Sept. 15, 1970 E. E. MARQUIS 3,528,315

CONTROL KNOB CONSTRUCTION AND THE LIKE

Filed Feb. 24, 1969 2 Sheets-Sheet 1

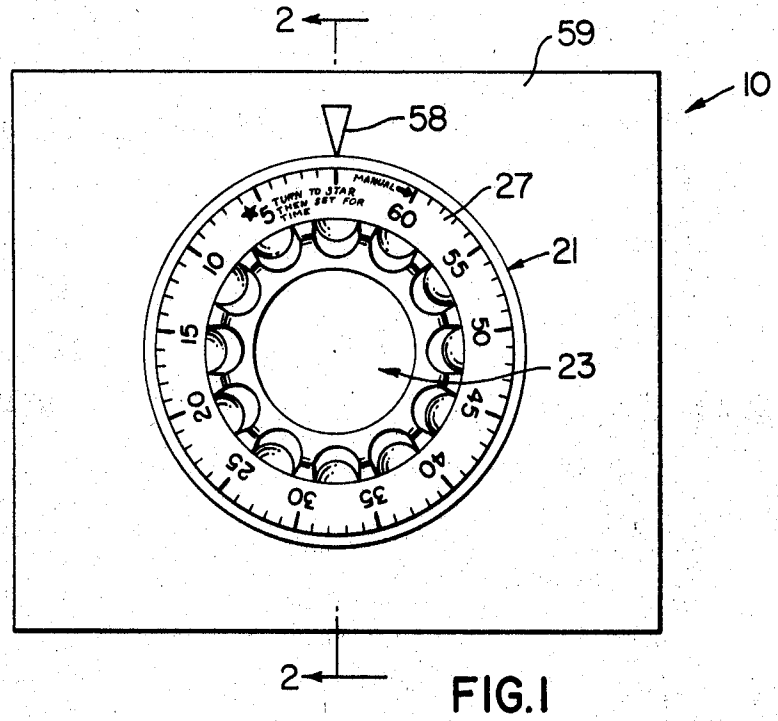


FIG.1

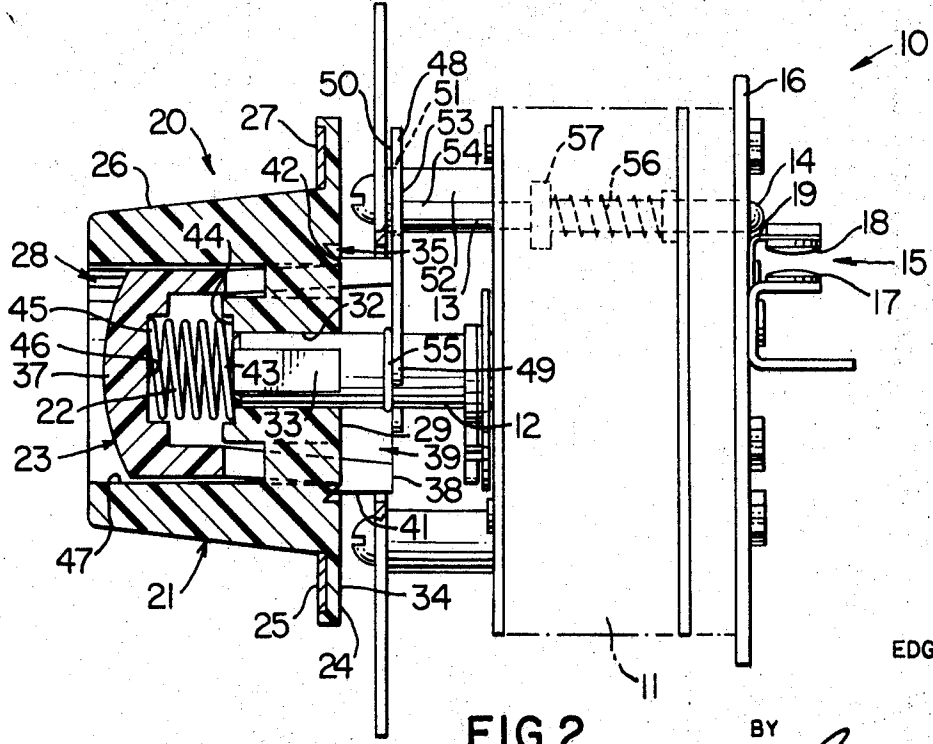


FIG.2

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CONTROL KNOB CONSTRUCTION AND THE LIKE

