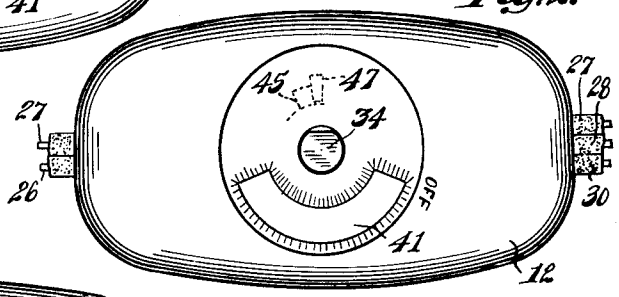


Fig. 1a.

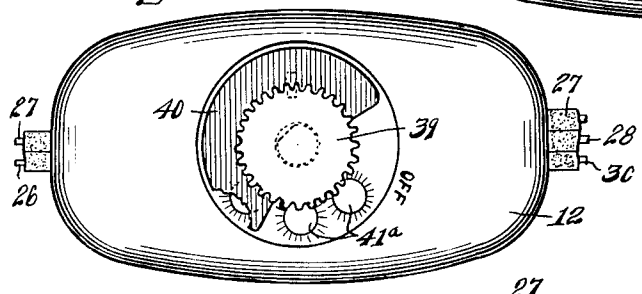


Fig. 4.

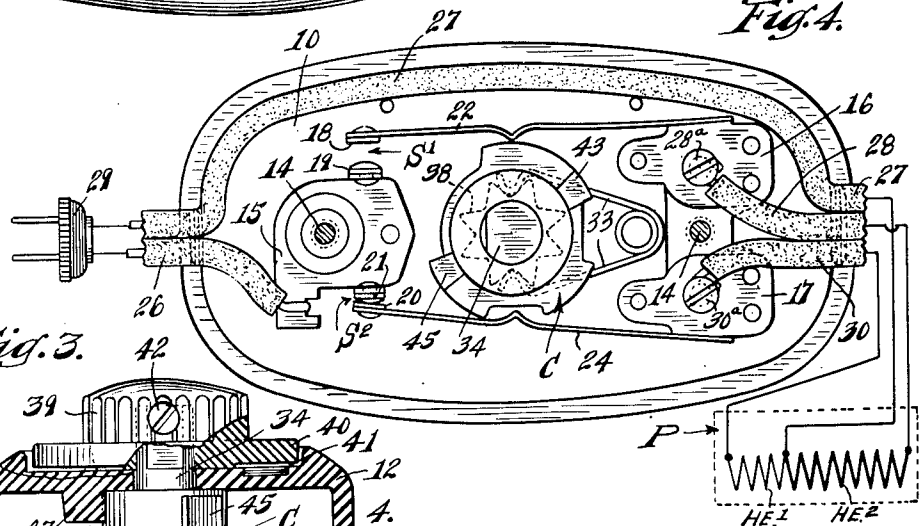
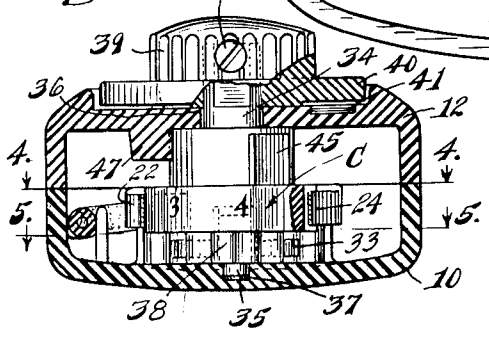


Fig. 3.



Inventor.
Alfred J. Huck.
By Baird & Freeman
Atty's

June 17, 1952 A. J. HUCK 2,600,652

CONTROL SWITCH

Original Filed April 24, 1947 2 SHEETS—SHEET 2

Fig. 5.

