

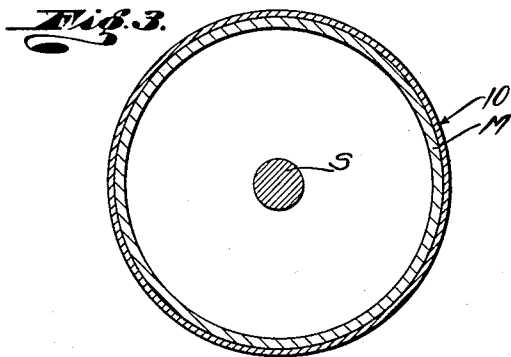
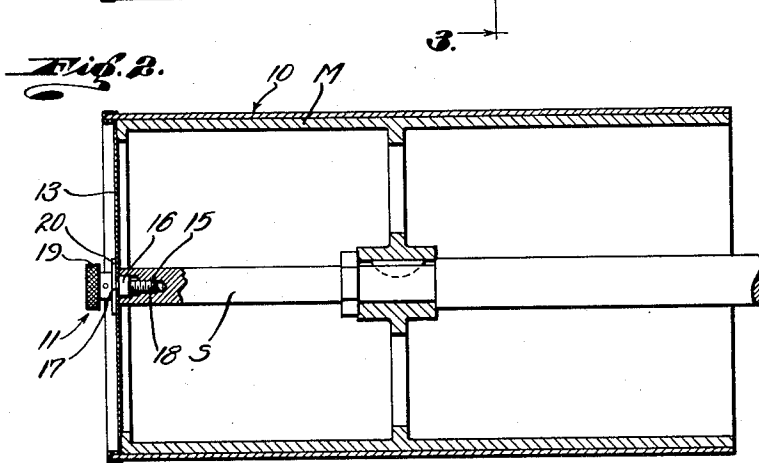
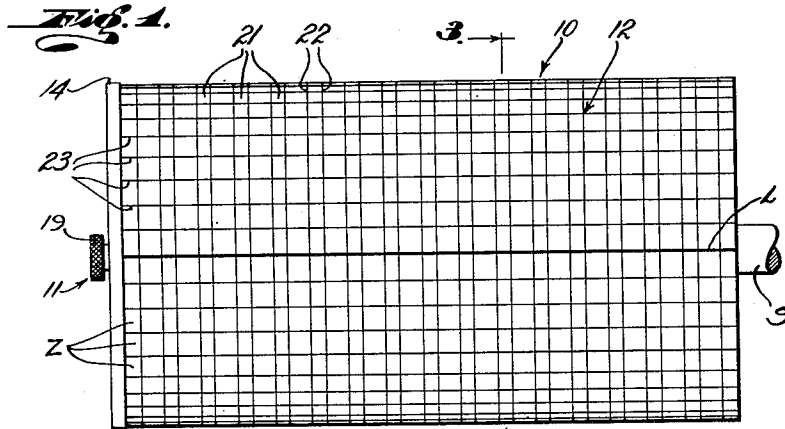
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H. HARVEY

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CONTROL ELEMENT

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## CONTROL ELEMENT

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7 Claims. (Cl. 74-568)

This invention relates to timing mechanisms or control mechanisms and relates more particularly to the active or control elements for such mechanisms. A general object of this invention is to provide a simple, inexpensive and easily conditioned or cut control element for control means of the class described in co-pending application Serial No. 352,584, filed August 14, 1940.

The co-pending application just referred to describes a control means for governing various electrically actuated and controlled mechanisms and parts of automatic and semi-automatic machines such as commercial cyclic operation washing machines. The control means embodies a plurality of switches governed by an element rotating at a constant speed which is cut or perforated to cause operation of the switches in a given or selected order or sequence and for selected periods. The present invention is directed primarily to a control element for use on a control mechanism of the type described in said co-pending application.

Another object of this invention is to provide a control drum or control element of the character referred to that may be easily and quickly cut, perforated, or conditioned to produce operation of the control mechanism switches in any order or sequence and for any selected periods. The element of the invention is characterized by the ease with which it may be cut by a knife or similar implement to produce any selected or required operation of the switches.

