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54 **Step-by-step timer switch activation system for program control devices.**

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Description

The present invention relates to a step-by-step activation system, with a choice of stop intervals of variable lengths, applicable to program control devices, of the sort used in automatic washing machines, dishwashers and tumble driers, which devices comprise a block or set of fast cams which rotate continuously and assist contacts, where provided, which govern periodic functions in such machines, for instance reversing the direction of rotation of the washing drum, the said devices also having a block or set of main or program cams, the various working phases of the machines being governed through the said contacts, the block of fast cams being generally uniformly and steadily activated whereas the main block is driven step by step, with stop intervals every two step movements of variable lengths.

BACKGROUND OF THE INVENTION

It is a well-known fact that the larger the number of stop intervals obtainable, the bigger the capacity to program a control device, which is why the systems generating these are continually being improved, and a large number of varied solutions have been put forth in time.

Reference could for instance be made to French patent 1,595,564 where the block of program cams is designed with an integral ring gear activated by a pawl which makes it move one step forward each time it engages with the ring gear. Whenever the program so provides, a lock prevents the pawl from engaging with the ring gear integral with the block of cams, remaining thus until a timer element or wheel determines otherwise. The lock is part of a pivoting lever with a probe which works, assisted by the appropriate elastic means, with a selector cam that is also integral with the block of program cams. The timer element or wheel also has a surface that removes the lock from its active position when the pre-set time is over.

Italian patent 21,953 A/67 relates to a system similar to the above, singular in that the timer element or wheel is coaxial with the blocks of fast and program cams and also has means to reset the timer element to zero each time the block of program cams moves one or more steps forward, resetting being triggered by the element which accurately positions the block of main cams angularly.

Reference can also be made to German patent 1,193,008 in which the ratchet that prevents the timer wheel, which is continuously acted upon by elastic means, from returning toward it each time it moves forward, is rendered inactive when the preset time is over and held in such position until the pawl that makes it move forward step by step is also separated from the ring gear, both actions therefore allowing the timer wheel to be reset to zero, whereupon the anti-

return ratchet is immediately released, becoming active again.

The original arrangement and combination of the above and other known elements, such as ring gears with various levels of cogs, swinging or overlapping timer wheels and so on, have resulted in the aforesaid current choice of solutions.

The step by step timer switch disclosed in the Italian patent No. 1179717, which represents the most pertinent prior art, includes a block of fast cams rotating with a preset speed, a block of program cams provided with a drive gear ring and a detent gear ring both fixed to it, a timer cam also provided with two gear rings, an actuation pawl which works with both drive gearings, a profil cam along three levels fixed to the program cam, a helical spring to maintain the timer cam at rest, a ratchet preventing the return of the timer cam, an actuating organ which releases the anti-return ratchet, and a selection lever provided with a probe feeling along the three said profil levels and having one shaped end which intervenes the path of the actuation pawl.

This disclosed timer switch comprises two subsystems to yield the timing, the first yields two stop intervals for the block of program cams, one of which is called the basic stop interval which lasts the period of rotation of the block of fast cam, and the other a preset fraction of this latter, and the second subsystem yields two further stop interval which times are multiples of said basic interval. The first subsystem includes two different sector gears fixed to the block of fast cams in combination with some cogs of different depth in the driving gear ring of the program cams; the second subsystem includes the timer lever, said cam profil along three levels, and said selection lever.

The disadvantage of the system is that the difference between both timings of length equal to or a fraction of the period of rotation of the block of fast cams, and the intervention or otherwise of the multiplier mechanism, depend on the active area within reach of the actuation pawl having the high or low level cogs of a ring gear fixed to the block of program cams, wherefore the number of timing lengths are limited to the said four.

DESCRIPTION OF THE INVENTION

The activation system subject hereof is designed to achieve step-by-step activation of the block of program cams with the choice of stop intervals of variable length, partially relying on the timer cam coaxial with the cam blocks and a detent which is particularly convenient and which on the one hand makes a long timing equal to the period of rotation of the fast cams and two fractions thereof, and on the other, timing length resultants from the multiplication of either of them by two whole factors, thereby simply and reliably to obtain nine stop intervals of different lengths, which

means that use is very flexible, according to the needs that arise nowadays in machines for which such system is designed.

The timer switch incorporates a motor and a transmission that provide a block of fast or reversing cams with motion, such cams rotating continuously at a steady speed, and an eccentric cam which rotates to produce a steady to-and-fro motion in an actuation pawl. The switch is also provided with a block of program cams, which moves forward step by step each time the actuation pawl acts upon a gear ring with which it is integral, and a timer system which acts following a pre-set program, temporarily preventing the actuation pawl from moving the block of program cams forward each time it undergoes a to-and-fro motion, the timing system comprising two subsystems that may act separately or in combination, one such subsystem achieving stop intervals lasting the same as the period of rotation of the block of fast cams or fractions thereof, and the other subsystem multiplying the length of any of the foregoing intervals by a whole factor whose magnitude is defined by a timer cam placed between the two blocks of cams, coaxially therewith, with freedom of rotation.

Such timer cam is complemented by activation and deactivation elements, elastic means urging it to start running, holding means preventing it from being reset to zero during the pre-set time, and means to position and keep such holding elements inactive to allow the timer cam to return to the starting point each time the block of program cams moves one step forward, and again position the same ready to act once reset to zero. It also has said detent which works with the timer cam and may obtain whole factor multiplying the times from the first subsystem, on preventing the actuation pawl from penetrating a first deep space in a timer cam's time counter gear ring, state corresponding to a first multiplication factor, thereby preventing the actuation pawl from engaging the gear ring of the block of program cams, when the said deep space comes within reach of the pawl, the timer cam having a surface which displaces the detent at the end of its longer pre-set time, beyond its active position, leaving the system ready for the block of program cams to move one step forward.

