Sept. 27, 1938. B. E. SHAW 2,131,304

SELECTOR FOR CONTROL CLOCKS

Filed Dec. 22, 1936

Fig. 1.

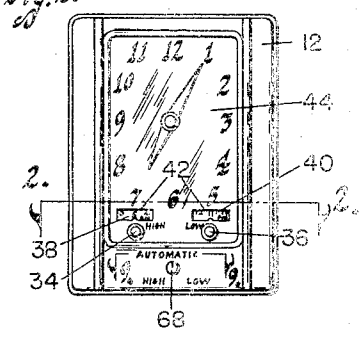


Fig. 2

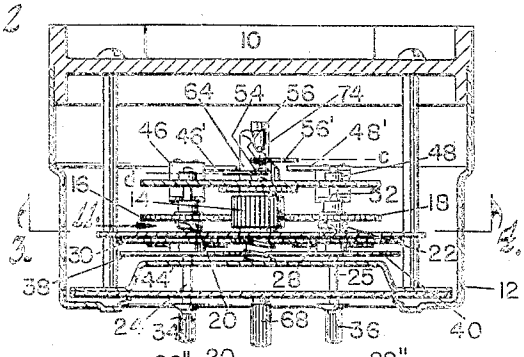


Fig. 3.

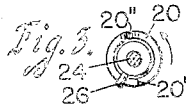


Fig. 4.

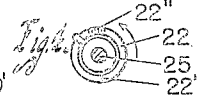


Fig. 5.

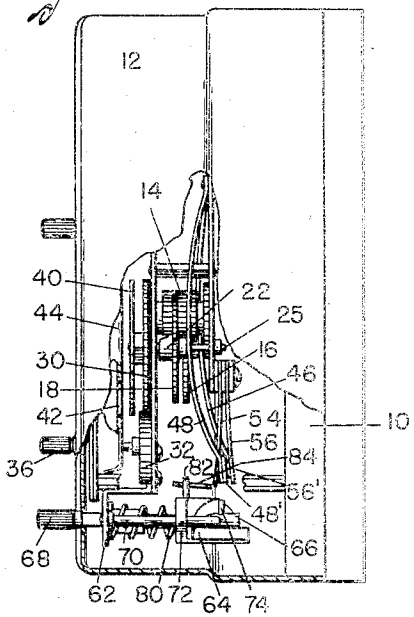


Fig. 6.

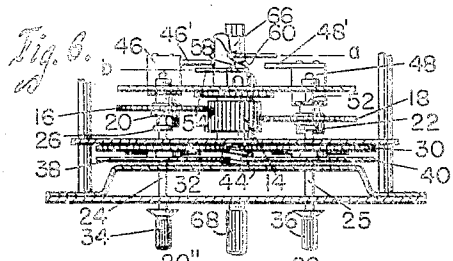


Fig. 7.

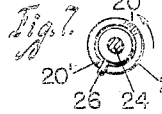


Fig. 8.

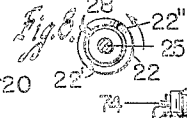


Fig. 9.

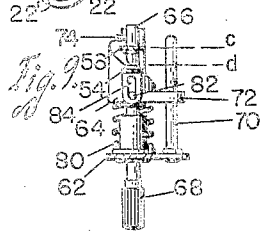


Fig. 10.

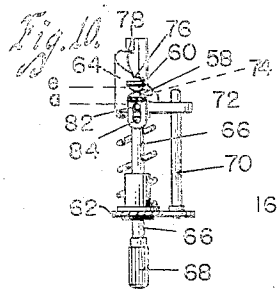


Fig. 11.

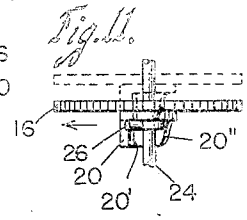


Fig. 12.

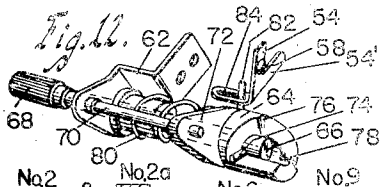
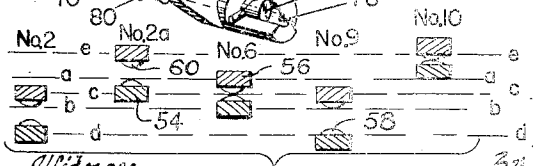


Fig. 13.



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UNITED STATES PATENT OFFICE

2,131,304

SELECTOR FOR CONTROL CLOCKS

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Application December 22, 1936, Serial No. 117,168

8 Claims. (Cl. 200—38)

One object of my invention is to provide a selector for control clocks, such selector being comparatively simple and inexpensive in construction.

