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⑤④ **Washing machine with a wash programme designed to operate normally in the lower of two selectable temperature ranges.**

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Description

The present invention relates to a washing machine comprising known mechanical and electrical wash cycle programming means.

As we know, for a main wash cycle at least, such as that used for fabrics like cotton, linen, hemp or whites, the said means heat the water up to one of at least two temperature ranges which are usually around 60 to 90°C. The normal cycle on known washing machines is designed to heat the water up to the higher temperature range (90°C) and, only if the user wishes to save on energy, a push-button or equivalent means of selection is operated to heat the water to a lower temperature range (60°C). Obviously, all other conditions being the same, reducing the temperature of the water also reduces the quality of the wash, so that this wash mode is only selected by operating the relative selection button or equivalent when the user deems it sufficient.

Nowadays, however, the increase in the use of new, powerful detergents specially designed for medium-low temperatures (60°C) has led to more frequent use of low temperature settings (60°C) which are also recommended from the energy saving point of view in that the lower the water is heated the lower the consumption of the washing machine will be. The aim of the present invention is to provide a washing machine whose normal wash cycle provides for the said energy saving, even in the event of the user forgetting to set the programme, and which requires a precise setting by the user for heating the water up to the maximum temperature.

A further aim of the present invention is to improve the quality of the wash at relatively low temperatures. Further aims and advantages of the washing machine covered by the present invention will be clear from the description given.

With these aims in view, the present invention relates to a washing machine comprising wash cycle programming means which provide for heating the water up to a predetermined temperature value and also comprise temperature selection means to select, in a single wash cycle, one of two maximum temperature values for the water, characterized in that, in order to avoid a not intentionally selected higher energy consumption, said programming means automatically select in said single wash cycle the lower of the two said temperature values (for ex. 60°C), unless the user, acting on said temperature selection means, manually set the higher value (for ex. 90°C).

The invention will now be described with reference to the attached diagrams, provided by way of a non-limiting example, in which:

— Fig. 1 shows a sequence of normal and alternative wash cycles, according to a first arrangement of the washing machine covered by the present invention;

— Fig. 2 shows the same type of diagram as in Fig. 1 for a different arrangement of the washing machine covered by the present invention;

— Fig. 3 shows an operating knob for selecting the water heating temperature range as covered by the present invention;

— Figs. 4a and 4b show wiring diagrams of an operating unit on the washing machines whose wash cycles are shown in Figs. 1 and 2;

— Figs. 5a and 5b are side and top part sections respectively of one arrangement of the wash cycle programming means on the washing machine covered by the present invention;

— Figs. 6a, 6b, 7a, 7b, 8a, 8b and 9a, 9b are side and top part sections respectively of four different operating modes of the programming means on the washing machine covered by the present invention and whose wash cycle diagram is shown in Fig. 2.

The Fig. 1 wash cycle sequence (in which water temperature is shown on the vertical axis, time on the horizontal axis and loading or drawing off wash water by a thick black line) is essentially of the known type consisting of a first or prewash cycle up to t_A , in which the machine is filled with water at, say, 15°C, followed by a basket back-and-forth rotation stage with a pause inbetween each direction change (the basket rotation stages are shown by a dotted line), heating of the water between A and B, a hold stage at which the temperature of the water is kept constant, and, finally, drain off. The main wash cycle itself commences at t_A and is essentially of the known type. After the tub is filled with water, the basket is turned back and forth from C to D. The latter marks the starting point for heating the water which is heated up to E or F (60°C or 90°C) depending on which temperature has been set. This is followed by the wash stage in which the basket is turned back and forth with pauses inbetween each direction change and the water is kept at the set temperature for time t_1 . Finally, the water is drained off and the wash cycle terminated at t_b and t_c respectively.

According to the present invention, selection of water heating temperature E or F by the user is designed so that, in the event no setting is made, water is heated up to point E, i.e. normal wash cycle. For water to be heated up to point F, i.e. alternative wash cycle, a specific setting must be made by the user. The setting control may be a push-button, as in the case of selecting between two temperature values, e.g., 60°C or 90°C, which is zeroed when the washing machine is turned on again. Alternately, provision can be made, as shown in Fig. 3, for selecting a range of temperatures, a first range round 60°C and a second round 90°C. A knob 10 for turning on the washing machine and setting the temperature the water is to be heated to can be turned to the 60°C setting where it stops against push-button 11. To set higher temperatures, the user must press button 11 and turn knob 10, say, to 90°C. In this condition, button 11 is kept pressed by a flat tailpiece 12 on knob 10. In another arrangement not shown in the Figure, button 11 can also control a warning light or buzzer circuit which, when knob 10 exceeds the 60°C setting, activates a blinker or buzzer to

inform the user that the 60°C setting has been overstepped. At this point, the user can either leave the wash temperature over 60°C or, if the setting was made by mistake, turn the knob back to 60°C or lower which de-activates the warning circuit and turns off the blinker or buzzer. The buzzer may be timed to go off after a certain length of time if the user decides to maintain the higher temperature setting. The single push-button for selecting between two water temperatures determines a setting on a temperature detector circuit, essentially of the known type, comprising, for example, a threshold comparator one input of which is connected to a resistor element, which detects the temperature of the water in the basket, while the second is connected to the middle terminal of a variable voltage divider, which supplies a variable reference voltage depending on the temperature the water is to be heated to. The reference voltage is therefore determined by the setting of knob 10, the idle position of which coincides with the reference voltage value corresponding with the resistor element value when the water is at 60°C. The output of the comparator therefore enables or disables, in the known way, supply to the water heating resistors and controls, again in the known way, opening or closing of contact 15, shown in Fig. 4b, series connected to coil 16 of an electromagnet the function of which, as described later on, is to shift into neutral the drive between two groups of cam wheels on the programming means while the water is being heated.

As shown in Fig. 4b, a further contact 17 is provided, between the positive and negative supply terminals, series connected to coil 16 and contact 15, opening and closing of which is controlled, in the known way, by a cam on the wash cycle programming means.

In Figs. 5a and 5b showing known types of cam programming means, coil 16 forms part of an electromagnetic unit 20, fitted to a plate 21, the said unit controlling axial travel of rod 22 the end of which is fitted with a bottom arm 23 of a bush body 24 which can slide along a rod 25 also fitted to plate 21 against the action of a helical spring 26. Bush body 24 has a horizontal arm 27 which can counteract rotation of a top piece 28 on coupling 29 assembled on rod 30 fitted to plate 21. The said coupling 29 also has a bottom piece 31 which works in conjunction with a top tooth 32 on part 33 which is hinged to dog 34 fitted to wheel 35 which forms part of a first group 36 of cam wheels, of the known type, which form part of the wash cycle programming means on the washing machine, the said wheels being driven continuously and suitably geared down by a starting motor of the known type, e.g. synchronous. The said first group of cam wheels 36 lies between plate 21 and wheel 35. Part 33 has a side tooth, not shown in Fig. 5a, on the end of which is hooked one end of a tension spring 38, the other end of which is fixed to dog 39 integral with wheel 35. A second tooth 37 is also hinged on to dog 34 so as to provide a certain amount of

slack in relation to part 33. The end of tooth 37 is designed to engage with inside teeth 41 on the inside face of the circumference of wheel 42 facing wheel 35 on the side and forming part of a second group 43 of cam wheels which also form part of the wash cycle programming means.

