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(54) **Method to use desired parts of the cycle times in programmer devices, and the relative devices**

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DE-B- 1 193 578

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EP 0 443 196 B1

Description

This invention concerns a method to use desired parts of specific established cycle times in timer devices, and also concerns the relative device that obtains such method.

To be more exact, this invention concerns a method suitable to use parts of, or in any event to reduce to minimum determined values, the established cycle times provided in the timer devices.

The established cycle times with which this invention is concerned are cycle times already pre-set in the programmer device and condition the working of the programmer device itself.

The programmer devices with which the invention is concerned are normally called "timers" and condition in desired selectable sequences the functions proper to a machine or device with which the programmer devices are associated.

The timers can control and govern manifold functions at one and the same time.

The invention concerns preferably, but not only, the timers employed in washing and drying machines, whether these machines are for use in the household, in public premises or for industrial use.

The method according to the invention is associated with those timers which comprise a device called a "thermostop". A thermostop serves to condition in a variable manner the working of a timer device of the type now in question; such working is normally governed by a thermostat which indicates the temperature of the water.

Timer devices of a mechanical or electromechanical type are assumed here to be known as regards their various structures and features.

Briefly, they comprise a small motor, a train of gearwheels, a plurality of means performing the functions of cams, elements or contacts suitable to be actuated by such cams, each of such elements or contacts being able to open or close an electrical circuit, and comprise also electrical connection means and mechanical connection means.

Where the timer governs the functions proper to a washing and/or drying machine, it has to govern also the function of heating the washing water or the drying air, that is to say, it has to actuate for a suitable time the electrical resistor or resistors performing the function of heating the fluid. This time is a variable cycle time associated with an external factor.

When the timer is governing the functions of a washing machine, it has to govern the washing function (or prewash function or rinsing function or other function) which requires an established, but long, cycle time.

Under given conditions the user of a washing machine may find it useful to be able to correct this or that established cycle time by reducing it or even cancelling it while still keeping the pre-set work programme.

This is not possible at the present time since the various cycle times are pre-set and follow the geometric laws (design and combination of cams) associated with that particular timer; the cycle time for the heating of water, for instance, is the only variable time.

FR-A-2628889 describes a programmer device typically used with a washing machine, in which the thermostop assembly is associated with a switch which can be actuated by hand by the machine operator so as to condition the working of the machine.

This document of the prior art teaches the use of this switch for the prolonging of the individual washing steps of the washing machine, for instance for the prolonging of the heating step until a given event has taken place. This prolonging action can be carried out only in correspondence with institutional steps of the working of the thermostop assembly but can in no way be concerned with intermediate moments in a specific step to be selected as desired.

This invention tends to provide a method suitable to use desired parts (all the parts or some of them) of one or more specific established cycle times in any work programme provided in a timer device of the type cited above.

The method to use desired parts of specific established cycle times in timer devices and also the relative timer device are set forth and characterized in the respective main claims 1 and 5, while the respective dependent claims describe variants of the idea of the solution.

In a timer device to which the method according to the invention is applied a device is included to actuate the heating function and acts on the timer itself, thus halting the system of movement of at least part of the cams until the temperature of the fluid (water) has reached the required value.

This device to halt the movement is called technically a "thermostop", since it was invented to perform halting functions associated with heat factors, and ususally consists of a shaft that is normally held in an active position by spring means.

In normal applications to washing machines, when the heating function is started, this shaft is displaced by an armature or electrical coil and is placed in a working position to halt the system of movement of at least part of the cams of the timer, as we said above.

For the sake of simplicity of description the thermostop has been shown as a shaft but in actual fact the known embodiments provide levers of various types, sliders, wedges, etc. Thus when we speak hereinafter of shafts asssociated with thermostop functions, we mean all the known variants too.

The thermostop acts on the movement of the cams assembly either by creating a mechanical blockage of the movement (rotation) of that assembly or by creating a mechanical non-connection which nullifies the action of movement which should act on the cams assembly.

This invention concerns those timer devices in which the thermostop acts to nullify for the required time the action of movement which should act on the cams assembly while this action of movement continues to re-present itself.

The action of movement may be obtained with a movable spring latch acting on a toothed portion associated with means which determine the time during which this movable latch can act on that toothed portion.

This toothed portion includes a zero position in which the movable latch, when associated with that position, has its to-and- fro movement nullified, and this movement is therefore not converted into a forward movement of the cams assembly.