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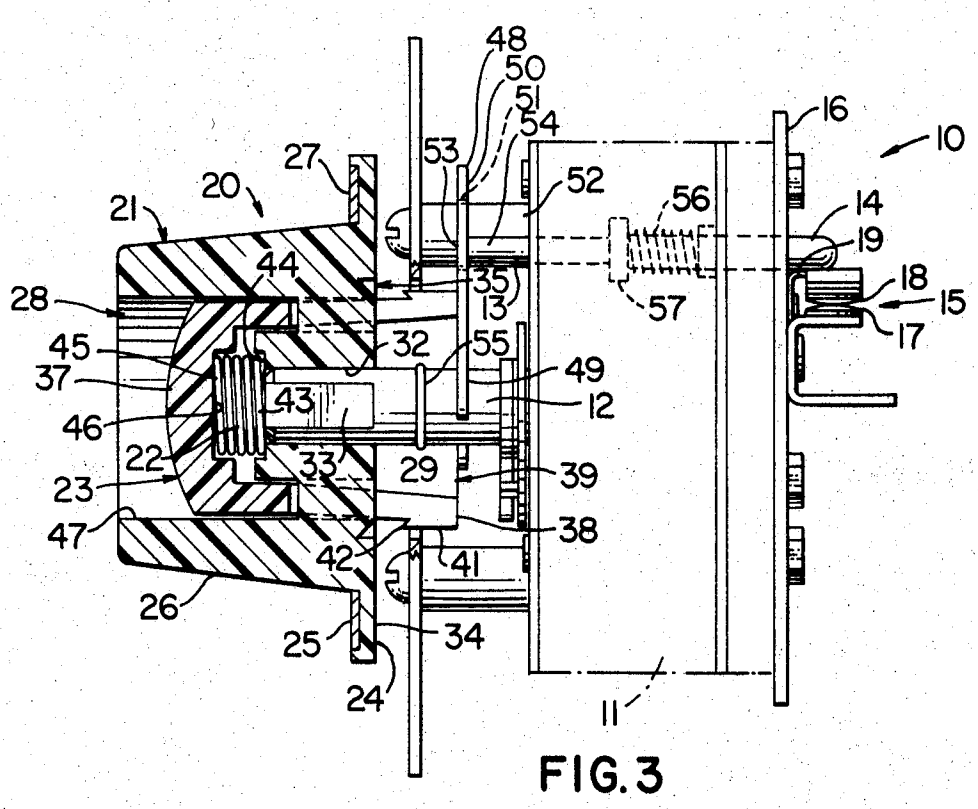


