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H. L. NEWELL
TIMING MECHANISM FOR WASHING
MACHINES AND THE LIKE
Filed July 10, 1946

2,467,848

Fig. 1.

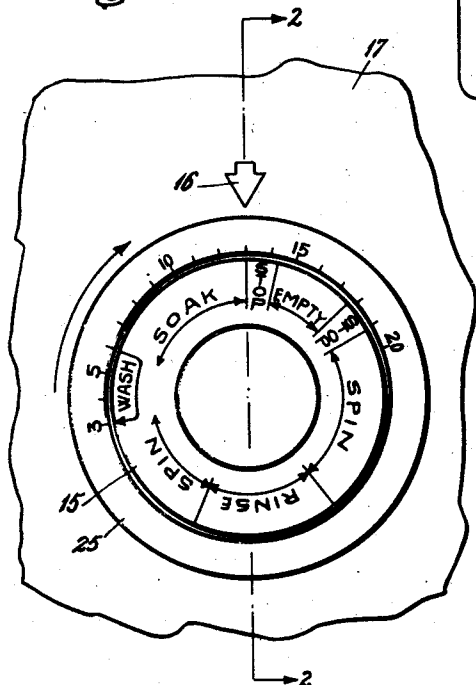


Fig. 2.

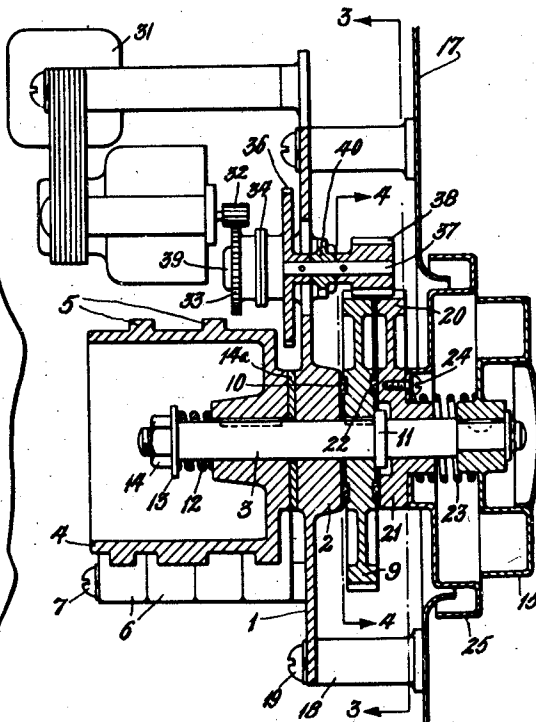


Fig. 3.

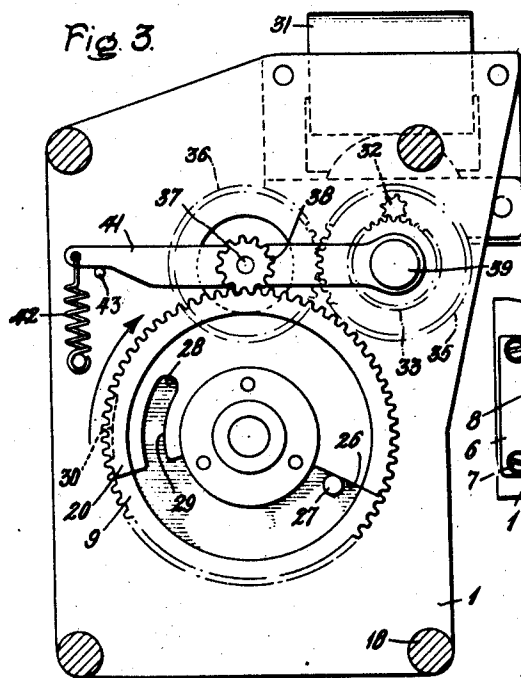


Fig. 4.