This zero position associated to the movable latch is actuated when the thermostop is connected up and when the means that determine the time of action of the movable latch on the toothed portion are disconnected.

This invention therefore provides an electrical circuit which is parallel to the circuit linking the thermostop to the conditioning element (for instance, a thermostat associated with measurement of the temperature of the water) and which is suitable to recreate momentarily, when so desired by the operator of the machine, the zero position conditions acting on the movable latch in relation to a specific established cycle time.

In this way, when the specific established cycle time to be used in desired parts is connected by the cams, the zeroing action cited above is created and nullifies momentarily the effect of the means which determine the time of action of the movable latch on the aforesaid toothed portion.

The action of movement can be obtained not only by a movable latch but also by gearwheels, clutch means or other means and can be not only periodic but also continuous.

The established cycle time to be used in desired parts can be one specific time or can also be selected by the machine operator as required. In other words, when the specific established cycle time to be use in desired parts has been pre-set, electrical means act on the thermostop and create a momentary setting to zero and enable the toothed portion to provide the zero portion for the movable latch, so that the means which determine the time of action are in fact shortcircuited provisionally.

Under these conditions the specific established cycle time pre-selected is either cancelled or reduced to a minimum pre-set value.

The invention as applied to a preferred but not binding type of timer is shown as a non-restrictive example in the attached figures, wherein:-

Fig.1	shows a view of a possible timing assembly of a timer device;
Fig.2	gives an axial view of a possible cams assembly of the timer device of Fig.1;
Fig.3	shows a lengthwise diagrammatic view of the cams assembly of Fig.2;
Fig.4	shows a circuit suitable to provide a programme according to the invention in the device of Fig.1;
Figs.5 to 8	show possible evolutive variants of the circuit of Fig.4.

The example which follows is based on a timer device with periodic action of movement by means of a movable latch.

A motor 10 sets in rotation a first toothed wheel 11 and an eccentric disk 12. The first toothed wheel 11 sets in rotation an idler wheel 13 and, thereby, a second toothed wheel 14 associated with an auxiliary service assembly 15.

The service assembly 15 is rotated continuously owing to the action of the motor 10 and bears auxiliary service cams 16.

The service assembly 15 enfolds a terminal part 17 of a cams assembly 18, which advances periodically in relation to the commands provided by a timing assembly and by the action of a thermostop 40.

The service assembly 15 comprises one or more first slits 19 providing outward access and one or more second slits 20 providing inward access.

The first access slits 19 provide access to an outer toothed portion 21 included on the periphery of the exterior of the terminal part 17 of the cams assembly 18.

The second access slits 20 provide access to an inner circumferential cam 22 which is developed on the inner portion of the terminal part 17.

Under given conditions which we shall see later, a first tooth 23 on a movable latch 24 can act on the outer toothed portion 21 through the first access slits 19.

The movable latch 24 is actuated by the eccentric disk 12 kept active by first spring means 25.

A second tooth 26 cooperates with the inner circumferential cam 22 through the second access slits 20. This second tooth 26 is borne by a timing lever 27 kept active by second spring means 28.

A third tooth 29 too is comprised on the timing lever 27 and, like the first tooth 23, cooperates with a timing cam disk 30, which can rotate by an angle not greater than 360° about an axis 31 and is kept resiliently resisted by third spring means 32.

The axis 31 coincides with the axis of the cams assembly 18 and with the axis of the service assembly 15.

The cam disk 30 includes an inner toothed portion 33, which has a differentiated radius and cooperates with the third tooth 29 in determining the times during which the movable latch 24 can act on the outer toothed portion 21 through the first slits 19.

Thus, the cooperation between the specific position of the inner circumferential cam 22 and of the inner toothed portion 33, by means of the second 26 and third 29 teeth, determines the duration of the movement of the cams assembly 18. All these elements form the means which determine such duration of the movement of the cams assembly 18.

The cam disk 30 comprises also a toothed portion 42 for the movement of the disk 30; this toothed portion 42 includes a forward movement space 34, which enables the first tooth 23, when coinciding with that space 34 and with a first slit 19, to act on the outer toothed portion 21 of the cams assembly 18.

A zero zone 35 is included beside the movement space 34 and, when it cooperates with the first tooth 23, nullifies the to-and-fro working of the first tooth 23.