Both the first 36 and second 43 group of cam wheels are arranged on a shaft 44 fitted to plate 21. The device numbered 46 in Figs. 5a and 5b provides for enabling or disabling drive from the first group of cam wheels 36 to the second 43 depending on whether or not electromagnetic unit 20 is energized or not. When the said electromagnetic unit 20 is de-energized, it is as shown in Fig. 5b with horizontal arm 27 clamping top piece 28 on coupling 29. Therefore, when wheel 35 turns round and part 33 and, in particular, its top tooth 32, corresponds with bottom piece 31 on coupling 29, the fixed pressure on the latter causes part 33 to turn round dog 34 and side tooth 37 to engage with inside teeth 41 so as to create drive between wheel 35 on the first group 36 and wheel 42 on the second 43. This drive is only created until the entire tooth 32 on part 33 moves over the bottom piece 31 on coupling 29, after which wheel 42 remains stationary until part 33 or a similar part on wheel 35 moves back into contact with bottom piece 31. In this way, wheel 42 moves round a given number of degrees for each complete turn of wheel 35.

When, on the other hand, electromagnetic unit 20 is energized, bush body 24 is shifted towards plate 21, against the action of spring 26, and top piece 28 of coupling 29 is freed from horizontal arm 27. Therefore, when coupling 29 turns to bring part 33 up to bottom piece 31, and side tooth 37 fails to engage with inside teeth 41, thus leaving wheel 42 free, no drive is created between the first 36 and second 43 group of wheels.

In the condition marked D in Figures 1 and 4b, a cam on the second group 43 closes contact 17 which, as contact 15 is also closed on account of the water not being over the set temperature, energizes coil 16, followed by electromagnetic unit 20, which stops drive between wheels 35 and 42. Starting from point D, the water is heated up to the set temperature after which contact 15 is opened and coil 16 and electromagnetic unit 20 de-energized to start up drive between wheels 35 and 42 so as to continue the wash cycle. According to the present invention, the main wash cycle, in which the water is kept at the set temperature for time t_1 , provision can be made for different timing arrangements of the basket back-and-forth rotation and hold stages. If the higher temperature range (90°C) is set, basket rotation time may be shortened or, alternately, total rotation and hold cycle time may be unaltered whichever temperature range is selected. In the higher temperature range (90°C) in particular, rotation time in one direction or the other may be the same as hold time, i.e. about 7.5 seconds, whereas, in the relatively low temperature range (60°C), rotation time in one direction or the other may be twice the hold time, i.e. about 10 seconds as

compared with about 5 seconds hold time. In this way, for a given total time t_1 for the normal operating cycle at 60°C and the specially set cycle at 90°C, a very high quality wash is obtained at a lower temperature, by improving mechanical washing action by increasing basket rotation time. Basket rotation in one direction or the other and basket hold are controlled by specially shaped cams on the wheels of first group 36. The latter can be provided with two wheels with cams for controlling different timing of normal and specially selected cycle conditions. Timing control by means of switches activated by either one of the said cam wheels may be selected using the same push-button used for selecting the temperature range, i.e. normal or specially selected cycle conditions, that is, push-button 11 in Fig. 3.

Fig. 2 shows normal and specially selected wash cycles for a differently arranged washing machine, though still according to the present invention. This machine is also provided with a push-button or knob for selecting water temperature, as shown in Fig. 3 and described previously, which the user operates for selecting a higher temperature range. To improve the wash, however, in this case, if the relatively low (60°C) temperature range has been selected, instead of altering basket rotation time, the main wash cycle is extended by time t_2 , e.g. 30 minutes, making a total main wash cycle time ($t_1 + t_2$) of about 45 minutes, as compared with 15 minutes t_1 if the higher temperature range (90°C) is selected.

The way this extra time t_2 is provided for according to the present invention is extremely simple, consisting, for example, in making a slight alteration to the mechanical programming mechanisms already on the washing machine.

As shown in Figures 6a and 6b, coupling 29 has a side tab 49 on which is hinged laterally the end of pawl 50. The latter has a side projection 51 on which rests the end of spring 52 wound round rod 30 so as to push and engage the bottom end of pawl 50 with gear 53 on pin 54 fitted to plate 21. Integral with pawl 50 is a side tab 55 which engages with the end of arm 56 fitted to coupling 57 on pin 58 fitted to plate 21. Coupling 57 is also fitted with bottom arm 59 the end of which rests on the face of wheel 60 on the second group of cam wheels 43. Coupling 57 also has a hook 61 to which is fitted one end of spring 62 the other end of which is fitted to hook 63 on coupling 29. The teeth on gear 53 also engage with check pawl 64 on pin 58, the said pawl accommodating a horizontal pin 65 on top which slides vertically in a slot on plate 21 and on which rests the other end of spring 52. Pin 65 also supports a flexible tab 66 of coupling 67 fitted on pin 58 between coupling 57 and pawl 64. The said coupling 67 has a side arm 68 which works in conjunction with tooth 69 projecting from the bottom of coupling 29. It also has a bottom arm 70 the end of which rests on the face of wheel 71 on the second group of cam wheels 43. Wheel 71 has a recess 72 while wheel 60 has a projection 73. Gear 53 is fitted with gear 75 which has a toothless section 76 and engages

with gear 77 which also has a toothless section 78 and is connected to the second group of cam wheels 43.

As shown in Fig. 4a, besides being controlled by series contacts 15 and 17 as described with reference to Fig. 4b, coil 16 is also controlled by two series connected contacts, 80 and 81, the first controlled by a cam on the second group of wheels 43 and the second by a push-button which must be operated intentionally for setting the alternative high temperature cycle.