Attached to said detent are the means allowing the second multiplication subsystem to be activated and deactivated, and a probe which, with the assistance of elastic means, follows a three-level selector cam profile located inside the block of program cams, so that when the probe detects the level of greatest radius, the said subsystem is inactive, at the middle level the timer cam is active and the lock inactive, which state corresponds to the first multiplication factor, whereas at the level of smallest radius, both the timer wheel and the detent are active, which state corresponds to the second multiplication factor.

In addition to this basic and conventional struc-

ture, the system subject hereof has, as a feature of the invention, an actuation pawl that is provided with to-and-fro motion by an eccentric cam which rotates continuously, the said pawl being urged by a helical spring towards the gear ring in the block of program cams and towards the counting ring gear in the timer cam, the said pawl also having means which lift the same when it moves back, drawing it away from the aforesaid two gear rings.

With reference to another feature of the invention, the free end of the actuation pawl can be interfered with the free end of a swinging detent member that can take up two positions, one in which it stands in the way of the pawl, preventing it from engaging the aforesaid ring gears each time it undergoes a to-and-fro motion, whilst in the other position it remains at a distance, allowing the pawl to act freely.

The detent's member position is in turn defined by a swinging clearance lever with three working positions. At the two end positions, it holds the detent member out of the reach of the actuation pawl, whereas in the middle position it stands in its way.

This clearance lever, located between both blocks of cams, has two probes to connect with the same number of internal cam profiles, both having three levels, one being a selector profile in the block of program cams, and the other an activation profile, located in the block of fast cams.

With reference to another feature of the invention, each of the three levels of the selector profile of the block of program cams governs a different time of inactivity of the actuation pawl length. Thus at the level of smaller radius, a short length equal to the period of oscillation of the actuation pawl, for instance 7.5 seconds, is obtained, at the middle level the length is equal to the period of rotation of the block of fast cams, for instance 4 minutes, the length at the level of greatest radius being equal to a fraction of the latter, for instance $1/2$ or $1/3$ or $1/4$.

The activation profile fixed to the block of fast cams must cause the detent member to swing, making it hold or release the actuation pawl at some certain instants, as defined by the shape of the actual profile and by the level of the selector profile at which the relevant probe is found. In the short timing position, is exceptionally the own selector profile which acts through its level of lower radius on the clearance lever to cause direct release of the actuation pawl.

It is then possible for the actuation pawl to act, when the detent member is released, on the gear ring, making the program block move one step forward, or otherwise a second part of the system to intervene delaying such action. This second part or subsystem, which has already been generically described, has the following peculiarities.

When the timer cam is at rest, it lies beyond the reach of the actuation pawl, in a stand-by position defined by a fixed abutment toward which it is urged per-

manently by a helical spring, activation coming about when an anti-return ratchet, in moving to engage the gear ring holding the timer cam, acts on a ramp-like surface on the timer cam, causing the same to move angularly beyond the reach of the actuation pawl, ready to start its pre-set time.

A selector lever, whose probe follows a second three-level cam profile disposed inside the block of program cams, has a holding surface so that when the lever probe is at the level of greater radius, it keeps the anti-return ratchet at a distance from the timer cam, allowing it to reach the same once it is on either of the other two levels.

With reference to another feature of the invention, the said anti-return ratchet has an elastic arm whose free end works with a fixed abutment so that when the holding ratchet moves away from the timer cam, each time the block of program cams moves one step forward, it holds the same in such position for the time required for the actuation pawl, which is lifted as it moves back, also to move away from the timer cam, both actions together permitting its being reset to zero. A peripheral protuberance on the eccentric cam acts shortly after on the elastic arm, moving it out of said fixed abutment and hence leaving the anti-return ratchet free to act again on the timer cam.

Finally, and with reference to another feature of the invention, for the activating, timing and positioning, functions of the system the block of program cams only has a single gear ring, all their cogs spaces being the same depth. The timer wheel ring gear, working with the foregoing, is at a radially higher level and has, in specific positions, spaces of greater depth that enable the actuation pawl to engage the said ring gear in the block of program cams.

DESCRIPTION OF THE DRAWINGS

Figure 1.- Is a plan view of a timer switch provided with the activation system subject hereof, with the detent member in activated position.

Figure 2.- Is a section of the both blocks of program and fast cams with the internal cams profiles.

Figures 3, 4 and 5.- Respectively show details of the three positions of the clearance lever, connected to the detent member with the actuation pawl, likewise showing the program and fast blocks cam profiles.

Figure 6.- Is a plan view of the timer switch, as in figure 1, but without the timer cam in order for the mechanisms located under the same to be seen in greater detail.

Figures 7 to 13.- Show the various working positions of the timer cam together with the selection lever and the anti-return ratchet, and their connection to the actuation pawl catch and the ring gear in the block of program cams.

PREFERRED EMBODIMENT OF THE INVENTION

It can in light of these drawings be appreciated that a motor and a transmission that are not shown in such figures generate, in a manner that is known per se, a steady rotary movement supplied to a block of fast cams (1) and an eccentric cam (2). This eccentric cam (2) in turn provides a steady to-and-fro motion to an actuation pawl (3) having a catch (4), which engages, when the timing means so allow, a uniform ring gear and cogs (5), integral with the block of program cams (6), causing it to move forward step by step.

The actuation pawl has an extension whose end (7) which can engage the end (8) of the swinging detent member (9), the cogs (5) thus remaining beyond the reach of the actuation pawl's catch (4), as may be observed in figures 1 and 5.

The detent member (9) can in turn take up the two positions shown in figures 3 and 4 and in figure 5, thereby allowing the catch (4) to engage the cogs (5) in one such position (figures 3 and 4) and preventing such engagement in the other position, shown in figure 5.

A spring (10) drives the actuation pawl (3) towards a position of engagement with the cogs (5), and the detent member (9) towards a position of engagement with the end (7) of the actuation pawl.