Since the cam disk 30, owing to the effect of the third spring means 32, will not remain still when neither the first tooth 23 nor the third tooth 29 are meshed with their respective toothed portions 42 and 33, a third toothed portion 36 is provided with which a stop lever 37 cooperates by means of a fourth tooth 39, the stop lever 37 being actuated resiliently by fourth spring means 38.

The thermostop 40 cooperates with the stop lever 37 and, by drawing an armature 41, nullifies the effect of the fourth spring means 38 and frees from conditioning the timing cam disk 30, which returns to its zero position, namely to the position where the zero zone 35 coincides with the first tooth 23 and nullifies the action of movement so long as the thermostop 40 remains actuated.

The thermostop 40 is normally actuated by a thermostop contact 43 set to work by an appropriate cam of the cams assembly 18 and is disconnected by a first normally closed contact 44 of a thermostat or other suitable means.

According to one embodiment the thermostop 40 (Fig.4) is associated with a first external switch 45, which can be actuated by the machine operator and serves to eliminate the heating cycle.

Everything described so far forms part of the state of the art which has been included here as an example to illustrate the invention.

According to the invention, in relation to a specific established cycle time a circuit is provided which includes a first normally open contact 46 actuated by the same specific cam 47 of the specific established cycle time of which desired parts are to be used, the contact 46 identifying the position where it is desired to alter such specific established cycle time. The circuit (Fig.5) is positioned in parallel to the circuit shown in Fig.4 and includes an additional external switch 145 which can be actuated by the machine operator.

According to a first variant the first normally open contact 46 is actuated by the specific cam 47 or by an adjacent cam 48 included in the auxiliary service assembly 15; this adjacent cam 48 divides into desired parts the time of feed of the thermostop 40.

According to a further variant the first normally open contact 46 is actuated by the cited specific cam 47 and is positioned in series with a further normally open contact 146 actuated either by the adjacent cam 48 of the auxiliary service assembly 15 or by another cam or means suitable to divide in parts the time of feed of the thermostop 40.

A further normally open timed contact 146 may be included, for instance, as an alternative means and may open or close according to its position in the electrical circuit after a determined time, starting from actuation of the first normally open contact 46, thus dividing the effect into desired parts.

When the operator closes the contact of the additional external switch 145, therefore, the specific established cycle time with which this contact is associated is brought to zero or reduced to a minimum value, since by closure of the second normally open contact 46 associated with start-up of the cycle time the thermostop 40 is actuated and the first tooth 23 comes into contact with the zero zone 35, thus bringing to zero the timing cam disk 30.

At the same time there is started, for instance by the action of the adjacent cam 48 or by the action of the auxiliary contact 146, positioned in series or timed, a process of use of desired parts of the inactive time of the thermostop 40; these parts may be very short or may coincide with one or more cycles of the passage of one or all of the first slits 19 arranged in front of the first tooth 23.

Let us now see some practical examples shown in Figs.5 to 8.

In Fig.5 a second circuit is associated in parallel with the circuit of Fig.4 and upstream of the thermostop 40. By means of this embodiment it is possible to use parts of any desired specific established cycle time associated with the first contact 46 and actuated by the additional external switch 145.

The first contact 46 is actuated, for instance, by the cams 47 and 48, as indicated above.

Fig.6 shows a variant of Fig.5 whereby the first normally open contact 46 and the further normally open contact 146 are included in series. In this case the first contact 46 is actuated by the specific cam 47, while the further contact 146 is actuated by the auxiliary cam 48.

Fig.7 shows a variant of Fig.6 whereby a timed contact 246 is included instead of the further normally open contact 146 and is associated with a timer 49. In this embodiment the first normally open contact 46 is actuated only by the specific cam 47.

Fig.8 shows a variant of Fig.5, this variant being suitable to time a plurality of specific cycle times. Fig 8 includes an additional external switch 145, which may also be omitted and which serves as a general cut-out means and, in a variant, can also cut out the first external switch 45.

Besides the additional external switch 145, a third external switch 245 is included for each specific cycle time (x, y, z, etc.) and serves specifically for the use of desired parts of such specific cycle time.

The method according to the invention, therefore, arranges to act on the thermostop function 40 or on another function suitable to condition the performance of the timed cycle of a timer device of the type in question so as to cut off, immediately after a determined time, the thermostop function which stops the progress of a timed cycle or which in any case contributes towards the correct performance of such timed cycle.

