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PERFORATED DRUM CONTROL FOR AUTOMATIC WASHING MACHINES

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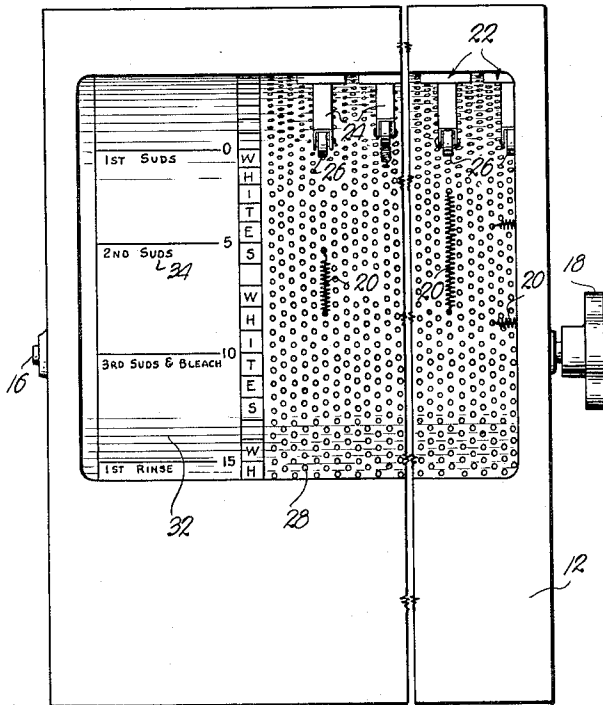


Fig. 1.

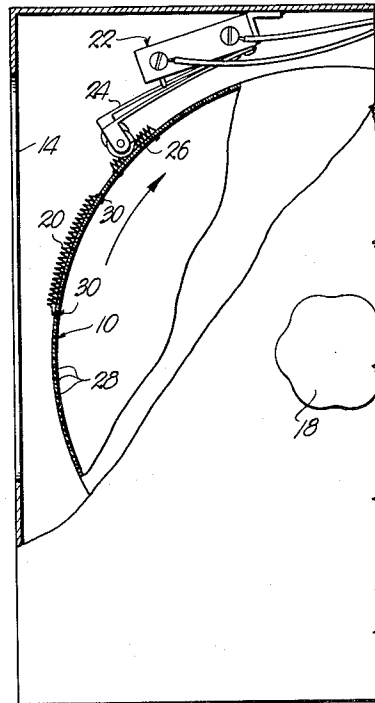


Fig. 2.

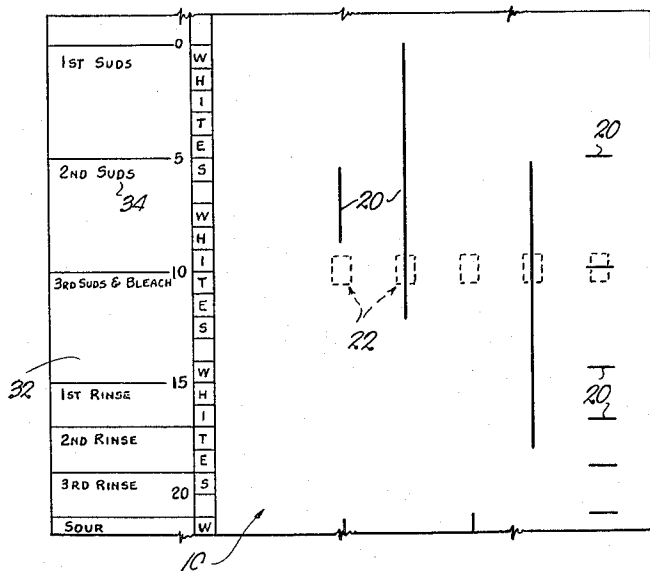


Fig. 3.

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PERFORATED DRUM CONTROL FOR AUTOMATIC WASHING MACHINES

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10 Claims. (Cl. 74—568)

This invention has to do with a control unit in the nature of a timer for governing a plurality of sequential operations in machines, apparatus and the like, functioning on cyclic principles such as in automatic washing machines.

In line with the foregoing, the timer forming the subject matter of this invention has been adapted for use and is particularly usable in connection with automatic washing machines, but is to be understood and it will hereafter become readily apparent, that the same may have use in varied fields to control a cycle of operations wherein various component parts are to be actuated in predetermined sequence and during pre-selected time intervals within the complete cycle.

It is the most important object of this invention therefore, to provide a timer that includes a rotatable element in much the same manner as has heretofore been provided, but which rotatable element is adapted to receive a number of releasable members arranged in virtually any pattern that may be desired, to in turn actuate movable arms of individual control units in timed sequence as the said element rotates.

It is a further object of this invention to provide in a timer having a rotatable drum of the aforementioned character, a plurality of members thereon that are in turn extensible so that the period of time during which corresponding control units are actuated, may be varied to suit the desires of the user.