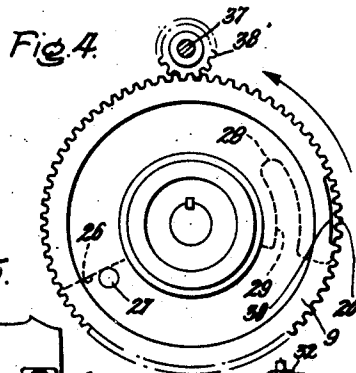
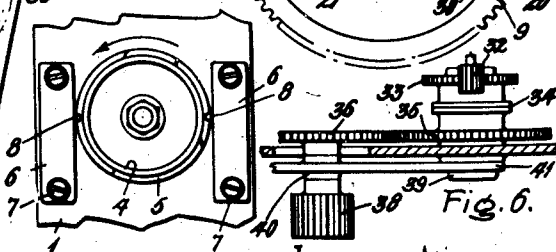


Fig. 5.



Inventor:
Heber L. Newell,
by Alfred V. Bobst.

His Attorney.

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TIMING MECHANISM FOR WASHING
MACHINES AND THE LIKEHeber L. Newell, Fishkill, N. Y., assignor to Gen-
eral Electric Company, a corporation of New
York

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5 Claims. (Cl. 161-1)

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The present invention relates to timing mechanisms such as are used in connection with automatic domestic washing machines for controlling the sequence of operations wherein it is desired to have one of the periods of the sequence adjustable as to length. For example, in the case of an automatic washing machine, it is desirable to be able to adjust the length of time for the washing period so that it may be made to conform to the character of the clothes being washed.

The object of my invention is to provide an improved timing mechanism or controller for a sequence of operations embodying means for adjusting the length of time of one of the operations of the sequence, which is simple in construction, reliable in operation, easily set, and which may be manufactured at low cost.

In the drawing, Fig. 1 is a front view of a timing mechanism embodying my invention; Fig. 2 is a sectional view taken on line 2-2, Fig. 1; Fig. 3 is a sectional view taken on line 3-3, Fig. 2; Fig. 4 is a detailed sectional view taken on line 4-4, Fig. 2, and Fig. 5 is a detailed view on a smaller scale showing the arrangement of switches with respect to the cam drum.

While my invention is particularly illustrated and will be described as applied to an automatic control for a domestic washing machine, it is to be understood that this is only one application for it and that the invention may be used wherever found applicable.

Referring to the drawing, 1 indicates a stationary base having a hub 2 which forms a bearing for a shaft 3. Mounted on the inner end of shaft 3 is a cylinder or drum 4 having cams 5 on its surface adapted to operate electric switches 6 (Fig. 5) suitably mounted adjacent to cylinder 4. Any suitable arrangement of cams and switches may be provided to meet the requirements of a particular control system. The switches may be of any suitable type and they may be fastened to base 1 by bolts 7. In Fig. 5, 8 indicates the operating buttons of the switches.

Keyed to shaft 3 on the side of hub 2 opposite drum 4 is a gear 9 having a friction ring 10 on its hub which is held against the adjacent surface of hub 2 by a collar 11 on shaft 3 which is biased against the hub of gear 9 by a spring 12 positioned between the hub of drum 4 and a washer 13 held on the end of shaft 3 by a nut 14. Drum 4 is keyed to shaft 3 in a manner such that the shaft can slide axially relatively to the drum as shown clearly in Fig. 2. Between hub 2 and the hub of drum 4 is a bearing disk 14a. On the outer end of shaft 3 is fixed a handwheel or dial 15 by means

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of which shaft 3 and drum 4 may be turned manually. It is provided on its surface with suitable indicia corresponding to the operations to be performed by the several cams. In the case of an automatic domestic clothes washing machine wherein the clothes are washed in a basket after which the basket is rotated to extract the water from the clothes, this being a known type of machine, the operations may comprise (see Fig. 1) a soak period, a wash period, a spin period, a rinse period and a second spin period; and beyond the second spin period is an empty period preceded and followed by stop positions of the drum. Handwheel 15 may be adjusted with respect to a fixed point 16 marked on a wall or cover plate 17 on which the device may be mounted by means of posts 18 and screws 19.