Claims

1. Method to use desired parts of specific established cycle times in programmer devices of the type normally called "timers", whereby there are included a cams assembly and a timing assembly that determines the times and conditions the movement of the cams assembly, the timing assembly including a thermostop assembly (40) suitable to halt momentarily the movement of the timing assembly when a thermostop contact (43) is connected, which method is characterized in that a specific additional external switch (145) is actuated to cut off the thermostop function so as to create the zero-point conditions in an intermediate position of a specific phase, thus allowing the use of desired parts of a specific established cycle time of that specific phase so as to shorten the time of the phase itself, said specific additional external switch (145) remaining active in relation to the thermostop assembly (40) for a minimum defined time when a first normally open contact (46) relating to that specific established cycle time is actuated by a specific cam (47).

2. Method as claimed in Claim 1, in which the first normally open contact (46) that determines the minimum defined time is actuated by an auxiliary service cam (48)

3. Method as claimed in Claim 1 or 2, in which the first normally open contact (46) that determines the minimum defined time is governed by a further normally open contact (146) actuated by the auxiliary service cam (48).

4. Method as claimed in Claim 1 or 2, in which the first normally open contact (46) that determines the minimum defined time is governed by a timed contact (246).

5. Programmer device of the type called a "timer", which comprises a cams assembly and a timing assembly that conditions the movement of the cams assembly, the timing assembly including a thermostop assembly suitable to halt momentarily the movement of the timing assembly, the device being suitable to use parts of a specific cycle time and being characterised in that in parallel with the line feeding the thermostop (40) and comprising at least a thermostop contact (43) there are included in series at least a specific external switch (145) with a normally closed contact and a first normally open contact (46) associated with a specific cam (47) of the specific established cycle time of which desired parts are to be used, that specific external switch (145) being able to cut off the thermostop function for creating the zero-point condition in an intermediate position of a specific phase so as to shorten the time of that specific phase.

6. Device as claimed in Claim 5, in which the first normally open contact (146) is also associated with an auxiliary service cam (48) that conditions the time of actuation of such first contact (46).

7. Device as claimed in Claim 5 or 6, in which a further normally open contact (146) is included in series with the first normally open contact (46) and is associated with an auxiliary service cam (48) that conditions the time of actuation of such further normally open contact (146).

8. Device as claimed in any of claim 5, 6 or 7, in which a timed contact (246) with normally open contacts is included in series with the first normally open contact (46).

9. Device as claimed in any of Claims 5 to 8 inclusive, in which there is included for each further specific established cycle time a further feed line including in series at least one specific external switch (245) for the use of desired parts of such cycle times and one specific first normally open contact (46).

Patentansprüche

1. Verfahren zur Verwendung gewünschter Teile spezifischer, eingerichteter Takt- oder Zykluszeiten in Programmiereinrichtungen von der Bauart, die normalerweise "Timer" genannt wird, wobei eine Nockenanordnung und eine Zeitsteuer- bzw. Timing-Anordnung vorgesehen sind, welche die Zeiten und Bedingungen der Bewegung der Nockenanordnung bestimmt, wobei die Zeitsteueranordnung eine Thermostop-Anordnung (40) umfaßt, welche in der Lage ist, die Bewegung der Zeitsteueranordnung augenblicklich bzw. momentan anzuhalten, wenn ein Thermostop-Kontakt (43) verbunden bzw. geschlossen ist, wobei das Verfahren dadurch gekennzeichnet ist, daß ein spezifischer, zusätzlicher, äußerer Schalter (145) betätigt wird, um die Thermostop-Funktion abzuschneiden bzw. abzuschalten, um die Nullpunkt-Bedingungen in einer Zwischenposition einer spezifischen Phase zu schaffen, um somit die Verwendung gewünschter Teile einer spezifischen, eingerichteten Takt- oder Zykluszeit dieser spezifischen Phase zu verwenden, um die Zeit bzw. Dauer der Phase selbst zu verkürzen, wobei der spezifische, zusätzliche, äußere Schalter (145) bezüglich der Thermostop-Anordnung (40) für eine minimale definierte Zeit aktiv bleibt, wenn ein erster, normalerweise offener Kontakt (46), der mit dieser spezifischen, eingerichteten Takt- oder Zykluszeit in Verbindung steht, durch einen spezifischen Nocken (47) betätigt wird.

2. Verfahren gemäß Anspruch 1, wobei der erste, normalerweise offene Kontakt (46), der die minimale definierte Zeit bestimmt, durch einen Hilfsnocken (48) betätigt wird.