Supposing the machine is set for a normal wash cycle, i.e. the push-button has not been operated for setting the high temperature cycle, contact 81 is closed and the input of the threshold comparator described previously is set to the reference voltage corresponding, say, to a water temperature of 60°C. When the programmed cycle gets to point D, the second group of cam wheels 43 closes contact 17 and, as contact 15 is also closed, energizes coil 16 and electromagnetic unit 20 so as to shift the drive between the first and second group of cam wheels 36 and 43 into neutral as already described with reference to Figs. 5a and 5b. This arrangement is shown in Figs. 6a and 6b which show how, with bottom arm 59 of coupling 57 resting on the face of wheel 60, arm 56 keeps pawl 50 from engaging with gear 53 so that, when coupling 29 is turned periodically by part 33, no drive is transmitted to gear 53. In the meantime, the water is heated and, when point E is reached, contact 15 opens, electromagnetic unit 20 is de-energized and coupling 29 clamped to drive the second group of cam wheels 43 once more. Contact 17 then opens to give the set-up shown in Figs. 7a and 7b in which the bottom arm 59 on coupling 57 is turned anti-clockwise by projection 73 so that arm 56 frees side tab 55 on pawl 50 which thus engages with gear 53. At the same time, the position of the second group of cam wheels 43 also closes contact 80 and, as contact 81 is also closed, energizes coil 16 and electromagnetic unit 20 which shifts coupling 29 into neutral. This cuts off drive to the second group of cam wheels 43 so that, at each turn of part 33, coupling 29 also turns to control gradual rotation of gear 53 via pawl 50. A full turn of gear 53 determines phase time t_2 . When gear 53 comes to the end of its turn, a fake tooth 83 keeps check pawl 64 raised so as to keep flexible tab 66 raised by means of pin 65 and turn coupling 67 clockwise. The end of arm 70 is allowed to rotate by recess 72 in wheel 71 which is accompanied by rotation of arm 68 which engages with tooth 69 on coupling 29 to clamp the coupling (Figs. 8a and 8b). When part 33 is activated again, drive is transmitted from the first group of cam wheels 36 to the second 43, contact 80 is opened and electromagnetic unit 20 de-energized. The set-up is therefore as shown in Figs. 9a and 9b in which coupling 57 turns clockwise in that bottom arm 59 has fully overstepped projection 73, and arm 56 once more works in conjunction with side tab 55 on pawl 50 which is released from gear 53. Coupling 67 also turns

anticlockwise, when the end of bottom arm 70 moves up from recess 72, which frees side arm 68 from tooth 69 on coupling 29 which only remains clamped by electromagnetic unit 20 which is de-energized. In this set-up (H in Fig. 2) drive is once more transmitted from the first 36 to the second 43 group of cam wheels for time t_1 defined in the wash cycle.

While the second group 43 of cam wheels is turning, gear 77 also turns to turn gears 75 and 53. When the toothless sections 76 and 78 of these come face to face, this marks the starting position for gear 53.

If, on the other hand, the high water temperature is set by pressing the push-button selector, i.e. 11 in Fig. 3, this opens contact 81 in which case, with reference to the Fig. 4a set-up, contact 17 is closed at D, electromagnetic unit 20 is energized and the water heated up to F at which point contact 15 is opened by the threshold comparator. In the next set-up in which drive is transmitted to the second group 43 of cam wheels, contact 80 is closed too but, as contact 81 is open, electromagnetic unit 20 is not energized so that coupling 29 remains clamped and the temporary release of pawl 50 ineffective. The result is therefore a wash cycle of length t_1 , as determined by the second group 43 of cam wheels.

The washing machine according to the present invention therefore provides for numerous advantages, the main one being that provision is made to ensure that the normal cycle condition is that in which the water is heated to a relatively low temperature, the said normal cycle condition being determined automatically when the machine is turned on whereas, for the water to be heated to a higher temperature, appropriate controls, i.e. a two-temperature push-button selector or push-button 11 for turning knob 10 past the 60°C setting, must be operated. Furthermore, the quality of the relatively low temperature wash is improved by altering the high temperature wash conditions, i.e. either by increasing basket rotation time or the length of the main wash cycle. The second case is relatively simple to achieve in that, starting with a known type of programmer, only a few parts need modifying, the others being devices already present on the machine and used for other functions. The said additional stage is provided for using the device for shifting the two groups of cam wheels on the programmer into neutral during the water heating stage while the length of the said additional stage is determined by a device already used for extending other wash cycle stages.

To those skilled in the art it will be clear that various alterations can be made to the arrangement described by way of a non-limiting example without, however, departing from the scope of the present invention. For example, it may be applied to washing machines with either mechanical or electronic programming means; the control means for selecting the high temperature range may be of various types; the said additional

main wash cycle stage may be affected more than once by simply providing the second group 43 of cam wheels with appropriate cams for closing contact 80. Provision can also be made for a device for discriminating between the two operating conditions without having to operate push-button 11 shown in Fig. 3. For example, in the case of a machine fitted with an electronic timer, provision can be made so that the processor itself, on the basis of the temperature selected by the user, decides which of the two operating cycles is to be performed and automatically puts the machine through a normal or alternative cycle and automatically informs the user, by means of an alarm or indicator light, that an alternate cycle has been set so that the user may change it if the said wash programme has been set by mistake.

Claims

1. A washing machine including a wash cycle programming means which provide for heating the water up to a predetermined temperature value and also comprise temperature selection means to select, in a single wash cycle, one of two maximum temperature values for the water, characterised in that, in order to avoid a not intentionally selected higher energy consumption, said programming means automatically select in said single wash cycle the lower of the two said temperature values (for ex. 60°C), unless the user, acting on said temperature selection means (10, 11), manually set the higher value (for ex. 90°C).

2. Washing machine according to claim 1, characterised in that said wash cycle programming means comprises mechanical means which, after said single wash cycle manually set at the higher temperature value is finished, automatically at the end of the cycle restore the selection temperature means at the selection of the lower temperature value.

3. Washing machine according to Claim 1 or 2, characterised in that it comprises means for detecting a main wash cycle setting associated with the high temperature value and activating an indicator light or alarm to inform the user of the said high temperature setting, whereas the said light or alarm is not activated when the normal relatively low temperature value is set.

4. Washing machine according to Claim 1 or 2, characterised by the fact that the said selection means comprise first means (11) which must be operated for selecting the high temperature value and alternative cycle conditions but which need not be operated for selecting the normal relatively low temperature range value.

5. Washing machine according to Claim 4, characterised by the fact that the said first means (11) comprise a push-button.

6. Washing machine according to any one of the previous Claims, characterised by the fact that the said two selectable temperature values are 60°C and 90°C respectively.

7. Washing machine according to any one of

the previous Claims, characterised by the fact that selection of the said high temperature value varies the back-and-forth rotation and hold phase time of the basket on the said washing machine.

8. Washing machine according to Claim 7, characterised by the fact that selection of the said high temperature value reduces the rotation phase time of the said basket.

9. Washing machine according to Claim 8, characterised by the fact that the total cycle time of the said rotation and hold phases is unaffected whichever temperature value is selected.

10. Washing machine according to any one of the previous Claims from 7 to 9, characterised by the fact that selection of the said high temperature value determines a rotation time in either direction equal to the hold time whereas selection of the said relatively low temperature value determines a rotation time in either direction of twice the length of the subsequent hold time.

11. Washing machine according to Claim 10, characterised by the fact that, when the high temperature value is selected, rotation time in either direction and hold time are around 7.5 seconds whereas, when the relatively low temperature value is selected, rotation time in either direction is around 10 seconds and hold time about 5 seconds.

12. Washing machine according to any one of the previous Claims from 1 to 6, characterised by the fact that selection of the said high temperature value varies the length of the said main wash cycle in which the water is within a preset temperature range.

13. Washing machine according to Claim 12, characterised by the fact that selection of the said high temperature value reduces the length of the said main wash cycle.

14. Washing machine according to Claim 13, characterised by the fact that selection of the said high temperature value excludes one phase of the said main wash cycle.