FIG. 3

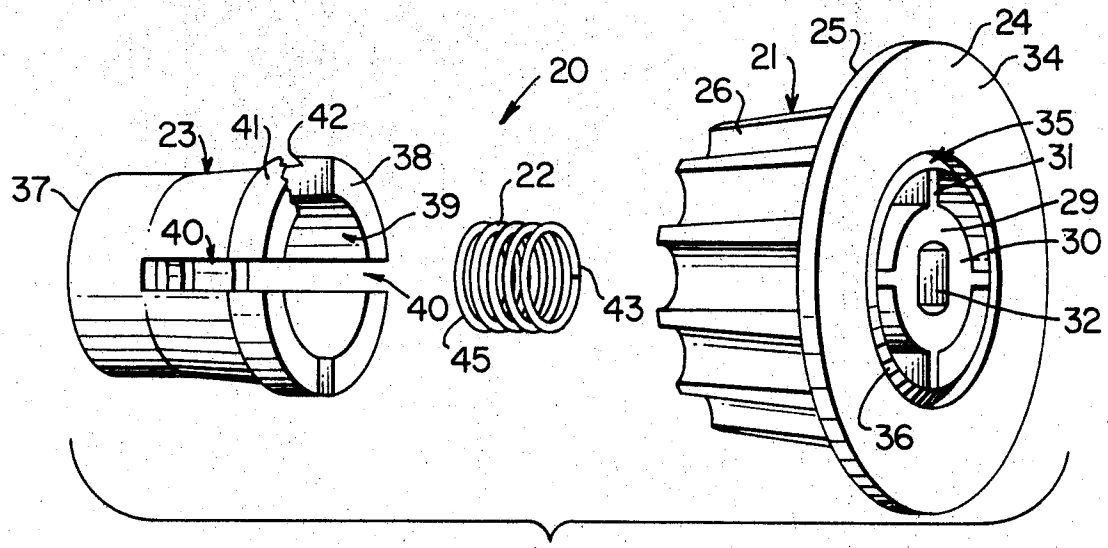


FIG. 4

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CONTROL KNOB CONSTRUCTION AND THE LIKE

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U.S. Cl. 74—553 20 Claims

ABSTRACT OF THE DISCLOSURE

A control knob construction having an outer dial member interconnected to a control shaft for rotating the control shaft in unison therewith, the outer dial member having an opening means passing therethrough and receiving a push button member that is axially movable relative thereto and is snap fitted to the outer dial member to interconnect the same together while permitting such axial movement therebetween.

This invention relates to an improved control knob construction for a timer means or the like as well as to an improved control device utilizing such a control knob construction.

It is well known that a control device can be selectively set for a cycle of operation thereof by setting a control knob of the control device in a preselected position thereof. Thereafter, the control device can have its selected cycle of operation initiated by the subsequent actuation of a push button part of the control knob.

Accordingly, it is one of the features of this invention to provide an improved control knob construction of the above described type wherein the control knob construction is formed from a relatively few parts in a simple and economical manner to accomplish the above function or the like.

In particular, the disclosed embodiment of the control knob construction of this invention comprises an outer dial member having means for being interconnected to a control shaft or the like of a control device to move the control shaft in unison therewith, the outer dial member having an opening means passing therethrough and telescopically receiving a push button member that is snap fitted to the outer dial member while being axially movable relative thereto.

Accordingly, it is an object of this invention to provide an improved control knob construction having one or more of the novel features set forth above or hereinafter shown or described.

Another object of this invention is to provide an improved control device having one or more of the novel features set forth above or hereinafter shown or described.

Other objects, uses and advantages of this invention are apparent from a reading of this description which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIG. 1 is a front view of the improved control device of this invention.

FIG. 2 is a cross-sectional view taken on line 2—2 of FIG. 1 with the control knob construction of this invention being in cross section and the control device being in elevation.

FIG. 3 is a view similar to FIG. 2 and illustrates the control knob construction in another operating position thereof.

FIG. 4 is an exploded perspective view of the control knob construction for the control device of FIG. 1.

While the various features of this invention are hereinafter described and illustrated as providing a control knob construction for a timer operated control device, it is to be understood that the various features of this invention to be utilized singly or in any combination thereof to provide a control knob construction for other types of control devices as desired.

Therefore, this invention is not to be limited to only the embodiments illustrated in the drawings, because the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

Referring now to FIGS. 1 and 2, the improved control device of this invention is generally indicated by the reference numeral **10** and comprises a housing means **11** containing a conventional wind-up timer means (not shown) that is operatively interconnected to a control shaft **12** in a manner well known in the art so that when the control shaft **12** is rotated in a clockwise direction in FIG. 1 from the "off" position illustrated in FIG. 1 to a desired time period setting thereof in a manner hereinafter described, the timer motor is wound by such clockwise movement of the control shaft **12** and will rotate the control shaft **12** back in a counterclockwise direction in FIG. 1 to the "off" position thereof when an actuating plunger **13** of the control device **10** is moved to the right in FIG. 2 to initiate the starting action of the timer motor.