3. Verfahren gemäß Anspruch 1 oder 2, wobei der erste, normalerweise offene Kontakt (46), der die minimale definierte Zeit bestimmt, durch einen weiteren, normalerweise offenen Kontakt (146) bestimmt bzw. betätigt wird, welcher durch den Hilfsnocken (48) betätigt wird.

4. Verfahren gemäß Anspruch 1 oder 2, wobei der erste, normalerweise offene Kontakt (46), der die minimale definierte Zeit bestimmt, durch einen zeitgesteuerten bzw. getimten Kontakt (246) bestimmt bzw. betätigt wird.

5. Programmiereinrichtung von der "Timer" genannten Bauart, die eine Nockenanordnung und eine Zeitsteuer-bzw. Timing-Anordnung aufweist, welche die Bewegung der Nockenanordnung beeinflußt, wobei die Zeitsteuer-Anordnung eine Thermostop-Anordnung umfaßt, welche in der Lage ist, die Bewegung der Zeitsteueranordnung augenblicklich bzw. momentan anzuhalten, wobei die Einrichtung in der Lage ist, Teile einer spezifischen Takt- oder Zykluszeit zu verwenden und wobei die Einrichtung dadurch gekennzeichnet ist, daß parallel zu der Leitung, die die Thermostop-Anordnung (40) versorgt und mindestens einen Thermostop-Kontakt (43) aufweist, mindestens ein spezifischer, äußerer Schalter (145) mit einem normalerweise geschlossenen Kontakt in Reihe mit einem ersten, normalerweise offenen Kontakt (46) vorgesehen ist, welcher mit einem spezifischen Nocken (47) der spezifischen, eingerichteten Takt- oder Zykluszeit assoziiert ist, von der gewünschte Teile verwendet werden sollen, wobei der spezifische äußere Schalter (145) in der Lage ist, die Thermostop-Funktion abzuschneiden bzw. abzuschalten, um die Nullpunkt-Bedingung bzw. den Nullpunkt-Zustand in einer Zwischenposition einer spezifischen Phase zu schaffen, um die Zeit bzw. Dauer dieser spezifischen Phase zu verkürzen.

6. Einrichtung gemäß Anspruch 5, wobei der erste, normalerweise offene Kontakt (46) auch mit einem Hilfsnocken (48) assoziiert ist, der die Betätigungsdauer des ersten Kontakts (46) beeinflußt.

7. Einrichtung gemäß Anspruch 5 oder 6, wobei ein weiterer, normalerweise offener Kontakt (146) in Reihe

mit dem ersten, normalerweise offenen Kontakt (46) vorgesehen ist und mit einem Hilfsnocken (48) assoziiert ist, der die Betätigungsdauer des weiteren, normalerweise offenen Kontakts (146) beeinflußt.

8. Einrichtung gemäß einem der Ansprüche 5, 6 oder 7, wobei ein zeitgesteuerter bzw. getimter Kontakt (246) mit normalerweise offenen Kontakten in Reihe mit dem ersten, normalerweise offenen Kontakt (46) vorgesehen ist.

9. Einrichtung gemäß einem der Ansprüche 5 bis 8, wobei für jede weitere, spezifische, eingerichtete Takt- oder Zykluszeit eine weitere Versorgungs- bzw. Zuführleitung vorgesehen ist, welche in Reihe mindestens einen spezifischen, äußeren Schalter (245) für die Verwendung gewünschter Teile solcher Takt- oder Zykluszeiten und einen spezifischen, ersten, normalerweise offenen Kontakt (46) aufweist.

Revendications

1. Procédé destiné à utiliser les parties désirées de temps de cycles spécifiques établis dans des dispositifs programmateurs du type normalement appelé "minuteries", dans laquelle on trouve un ensemble de cames et un ensemble de temporisation qui détermine les temps et conditionne le mouvement de l'ensemble de cames, l'ensemble de temporisation incluant un ensemble thermostop (40) adéquat pour stopper momentanément le mouvement de l'ensemble de temporisation quand un contact (43) du thermostop est connecté, lequel procédé étant caractérisé en ce qu'un interrupteur (145) externe supplémentaire spécifique est actionné pour couper le fonctionnement du thermostop et créer les conditions du point zéro dans une position intermédiaire d'une phase spécifique, permettant ainsi l'utilisation des parties désirées d'un temps de cycle spécifique établi de cette phase spécifique pour abréger le temps de la phase elle-même, ledit interrupteur (145) externe supplémentaire spécifique restant actif en relation avec l'ensemble thermostop (40) pour un temps minimum défini quand un premier contact (46) normalement ouvert concernant ce temps de cycle spécifique établi est actionné par une came (47) spécifique.