Another important object is to provide a timer having the rotatable drum thereof perforated throughout to receive the extensible members and thereby present a convenient, highly selective means for varying the positions of the extensible elements with respect to the drum so that the sequential operation of the control units, as well as the time interval of actuation thereof, may be varied within a wide range.

Other objects include the way in which the control elements take the form of electrical switches having control arms that normally ride upon the rotatable drum; the way in which the arms are in turn provided with rollers that rotate on the drum as the latter is revolved; the manner of arranging the perforations of the drum in circumferential rows concentric with the axis of rotation thereof; the manner of also aligning the perforations in rows parallel with the axis of rotation of the drum so that the extensible elements may be positioned either parallel with the axis of rotation of the drum or concentric thereto; the way in which the extensible elements take the form of elongated coil springs of varying lengths and which are therefore, extensible; the manner of providing hooks on the ends of the springs engageable within the perforations so that the springs may be re-positioned with respect to their corresponding switch arms as desired; and many additional more minor objects, all of which will be made clear or become apparent as the following specification progresses.

In the drawing:

Figure 1 is a fragmentary, front elevational view of

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the control unit of an automatic washing machine showing the perforated drum control forming the subject matter of this invention.

Fig. 2 is a fragmentary, side elevational view of the control unit, parts being broken away and in section to reveal details of construction; and

Fig. 3 is a fragmentary, schematic plan of the drum showing the relative positions of certain of the springs and of the rollers forming a part of the switches.

The sequential operations of an automatic washing machine include opening of valves to introduce water, actuation of means to introduce soap, bluing and other substances used in the washing operations, control valves for emptying the tub of wash water, rinse water and the like, together with various and sundry more minor operations familiar to those skilled in this particular field.

Thus, since the automatic washing machine other than the control unit hereof forms no part of this invention, and further, since the control unit may well be adapted for use in connection with many other types of machines, there is illustrated in the drawing only the structural elements of the control and which include a cylindrical, preferably hollow drum broadly designated by the numeral 10.

Drum 10 may be mounted within a hollow case 12 if desired, having an access opening 14 in one face thereof and adapted to receive a shaft 16 mounting the drum 10 for rotation on its longitudinal axis. Any suitable means not herein shown may be operably coupled with the drum 10 to rotate the same in the direction of the arrow in Fig. 2 at a predetermined constant speed. A knob 18 on the shaft 16 permits manual rotation of the drum 10 in the opposite direction so that the positions of extensible members 20 on the drum 10 may be varied as desired.

The various mechanisms of the automatic washing machine are manifestly operated by control circuits not herein shown, that are in turn provided with a plurality of switches 22 suitably mounted in the case 12 and preferably above the drum 10 so that the switch arms 24 will normally ride on the drum 10 by force of gravity, although it is to be understood that the arms 24 may be spring biased against the drum 10 if desired.

Each arm 24 respectively is provided with a small roller 26 that rotates on the outer face of the drum 10 as the latter revolves. The elements 20 on the drum 10 are provided for the purpose of raising the arms 24, thereby actuating the corresponding switch 22 and either opening or closing a circuit as desired. In other words, the switches 22 may be either normally opened or normally closed, depending upon the type of mechanism to be controlled thereby.

A portion of the drum 10 is provided with a plurality of circumferential, spaced, parallel rows of perforations 28, and it is to be noted further that the perforations 28 are not only concentric to the axis of rotation of drum 10, but are aligned in rows parallel to said axis of rotation of drum 10. The switches 22 are arranged so that their rollers 26 are each aligned with one of the annular rows of perforations 28 as seen in Fig. 1.

The members 20 are in the nature of elongated coil springs readily conformable to the arcuate contour of the drum 10 and provided with a hook 30 on each end respectively thereof engageable within a pair of perforations 28.

Springs 20 may be of varying lengths and since each is extensible, the period of time during which a given switch 22 is actuated, may be varied simply by stretching the springs 20 longitudinally thereof prior to mounting the same in the perforations 28 of drum 10 by use of hooks 30. It is further notable that inasmuch as the springs 20 are shorter than the circumference of the

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drum 10, a plurality of springs 20 may be mounted on the drum 10 in alignment with each roller 25 respectively.

It is further to be recognized that the springs 20 need not be in alignment but may be staggered in any desired arrangement so that one or more switches 22 may be actuated simultaneously and for varying lengths of time during continued rotation of drum 10. Further, since the perforations 28 are arranged in circumferential rows, as well as in rows parallel with the axis of rotation of drum 10, springs 20 may be mounted on the drum 10 either concentric to the axis of rotation of drum 10 as shown in Fig. 2, or parallel with the axis of rotation of drum 10 as shown at the extreme right of Figs. 1 and 3. In the latter case, the corresponding switch 22 will be actuated only momentarily, whereas, when the springs 20 are positioned as shown in Fig. 2, the switches 22 are held open or closed for longer periods of time, depending upon the length of the springs 20 and the degree of extension thereof.

In order to guide the operator so as to aid in proper disposition of the various springs 20 on the drum 10, a portion 32 of the latter is imperforate and provided with indicia 34 indicative of the various operations of the washing machine as controlled by the switches 22.