15. Washing machine according to Claim 14, characterised by the fact that the said phase lasts a few tens of minutes.

16. Washing machine according to Claim 14 or 15, characterised by the fact that the said phase is cut in at a given point set in the wash cycle by controlling a first system (46) which controls the transmission of drive between two series connected groups of cam wheels (36, 43) which control programmed performance of the said wash cycles so as to cut off the said drive for the length of time determined by a second timing system (53).

17. Washing machine according to Claim 16, characterised by the fact that the said first control system (46) comprises an electromagnetic unit (20) which, depending on whether it is activated or not, released or clamps a first part (29) which, in conjunction with a second part (33) transmits or prevents drive between the said two groups (36, 43) via the said second part (33).

18. Washing machine according to Claim 17, characterised by the fact that selection of the said

high temperature value controls the said first control system (46) so as to prevent release of the said first part (29).

19. Washing machine according to Claim 17 or 18, characterised by the fact that the said first system (46) also controls the said second timing system (53) with the consent of a third part (56) activated by a projection (73) on one (60) of the said wheels controlling programmed performance of the said cycle.

20. Washing machine according to Claim 19, characterised by the fact that the said third part (56) releases a pawl (50) activated by the said first part (29) so as to enable it to engage with a gear (53) on the said second timing system.

21. Washing machine according to any one of the previous Claims from 16 to 20, characterised by the fact that, at the end of its cycle, the said second timing system (53), in conjunction with a fourth part (68), restores drive between the said two series connected groups of cam wheels (36, 43).

22. Washing machine according to Claim 21 and depending on Claim 18, characterised by the fact that the said fourth part (68) is activated by an end tooth (83) on the said gear (53) and controls clamping of the said first part (29) to restore drive between the said two series connected groups of cam wheels (36, 43), one of the said wheels (71) having a recess (72) for enabling, by means of part 70 which works in conjunction with and is integral with the said fourth part (68), shifting of the latter to clamp the said first part (29), and subsequent release upon rotation of the said wheel (71) in which the said third part (56), having overstepped the said projection (73), once more clamps the said pawl (50) to prevent it from engaging with the said gear (53) while, at the same time, control of the said cam wheel restores control of the said first system (46) so as to clamp the said first part (29) and transmit drive between the said two groups (36, 43) by means of the said second part (33).

23. Washing machine according to any of the previous Claims from 16 to 22, characterised by the fact that it comprises means (75, 77) for restoring the said second timing system (53) to the initial operating condition automatically.

24. Washing machine according to Claim 23, characterised by the fact that the said means comprise wheels with toothed sectors (75, 77) which operate on the said second timing system (53) and are controlled by the said group (43) of cam wheels downstream.

25. Washing machine according to any of the previous Claims from 16 to 24, characterised by the fact that connection and the length of the said phase are controlled by devices (46, 53) already provided for on the washing machine for other wash cycle functions.

Patentansprüche

1. Eine Waschmaschine mit einer Waschzyklus-Programmierungseinrichtung, die für das Aufheizen

des Wassers bis zu einem vorgegebenen Temperaturwert sorgt und auch eine Temperaturwähleinrichtung umfaßt, um in einem einzelnen Waschzyklus eine von zwei Maximaltemperaturwerten für das Wasser zu wählen, dadurch gekennzeichnet, daß zwecks Vermeidung eines unabsichtlich gewählten höheren Energieverbrauchs die Programmierereinrichtung automatisch in dem genannten einzelnen Waschzyklus den niedrigeren der beiden genannten Temperaturwerte (beispielsweise 80°C) wählt, falls nicht der Benutzer durch Einwirken auf die genannte Temperaturwähleinrichtung (10, 11) manuell den höheren Wert (beispielsweise 90°C) einstellt.

2. Waschmaschine nach Anspruch 1, dadurch gekennzeichnet, daß die Waschzyklus-Programmierungseinrichtung mechanische Mittel umfaßt, die, nachdem der einzelne Waschzyklus, der manuell auf den höheren Temperaturwert gesetzt worden war, beendet ist, automatisch am Ende des Zyklus die Wähltemperatureinrichtung auf die Auswahl des niedrigeren Temperaturwertes zurückführt.

3. Waschmaschine nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß sie Mittel umfaßt für die Erkennung einer Hauptwaschzykluseinstellung in Verbindung mit dem höheren Temperaturwert und für das Aktivieren einer Anzeigeleuchte oder eines Alarms für die Information des Benutzers der genannten hohen Temperatureinstellung, während die genannte Leuchte oder der Alarm nicht aktiviert werden, wenn der normale, relativ niedrige Temperaturwert eingestellt ist.

4. Waschmaschine nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die genannte Wähleinrichtung erste Mittel (11) umfaßt, die für das Auswählen des höheren Temperaturwertes und alternativer Zyklusbedingungen betätigt werden müssen, die jedoch nicht betätigt werden müssen für das Auswählen des normalen, relativ niedrigen Temperaturbereichswertes.

5. Waschmaschine nach Anspruch 4, dadurch gekennzeichnet, daß die genannten ersten Mittel (11) eine Drucktaste umfassen.

6. Waschmaschine nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die beiden wählbaren Temperaturwerte 60°C bzw. 90°C sind.

7. Waschmaschine nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Auswahl des genannten hohen Temperaturwertes die Hin- und Herdrehungs- und Haltephasenzeiten der Trommel an der genannten Waschmaschine verändert.

8. Waschmaschine nach Anspruch 7, dadurch gekennzeichnet, daß die Auswahl des genannten hohen Temperaturwertes die Drehphasenzeit der genannten Trommel verringert.

9. Waschmaschine nach Anspruch 8, dadurch gekennzeichnet, daß die Gesamtzykluszeit der genannten Drehungs- und Haltephasen unbeeinflusst davon ist, welcher Temperaturwert ausgewählt wird.

10. Waschmaschine nach einem der vorangehenden Ansprüche 7 bis 9, dadurch gekennzeichnet, daß die Auswahl des genannten hohen Temperaturwertes eine Rotationszeit in einer der Richtungen gleich der Haltezeit festlegt, während die Auswahl des genannten relativ niedrigen Temperaturwertes eine Drehungszeit in einer der Richtungen gleich der doppelte Länge der nachfolgenden Haltezeit bestimmt.

11. Waschmaschine nach Anspruch 10, dadurch gekennzeichnet, daß, wenn der hohe Temperaturwert ausgewählt ist, die Rotationszeit in einer der Richtungen und die Haltezeit etwa 7,5 Sekunden betragen, während, wenn der relativ niedrige Temperaturwert ausgewählt ist, die Rotationszeit in einer der Richtungen etwa 10 Sekunden beträgt und die Haltezeit etwa 5 Sekunden.

12. Waschmaschine nach einem der vorangehenden Ansprüche 1 bis 6, dadurch gekennzeichnet, daß die Auswahl des genannten hohen Temperaturwertes die Länge des genannten Hauptwaschzyklus verändert, in welchem das Wasser innerhalb eines voreingestellten Temperaturbereichs ist.

13. Waschmaschine nach Anspruch 12, dadurch gekennzeichnet, daß die Auswahl des genannten hohen Temperaturwertes die Länge des genannten Hauptwaschzyklus verlängert.