2. Procédé selon la revendication 1, caractérisé en ce que le premier contact (46) normalement ouvert qui détermine le temps minimum défini, est actionné par une came (48) de service auxiliaire.

3. Procédé selon la revendication 1 ou 2, caractérisé en ce que le premier contact (46) normalement ouvert qui détermine le temps défini minimum, est commandé par un autre contact (146) normalement ouvert, actionné par la came (48) de service auxiliaire.

4. Procédé selon la revendication 1 ou 2, caractérisé en ce que le premier contact (46) normalement ouvert qui détermine le temps défini minimum, est commandé par un contact (246) temporisé.

5. Dispositif programmateur du type appelé "minuterie" qui comprend un ensemble de cames et un ensemble de temporisation conditionnant le mouvement de l'ensemble de cames, l'ensemble de temporisation comprenant un ensemble thermostop adéquat pour stopper momentanément le mouvement de l'ensemble de temporisation, le dispositif étant adapté pour utiliser les parties d'un temps de cycle spécifique et caractérisé en ce qu'il est parallèle avec la ligne d'alimentation du thermostop (40) et comprenant au moins un contact (43) de thermostop, et inclus en série, au moins un interrupteur (145) externe spécifique avec un contact normalement fermé et un premier contact (46) normalement ouvert, associés à une came (47) spécifique du temps de cycle spécifique établi dont les parties désirées sont utilisées, cet interrupteur (145) externe spécifique étant capable de couper la fonction du thermostop pour créer la condition du point zéro dans une position intermédiaire d'une phase spécifique, de façon à raccourcir le temps de cette phase spécifique.

6. Dispositif selon la revendication 5, caractérisé en ce que le premier contact (146) normalement ouvert est aussi associé à une came (48) de service auxiliaire qui conditionne le temps d'activité de ce premier contact (46).

7. Dispositif selon la revendication 5 ou 6, caractérisé en ce qu'un autre contact (146) normalement ouvert est inclus en série avec le premier contact (46) normalement ouvert tout en étant aussi associé à une came (48) de service auxiliaire qui conditionne le temps d'activité de cet autre contact (146) normalement ouvert.

8. Dispositif selon l'une quelconque des revendications 5, 6 ou 7, caractérisé en ce qu'un contact (246) temporisé avec des contacts normalement ouverts, est inclus en série avec le premier contact (46) normalement ouvert.

9. Dispositif selon l'une quelconque des revendications 5 à 8 incluse, caractérisé en ce que, pour tout autre temps de cycle spécifique établi, une autre ligne d'alimentation comprenant en série au moins un interrupteur (245) externe spécifique pour l'utilisation des parties désirées de tels temps de cycles et un premier contact (46) spécifique normalement ouvert est incluse.