The actuating member **13** of the control device **10** has a free end **14** adapted to operate an electrical switch means **15** carried on the rear side **16** of the control device **10** and comprising a fixed contact **17** and a movable contact **18** being carried on a spring blade **19** that has a normal bias that tends to maintain the contact **18** out of contact with the fixed contact **17**. However, when the actuator **13** is moved to the right in the manner illustrated in FIG. 3, the right hand end **14** of the actuator **13** moves the movable contact **18** into electrical contact with the fixed contact **17** and will maintain the same in electrical contact with each other during the entire time that the timer motor of the control device **10** is operating so that when the control shaft **12** returns to the "off" position illustrated in FIG. 1, suitable mechanism of the control device **10** returns the actuator **13** back to the left as illustrated in FIG. 2 to permit the switch **15** to open as illustrated in FIG. 2.

The control shaft **12** and actuating member **13** of the control device **10** are operated by a control knob construction **20** of this invention in a manner now to be described.

As illustrated in FIGS. 2 and 4, the control knob construction **20** of this invention only comprises three parts that can be assembled together in a simple and economical manner. In particular, the control knob construction **20** comprises an outer dial member **21**, a compression spring **22** and a push button member **23**, the outer dial member **21** and push button member **23** being formed of any suitable material, such as plastic or the like.

The outer dial member **21** has an end plate **24** integrally interconnected on the side **25** thereof to a suitably shaped knob-like part **26** disposed concentrically therewith and having a smaller diameter so that a suitable dial indicating ring **27** can be disposed about the knob-like part **26** and be carried against the side **25** of the disc part **24**. An opening means **28** passes centrally through the outer dial member **21** and defines a web means **29** spanning the opening **28**, the web means **29** having a central portion **30** integrally interconnected to the outer dial member **21** by a plurality of radially disposed fins **31** for a purpose hereinafter described.

The central portion **30** of the web means **29** of the outer dial member **21** has an aperture or slot **32** passing therethrough of a cross-sectional configuration that complements the cross-sectional configuration of the left-hand end **33** of the control shaft **12** of the control device

10 so that the left-hand end 33 of the control shaft 12 can be telescopically received in the aperture 32 to interconnect the outer dial member 21 to the control shaft 12 in a splining relation so that rotational movement of the outer dial member 21 will cause the control shaft 12 to rotate in unison therewith and vice versa.

The rear face 34 of the disc portion 24 of the outer dial member 21 has an annular recess 35 formed therein concentrically about the opening means 28, the recess defining an angled ridge 36 for a purpose hereinafter described.

The push button member 23 has a closed left-hand end 37 with the right-hand end 38 being interrupted by an opening 39 that passes centrally into the push button member 23 and is interconnected to a plurality of slots 40 that are formed radially through the right-hand end 38 of the push button member 23 to register with the fins 31 of the web means 29 of the outer dial member 21. The right-hand end 38 of the push button member 23 has outwardly directed tongue means 41 that define angled ridge means 42 that cooperate with the annular recess 35 of the outer dial member 21 in a manner now to be described.

When it is desired to assemble the parts 21, 22 and 23 of the knob construction 20 together, the compression spring 22 is disposed either in the left-hand end of the opening means 28 of the outer dial member 21 to have its right-hand end 43 disposed against the left-hand end surface 44 of the web means 29 of the outer dial member 21 or is disposed in the right-hand end of the opening 39 of the push button member 23 to have its left-hand end 45 disposed against the inside surface means 46 of the closed end 37 of the push button member 23.