Another object of this invention is to provide a control element of the character referred to that is very inexpensive and easily installed and replaced whereby the control mechanism may be conditioned, prepared, or changed to bring about any selected or required sequence of timed operations at low cost and without a long shut down of the controlled machine. A cyclic washing machine control equipped with the novel element of the invention may be quickly conditioned, at but a slight cost, to perform any cyclic washing operations with selected washing formulas.

A further object of this invention is to provide a control element of the character referred to that is formed and marked so that the operator may readily cut or form openings at selected points to bring about the required sequence of timed operations with the assurance that the controlled machine will operate as desired.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of the invention, throughout

which description reference is made to the accompanying drawing, in which:

Fig. 1 is a side elevation of the control element provided by the invention. Fig. 2 is a central longitudinal detailed sectional view of the element and Fig. 3 is a transverse detailed sectional view of the element taken as indicated by line 3-3 on Fig. 1.

The novel timer element or control mechanism element may be said to comprise, generally, a wall or tubular body 10, mounting or attaching means 11 for the body 10, and markings 12 on the body 10 to facilitate the accurate cutting or perforating of the same.

The body 10 of the control element is a tubular shell, sleeve, or wall of a material that may be easily cut or perforated. As illustrated, the body 10 is an elongate cylindrical member presenting smooth cylindrical internal and external surfaces. The element body 10 is formed of paper, cardboard, or similar fibrous material, or any other material that may be easily perforated or cut with a knife or similar tool. Although the body 10 is formed of a readily cut material it has sufficient rigidity to be handled without special care. The body 10 need not be stiff or extremely rigid because it is supported and backed up by the spindle. The tubular wall or body 10 may be relatively thick to assure the full operation of the switch actuating parts with which it co-operates. The body 10 is adapted to be passed onto a cylindrical mandrel or spindle M and the switches of the control mechanism are controlled or operated by the engagement of their actuating parts with the external surface of the body and openings formed in the body. Where the wall thickness of the body 10 is substantial, as described above, the openings cut or formed in it have sufficient depth to assure the full actuation of the switches. One end of the body 10, which may be termed the inner end, is open to facilitate the arrangement of the body on the driving spindle M.

The means 11 serves to facilitate the attachment of the body 10 to the timed driving spindle. The attaching means 11 comprises a disc or plate 13 which closes the outer end of the body 10. The plate 13 may be formed of sheet metal or other selected material. As illustrated, the plate 13 may be a plain flat member whose edge is secured to the body 10 by a seam 14. The seam 14 may be a simple, rolled seam of the type employed to secure the metal ends to paper containers. It is to be understood that the end plate 13 is fixed to the body 10.

The means 11 further includes an attaching screw 15. The screw 15 has an enlarged unthreaded portion 16 at the inner side of the plate 13 and a reduced stem portion 17 extending outwardly through a central opening in the plate 13. The major inner portion of the screw 15 carries a thread to cooperate with a thread in the opening 18 of the spindle shaft S, indicated in Fig. 2. The opening 18 has a plain unthreaded portion of enlarged diameter which receives the screw portion 16 so that the enlarged screw portion does not interfere with the inward threading of the screw. A knob 19 is provided on the reduced stem portion 17 of the screw 15. The knob 19 may be pinned or otherwise fixed to the screw 15. A washer 20 is arranged on the reduced stem portion 17 of the screw 15 between the plate 13 and the inner end of the knob 19.

When the body 10 is slid on the driving mandrel or cylinder M the screw 15 is started in the opening 18, bringing the plate 13 against the outer end of the shaft S. Prior to final tightening of the screw 15 the body 10 may be turned on the timed spindle and when the body 10 has been brought to the selected rotative position the knob 19 may be turned to secure the body 10 in place. When the knob 19 is turned to thread in the screw 15 the washer 20 is clamped against the outer side of the plate 13 and the inner surface of the plate 13 is tightly clamped against the end of the shaft S. This securely fixes the body 10 to the timed rotating spindle or cylinder. The screw 15 may be easily unthreaded from the opening 18 to permit withdrawal of the body 10 from the timed spindle or cylinder.