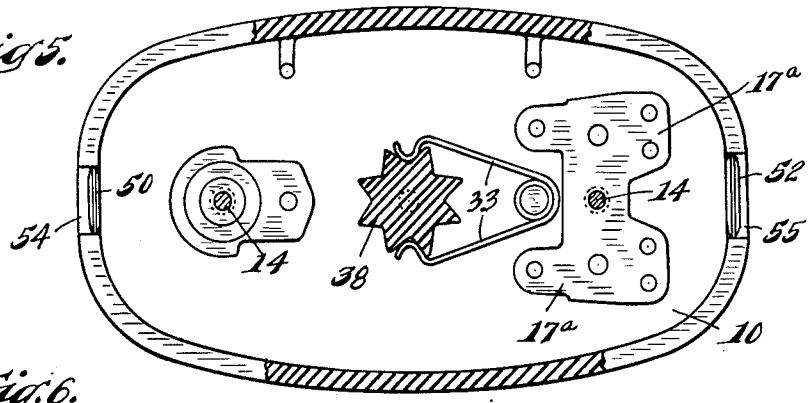


Fig. 6.

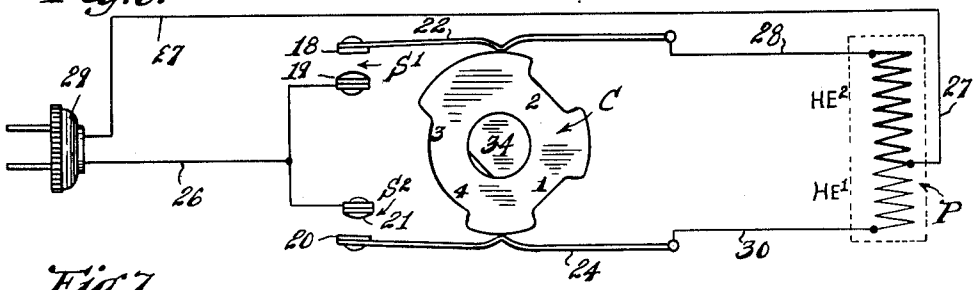


Fig. 7.

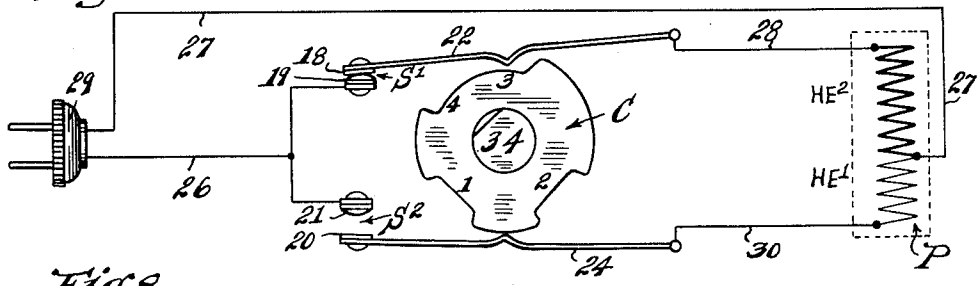
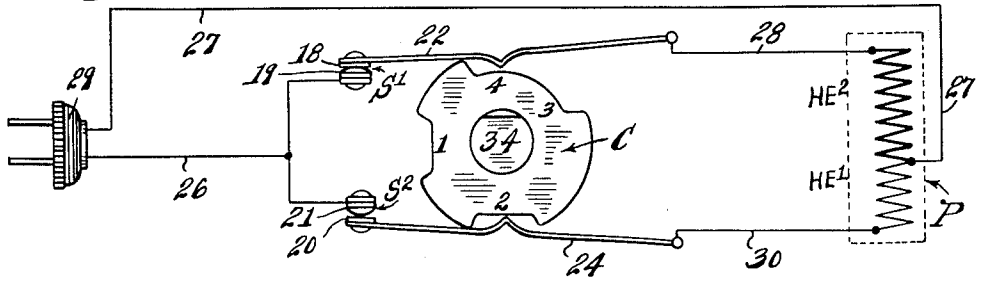


Fig. 8.



Inventor:
Alfred J. Huck.
By Bair & Freeman
Atty's.