The position of the detent member (9) is defined by a ridge (11) thereof which feels a cam profile (12) located on the free end of the clearance lever (13), specifically swinging about the axle (14), the clearance lever being able to take up three working positions, respectively shown in figures 3, 4 and 5.

The clearance lever (13), located between the blocks of fast (1) and program (6) cams, as is clearly appreciated in figure 2, has two probes, 15 and 16, with one of these, number 15, following a selector cam profile 17 along three levels, in the block of program came (6), the other one, number 16 being related to an actuation cam profile 18 also along three levels, integral with the block of fast cams (1). A spring (19) must keep the probes in touch with the respective aforesaid cam profiles.

The cam profiles are shown figuratively in figures (3), (4) and (5), for their movement is obviously circular.

As shown in figure 3, when the probe (15) rests at the level of greatest radius (20) on the cam profile 17 the clearance lever (14) will act upon the detent member (9) causing the end (8) thereof to move away from the actuating pawl end (7) whenever the probe (16) is in an area of the cam profile of greater radius (21) or smaller radius (22), such position corresponding to a timing equal to a fraction of the period of rotation of the block of fast came, the denominator of the fraction depending on the number of elevations and depressions present on the cam profile (18).

When the probe 15 is at the level of smaller radius

(23) on the selector profile 17, as shown in figure 4, this same profile puts, without the assistance of the actuation profile 18, the system in the active state, corresponding to a short timing, of length equal to that of the period of to-and-fro motion of the actuating pawl (3), for instance, and as aforesaid, 7.5 seconds.

In the working position shown in figure 5, the system will only be activated when the salient level (24) on the actuation profile (18), moves the probe (16) carrying the clearance lever (13), and the latter the detent member (9) to the position shown in figure 4. In the event of the actuation profile (18) having only one salient level (24) on its periphery, the timing obtained will last the period of rotation of the block of fast cams.

When the above-described first timing subsystem allows the actuating pawl (3) to go near the ring gear (5) in the block of program cams, it can either act on the same, causing a step, or else a second part of the timing subsystem take also part to multiply the length of the timings by one of two pre-set factors which are whole numbers.

This second subsystem comprises a selector lever (25), a timer cam (26) and an anti-return ratchet (27) of the timer cam. The selector lever, shown in figures 1 and 6, is provided with a probe (28) to follow a second internal cam profile (29) along three levels, integral with the block of program cams (6).

The timer cam (26) has two gear sectors (32,39), those are the holding gear 32 and the drive gear 39.

When the selector lever's probe (28) is on the level 29 of greater radius, the free end (30) of the selector lever, and the timer cam, are drawn away, as shown in figures 7 and 8, thus allowing the catch (4) in the actuating pawl (3) to act upon the gear ring (5) in the block of program cams. In such position, a recessed surface (31) of the selector lever (25), as shown in figure (6), prevents the anti-return ratchet (27) from moving towards the holding gear 32, toward which it is urged by a spring (33).

When the probe (28) in the selector lever moves into any of the other two levels of smaller or medium radius on the cam profile (29), the recessed surface (31) is no longer flush with the anti-return ratchet (27) allowing the latter to engage the holding gear 32. In order for this to take place it is also necessary for a peripheric salient (34) on the eccentric cam 2 to thrust the probe (35) in the elastic arm (36) of the anti-return ratchet (27) in order to release the same from a salient (37) provided on the supporting plate (38), upon which they are assembled. When this happens, the catch (40) in the anti-return ratchet acts, on falling upon a ramp (41) of the timer cam (26), moving forward and carrying the system in the situation shown in figure 9.

As shown in such figure 9, the first cog 39 in the timer cam is placed within reach of the catch (4) in the actuating pawl, preventing it from reaching the ring

gear (5) in the block of program cams (6), since the drive gear (39) in the timer cam is located at a level above the ring gear (5) in the block of program cams. The end (30) of the selector lever (25) remains moved away the actuating cam (4). Under this state of the actuating pawl 3, only the timer cam (26) moves forward step by step until a first deep space (42) comes within reach, of the actuating pawl as shown in figure 11, allowing the catch (4) to penetrate in the ring gear (5) block of program cams, causing the latter to move one step forward. Thus, operation corresponds to a position of the selection lever (25) where its probe (28) is located on the middle level of the second profile (29) thereof, thereby to achieve a multiplication factor equal to the number of cogs provided between the first cog (39) in the timer cam and the first deep space (42).

When the probe (28) in the selector lever (25) is located at the level of smaller radius on the second profile (29), the free end (30) of the selector lever is positioned within the scope of the catch (4), as shown in figure 12. The catch (4) then causes the timer cam to move forward step by step, but the end (30) of the selector lever (25) prevents it from entering the first deep space 42. The timer cam continues to move forward until a thrusting surface (43) provided thereon acts on a protrusion (44) fixed to the selector lever (25), displacing the end (30) thereof to a position beyond the path of the catch (4), as shown in figure 12. The catch (4) then enters the second deep space (45) in the ring gear of the timer cam, causing the block of program cams (6) to move one step forward. The second multiplying factor is thus obtained.

The timer cam (26) is provided with a spring (55) that tends to displace the same towards a fixed rest position defined by a post (56) located on the selector lever (25). The catch (40) of the anti-return ratchet (27) prevents the timer cam from moving back whenever it moves one step forward.

A positioning ratchet 46 helps the ring gear (5) in the block of program cams so that with the assistance of a spring (47), the block of program cams is accurately in place for a step to be advanced, manually or automatically.

Whenever one step is advanced in the block of program cams (6), the end (48) of the positioning ratchet (46) a thrusts edge surface (49) of the anti-return ratchet (27), causing it to swing about an axle (50), and carrying the end (51) of its elastic arm (36) to the position relative to the salient (37) shown in figure 6, the cogs (32) of the timer cam hence being released from the holding action of the catch (40) in the ratchet (27). Shortly after this, an actuating pawl hollow profile (52) will, with the assistance of a spigot (53) integral with the support (38), cause the catch (4) in the actuating pawl to rise, moving away from the drive gear (39) in the timer cam, both actions allowing the timer cam to be free to return, by action of the

spring (55) to its stand-by position as defined by the post (56).