During initial rotation of drum 10, hot water may be introduced for a predetermined period of time, whereupon the tub is drained of suds, a bleach introduced, cold rinse water fed into the tank of the machine, etc. continually until the drum 10 has completed a full cycle of rotation, whereupon the machine is deenergized and the operation of drum 10 ceased simultaneously and automatically all through the operation of switches 22 as controlled by springs 20.

It is apparent that the advantages of the timer forming the subject matter hereof include the simple and quick adjustment of the springs 20 as desired, whether or not the timer is used in connection with automatic washing machines. Further, by virtue of use of coil springs for the switch actuating members 20 and through use of perforations 28 as well as the hooks 30, the time intervals may be varied and the sequential operations changed as the particular machine with which the timer is used, requires.

Devices of this type heretofore proposed, include the use of cam elements that are either fixed or rendered adjustable through coupling means that are not easily changed, and not infinitely variable as in the present invention. Others have proposed the use of springs as cam elements, but for the most part the same either totally surround the rotatable drum or require the utilization of means to deform the shape of the springs in order to present rises for actuating switches or the like. The use of a large number of relatively short springs of varying lengths mounted in the perforations of a perforated drum, is however, entirely novel so far as I am aware and while changes and modifications are possible, it is to be desired to be limited only by the spirit of the invention as defined by the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a timer, a rotatable drum; a control element having a movable arm normally resting on the drum; a spring; and means at opposite extremities of the spring attaching the latter to said drum for engaging the arm to move the same away from the drum as the latter rotates.

2. In a timer, a rotatable drum; a control element having a movable arm normally resting on the drum; a spring; and releasable means attaching the spring to said drum for engaging the arm to move the same away from the drum as the latter rotates, said spring being extensible whereby the period of time said arm is held away from the drum during each cycle of rotation of the latter may be varied.

3. In a timer, a rotatable, perforated drum; a control element having a movable arm normally resting on the drum; an elongated spring; and means on each end

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respectively of the spring, engageable in a perforation of the drum, and attaching the spring to said drum for engaging the arm to move the same away from the drum as the latter rotates.

4. In a timer, a rotatable, perforated drum; a control element having a movable arm normally resting on the drum; an elongated spring; and releasable means on each end respectively of the spring, engageable in a perforation of the drum, and attaching the spring to said drum for engaging the arm to move the same away from the drum as the latter rotates, said spring being extensible longitudinally thereof whereby the period of time said arm is held away from the drum during each cycle of rotation of the latter may be varied.

5. In a timer, a rotatable drum; a control element having a movable arm having a roller normally resting on the drum; a spring; and means at opposite extremities of the spring attaching the latter to said drum for engaging said roller to move the arm away from the drum as the latter rotates.

6. In a timer, a rotatable drum having a plurality of spaced, parallel, circumferential rows of perforations concentric with the axis of rotation of the drum; a control element for each of said rows respectively, each provided with a movable arm normally resting on the drum; an extensible member for each arm respectively; and releasable means attaching the members at their opposite extremities in selected perforations of corresponding rows for engaging their arms to move the same away from the drum as the latter rotates.

7. In a timer, a rotatable drum having a plurality of spaced, parallel, circumferential rows of perforations concentric with the axis of rotation of the drum; a control element for each of said rows respectively, each provided with a movable arm normally resting on the drum; an elongated coil spring for each arm respectively; and releasable means attaching the springs at each end thereof in selected perforations of corresponding rows for engaging their arms to move the same away from the drum as the latter rotates.

8. In a timer, a rotatable drum having a plurality of spaced, parallel, circumferential rows of perforations concentric with the axis of rotation of the drum; a control element for each of said rows respectively, each provided with a movable arm normally resting on the drum; an elongated coil spring for each arm respectively; and a hook on each end respectively of each spring attaching the springs in selected perforations of corresponding rows for engaging their arms to move the same away from the drum as the latter rotates.

9. In a timer, a rotatable drum having a plurality of perforations; a number of control elements each having a movable arm normally resting on the drum; and at least one actuating member for each arm respectively, each member having releasable means at opposite extremities thereof engageable in a perforation for attaching the members to the drum to move corresponding arms away from the drum as the latter rotates, there being a circumferential row of perforations for each arm respectively in alignment therewith and concentric to the axis of rotation of the drum, whereby the members may each be selectively positioned on the drum to actuate their arms during a predetermined time interval within the cycle of rotation of the drum.

10. In a timer, a rotatable drum having a plurality of perforations; a number of control elements each having a movable arm normally resting on the drum; and at least one elongated actuating member for each arm respectively, each member having releasable means at each end thereof engageable in a perforation for attaching the members to the drum to move corresponding arms away from the drum as the latter rotates, there being a plurality of spaced, parallel, circumferential rows of perforations concentric to the axis of rotation of the drum, whereby the members may each be selectively positioned

on the drum to actuate their arms during a predetermined time interval within the cycle of rotation of the drum, said perforations being aligned in rows parallel with said axis of rotation whereby the members may be positioned with their longitudinal axes parallel to or concentric with said axis of rotation.

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