It is a further object of my invention to provide a selector for a control clock which is manually operable to set the control mechanism in different positions independent of the clock actuated mechanism normally effecting control of the control mechanism.

Still another object is to provide for a control clock having a pair of switch blades or other control mechanism a means for manually adjusting the mechanism to a position in which it will positively remain until the mechanism is manually reset for normal actuation by the clock actuated mechanism of the control clock.

More specifically it is my object to provide in connection with a pair of switch blades which are normally operated by clock actuated mechanism a manual controller which is cooperable with the switch blades to position them either in a positively engaged or a positively disengaged position without being capable of being affected by the motion of the clock actuating mechanism.

A further object is to provide manually operable means to modify the action of a normally automatic clock controlled switch, which includes a member movable to control the switch and position the elements of the switch beyond their normal position to which they are usually actuated by the clock actuated mechanism.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my selector for control clocks, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing, in which:

Figure 1 is a front elevation of a control clock embodying my selector.

Figure 2 is an enlarged horizontal sectional view on the line 2—2 of Figure 1, showing the parts in one position.

Figures 3 and 4 are sectional views on the line 3—4 of Figure 2 showing the positions of two different cams of the control clock, these positions being the ones illustrated in Figure 2.

Figure 5 is a side elevation on an enlarged scale with parts broken away and showing them in a different position than in Figures 1 and 2.

Figure 6 is a sectional view similar to Figure 2 showing the parts in the position of Figure 5.

Figures 7 and 8 are views similar to Figures 3 and 4 showing the positions of the cams in Figure 6.

Figure 9 is a sectional view on the line 9—9 of Figure 1 showing a selector device of my control clock in position with the control switch open.

Figure 10 is a similar view showing the control switch closed.

Figure 11 is an enlarged, side elevation of a gear, shaft and cam of my control clock as viewed in the direction of the arrow 11 on Figure 2.

Figure 12 is a perspective view of the manually operable selector shown in Figures 9 and 10; and

Figure 13 is a diagrammatical view showing various positions of the contacts of the control switch, to illustrate different phases of operation of the device.

On the accompanying drawing I have used the reference numeral 10 to indicate generally a base and 12 a casing of a control clock. Clock mechanism either of the spring wound or electric motor type is mounted within the casing 12 but forms no part of my present invention, and accordingly I have not illustrated it except to show a gear 14 of the clock which rotates once each twelve hour period. The gear is in mesh with the clock mechanism and is thereby clock actuated, and it meshes with a pair of gears 16 and 18 which are therefore also clock actuated.

The gears 16 and 18 are provided with cams 20 and 22 having drop shoulders 20′ and 22′ respectively, and also riser portions 20″ and 22″. The riser portions are substantially diametrically opposite the drop portions 20′ and 22′.

Setting shafts 24 and 26 are provided which have projections of pin like character 26 and 28 extending radially therefrom. These shafts are frictionally held in any position in which they are set. For setting their positions, the shafts 24 and 26 are each provided with gears 30 in mesh with gears 32. Knobs 34 and 36 are provided for manually rotating the gears 32. The positions of the setting shafts 24 and 26 are indicated by dials 38 and 40 which can be observed through openings 42 in the clock face 44.

The cams 20 and 22 are normally retained in engagement with the projections 26 and 28 by leaf springs 46 and 48. These springs are anchored as at 50 to the frame of the clock and have slot-like perforations at 52 receiving the setting shafts 24 and 26.

A control switch is provided which comprises leaf springs 54 and 56 suitably anchored at their upper ends to the frame of the clock and properly insulated from each other. The leaf springs 54 and 56 carry contacts 58 and 60 respectively which are normally engaged with each other as shown in Figure 6, due to the resiliency of the leaf springs when they are free to flex.

The leaf springs 46 and 48 are adapted to normally control the positions of the switch springs 54 and 56 and for this purpose the springs 46, 48, 54 and 56 have projections 46′, 48′, 54′ and 56′ respectively.

A selector is provided comprising a bracket 62 supporting a slidable and non-rotatable member 64 and a rotatable and non-slidable member 66. The member 64 is a cam which is rotatable and slidable on the member 66, the member 66 being rod or shaft like in character. The member 66 is provided with a control handle or knob 68. The bracket 62 carries a stationary pin 70 which is received in the perforation of a perforated ear 72 extending from the cam 64. The rod 66 is provided with a projection 74 of pin-like character adapted to coact with the cam surface of the cam 64, such surface being spirally arranged. The cam surface is provided with a pair of depressions 76 and 78 with which the pin 74 may coact in different positions of adjustment of the selector.