Claims

1. Step-by-step timer switch activation system for program control devices incorporating a block of program cams (6) which moves forward step by step, a block of fast cams (1) turning at a steady speed which period is the basic timing or stop interval of the program cams, a drive ring gear (5) fixed to the block of program cams which is moved forward by an actuation pawl (3) having a catch (4) engaging the ring gear (5) and to which a coaxial eccentric cam (2) imparts a steady to-and-fro motion of a certain period, the timer switch system including timer means (15,16,17,18,26,28,29) and activation means (9,10,13,25,27,33,46, 55) both being assembled upon a supporting plate (38) to arrange two timing subsystems and which in combination can yield a plurality of stop intervals of different lengths, which result from the multiplication of said turning period by two fractional and two whole numbers respectively relative to the first and to the second subsystem, the latter including a timer cam (26) provided with a drive sector gear (39) and a holding sector gear (32), also driven by said catch (4) and with a helical spring (55) which causes it to return to zero, whenever the program block (6) moves one step forward once the preset time has begun, a selector lever (25) provided with a probe (28) which follows a profil cam (29) along three levels fixed to the program cams and with a free end (30) intervening the path of said catch (4), and an anti-return ratchet (27) urged by a helicoidal spring (33) holding the timer cam (26) activated, characterized by
 - a swinging detent member (9) that can take two positions, in one such position standing in the path of of the actuating pawl (3) to avoid engagement of the catch (4) with the ring gear (5) and in the other staying away from it;
 - a swinging clearance member (13) driving the detent member (9) and provided with two lateral probes (15, 16), each one following an internal cam profil (17,18) on the program cams (6) and fast cams (1), respectively, said clearance member (13) having its free end shaped as a cam profil (12) ; one of said two internal cam profiles (17,18) being a selector profile (17) fixed to the program block (6) and the other an actuation profile (18) fixed to the fast block (1), both having three levels which in combination define three working positions of

- the clearance member (13);
- said selector lever (25) shaped as a "S" and having a central recessed surface (31) to prevent displacement of the anti-return ratchet (27) towards the gear ring (5) depending on the probe (28) location with regard to the levels of the profile (29);
- said timer cam (26) having at the end of its holding gear sector (32) a ramp-like surface (41), at an angle to the radius, and having a thrusting surface (43) which acts, when the length of the stop interval is over, upon a protrusion (44) in the selector lever (25) which displaces the free end (30) thereof beyond the path of said catch (4);
- said anti-return ratchet (27) having two swinging arms and a holding catch (40) in one of ratchet bends, one of the arms being an integral elastic member (36) which may take up two working positions in one of which its free end (51) abuts against a salient (37) on the supporting plate (38) to take the catch (40) away from the holding gear sector (32) in the timer cam (26), whereas in the second position the elastic member swings freely, thus the holding catch (40) engaging said gear sector (32);
- a second ratchet (46) having a rounded end (48) and two cogs engaging the drive gear ring (5) of the program block (6), and so urged with a spring (47) that the program block (6) is accurately placed after a step is advanced;

said timing and activation means working in combination to achieve stop interval length multiples of both, the fast block (1) revolution period and its fractional lengths.

2. Step-by-step timer switch activation system, as in claim 1, where the detent member (9) has a rounded free end (8) engaging a recess of the free end (7) of the actuating pawl (3) so that the latter stands away from the gear ring (5), whereas a helical spring (10) urges both towards such engagement, and also has a ridge (11) in the other end which follows said profil (12) on the free end of the clearance lever (13).
3. Step-by-step timer switch activation system, as in claim 1, where the anti-return ratchet (27) has on the elastic member (36) a probe (35) which is thrust by a peripheric salient (34) on said eccentric cam (2) releasing the end (51) of the elastic member (36), thus the holding catch (40) is no longer flush with the recessed surface (31) of the selector lever (25) and falls upon a ramp-like surface (41) of the holding gear sector (32) changing the position of the timer cam (26).

4. Step-by-step timer switch activation system, as in claim 1, where the second arm of the anti-return ratchet (27) is edged with a surface (49) thrust by the positioning ratchet (46) so that the timer cam (26) is liberated from the catch (40) of the anti-return catchet (27). 5
5. Step-by-step timer switch activation system, as in claim 1, where the selector lever (25) has a post (56) next to its probe (28) which fixes the rest position of the timer cam (26) urged by its spring (55). 10
6. Step-by-step timer switch activation system, as in claim 1, where said actuating pawl (3) has between its swing shaft and the drive catch (4) a hollow area (52) whose internal profil works with a spigot (53) on the supporting plate (38) so that when the pawl moves back it draws the catch (4) away from both drive gear rings (5,39), again drawing near as soon as it begins to move forward. 15 20