Patented June 17, 1952 2,600,652

UNITED STATES PATENT OFFICE

2,600,652

CONTROL SWITCH

Alfred J. Huck, St. Louis, Mo., assignor to Knapp-Monarch Company, St. Louis, Mo., a corporation of Delaware

Original application April 24, 1947, Serial No. 743,676. Divided and this application November 13, 1948, Serial No. 59,937

2 Claims. (Cl. 200—6)

1

My present invention relates to a control switch which may be used in connection with a heating pad or other electrical appliance, the present application being a division of my copending application, Serial No. 743,676, filed April 24, 1947.

One object of the invention is to provide a control switch of novel character having a simple arrangement of first and second switches and a cam to open both switches, close one and open the other, close the other and open the one, or close both switches, as desired.

Another object is to provide a detent means for holding the cam which operates the first and second switches in their various positions of adjustment.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view of a switch structure embodying my invention;

Figure 1a is a similar view showing a modified form of the structure;

Figure 2 is a similar view with the control knob removed and the control shaft shown in end view;

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 1;

Figure 4 is a sectional view on the line 4—4 of Figure 3 showing the switch mechanism within the housing and illustrating diagrammatically a heating pad connected in circuit therewith to illustrate one use for the switch;

Figure 5 is a sectional view on the line 5—5 of Figure 3 showing a detent means for holding the switch in various adjusted positions; and

Figures 6, 7 and 8 are diagrammatic views showing, respectively, the position of the switch for low, medium and high heat in the heating pad.

On the accompanying drawings I have used the reference numerals 10 and 12 to indicate a bottom portion and a cover, respectively, of a switch housing. The parts 10 and 12 may be held assembled in relation to each other by screws 14 extending through the housing portion 10 and threaded into the cover 12 in the usual manner for switches of this general character.

Within the switch housing 10—12 is a pair of switches, indicated as S^1 and S^2, comprising

2

a pair of brackets 16 and 17 attached to a boss 17^a by terminal screws 28^a and 30^a. The brackets 16 and 17 have leaf spring switch arms 22 and 24 extending therefrom. The switch arms 22 and 24 carry contacts 18 and 20 which are normally engaged with stationary contacts 19 and 21 on a bracket 15 due to inherent tendency of the leaf springs 22 and 24 to move toward each other from the position shown in Figure 6.

The contacts 19 and 21 are mounted on a bracket 15 which is connected with a supply wire 26. A second supply wire 27 and the supply wire 26 are connected to a service cord plug 29. Feed wires 28 and 30 extend from the brackets 16 and 17 to the ends of a heating element having sections HE^1 and HE^2. These heating element sections may be within a heating pad P, or may be heating elements or other types of electrically energized devices in electrical appliances or the like, wherever it is desirable to energize one, the other, or both. The supply wire 27 extends through the housing 10—12 and connects with a center tap of the heating elements HE^1 and HE^2.

A cam C is provided for operating the switches S^1 and S^2, the cam having shaft-like extensions 34 and 35 journalled respectively in a hole 36 of the cover 12 and a socket 37 of the housing bottom 10. The cam has a detent wheel 38 formed thereon, with which leaf spring detent arms 33 coact for positioning purposes as shown in Figure 5. The cam C has four depressed sections indicated as 1, 2, 3 and 4, adapted to coact with the switch arms 22 and 24, in various positions of adjustment, as will hereinafter appear.

For operating the cam C, I provide a control knob 39 secured thereto as by a set screw 42. The upper part of the cam C has a pair of stop lugs 43 and 45 to coact with a stationary stop lug 47 for the purpose of limiting rotation of the knob to approximately 135°.

For indicating the position of the switch I provide a flange 40 partially around the control knob 39, and an area 41 on the switch cover 12, which area is arcuate, as shown in Figure 2, and is coated with paint or the like, having a color which is clearly distinguishable from the flange 40. Preferably, the coating is a luminous paint or strip of luminous adhesive so that it can be readily seen at night, this being particularly desirable in connection with a heating pad. The flange 40, it will be obvious, can completely cover the illuminated area 41 when the switch is adjusted to the "off" position of Figure 6, and will

variably uncover the luminous area at other positions of adjustment, for instance at "low" position in Figure 1. In Figure 1*a* the luminous area is shown as consisting of a plurality of small areas **41***a* so that the number of them can be counted in the dark and the position of the control switch thereby determined, whereas with the arrangement shown in Figure 1 the user can determine the position of the switch by noting the amount of the luminous area uncovered, that is one-third, two-thirds, or all of it. The position indicating means just described is claimed in my parent application.

