March 24, 1953 T. R. SMITH 2,632,540

POSITIVE CLUTCH

Filed Oct. 11, 1950

Fig. 1.

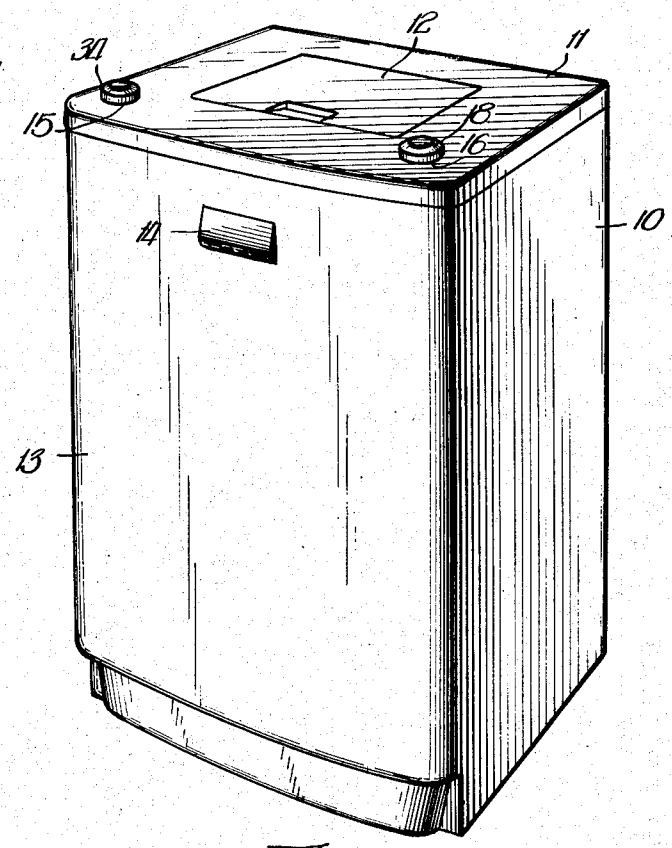
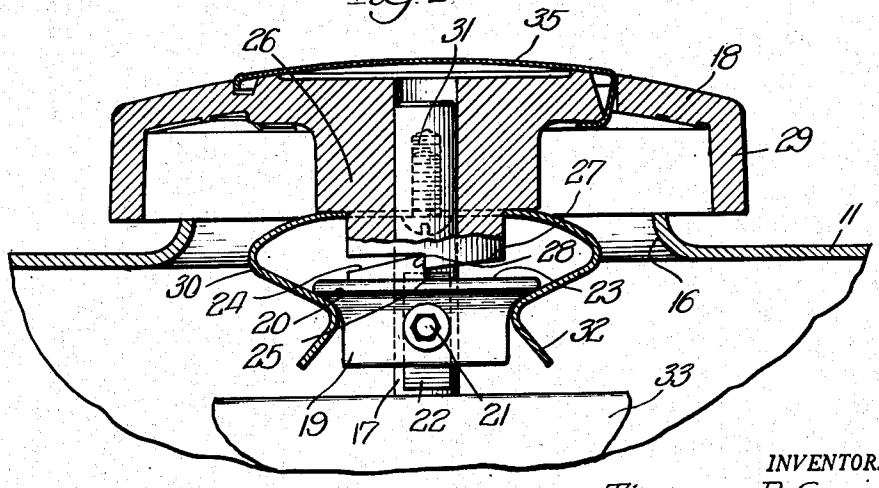


Fig. 2.



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POSITIVE CLUTCH

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Original application December 20, 1948, Serial No. 66,229. Divided and this application October 11, 1950, Serial No. 189,619

1 Claim. (Cl. 192—46)

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This invention relates to control mechanism. In the parent application Serial No. 66,229, filed December 20, 1948, of which this present application is a division, the control mechanism is shown in connection with a washing machine and more particularly in connection with an automatically controlled washing machine wherein washing, rinsing and liquid extraction from the washed and rinsed clothes takes place in cycles.

Normally the washing machine controls are set for automatically giving a specified time for each of the washing, rinsing and liquid extraction operations. It is desirable at times to vary the time or duration for any one or all of said operations. It is to that feature primarily that this application is directed. It takes the form of a manual control.

It will be apparent from a reading of the parent application that electric switches, among other elements, are actuated in the automatic cycle of operation. It is important that such switches be operated in a given sequence by elements which rotate in a given direction. Otherwise the automatic control parts including the switches might be damaged.

It is therefore one of the objects of this invention to optionally manually control the duration of the washing, rinsing and liquid extraction operations in a manner to safe-guard or protect the parts which normally control the automatic operation and do so by means that have simple, durable and efficient cooperating elements.

Another object is to provide a novel manual control device adapted to cooperate with an automatic control device whereby the control switches function as a result of movement of actuating parts always in the same direction whether the automatic or manual control device is made dominant.

These and other objects are accomplished by the mechanism shown by the drawings in which—

Figure 1 is a perspective view showing primarily the cabinet of an automatic washing machine fully described in the above mentioned parent application; and

Figure 2 is a sectional view of a manual control device which cooperates with automatic control mechanism.