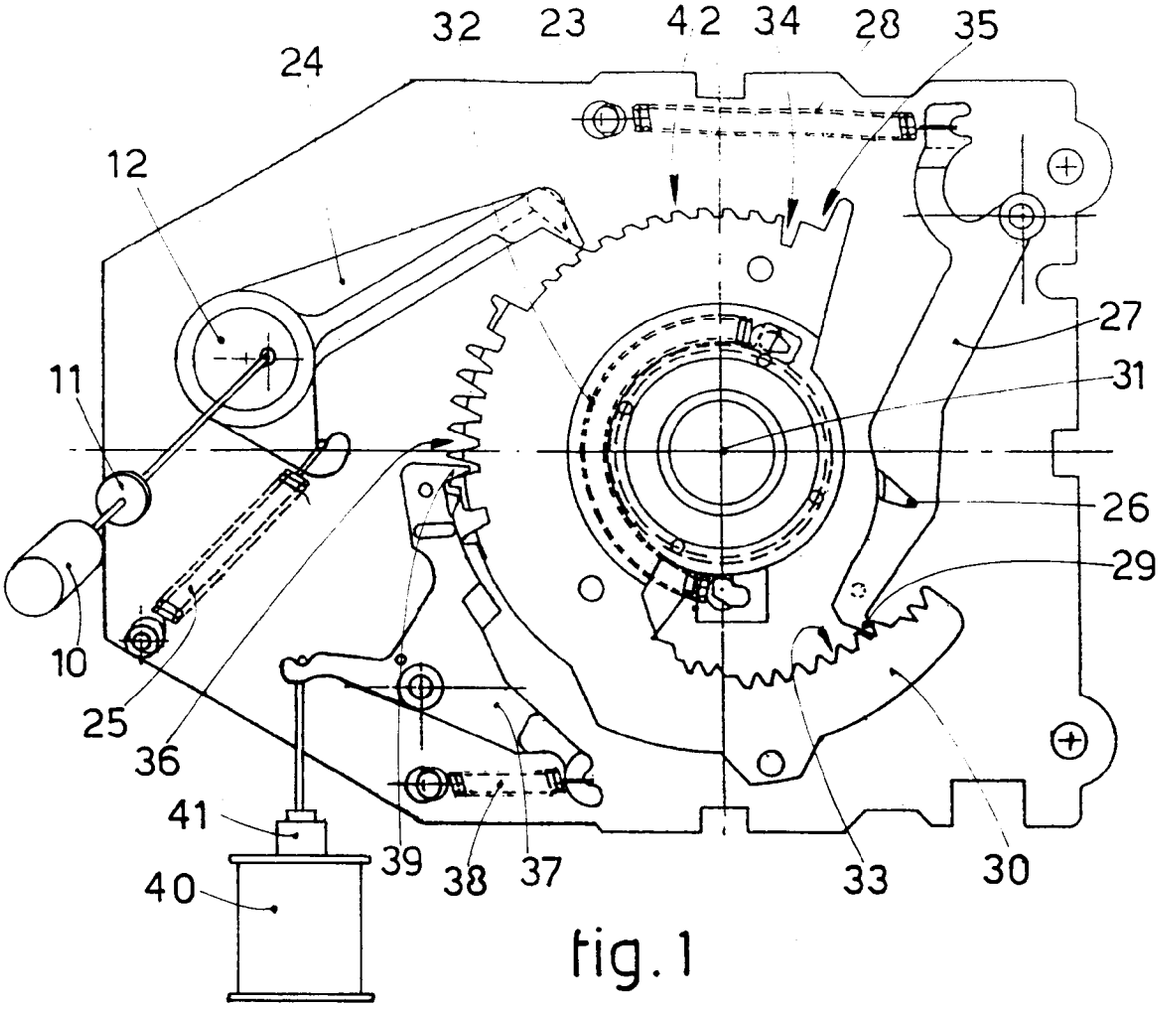

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fig. 1

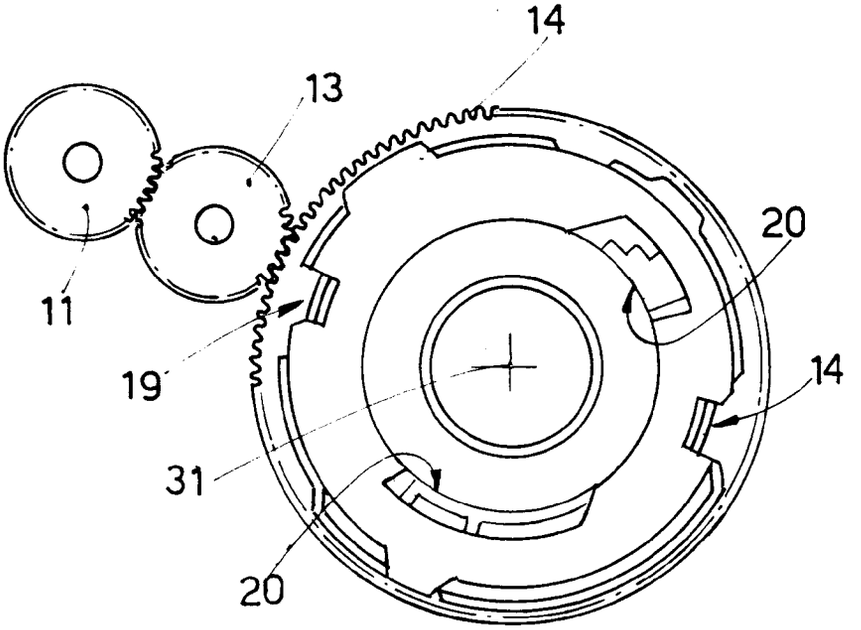

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fig. 2

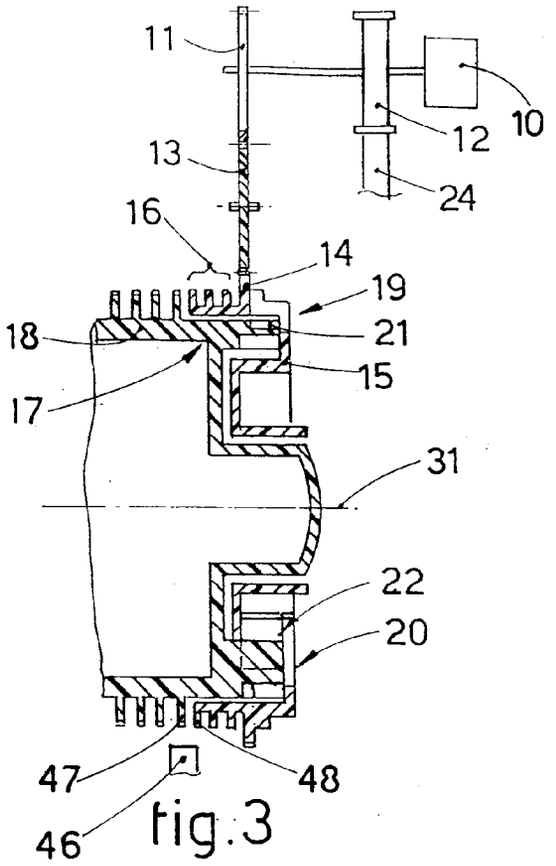