The markings 12 while not essential, facilitate cutting of the openings in the body 10 to provide for selected switch operation. The markings 12 include a plurality of longitudinally spaced circumferentially extending paths 21. The paths 21 are continuous extending throughout the circumference of the body 10 and may be of equal width and of equal spacing. The paths 21 may be colored and different paths may be of different colors or may be otherwise distinguished as by printed markings. In the simple case illustrated the paths 21 are formed or defined by pairs of spaced lines 22 extending around the body 10. The paths 21 are intended to be engaged by the rollers or actuating parts of the switches embodied in the control mechanism. Thus, in a typical installation there may be a switch roller for engaging each path 21.

The markings 12 further include longitudinally extending lines 23 on the peripheral or external surface of the body 10. The lines 23 designate time, that is, the spaces or zones Z between the spaced lines 23, represent given time intervals. The lines 23 are preferably equally spaced and may extend from one end of the body 10 to the other. The number of lines 23 and the spacing of the lines of course varies with different applications of the invention. Where the body 10 is of substantial diameter and is rotated at a slow rate each zone Z may represent one minute. One of the lines 23 may be thickened, darkened, or of a distinguishing color to constitute what I will term the starting line L. The lines 22 forming the paths 21 and the lines 23 and L may be printed, pressed, or otherwise formed on the body 10.

With the lines 22 and 23 provided on the body 10 as above described, the surface of the body

has a multiplicity of time zones Z of equal circumferential extent. Where the extent of the zones Z and the speed of rotation of the body 10 are known, selected zones Z may be cut from one or more of the paths 21 to cause operation of the timer switches in a given order or sequence. It is to be observed that the length and not the depth of the openings determines the timing and the body 10 need not be of extreme thickness. The spindle forms or provides the bottom walls of the openings at the cut out zones. The starting line L indicates where the cycle of operation begins and by computing the number of zones Z from the starting line L a given switch may be made to operate at a given time and for any given period by cutting out the selected zone Z or zones Z. The lines 22 and 23 outline the zones Z and the operator may readily cut along the lines to cut out the zones to provide for the timed operation of the switches. It is to be understood that a single zone Z may be cut in a path 21 or that a plurality of zones Z may be cut out of a given path 21 at points spaced around the body 10 or that a number of contiguous zones Z may be cut from any one of the paths 21 to provide a long slot or opening. The openings cut or formed in the body 10 to produce switch operation need not be the full extent of the zones Z, for example, a given opening may be only a fraction of the length of a zone. It is believed that it will be understood how the body 10 may be perforated or cut at given or selected zones Z in given or selected paths 21 to provide for the required or desired cyclic or timed operation of the controlled switches.

The body 10 may be easily and quickly arranged on its timed driving spindle and secured in the correct rotative position by means of the screw 15. The body provided with the openings or perforations for the selected sequence of switch operation may be left on the timed driving spindle indefinitely or as long as it is desired to maintain this particular sequence. When it is desired to change the sequence of operations, for example, when it is desired to change the washing formulas in a commercial washing machine, the screw 15 may be unthreaded from the opening 18 and the body 10 removed from the driving cylinder. A similar body 10 provided with openings arranged to produce the other cyclic operations, is easily arranged in place on the driving spindle and secured by means of its screw 15. In some cases where the cycle requires less than the full circumference of the body 10, the body may be turned back at the completion of a cycle to provide for the next cyclic operation. If it is desired to repeat any given part of a cycle the body 10 may be turned back on the spindle to cause such repetition. When the body is turned on the spindle in such cases it results in a retiming of all of the switches without the necessity of setting cams or changing any mechanical parts. It will be observed that the opening or openings formed in the body 10 may be lengthened at any time to lengthen the time or times of given switch operations. The operator may easily condition the element body 10 to cause any required machine operation and may replace the element when desired. A number of the control elements having different arrangements of openings may be kept on hand so that the machine may be instantly conditioned for different washing operations, etc. The openings may be formed in the body 10 at the time of

manufacture or may be cut in the body by the operator as above described. It will be apparent that the control element is very inexpensive so that the provision of a number of the elements and the replacement of the elements as needed entails but little cost.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art of fall within the scope of the following claims.