Journalled on shaft 3 on the side of collar 11 opposite to gear 9 is a gear segment 20 carried by a hub 21. The inner face of hub 21 engages a friction ring 22 carried by the hub of gear 9. It is held in engagement therewith by a spring 23 positioned between hub 21 and the web of handwheel 15. Fixed to hub 21 by screws 24 is a handwheel or dial 25. The arrangement is such that the friction between ring 10 and hub 2 is greater than the friction between ring 22 and hub 21. This result may be obtained by making spring 12 heavier than spring 23. Hub 21 is spaced from the hub of dial 15 to permit gear segment 20 to be moved axially on shaft 3 against the biasing action of spring 23. On dial 25 is suitable indicia indicating time, in the present instance 3 to 20 minutes. (See Fig. 1.) Dial 25 may be termed the wash time dial. It is used to adjust the length of the wash period as hereinafter explained. The arcuate length of gear segment 20 is shown in Figs. 3 and 4. It may be adjusted with respect to gear 9 from the minimum wash time position wherein the one end 26 engages a pin 27 fixed to gear 9 to the maximum wash time position wherein the end 28 of a slot 29 in the gear segment engages pin 27. At one point on gear 9 is a short segment 30 where there are no gear teeth.

Gear 9 and gear segment 20 are driven through suitable gearing by timing motor 31, the arrangement being such that the timing motor will turn drum 4 through a washing cycle in a desired period of time. In the present instance, the pinion 32 of the timing motor meshes with gear 33 which is connected through a suitable friction coupling 34 to a gear 35. (See Fig. 3.) Gear 35 meshes with a gear 36 fixed on one end of a shaft

37. Fixed on shaft 37 is a pinion 38 which is wide enough to mesh with both gear 9 and gear segment 20. Gears 33 and 35 are journaled on a stub shaft 39 fixed on base 1. Gear 36 and pinion 38 are journaled in a floating bearing 40 carried by a lever 41 which at one end is pivoted on the inner end of stub shaft 39 and at its outer end is connected with a spring 42 which serves to hold the pinion yieldingly in mesh with gear 9 and gear segment 20. The arrangement is such that pinion 38 drives gear 9 and gear segment 20 in the direction indicated by arrows in Figs. 1, 3 and 4.

The operation is as follows. Assume gear 9 and gear segment 20 occupy the minimum wash period positions shown in Figs. 3 and 4, the end 26 of the gear segment being against pin 27, and that pinion 38 is being driven by the timing motor. The gear 9 and the gear segment 20 will be both driven by pinion 38 until the space 30 in the teeth of gear 9 reaches the pinion whereupon the pinion will be in mesh with and drive directly only the gear segment. However, since end 26 of the gear segment is in engagement with pin 27, gear 9 will be carried along with the gear segment and eventually the pinion will again engage the teeth of both the gear and the gear segment. The trailing end of space 30 marks the end of the wash period. If it is desired to increase the length of the wash period, dial 25 is pulled toward the right in Fig. 2 to move the gear segment 20 out of mesh with pinion 38 after which the dial is turned to move end 26 of the gear segment away from pin 27. After being turned to the desired position, the gear segment is again brought into mesh with the pinion. Now when space 30 reaches the pinion, the pinion will drive only the gear segment until such time as end 26 again engages pin 27; and during such time drum 4 will be stationary since the friction between friction ring 10 and the hub 2 is greater than the friction between friction ring 22 and the hub of gear 9. If gear segment 20 is set with end 28 of slot 29 against pin 27, the drum will be stationary for the maximum permissible period representing the maximum wash period. In the present instance, the minimum period is indicated as being three minutes; the maximum period twenty minutes. The gear segment may be set for a wash period anywhere between these limits. When the trailing end of gear segment 20 passes beyond pinion 38, the pinion then meshes with gear 9 only but the gear segment will be carried along with gear 9 due to friction ring 22.