14. Waschmaschine nach Anspruch 13, dadurch gekennzeichnet, daß die Auswahl des genannten hohen Temperaturwertes eine Phase des genannten Hauptwaschzyklus unterdrückt.

15. Waschmaschine nach Anspruch 14, dadurch gekennzeichnet, daß die genannte Phase einige wenige zehn Minuten dauert.

16. Waschmaschine nach Anspruch 14 oder 15, dadurch gekennzeichnet, daß die genannte Phase an einem gegebenen Punkt des Waschzyklus eingefügt wird durch Steuern eines ersten Systems (46), das die Übertragung des Antriebs zwischen zwei in Serie geschalteten Gruppen von Nockenrädern (36, 43) steuert, die die programmierte Ausführung der genannten Waschzyklen derart steuern, daß der genannte Antrieb für die Zeitdauer unterbrochen ist, die durch ein zweites Zeitgebersystem (53) festgelegt wird.

17. Waschmaschine nach Anspruch 16, dadurch gekennzeichnet, daß das genannte erste Steuersystem (46) eine elektromagnetische Einheit (20) umfaßt, die, je nachdem, ob sie aktiviert ist oder nicht, ein erstes Teil (29) losläßt oder festhält, das in Verbindung mit einem zweiten Teil (33) den Antrieb zwischen den genannten beiden Gruppen (36, 43) über das genannte zweite Teil (33) überträgt oder verhindert.

18. Waschmaschine nach Anspruch 17, dadurch gekennzeichnet, daß die Auswahl des genannten hohen Temperaturwertes das genannte erste Steuersystem (46) so steuert, daß das Loslassen des genannten ersten Teils (29) verhindert wird.

19. Waschmaschine nach Anspruch 17 oder 18, dadurch gekennzeichnet, daß das genannte erste System (46) außerdem das genannte zweite Zeitgebersystem (53) in Übereinstimmung mit einem dritten Teil (56) steuert, das aktiviert wird durch

eine Projektion (73) auf eines (60) der genannten Räder, die die programmierte Durchführung des genannten Zyklus steuern.

20. Waschmaschine nach Anspruch 19, dadurch gekennzeichnet, daß das genannte dritte Teil (56) eine Klinke (50) losläßt, aktiviert durch das genannte erste Teil (29), um ihm so zu ermöglichen, mit einem Zahnrad (53) auf dem genannten zweiten Zeitgebersystem in Eingriff zu gelangen.

21. Waschmaschine nach einem der vorangehenden Ansprüche 16 bis 20, dadurch gekennzeichnet, daß am Ende seines Zyklus das genannte zweite Zeitgebersystem (53) in Verbindung mit einem vierten Teil (68) den Antrieb zwischen den genannten beiden seriengeschalteten Gruppen von Nockenrädern (36, 43) wieder herstellt.

22. Waschmaschine nach Anspruch 21, soweit auf Anspruch 18 rückbezogen, dadurch gekennzeichnet, daß das genannte vierte Teil (68) durch einen Endzahn (83) auf dem genannten Zahnrad (53) aktiviert wird und das Festhalten des genannten ersten Teils (29) steuert zum Wiederherstellen des Antriebs zwischen den genannten beiden seriengeschalteten Gruppen von Nockenrädern (36, 43), wobei eines der genannten Räder (71) eine Ausnehmung (72) aufweist und mittels des Teils (70), das mit dem vierten Teil (68) zusammenwirkt und integral mit diesem ist, das Verschieben des letzteren ermöglicht zum Festhalten des genannten ersten Teils (29) und nachfolgendes Lösen bei Drehung des genannten Rades (71), wobei das genannte dritte Teil (56) nach Überlaufen der genannten Projektion (73) nochmals die genannte Klinke (50) festhält, um sie daran zu hindern, mit dem genannten Zahnrad (53) in Eingriff zu gelangen, während gleichzeitig die Steuerung des genannten Nockenrades die Steuerung des genannten ersten Systems (46) wiederherstellt, um so das genannte erste Teil (29) festzuhalten und den Antrieb zwischen den genannten beiden Gruppen (36, 43) mittels des genannten zweiten Teils (33) zu übertragen.

23. Waschmaschine nach einem der vorangehenden Ansprüche 16 bis 22, dadurch gekennzeichnet, daß sie Mittel (75, 77) umfaßt für das automatische Rücksetzen des genannten zweiten Zeitgebersystems auf die ursprünglichen Betriebsbedingungen.

24. Waschmaschine nach Anspruch 23, dadurch gekennzeichnet, daß die genannten Mittel Räder umfassen mit verzahnten Sektoren (75, 77), die auf dem genannten zweiten Zeitgebersystem (53) arbeiten und durch die genannte Gruppe (43) der dahinter angeordneten Nockenräder gesteuert werden.

25. Waschmaschine nach einem der vorangehenden Ansprüche 16 bis 24, dadurch gekennzeichnet, daß die Verbindung und die Länge der genannten Phase durch Einrichtungen (46, 53) gesteuert werden, die in der Waschmaschine bereits für andere Waschzyklusfunktionen vorgesehen sind.

Revendications

1. Une machine à laver comportant un dispositif de programmation de cycles de lavage qui assure le chauffage de l'eau jusqu'à une valeur de température prédéterminée et qui comprend également des moyens de sélection de température pour sélectionner, dans un seul cycle de lavage, une des deux valeurs maximales de la température de l'eau, caractérisée en ce que, pour éviter une consommation d'énergie supérieure et non-intentionnellement sélectionnée, ledit dispositif de programmation sélectionne automatiquement, dans ledit cycle de lavage individuel, celle des deux valeurs de température qui est la plus basse (par exemple 60°C), à moins que l'utilisateur, agissant sur lesdits moyens de sélection de température (10, 11), règle manuellement la valeur supérieure (par exemple 90°C).

2. Machine à laver selon la revendication 1, caractérisée en ce que ledit dispositif de programmation de cycles de lavage comprend des moyens mécaniques qui, après que ladite période de réglage manuel dudit cycle de lavage individuel à la valeur supérieure de température est terminée, ramène automatique à la fin du cycle les moyens de sélection de température dans la condition de sélection de la valeur inférieure de température.

3. Machine à laver selon la revendication 1 ou 2, caractérisée en ce qu'elle comprend des moyens pour détecter un réglage de cycle principal de lavage associé à la valeur supérieure de température et pour actionner une lampe indicatrice ou une alarme servant à informer l'utilisateur dudit réglage de la température supérieure, ladite lampe ou ladite alarme n'étant pas actionnée lorsque la valeur normale de température relativement basse est réglée.

4. Machine à laver selon la revendication 1 ou 2, caractérisée par le fait que lesdits moyens de sélection comprennent un premier moyen (11) qui doit être actionné pour sélectionner la valeur supérieure de température et d'autres conditions de cycles mais qui ne doit pas être actionné pour sélectionner la valeur normale de gamme de température relativement basse.