fig.3

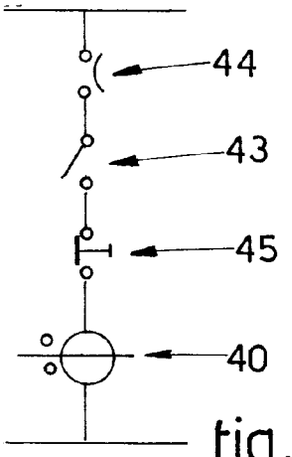


fig.4

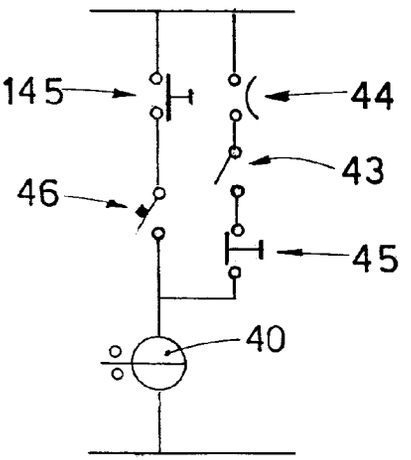


fig.5

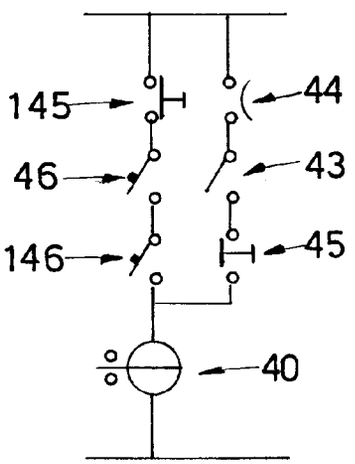


fig. 6

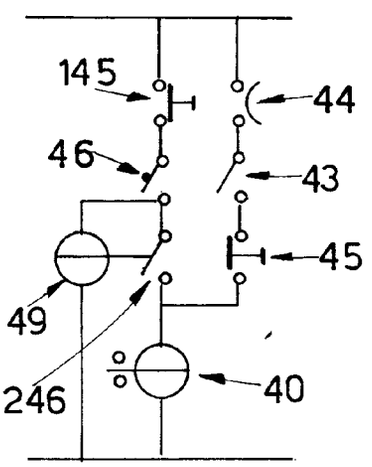


fig.7

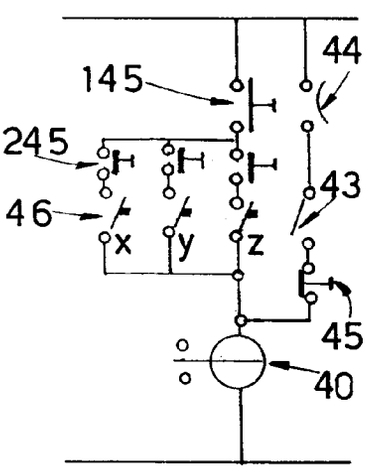


fig.8