The purpose of the floating bearing for pinion 38 is to permit the pinion to rise and be brought into engagement with the teeth of gear segment 20 in case segment 20 is set for the wash period at a time when pinion 38 is in mesh with gear 9 only and is left in a position wherein its teeth do not line up correctly with the teeth of gear 9. Under these circumstances when the leading end of the segment reaches the pinion, the pinion will ride up over the tops of the teeth, bringing the teeth into alignment and then meshing with the teeth on both the gear and the segment.

By reason of friction clutch 34, drum 4 can be turned manually by dial 15 to set the drum at the starting position or at any intermediate position so as to omit or perform any desired operation. During such a setting, clutch 34 slips with respect to the driving motor and clutch ring 10 slips with respect to hub 2.

In the case of a domestic washing machine, the operator may initially set dial 25 for the desired length of washing period or it may be set

at any time while the drum is rotating prior to the completion of the wash period.

As stated above, my timing mechanism or controller may be used in connection with any mechanism to which it may be found to be adapted. As specifically shown, it is well adapted for use in connection with a control system such as that shown in the application of Thomas T. Woodson, Serial No. 639,817, filed January 8, 1946.

My improved construction has the advantages that it is simple and compact in structure, comprises few parts, is easy to set and is capable of being manufactured at low cost. At the same time, it is reliable in operation.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In combination, a movable switch control member for a sequence of operations, a timer motor, a first gear member connected to the switch control member to move it, a pinion driven by the timer motor meshing with said first gear member, a second gear member with which the pinion meshes, means forming an adjustable lost motion connection between said gear members, means for disengaging said second gear member from said pinion to permit rotation of said gear relative to said first gear member for adjusting the lost motion connection, and means for interrupting the connection between said first gear member and said pinion during the period when said lost motion connection is ineffective to connect together said two gear members.

2. In combination, a movable switch control member for a sequence of operations, a toothed gear member for driving it, a second toothed gear member, a timer motor, a pinion driven by said motor which meshes with both gear members, a circumferentially adjustable lost motion driving connection between said gear members and means for interrupting the drive between the pinion and said first-named toothed gear member for a period of time determined by the setting of said second toothed gear member with respect to said first toothed gear member.

3. In combination, a movable switch control member for a sequence of operations, a toothed gear member for driving it, a second toothed gear member, a timer motor, a pinion driven by said motor which meshes with both gear members, a circumferentially adjustable lost motion driving connection between said members, and means comprising an arc of said first-named toothed member which is without teeth for interrupting the drive between the pinion and such member for a period of time determined by the setting of said second toothed gear member with respect to said first toothed gear member.

4. In combination, a control drum, a toothed gear wheel connected to it for turning it, said gear wheel having an arc without teeth, a toothed gear member, engaging parts on said gear wheel and gear member adapted to be moved apart for adjusting said gear member relatively to said gear wheel, a timer motor, a pinion driven by the timer motor which meshes with both said gear wheel and said gear member, said pinion driving only said gear member when said tooth-

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less arc is in line with the pinion and said engaging parts are separated.

5. In combination, a movable switch control member for a sequence of operations, a timer motor, a first gear member connected to the switch control member to move it, a second gear member, a pinion driven by said timer motor and normally meshing with both of said gears, means forming an adjustable lost motion driving connection between said gear members, means for axially shifting one of said gear members to disengage it from the pinion and permit relative rotation of the gear members with respect to each other within the limits of the lost motion connection, and means for interrupting the connection between said first gear member and said pinion during the period when said lost motion con-

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nection is ineffective to connect together said two gear members.

HEBER L. NEWELL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

10	Number	Name	Date
	2,325,837	Dyer	Aug. 3, 1943
	2,374,590	Dunham	Apr. 24, 1945

FOREIGN PATENTS

15	Number	Country	Date
	847,516	France	Dec. 13, 1938