Referring more particularly to the details of the drawings illustrating one embodiment of my invention, there is shown the cabinet 10 of an automatic washing machine the various features of which are fully disclosed in the parent application and not specifically claimed herein. The cabinet includes an upper cover 11 with an opening therein normally closed by a lid 12. The front vertical wall or panel 13 is provided with an opening in which is mounted a member 14 of translucent material such as "Lucite" or the like, having formed therein certain indicia, such as the name of the maker or any desired trade-name.

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Adjacent the front panel 13, the top cover member 11 is formed with openings 15 and 16 through each of which loosely extends a shaft, such as a unidirectionally driven rotatable shaft 17, of a control device. Each shaft is adapted to be manually actuated by means of a knob or the like 18 for manipulating control mechanism for causing the washing machine to perform various operations. In the present assembly, one of such mechanisms controls the temperature of the water entering the inner receptacle of the washing machine and the other of such mechanisms controls the washing cycle including washing, rinsing and drying operations as fully described in said parent application.

As shown in Figure 2 of the drawings, the manual control means for the cycle timer comprises a clutch collar 19 having a conically shaped shoulder 20 extending outwardly therefrom at its upper portion, the collar being fixed to the shaft 17 by a locking set screw 21 which engages a flat 22 on the shaft 17 to align it in its proper position and rigidly hold it thereon. The upper portion 23 of the collar 19 is flat and has a cam surface 24 extending upwardly or forwardly therefrom provided with an abutment 25 through which the shaft 17 may be rotated. The manual control knob 18 is loosely mounted or journaled on the upper end of the shaft 17 and is provided with a hub portion 26 having a cam surface 27 terminating in an abutment or shoulder 28. The shoulder 28 is adapted to engage the shoulder 25 on the collar 19 so that when the outer periphery 29 of the control knob is gripped by the operator and is rotated in a clockwise direction, the two abutments 25 and 28 engage and the shaft 17 is rotated to manually actuate the control mechanism 33. However, if the operator rotates the control knob in a counter-clockwise direction, the control knob will rotate about the shaft 17, which moves the normally abutting shoulders 25 and 28 apart so that the shaft 17 cannot be rotated during this counter-clockwise rotation. It will be apparent that the complementary cam surfaces 24 and 27 terminating in the abutments 25 and 28, respectively, provide a one-way driving connection between the knob 18 and shaft 17.

In order to hold the cam surface **27** of the control knob in position against the cam surface **24** of the collar **19**, there is provided a C-shaped leaf spring member **30** having its central portion secured to the hub **26** by screw means **31**. The spring is provided at its free ends with the inwardly extending portions **32** which engage the shoulder **20** of the collar **19** to hold the knob in engagement with the collar at all times, regardless of the location of the control knob. The spring **30** is also formed to prevent removal of the knob by the operator or a loss thereof during transit. A plate **35** is mounted on the control knobs to cover the parts thereunder.

Each of the knobs for the control means has indicia applied thereto which is readily readable by the operator for ascertaining the setting of the particular control means each knob is designed to actuate. The water temperature control knob **34** differs from control knob **18** in that the former is capable of movement in both directions as fully described in the parent application.

In a washing and drying machine of the type herein referred to it is desirable to provide means for automatically operating same. Such contemplates control means including the timer motor **33** adapted to rotate a plurality of cams for actuating switch means in a predetermined sequence to cause the machine to perform its various functions automatically as set forth in said parent application.

The washing and drying machine above referred to is automatically operated through a complete washing cycle without it being necessary for the operator to do anything other than adjust the control knobs on the upper part of the machine, prior to the time that the machine is set in operation. In accordance with the contemplated operation of the washing and drying machine, the operator opens the lid **12** and places the clothes or fabrics to be washed in the washing receptacle. A proper quantity of a detergent is then poured into the receptacle, after which the lid is closed and the water temperature selected by moving the water selector knob **34** to either its warm or hot position. The timer control knob is then rotated to a position corresponding to the length of time desired for the washing period as shown by the indicia on the knob. These are the only manual operations initially required of the operator.

If at any time during the automatic cycle, it is desired to shorten a period of washing, a period of rinsing or a period of water extraction, it is merely necessary for the operator to turn the control knob **18** the desired amount for advancing the control cams in the same direction in which they were moving. By means of the construction and arrangement of the parts of this manual control mechanism all of the associated control parts including the switch mechanism are protected against damage.

It is my intention to cover all modifications of the control mechanism coming within the spirit and scope of the following claim.

I claim:

A control device comprising a unidirectionally driven rotatable shaft, a collar rigidly secured to said shaft and having a radially extending surface with a forwardly projecting single cam surface terminating in an abutment disposed in fixed annular relation with respect to said shaft, said collar being further provided with a shoulder beneath said radial surface, a manually operable control knob having a hub portion loosely journalled on the end of said shaft, said hub having a cam surface complementary to said first named cam surface and terminating in an abutment engageable with said first named abutment to provide a one-way manual driving connection between said knob and said unidirectional rotatable driven shaft, and a C-shaped leaf spring having its central portion secured to said hub and its free ends in engagement with said shoulder for normally maintaining said abutments in contact and to rotate in unison with said shaft, but yieldable to permit reverse rotation of said knob without effecting the unidirectional rotation of said shaft.

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