Patentansprüche 25

1. Schrittweises Zeitschalt-Antriebssystem für Programmsteuerungsvorrichtungen, mit einem schrittweise vorrückenden Programmierblock (6), einem mit gleichmäßiger Geschwindigkeit drehenden Block schneller Nocken (1), dessen Dauer der hauptsächlichen Zeitschaltung bzw. der Stillstandzeit der Programmierblock entspricht, einem am Programmierblock befestigten Mitnahme-Ringgetriebe (5), das mit Hilfe einer Antriebssperrklinke (3) vorrückt, die eine Krallen (4) besitzt, welche mit dem Ringgetriebe (5) in Berührung kommt und von einer koaxialen aussermittigen Nocke (32) während einer bestimmten Zeit in eine regelmäßige Hin- und Herbewegung versetzt wird, wobei das Zeitschaltsystem Zeitschaltelemente (15, 16, 17, 18, 26, 28, 29) und Betätigungselemente (9, 10, 13, 25, 27, 33, 46, 55) aufweist, die an einer Stützplatte (38) montiert werden, um auf diese Weise über zwei Zeitschalt-Untersysteme zu verfügen, die in Kombination eine Reihe von Stillstandzeiten unterschiedlicher Dauer erzeugen können, welche das Ergebnis der Multiplikation des genannten Drehzeitraums mit zwei Fraktionen und zwei ganzen Zahlen, jeweils in Zusammenhang mit dem ersten und dem zweiten Untersystem sind, von denen letzteres eine Zeitschaltnocke (26) enthält, die eine Mitnahmeverzahnung (39) und eine Befestigungsverzahnung (32) aufweist, die ebenfalls von der Krallen (4) mitgenommen wird, sowie mit einer Schraubenfeder (55), die immer dann, wenn der Pro-
- 30 35 40 45 50 55

grammierblock (6) einen Schritt vorrückt, eine Nullstellung bewirkt, sobald die vorgegebene Zeit begonnen hat, einem Wahlhebel (25), der mit einer Sonde (28) ausgestattet ist, die einer Profilenocke (29) entlang der drei an den Programmiernocken befestigten Ebenen folgt, mit einem freien Ende (30), das sich im den Weg dieser Krallen (4) befindet und mit einer die Rückstellung verhindernden Klinke (27), die von einer Schraubenfeder (33) verschoben wird, welche die aktivierte Zeitschaltnocke (26) hält, gekennzeichnet durch

- ein kippbares Blockierelement (9), das zwei Stellungen einnehmen kann, wobei es sich in einer dieser Stellungen in den Weg der Antriebssperrklinke (3) begibt, um den Kontakt der Krallen (4) mit dem Ringgetriebe (5) zu verhindern, und in der anderen die von diesem Weg getrennte Position einnimmt;
- ein kippbares Trennelement (13), welches das Blockierelement (9) betätigt und zwei seitliche Sonden (15, 16) aufweist, die jeweils einem internen Nockenprofil (17, 18) in den Programmiernocken (6) und in den schnellen Nocken (1) folgen, wobei das freie Ende dieses Trennelements (13) als Nockenprofil (12) ausgebildet ist; bei einem der beiden internen Nockenprofile (17, 18) handelt es sich um ein am Programmierblock (6) befestigten Wahlprofil (17) und bei dem anderen um ein am schnellen Block (1) befestigten Betätigungsprofil (18); beide besitzen drei Ebenen, welche in Kombination drei arbeitsstellungen des Trennelements (13) festlegen;
- den erwähnten Wahlhebel (25) in Form eines "S", der eine ausgesparte Fläche (31) besitzt, um - in Abhängigkeit von der Stellung der Sonde (28) zu den Profilebenen (29) - ein Verschieben der die Rückstellung verhindernden Klinke (27) in Richtung zum Getriebering (5) zu vermeiden;
- die Zeitschaltnocke (26), die am Ende des Bereichs der Befestigungsverzahnung (32) eine winklig zum Radius rampenförmige Fläche (41) besitzt und eine Schubfläche (43) aufweist, die nach Ablauf der Stillstandzeit auf einen Vorsatz (44) des Wahlhebels (25) wirkt, wodurch das freie Ende (30) außerhalb der Reichweite der Krallen (4) zu liegen kommt;
- die die Rückstellung verhindernde Klinke (27), die zwei Kippschenkel und an einer der Beugen der Klinke eine Befestigungskralle (40) aufweist, wobei einer der Schenkel ein integriertes elastisches Element (36) ist, das zwei arbeitsstellungen einnehmen kann, wobei sein freies Ende (51) in einer der stellungen gegen einen Vorsprung (37)

- der Stützplatte (38) stößt, um die Krallen (4) vom Bereich der Befestigungsverzahnung (32) der Zeitschaltnocke (26) zu trennen, während sich das elastische Element in der anderen Stellung frei bewegen kann, wodurch die Befestigungskralle (40) mit dem genannten Getriebebereich (32) in Berührung kommt;
- eine zweite Klinke (46), die ein abgerundetes Ende (48) und zwei mit dem Mitnahme-Getriebering (5) des Programmierblocks (6) in Kontakt stehende Zähne aufweist und von einer Feder (47) so verschoben wird, daß der Programmierblock (6) - nach jedem Schritt vorwärts - genau ausgerichtet wird; wobei alle diese Zeitschalt- und Betätigungselemente kombiniert zusammenwirken, um ein Vielfaches der Dauer der Stillstandzeiten beider, der Drehzeit des schnellen Blocks (1) und der fraktionierten Dauer zu erhalten.
2. Schrittweises Zeitschalt-Antriebssystem, nach Anspruch 1 dadurch gekennzeichnet, daß das Blockierelement (9) ein abgerundetes freies Ende (8) besitzt, das mit einer Aussparung am freien Ende (7) der Antriebssperklinke (3) so in Kontakt steht, daß letztere vom Getriebering (5) getrennt ist, während eine Schraubenfeder (10) beide in Richtung zu diesem Kontakt schiebt, und daß am anderen Ende außerdem eine Wulst (11) vorgesehen ist, die dem erwähnten Profil (12) des freien Endes des Trennhebels (13) folgt.
 3. Schrittweises Zeitschalt-Antriebssystem, nach Anspruch 1 dadurch gekennzeichnet, daß die die Rückstellung verhindernde Klinke (27) am elastischen Element (36) eine Sonde (35) aufweist, die durch einen Umfangsvorsprung (34) auf die genannte aussermittige Nocke (2) geschoben wird und das Ende (51) des elastischen Elements (36) in der Weise freigibt, daß die Befestigungskralle (4) nicht mehr in einer Ebene mit der ausgesparten Fläche (312) des Wahlhebels (25) liegt und auf eine rampenförmige Fläche (41) der Befestigungsverzahnung (32) fällt, wodurch die Stellung der Zeitschaltnocke (26) verändert wird.
 4. Schrittweises Zeitschalt-Antriebssystem, nach Anspruch 1 dadurch gekennzeichnet, daß der zweite Schenkel der die Rückstellung verhindernden Klinke (27) von einer Fläche (49) umgeben ist, gegen welche die Stellklinke (46) in der Weise drückt, daß sich die Zeitschaltnocke (26) von der Krallen (40) der die Rückstellung verhindernden Klinke (27) entfernt hält.
 5. Schrittweises Zeitschalt-Antriebssystem, nach Anspruch 1 dadurch gekennzeichnet, daß der