Strain relief is provided for the wires **26**, **27**, **28** and **30** in the form of raised beads **50** and **52** in the notches **54** and **55** of the housing bottom member **10**. The housing top member **12** is similarly treated and accordingly when the two halves of the housing are clamped together by the screws **14**, the beads **50** and **52** bite into the insulation on the wires to prevent them from longitudinal movement after the housing is closed. The beads of the two halves of the housing are preferably offset in relation to each other for the purpose of providing offset jaws to grip the wire for strain relief and at the same time prevent cutting the insulation as would be the case if the beads were in alignment with each other.

Practical operation

In the operation of the switches S^1 and S^2, when the cam C is in the position of Figure 6, both switches are held open. In the position of Figure 4, low heat is had by energizing the heating element HE^1 only, by reason of the cam notch **1** receiving the switch arm **24**. This permits the switch S^2 to close.

For medium heat the heating element HE^2 is energized by adjusting the switches to the position shown in Figure 7 with the cam notch **3** receiving the switch arm **22**.

For high heat, both heating elements are energized by closing both switches S^1 and S^2. This is accomplished by adjusting the cam C to the position of Figure 8 wherein the notches **2** and **4** receive the switch arms **24** and **22** and thereby permit closure of both switches.

The various positions of the switch are readily determined by noting the degree of exposure of the area **41**, Figure 1 corresponding to Figure 4 when low heat is being had. The arrangement in Figure 1*a* exposes a number of areas **41***a* depending upon the position of the switch. Obviously, a slidable arrangement can be used instead of a rotary arrangement, and the same indicating features retained. This change, as well as others, may be made without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

1. In a control switch of the character disclosed, a housing, a contact bracket therein adjacent one end thereof and having a pair of contacts, a pair of circuit wires extending into one end of said housing and one thereof being connected to said contact bracket, the other thereof extending through said housing and from the opposite end thereof, a pair of current carrying brackets in said housing adjacent said opposite end thereof, circuit wires extending therefrom and out of said opposite end of said housing, a leaf spring carried by each of said pair of current carrying brackets and each biased to engage one of said pair of contacts, a cam in said housing intermediate said brackets and cooperating with said leaf springs to separate them from said pair of contacts, said cams having three lobes around the cam axis to effect such separation and three notches between said lobes to permit engagement of said leaf springs with said pair of contacts, two of said lobes and notches being of substantially 45° extent and the third lobe and notch of substantially 90° extent whereby in substantially 90° of rotation and three positions spaced substantially 45° apart of said cam, said leaf springs are selectively disengaged from said contact bracket in two of said positions and both are permitted to engage it in the third position.

2. In a control switch of the character disclosed, a housing, a contact bracket therein adjacent one end thereof and having a pair of contacts, a pair of circuit wires extending into one end of said housing and one thereof being connected to said contact bracket, the other thereof extending through said housing and from the opposite end thereof, a pair of current carrying brackets in said housing adjacent said opposite end thereof, circuit wires extending therefrom and out of said opposite end of said housing, a leaf spring carried by each of said pair of current carrying brackets and each biased to engage one of said pair of contacts, a cam in said housing intermediate said brackets and cooperating with said leaf springs to separate them from said pair of contacts, said cams having three lobes around the cam axis to effect such separation and three notches between said lobes to permit engagement of said leaf springs with said pair of contacts, two of said lobes and notches being of substantially 45° extent and the third lobe and notch of substantially 90° extent whereby in substantially 120° of rotation and four positions spaced substantially 45° apart of said cam, said leaf springs are selectively disengaged from said contact bracket in two of said positions, both are permitted to engage it in the third position and both are disengaged therefrom in the fourth position.

ALFRED J. HUCK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,243,566	Kimball	May 27, 1941
2,343,008	Grossman et al.	Feb. 29, 1944