5. Machine à laver selon la revendication 4, caractérisée par le fait que ledit premier moyen (11) comprend un bouton-poussoir.

6. Machine à laver selon l'une quelconque des revendications précédentes, caractérisée par le fait que les deux valeurs de température sélectionnables précitées sont respectivement de 60°C et 90°C.

7. Machine à laver selon l'une quelconque des revendications précédentes, caractérisée par le fait qu'une sélection de ladite valeur supérieure de température fait varier la durée des étapes de rotation alternative et de maintien du tambour prévu dans ladite machine à laver.

8. Machine à laver selon la revendication 7, caractérisée par le fait qu'une sélection de ladite valeur supérieure de température réduit la durée de l'étape de rotation dudit tambour.

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9. Machine à laver selon la revendication 8, caractérisée par le fait que la durée totale des étapes de rotation et de maintien n'est pas affectée, quelle que soit la valeur de température qui a été sélectionnée.

10. Machine à laver selon l'une quelconque des revendications 7 à 9, caractérisée par le fait qu'une sélection de ladite valeur supérieure de température détermine une durée de rotation dans l'une ou l'autre direction qui est égale au temps de maintien, tandis qu'une sélection de ladite valeur relativement basse de température détermine une durée de rotation dans l'une ou l'autre direction qui est égale au double de la durée du temps de maintien suivant.

11. Machine à laver selon la revendication 10, caractérisée par le fait que, lorsque ladite valeur supérieure de température est sélectionnée, le temps de rotation dans l'une ou l'autre direction et le temps de maintien sont d'environ 7,5 secondes alors que, lorsque la valeur relativement basse de température est sélectionnée, le temps de rotation dans l'une ou l'autre direction est d'environ 10 secondes et le temps de maintien est d'environ 5 secondes.

12. Machine à laver selon l'une quelconque des revendications 1 à 6, caractérisée par le fait qu'une sélection de ladite valeur supérieure de température fait varier la durée dudit cycle principal de lavage dans lequel l'eau est située dans une gamme de température préétablie.

13. Machine à laver selon la revendication 12, caractérisée par le fait qu'une sélection de ladite valeur supérieure de température réduit la durée dudit cycle principal de lavage.

14. Machine à laver selon la revendication 13, caractérisée par le fait qu'une sélection de ladite valeur supérieure de température exclut une phase dudit cycle principal de lavage.

15. Machine à laver selon la revendication 14, caractérisée par le fait que ladite phase a une durée de plus de quelques dizaines de minutes.

16. Machine à laver selon la revendication 14 ou 15, caractérisée par le fait que ladite phase est arrêtée à un instant donné réglé dans le cycle de lavage par commande d'un premier système 46 qui assure la commande de la transmission d'entraînement entre deux groupes de roues à cames (36, 43) reliés en série et qui commande l'exécution programmée desdits cycles de lavage de manière à arrêter ledit mouvement d'entraînement pendant la durée d'un intervalle de temps déterminé par une seconde minuterie (53).

17. Machine à laver selon la revendication 16, caractérisée par le fait que ledit premier système de commande (46) comprend une unité électromagnétique (20) qui, suivant qu'elle est actionnée ou non, libère ou bloque une première pièce (29) qui, en coopération avec une seconde pièce (33), transmet ou empêche l'entraînement entre les deux groupes précités (36, 43) par l'intermédiaire de ladite seconde pièce (33).

18. Machine à laver selon la revendication 17, caractérisée par le fait qu'une sélection de ladite valeur supérieure de température commande le-

dit premier système de commande (46) de façon à empêcher une libération de ladite première pièce (29).

19. Machine à laver selon les revendications 17 ou 18, caractérisée par le fait que ledit premier système (46) commande également ladite seconde minuterie (53) avec l'autorisation d'une troisième pièce (56) actionnée par une saillie (73) prévue sur une (60) desdites roues assurant la commande du déroulement programmé dudit cycle.

20. Machine à laver selon la revendication 19, caractérisée par le fait que ladite troisième pièce (56) libère un cliquet (50) actionné par ladite première pièce (29) afin de lui permettre d'entrer en prise avec un engrenage (53) prévu dans la seconde minuterie.

21. Machine à laver selon l'une quelconque des revendications 16 à 20, caractérisée par le fait que, à la fin de son cycle, ladite seconde minuterie (53) assure, en coopération avec une quatrième pièce (68), le rétablissement de la transmission de mouvement entre les deux groupes précités de roues à cames (36, 43), reliés en série.

22. Machine à laver selon la revendication 21, et en rattachement à la revendication 18, caractérisée par le fait que ladite quatrième pièce (68) est actionnée par une dent extrême (83) prévue sur ledit engrenage (53) et commande un blocage de ladite première pièce (29) pour rétablir la transmission de mouvement entre les deux groupes précités de roues à cames (36, 43) reliés en série, une desdites roues (71) comportant un évidement (72) pour autoriser, au moyen d'une pièce (70) qui travaille en coopération avec ladite quatrième pièce (68) et qui est solidaire de celle-ci, un décalage de cette dernière pour bloquer ladite première pièce (29) et qui fait en sorte que, lors d'une libération ultérieure produite au cours de la rotation de ladite roue (71), ladite troisième pièce (56), ayant franchi ladite saillie (73), bloque à nouveau ledit cliquet (50) pour l'empêcher d'entrer en prise avec ledit engrenage (53) tandis que, simultanément, une commande de ladite roue à came rétablit la commande dudit premier système (46) de façon à bloquer ladite première pièce (29) et à transmettre le mouvement entre les deux groupes précités de roues à cames (36, 43) au moyen de ladite seconde pièce (33).

23. Machine à laver selon l'une quelconque des revendications 16 à 22, caractérisée par le fait qu'elle comprend des moyens (75, 77) pour ramener ladite seconde minuterie (53) automatiquement dans sa condition initiale de fonctionnement.

24. Machine à laver selon la revendication 23, caractérisée par le fait que lesdits moyens comprennent des roues pourvues de secteurs dentés (75, 77) qui opèrent sur ladite seconde minuterie (53) et qui sont commandés par ledit groupe de roues à cames (43) d'aval.

25. Machine à laver selon l'une quelconque des revendications 16 à 24, caractérisée par le fait qu'une liaison et la durée de ladite phase sont commandées par des dispositifs (46, 53) déjà installés dans la machine à laver pour remplir d'autres fonctions de cycles de lavage.