wahlhebel (25) neben der Sonde (28) einen Stab (56) aufweist, der die Ruhestellung der von der Feder (55) verschobenen Zeitschaltnocke (26) bestimmt.

6. Schrittweises Zeitschalt-Antriebssystem, nach Anspruch 1 dadurch gekennzeichnet, daß die Antriebssperklinke (3) zwischen der Drehachse und der Mitnahmekralle (4) einen Hohlraum (52) aufweist, dessen internes Profil mit einem an der Stützplatte (38) vorhandenen Bolzen (53) übereinstimmt, wodurch die Sperklinke dann, wenn sie zurückweicht, die Krallen (4) von den beiden Ringen der Mitnahmeverzahnung (5, 39) trennt und erneut nähert, sobald sie vorrückt.

Revendications

1. Système d'activation d'interrupteur temporisateur pas à pas pour des dispositifs de contrôle de programmes qui incorporent un bloc de cames de programmation (6) qui avance pas à pas, un bloc de cames rapides (1) qui tourne à une vitesse uniforme, dont la période est la temporisation de base ou l'intervalle d'arrêt des cames de programmation, un engrenage à anneau d'entraînement (5) fixé au bloc de cames de programmation qui avance à l'aide d'un cliquet d'actionnement (3) qui a une encoche (4) qui se met en contact avec l'engrenage à anneau (5) et auquel il assigne un mouvement uniforme de va-et-vient d'une certaine période, à l'inclusion du système d'interrupteur temporisateur, des moyens temporisateurs (15, 16, 17, 18, 26, 28, 29) et des moyens d'activation (9, 10, 13, 25, 27, 33, 46, 55), qui sont tous deux montés sur une plaque support (38) pour disposer ainsi deux sous-systèmes temporisateurs et qui, en combinaison, peut produire une série d'intervalles d'arrêts de durées différentes, qui sont le résultat de la multiplication de cette période de rotation par deux nombres fractionnaires et deux nombres entiers, respectivement, en rapport avec les premier et deuxième sous-systèmes, ce dernier comprenant une came temporisatrice (26) qui comporte un engrenage de secteur d'entraînement (39) et un engrenage de secteur de fixation (32), entraîné également par cette encoche (4), avec un ressort hélicoïdal (55) qui le fait retourner à zéro, à chaque fois que le bloc de programmation (6) avance d'un pas, une fois commencé le temps établi au préalable, un levier sélecteur (25) qui comporte une sonde (28) qui suit une came de profil (29) au long de trois niveaux fixés aux cames de programmation, avec une extrémité libre (39) qui est placée sur le parcours de cette encoche (4), et un cliquet anti-retour (27), poussé par un ressort hé-

licoïdal (33) qui soutient la came temporisatrice (26) activé, caractérisé par

- un membre basculant de joint d'étanchéité (9) qui peut adopter deux positions, dans l'une desquelles on le place sur le parcours du cliquet d'actionnement (3) afin d'éviter le contact de l'encoche (4) avec l'engrenage à anneau (5) et se situant dans l'autre position séparée de ce parcours;
- un membre basculant de séparation (13) qui actionne le membre de joint d'étanchéité (9) et comporte deux sondes latérales (15, 16), dont chacune d'elles suit un profil de came interne (17, 18), dans les cames de programmation (6) et les cames rapides (1), respectivement, ce membre de séparation (13) ayant l'extrémité libre appropriée comme profil de came (12); l'un des deux profils internes de came mentionnés auparavant (17, 18) est un profil sélecteur (17) fixé au bloc de programmation (6) et l'autre un profil d'actionnement (18) fixé au bloc rapide (1), tous deux ayant trois niveaux qui, combinés, définissent trois positions de travail du membre de séparation (13);
- ce levier sélecteur (25) a la forme d'un "S" et une surface centrale réduite (31) pour éviter le déplacement du cliquet anti-retour (27) en direction de l'anneau d'engrenage (5), selon la position de la sonde (28) par rapport aux niveaux du profil (29);
- la came temporisatrice (26) a, à l'extrémité du secteur d'engrenage de fixation (32), une surface en forme de rampe (41), en angle par rapport au rayon, et une surface de poussée (43) qui agit, à la fin de la durée de l'intervalle d'arrêt, sur une protubérance (44) du levier sélecteur (25) qui déplace son extrémité libre (30) au-delà du parcours de l'encoche (4);
- le cliquet anti-retour (27) a deux bras basculants et une encoche de fixation (40) à l'un des coudes du cliquet, l'un des bras étant un membre élastique intégral (36) qui peut adopter deux positions de travail, dans l'une desquelles l'extrémité libre (51) se heurte à un saillant (37) de la plaque support (38) pour éloigner l'encoche (40) du secteur de l'engrenage de fixation (32) de la came temporisatrice (26), tandis que dans la deuxième position, le membre élastique bascule librement, mettant ainsi l'encoche de fixation (40) en contact avec ce secteur d'engrenage (32);
- un deuxième cliquet (46) a une extrémité arrondie (48) et deux dents en contact avec l'anneau d'engrenage d'entraînement (5) du bloc de programmation (6), alors qu'il est

poussé par un ressort (47) de manière à ce que le bloc de programmation (6) soit placé exactement après que l'on avance d'un pas;