Thereafter, the push button member 23 and outer dial member 21 are disposed in telescopic relation so that when the push button member 23 has its right-hand end 38 received in the left-hand end of the opening 28 of the outer dial member 21 with the compression spring 22 therebetween and with the slots 40 of the push button member 23 being aligned with the fins 31 of the outer dial member 21, the push button member 23 and outer dial member 21 are further telescoped together so that the tongue means 41 of the push button member 23 are cammed radially inwardly by the internal peripheral surface 47 of the outer dial member 21 that is defined by the opening means 28 until the tongue means 41 pass beyond the right-hand end thereof and snap outwardly over the end surface 34 of the disc part 24 of the outer dial member 21 to snap fit the push button member 23 to the outer dial member 21. Since the compression spring 22 is placed under compression before the tongue means 41 clear the end surface 34 of the outer dial member 21, the compression spring 22 tends to normally maintain the push button member 23 in the position illustrated in FIG. 2 relative to the outer dial member 21 whereby the angled ridge means 32 of the tongue means 41 of the push button member 23 are received in the annular recess 35 of the outer dial member 21 against the angled surface 36 thereof to limit movement of the push button member 23 to the left in FIG. 2 relative to the outer dial member 21.

Therefore, it can be seen that the control knob construction 20 of this invention can be assembled together in a simple and economical snap fit relation while permitting the push button member 23 to be axially movable relative to the outer dial member 21 thereof.

The control device 10 includes a plate-like member 48 that has a yoke portion 49 receiving the control shaft 12 and another portion 50 having an opening 51 passing therethrough and telescopically receiving a support post 52 of the housing means 11. In this manner, the plate-like member 48 has a portion 53 thereof engaging against the left-hand end 54 of the actuator 13 while the yoke-like portion 49 is engageable against an abutment means 55 of the control shaft 12 in the manner illustrated in FIG. 2, the right-hand end 38 of the push button member 23 also engaging against the plate-like member 48 in the "off" position of the central device 10 as illustrated in FIG. 2.

The operation of the control knob construction 20 of this invention as utilized with the control device 10 will now be described.

With the control knob construction 20 disposed in the "off" position illustrated in FIGS. 1 and 2, it can be seen that the actuator 13 and push button member 23 are respectively disposed in their extreme left-hand positions by the compression spring 22 of the control knob construction 20 and a compression spring 56 of the control device 10 operating against an abutment means 57 of the actuator 13 whereby the electrical switch means 15 is disposed in an open position thereof.

The operator grasps the knob part 26 of the control knob construction 20 and rotates the same in a clockwise direction in FIG. 1 to position a desired time on the dial member 27 adjacent on indicating mark 58 carried on a control panel member 59 (FIG. 1), such selected time period being the time period that it is desired for the switch means 15 to be maintained in a closed position such as for actuating a household blender, mixer, or the like.

With the control knob construction 20 now set in a desired time position thereof, it can be seen that the rotation of the control knob construction 20 causes the control shaft 12 to rotate in unison therewith to wind up the timer motor of the control device 10 but that the timer motor can not operate until the actuator 13 is moved from the position of FIG. 2 to the position of FIG. 3.

Thereafter, in order to start the now set time cycle of the control device 10, the operator pushes inwardly on the push button member 23 of the control knob construction 20 to move the same from the position illustrated in FIG. 2 to the position illustrated in FIG. 3 in opposition to the force of the compression spring 22 whereby such rightward movement of the push button member 23 causes the plate-like member 48 to move to the right and move the actuator 13 to the right in opposition to the force of the compression spring 56 thereof to close the switch means 15. Such movement of the actuator 13 to the right operates suitable mechanism in the control device 10 that will hold the actuator 13 in its rightward position as illustrated in FIG. 3 and start the operation of the timer motor whereby the timer motor will, thereafter, drive the control shaft 12 back in a counterclockwise direction from the selected time setting thereof back to the "off" position illustrated in FIG. 1 at a timed rate as previously selected and when the control shaft 12 reaches the "off" position illustrated in FIG. 1, such mechanism will release the actuator 13 to permit the same to move back to the left by the force of the compression spring 56 to thereby open the electrical switch 15.

Thus, it can be seen that the control device 10 and control knob construction 20 of this invention can be utilized for operating a blender, mixer, or the like for a predetermined time period.

Accordingly, it can be seen that not only does this invention provide an improved control knob construction, but also this invention provides an improved control device or the like.