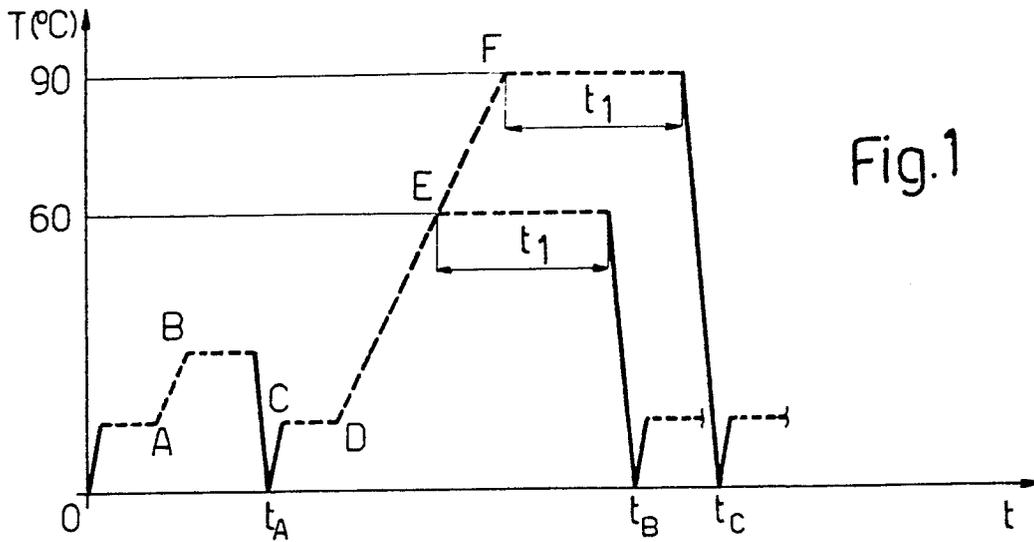


Fig. 1

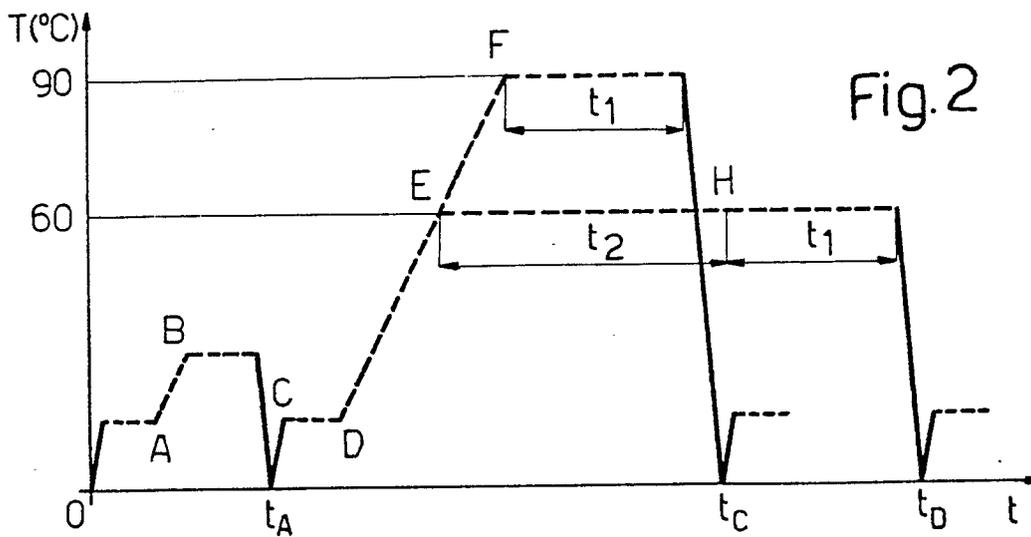


Fig. 2

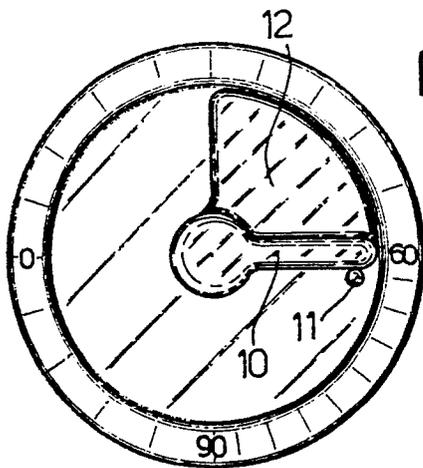


Fig. 3

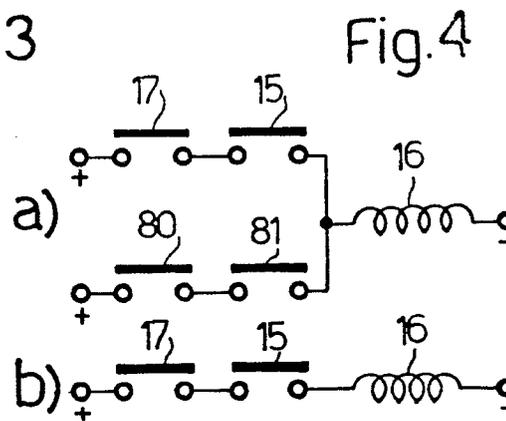
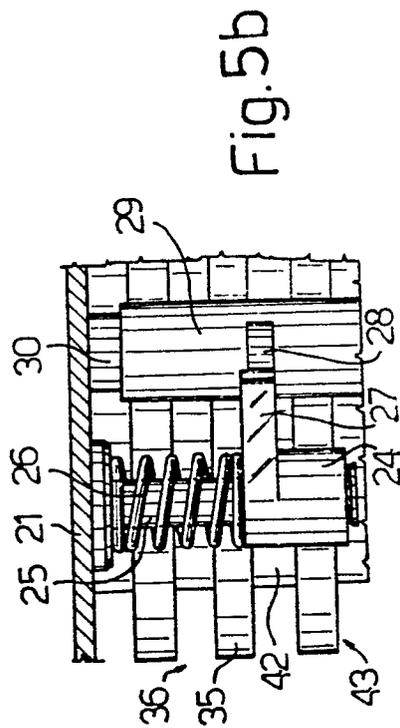
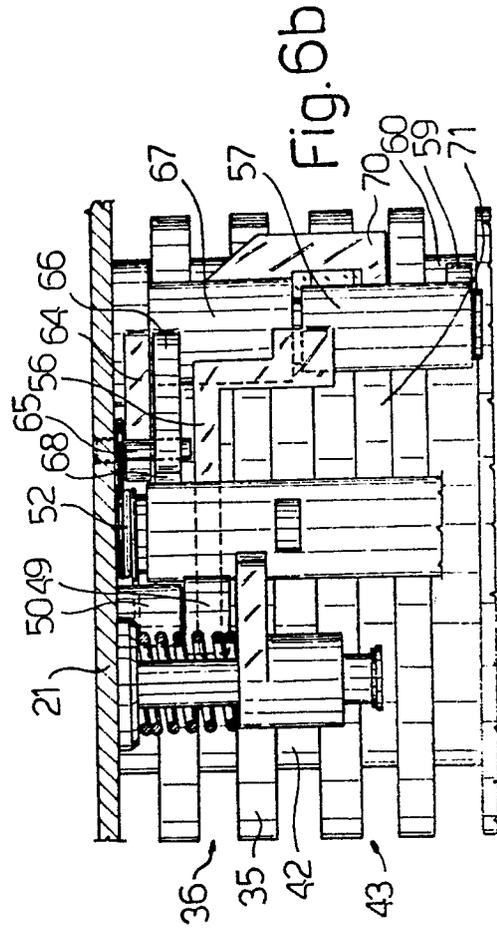
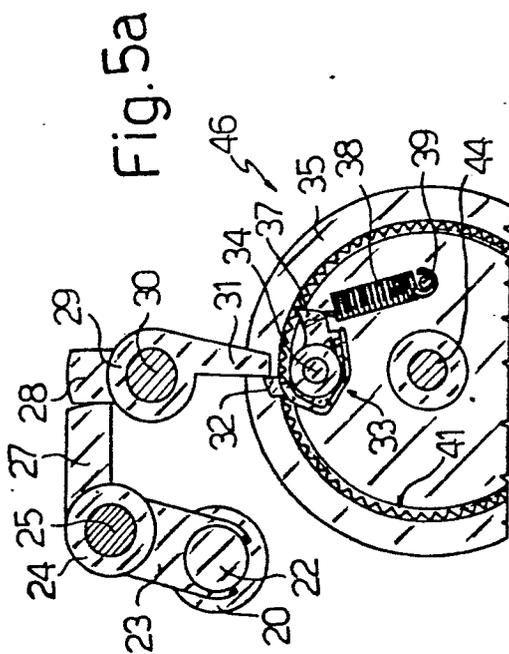
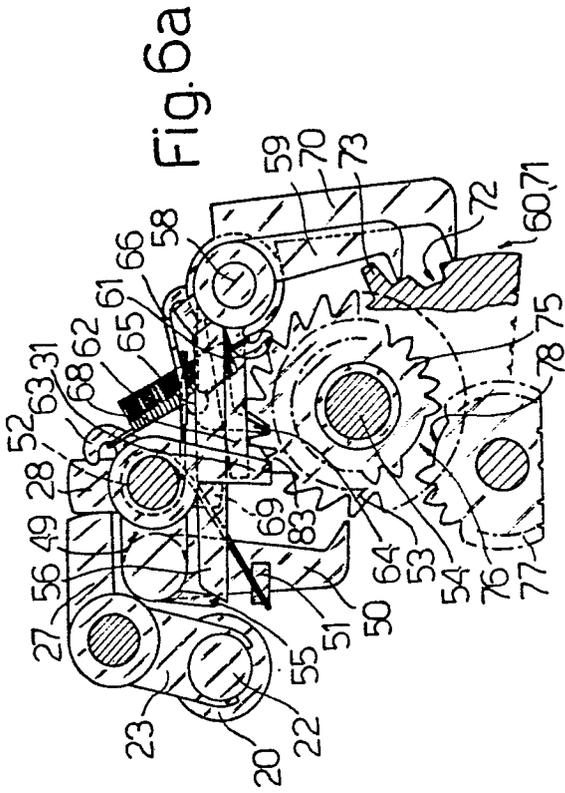