Having described my invention, I claim:

1. A control element for use on a timed rotating spindle and for operating a switch having a movable actuating part, the element comprising a pre-formed tubular body proportioned to be slid on the spindle and capable of rotary adjustment on the spindle, the spindle sustaining the wall of the body against inward radial forces, the body presenting a cylindrical external surface for engagement by said part to control the operation thereof, the body being formed of readily cuttable fibrous material whereby openings may be cut therein at selected points around the circumference of the body to cause timed operation of the switch part, and releasable means for securing the body on the spindle adapted to be partially released to allow rotary adjustment of the body on the spindle.

2. A control element for use on a timed rotating spindle and for operating a switch having a movable actuating part, the element comprising a pre-formed tubular body proportioned to be slid on the spindle and capable of rotary adjustment on the spindle, the spindle sustaining the wall of the body against inward radial forces, the body presenting a cylindrical external surface for engagement by said part to control the operation thereof, the body being formed of readily cuttable fibrous material whereby openings may be cut therein at selected points around the circumference of the body to cause timed operation of the switch part, the body having a substantial wall thickness so that the switch is operated by the movement of said part into and out of said openings entirely irrespective of the engagement of said part with the spindle, and releasable means for securing the body on the spindle adapted to be partially released to allow rotary adjustment of the body on the spindle.

3. A control element for use on a timed rotating spindle and for operating a switch having a movable actuating part, the element comprising a body of pre-formed tubular shape adapted to be slid onto the spindle to turn therewith and presenting a substantially cylindrical external surface for engagement by said part, the body being formed of a readily cuttable material whereby openings may be cut therein at selected points to cause timed operation of the switch part, spaced longitudinal lines of printing on the body to facilitate the formation of the openings at predetermined points, and means for removably securing the body to the spindle partially releasable to allow rotary adjustment of the body on the spindle.

4. A control element for use on a timed rotating spindle and for operating a plurality of switches having movable actuating parts, the

element comprising a pre-formed body of tubular configuration to be slid onto the spindle to turn therewith and presenting a substantially cylindrical external surface to be engaged by and to control said actuating parts, the body being formed of a readily cuttable material whereby openings may be cut therein for cooperating with and controlling said actuating parts, circumferential lines of printing on the body defining the paths of said parts, spaced longitudinal lines of printing on the body for facilitating the cutting of openings in selected zones of the paths to cause operating of the switches at given times, the circumferential and longitudinal lines defining zones of known extent adapted to be cut out to leave openings of known extent in said paths, and means for removably securing the body to the spindle partially releasable to allow rotary adjustment of the body on the spindle.

5. A control element for use on a timed rotating spindle and for operating a switch having a movable actuating part, the element comprising a tubular body adapted to be arranged on the spindle and presenting a substantially cylindrical external surface for engagement by said part, the body being formed of a readily cuttable fibrous material whereby openings may be cut therein at selected points to cause timed operation of the switch part, and means for removably securing the body to the spindle comprising a metal plate fixed to the body to close an end of the body and a screw rotatably secured to the plate adapted to have threaded engagement with the spindle.

6. A control element for use on a timed rotating spindle and for operating a switch having a movable actuating part, the element comprising a pre-formed tubular body adapted to be slid onto the spindle and presenting a substantially cylindrical external surface for engagement by said part, the body being formed of a readily cuttable material whereby openings may be cut therein at selected points to cause timed operation of the switch part, and means for removably securing the body to the spindle comprising a plate seamed on the body and extending across an end thereof, the plate having a central opening, a screw turnable retained in the opening in the plate and projecting from the inner side of the plate to have threaded engagement with the spindle, and an operating knob on the outer end of the screw for turning the same and engaging the outer side of the plate to clamp the plate against the end of the spindle.

7. A control element for use on a timed rotating spindle and for operating a plurality of switches having movable actuating parts, the element comprising a pre-formed tubular body to be arranged on the spindle and presenting a substantially cylindrical external surface to be engaged by and to control said actuating parts, the body being formed of a readily cuttable paper material so that openings may be cut therein for the control of said switch parts, lines on the body for facilitating the formation of the openings in given zones thereof, a metal plate seamed to the outer end of the body, and a screw rotatably retained on the plate for removably securing the element to the spindle.

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