What is claimed is:

1. A control knob construction comprising an outer member having means for interconnecting said outer member to a control shaft or the like for moving said shaft in unison therewith, said outer member having an opening means passing therethrough, and a push button member disposed in said opening means of said outer member and being movable relative thereto, said push button member and said outer member being snap-fitted together.

2. A control knob construction as set forth in claim 1

wherein said outer member has an integral web means spanning said opening means thereof, said push button member having recess means therein receiving said web means and permitting movement of said push button member relative to said outer member.

3. A control knob construction as set forth in claim 2 wherein said web means has slot means therein for receiving said control shaft to define said means for interconnecting said outer member to said control shaft.

4. A control knob construction as set forth in claim 2 wherein said web means comprises a central portion interconnected to said outer member by a plurality of radially disposed fins, said recess means of said push button member comprising a central opening receiving said central portion of said web means and a plurality of slots respectively receiving said fins.

5. A control knob construction as set forth in claim 1 wherein said push button member is axially movable relative to said outer member.

6. A control knob construction as set forth in claim 5 wherein a spring is disposed between said outer member and said push button member to tend to maintain said push button member in one axial position relative to said outer member.

7. A control knob construction as set forth in claim 1 wherein said outer member has an end surface interrupted by said opening means, said push button member having tongue means for camming through said opening means and snapping outwardly when disposed beyond said end surface to provide means for abutting against said end surface to limit movement of said push button member relative to said outer member in one direction.

8. A control knob construction as set forth in claim 7 wherein said end surface of said outer member has a recess therein for receiving said tongue means of said push button member when said tongue means abuts against said end surface.

9. A control knob construction as set forth in claim 8 wherein said recess in said end surface of said outer member is annular and is concentrically disposed about said opening means.

10. A control knob construction as set forth in claim 8 wherein said recess in said end surface defines an angled ridge, said tongue means having an angled ridge that mates with said angled ridge of said end surface when said tongue means is received in said recess.

11. In a control device having a control shaft and an actuator, the improvement comprising a control knob construction having an outer member provided with means for interconnecting said outer member to said control shaft for moving said shaft in unison therewith, said outer member having an opening means passing therethrough, and a push button member disposed in said opening means of said outer member and being movable relative thereto to control said actuator, said push button member and said outer member being snap-fitted together.

12. In a control device as set forth in claim 11, the further improvement wherein said outer member has an integral web means spanning said opening means thereof, said push button member having recess means therein receiving said web means and permitting movement of said push button member relative to said outer member.

13. In a control device as set forth in claim 12, the further improvement wherein said web means as slot means therin for receiving said control shaft to define said means for interconnecting said outer member to said control shaft.

14. In a control device as set forth in claim 12, the further improvement wherein said web means comprises a central portion interconnected to said outer member by a plurality of radially disposed fins, said recess means of said push button member comprising a central opening receiving said central portion of said web means and plurailty of slots respectively receiving said fins.

15. In a control device as set forth in claim 11, the further improvement wherein said push button member is axially movable relative to said outer member.

16. In a control device as set forth in claim 15, the further improvement wherein a spring is disposed between said outer member and said push button member in one axial position relative to said outer member.

17. In a control device as set forth in claim 11, the further improvement wherein said outer member has an end surface interrupted by said opening means, said push button member having tongue means for camming through said opening means and snapping outwardly when disposed beyond said end surface to provide means for abutting against said end surface to limit movement of push button member relative to said outer member in one direction.

18. In a control device as set forth in claim 17, the further improvement wherein said end surface of said outer member has a recess therein for receiving said tongue means of said push buton member when said tongue means abuts against said end surface.

19. In a control device as set forth in claim 18, the further improvement wherein said recess in said end surface of said outer member is annular and is concentrically disposed about said opening means.

20. In a control device as set forth in claim 18, the further improvement wherein said recess in said end surface defines an angled ridge, said tongue means having an angled ridge that mates with said angled ridge of said end surface when said tongue means is received in said recess.

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