Fig. 4



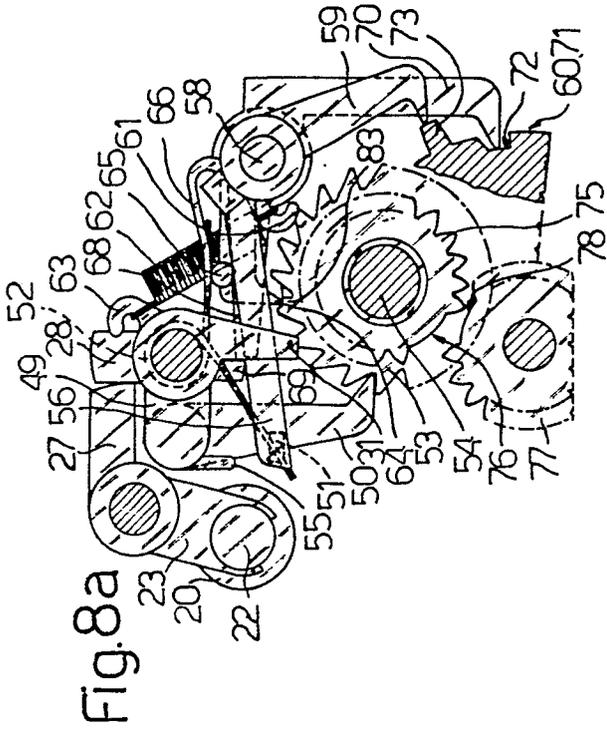


Fig. 8a

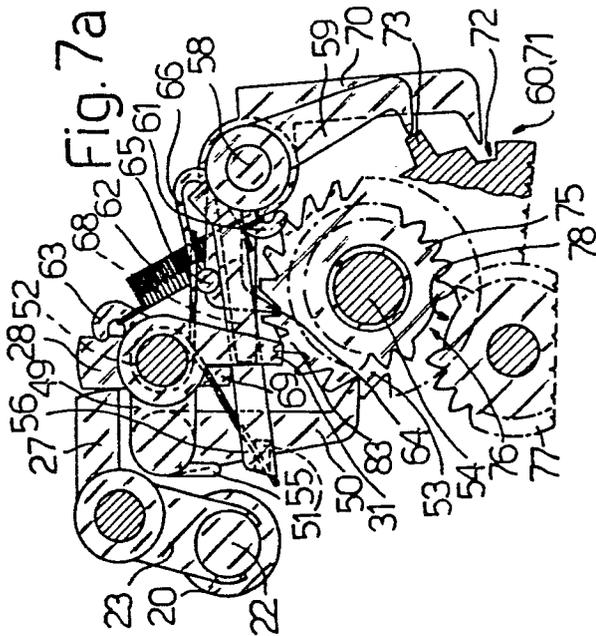


Fig. 7a

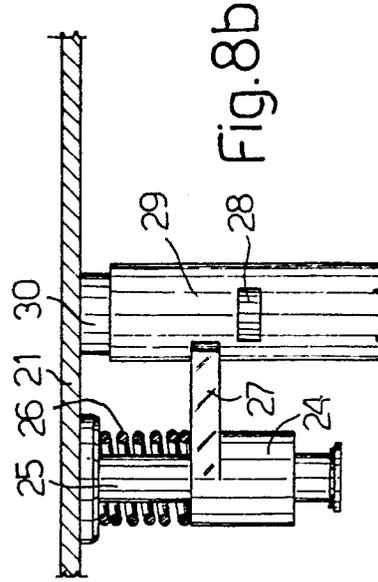


Fig. 8b

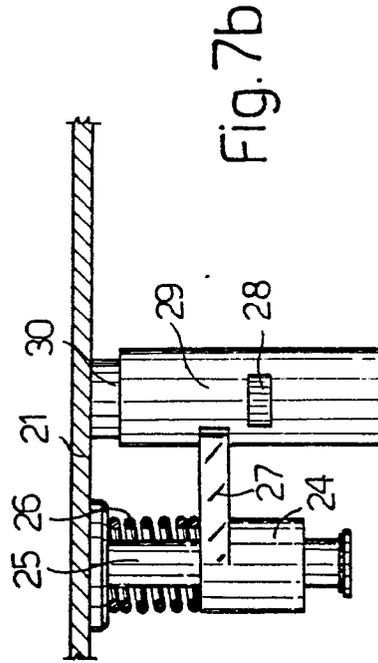


Fig. 7b