A spring 80 is provided for normally retaining the pin 74 coacting with the depression 76 or the depression 78. The cam 64 is provided with a projection 82 which cooperates with a slot 84 formed in an extension of the switch blade 54. The slot and pin provide a lost motion connection for an important purpose which will hereinafter appear.

Practical operation

In the operation of my control clock and its selector, let us first assume that the control switch is to be used for the purpose of energizing an electric heater in a room thermostat, so as to lower the ambient temperature to which the thermostat will be responsive when the heater is energized.

Such an arrangement finds practical application in oil burner control installations, the response to a lower temperature being desirable during the night when the occupants of the house have retired.

By way of example, if the knob 34 is adjusted for 5:00 A. M. and the knob 36 for 11:00 P. M., the switch contacts 58 and 60 will be closed at 11:00 P. M. and will open at 5:00 A. M., thus making the room thermostat responsive to a lower room temperature from 11:00 P. M. to 5:00 A. M., and responsive to a high room temperature from 5:00 A. M. to 11:00 P. M.

When the selector knob 68 is in the position shown in Figures 1, 2, 5 and 6, with the pin 74 engaged in the depression 76, the switch blades 54 and 56 are free due to the lost motion connection between the pin 82 and the slot 84 to be actuated by the leaf springs 46 and 48 in response to the rotation of the clock mechanism.

Starting with the positions shown in Figures 1, 2, 3 and 4, the clock mechanism and consequently the cams 20 and 22 are at a 7:05 A. M. position. Accordingly the drop portion 20′ of the cam 20 has permitted the leaf spring 46 to move the switch blade 54 toward the front of the clock, thus separating its contact 58 from the contact 60 of the switch blade 56. This position of the parts is shown at No. 2 in Figure 13, wherein five lines *a*, *b*, *c*, *d*, and *e* illustrate different positions assumed by the switch blades 54 and 56 during operation by the clock actuated mechanism. The line *c* is assumed by either of the blades 54 and 56 when they are free of any restraint and accordingly when both are free of any restraint, they will assume the position shown at No. 6 during a predetermined positioning of the leaf springs 46 and 48.

In Figure 11 I have illustrated the action of the gear 16 in controlling the position of the leaf spring 46. The dotted position illustrates the gear just prior to 5:00 A. M. when the high portion of the cam ahead of the drop portion 20′ is still on the projection 26. At 5:00 A. M. the drop portion 20′ passes the pin 26 and the leaf spring 46 then forces the gear downwardly to the full line position illustrated.

Describing the different positions in sequence, in Figure 13, the No. 2*a* position of the switch blade 56 will be assumed at about 11:00 A. M., due to the riser portion 22″ being substantially diametrically opposite the drop portion 22′. Thereafter at 5:00 P. M. the switch blade 54 will be released by the leaf spring 46 and moved from the No. 2 position to the No. 2*a* position. At 11:00 P. M. the No. 6 position will be assumed due to the leaf spring 48 being released by the cam drop portion 22′. This position will be maintained until 5:00 A. M., the parts being shown at about 3:15 A. M. in Figures 5, 6, 7 and 8. In this position, as best shown in Figure 6, it is obvious that both leaf springs 46 and 48 are in a position where their extensions 46*a* and 48*a* are free of the switch blade extensions 54*a* and 56*a*, thus permitting the contacts 58 and 60 to be engaged as a result of the resiliency of the switch blades, as before explained. At 5:00 A. M. the No. 2 position will again be assumed and thereupon the cycle of operations will be repeated.

My selector is operable to either positively open or positively close the control switch, as shown in Figures 9 and 10 and as illustrated diagrammatically at No. 9 and No. 10 in Figure 13. Figure 12 also illustrates the selector in switch closing position.

Whenever the pin 74 is rotated out of the depression 76 and into the depression 78 at the top of the cam surface as shown in Figure 9, or rotated to the bottom of the cam surface as shown in Figures 10 and 12, the control switch is out of control of the clock actuated mechanism. In the Figure 9 position, the cam 64 has been moved toward the front of the clock so that the pin 82 engages the front end of the slot 84 and pulls the switch blade 54 slightly beyond the position indicated by the line *d* in Figure 13, which is beyond the position to which it is urged by the leaf spring 46 when the control switch is actuated by the clock actuated mechanism. This positively holds the contact 58 separated from the contact 60 so that the room thermostat will be constantly responsive to the higher temperature, which is indicated by "High" on Figure 1, the control knob 68 being rotated counterclockwise for this purpose. When it is rotated clockwise, the pin 82 engages the rear end of the slot 84 for positively moving the switch blade 54 to a position slightly beyond the line *a* position in Figure 13, where it is normally moved by the leaf spring 48. This causes a positive engagement of the contact 58 with the contact 60 until such time as the selector knob 68 is rotated from the "Low" position in Figure 1 to the "Automatic" or "High" positions.