- ces moyens de temporisation et d'activation travaillant d'une manière combinée pour obtenir des multiples de la durée de l'intervalle d'arrêt de tous deux, la période de révolution du bloc rapide (1) et ses durées fractionnaires.
2. Système d'activation d'interrupteur temporisateur pas à pas, selon la revendication 1, caractérisé par le fait que le membre de joint d'étanchéité (9) a une extrémité libre arrondie (8) en contact avec une réduction à l'extrémité libre (7) du cliquet d'actionnement (3), de manière à ce que ce dernier reste séparé de l'anneau d'engrenage (5), tandis qu'un ressort hélicoïdal (10) pousse les deux en direction de ce contact, et par le fait qu'il ait également un rebord (11) à l'autre extrémité qui suit le profil mentionné précédemment (12) de l'extrémité libre du levier de séparation (13).
3. Système d'activation d'interrupteur temporisateur pas à pas, selon la revendication 1, caractérisé par le fait que le cliquet anti-retour (27) ait, au membre élastique (36), une sonde (35) qui est poussée par un saillant périphérique (34) sur la came excentrique (2) mentionnée auparavant, en relâchant l'extrémité (51) du membre élastique (36), de manière à ce que l'encoche de fixation (40) ne soit plus au niveau de la surface réduite (31) du levier sélecteur (25) et tombe sur une surface en forme de rampe (41) du secteur d'engrenage de fixation (32), en changeant la position de la came temporisatrice (26).
4. Système d'activation d'interrupteur temporisateur pas à pas, selon la revendication 1, caractérisé par le fait que le deuxième bras du cliquet anti-retour (27) soit rabattu avec une surface (49) poussée par le cliquet de positionnement (46), de manière à ce que la came temporisatrice (26) soit séparée de l'encoche (40) du cliquet anti-retour (27).
5. Système d'activation d'interrupteur temporisateur pas à pas, selon la première revendication, caractérisé par le fait que le levier sélecteur (25) ait un montant (56) tout près de sa sonde (28) qui fixe la fixation de repos de la came temporisatrice (26) poussée par son ressort (55).
6. Système d'activation d'interrupteur temporisateur pas à pas, selon la première revendication, caractérisée par le fait que ce cliquet d'actionnement (3) ait, entre l'axe de rotation et l'encoche

d'entraînement (4), une aire creuse (52), dont le profil interne coïncide avec un pivot (53) qui se trouve sur la plaque support (38), de manière à ce qu'il sépare, lorsque le cliquet recule, l'encoche (4) des deux anneaux de l'engrenage d'entraînement (5, 39), en la rapprochant de nouveau dès qu'elle commence à se déplacer vers l'avant.

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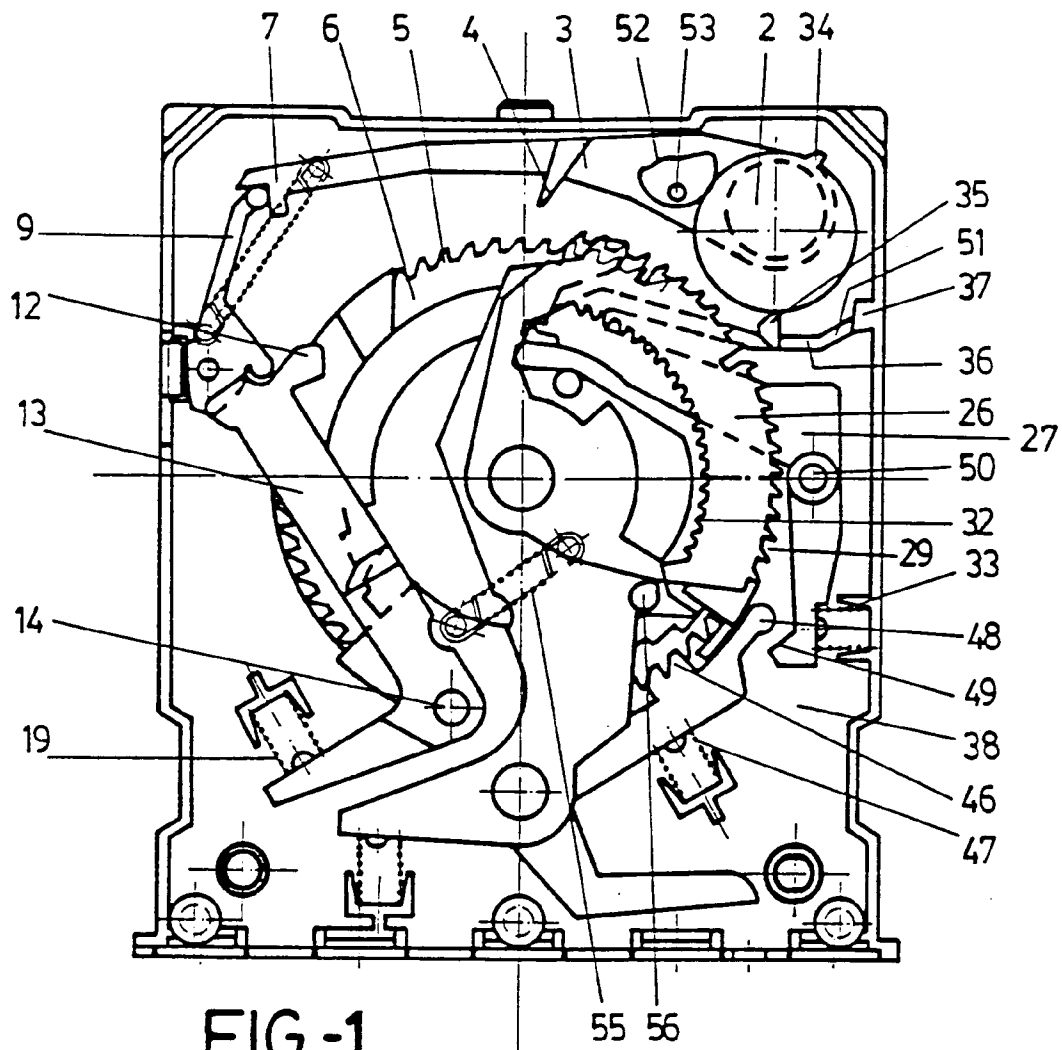