Thus by the simple expedient of providing the selector shown in Figure 12, and properly associating it with the switch blade 54, the control switch can be readily rendered inoperable from the clock actuated mechanism.

Some changes may be made in the construction and arrangement of the parts of my device 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. The combination of a control clock having a switch, a movable element for opening said switch when said movable element assumes one position, a second movable element for closing said switch when said second movable element assumes one position and a pair of clock actuated members, one for moving one of said movable elements to its said one position and the other for moving the other of said movable elements to its said one position, of a selector for preventing such movement by said movable elements comprising a single control handle operatively connected with said switch and operable to move it to and positively retain it in either open or closed positions and incapable in said positions of being operated by said movable elements.

2. The combination with a control clock having a pair of switch blades, a movable element for separating said switch blades when said movable element assumes one position, a second movable element for engaging said switch blades with each other when said second movable element assumes one position and a pair of clock actuated members, one of which moves one of said movable elements a predetermined distance to its said one position and the other of which moves the other of said movable elements a predetermined distance to its said one position, of a selector for preventing such movement by said movable elements comprising a control handle operatively connected with said switch blades to selectively separate them or engage them with each other beyond either of the limits of said predetermined distances.

3. The combination of a control clock having a pair of switch blades, a movable element for engaging one of said switch blades when said movable element assumes one position, a second movable element for engaging the other of said switch blades when said second movable element assumes one position and a pair of clock actuated members, one for moving one of said movable elements to its said one position and the other for moving the other of said movable elements to its said one position, of a selector for preventing such movement by said movable elements comprising a control handle connected with one of said switch blades and operable to move it to either open or closed position and to positively retain said switch blades in either of said positions independent of the normal movement thereof by the clock actuated members.

4. The combination with a control clock, a pair of elements to be controlled thereby, said elements being each movable from one position to another and a pair of clock actuated members, one for moving one of said elements to its said other position and the other for moving the other of said movable elements to its said other position, of a selector for preventing such movement comprising a single manual controller operable to move either of said elements to a position where said clock actuated members cannot move them.

5. The combination with a control clock, a pair of switch blades to be controlled thereby, said control clock having a pair of clock actuated members, one for moving one of said switch blades and the other for moving the other of said switch blades, of a selector for preventing movement of said switch blades by said clock actuated members comprising a manual controller operable in one position to render said clock actuated members ineffective to move said switch blades and simultaneously separate said switch blades from each other and operable in another position to render said clock actuated members ineffective to move said switch blades and simultaneously engage said switch blades with each other.

6. The combination with a control clock, a pair of elements to be controlled thereby, said elements being each movable from one position to another and a pair of clock actuated members, one for moving one of said elements to its said other position and the other for moving the other of said movable elements to its said other position, of a selector for said movable elements to render them inoperable by said clock actuated members, said selector comprising a slidable and non-rotatable member operatively connected with one of said elements, a rotatable member having a projection, said slidable member having a spiral cam with which said projection cooperates, said slidable member in a central position permitting normal movement of said pair of elements by said clock actuated members and in other positions positioning the elements so that said clock actuated members cannot change their position as determined by said rotatable member.

7. The combination with a control clock, a pair of elements to be controlled thereby, said elements being each movable from one position to another and a pair of clock actuated members, one for moving one of said elements to its said other position and the other for moving the other of said movable elements to its said other position, of a selector for said movable elements to render them inoperable by said clock actuated members, said selector comprising a slidable and non-rotatable member operatively connected with one of said elements by a lost motion connection, a rotatable member having a projection, said slidable member having a spiral cam with which said projection cooperates, said slidable member in a central position permitting through said lost motion connection normal movement of said pair of elements by said clock actuated members and in other positions positioning the elements so that said clock actuated members cannot change their position as determined by said rotatable member.

8. The combination with a control clock, a pair of elements to be controlled thereby, said elements being each movable from one position to another and a pair of clock actuated members, one for moving one of said elements to its said other position and the other for moving the other of said movable elements to its said other position, of a selector for said movable elements to render them inoperable by said clock actuated members, said selector comprising a slidable and nonrotatable member and a rotatable and nonslidable member, said members having cam and projection coaction with each other, one of said members being operatively connected with one of said elements for moving it to a position where it cannot be actuated by said clock actuated members or to a position where it can be so actuated.

BURTON E. SHAW.