FIG.-1

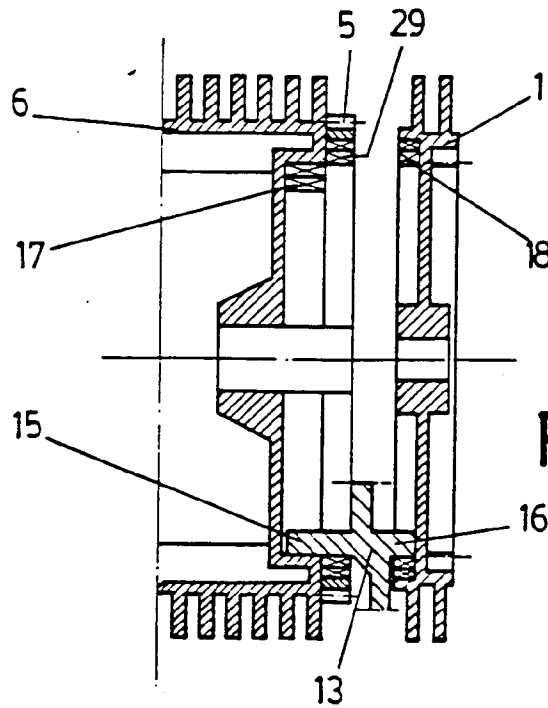


FIG.-2

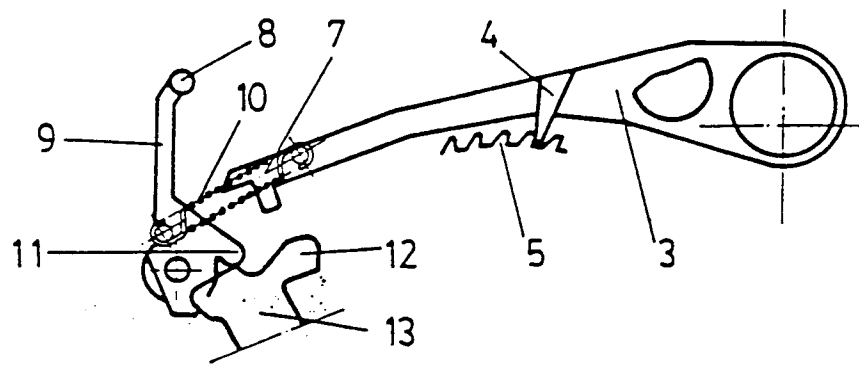


FIG.-3

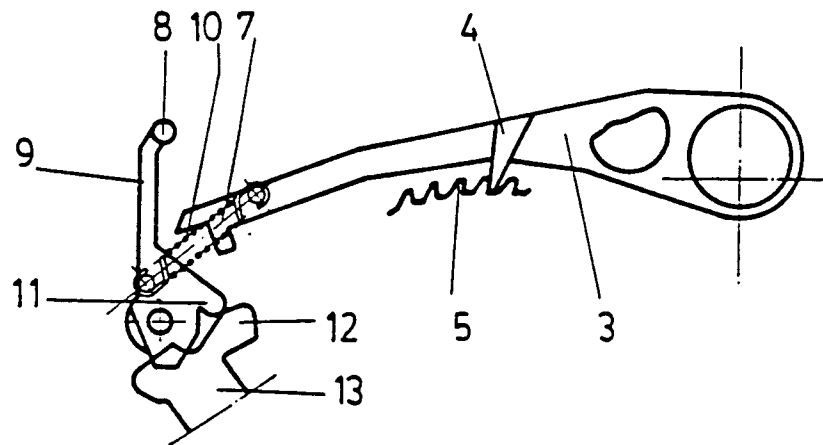
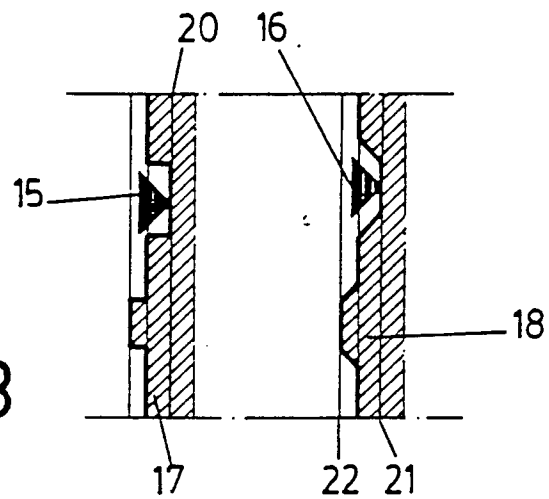
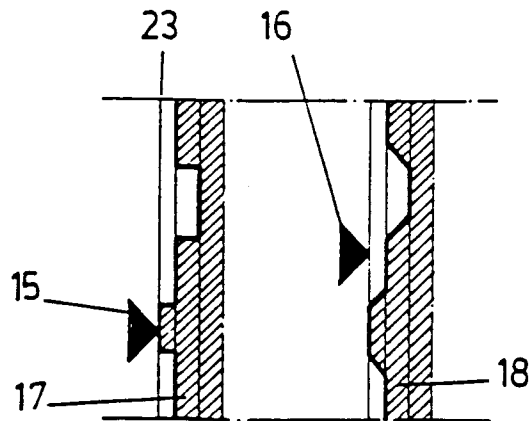
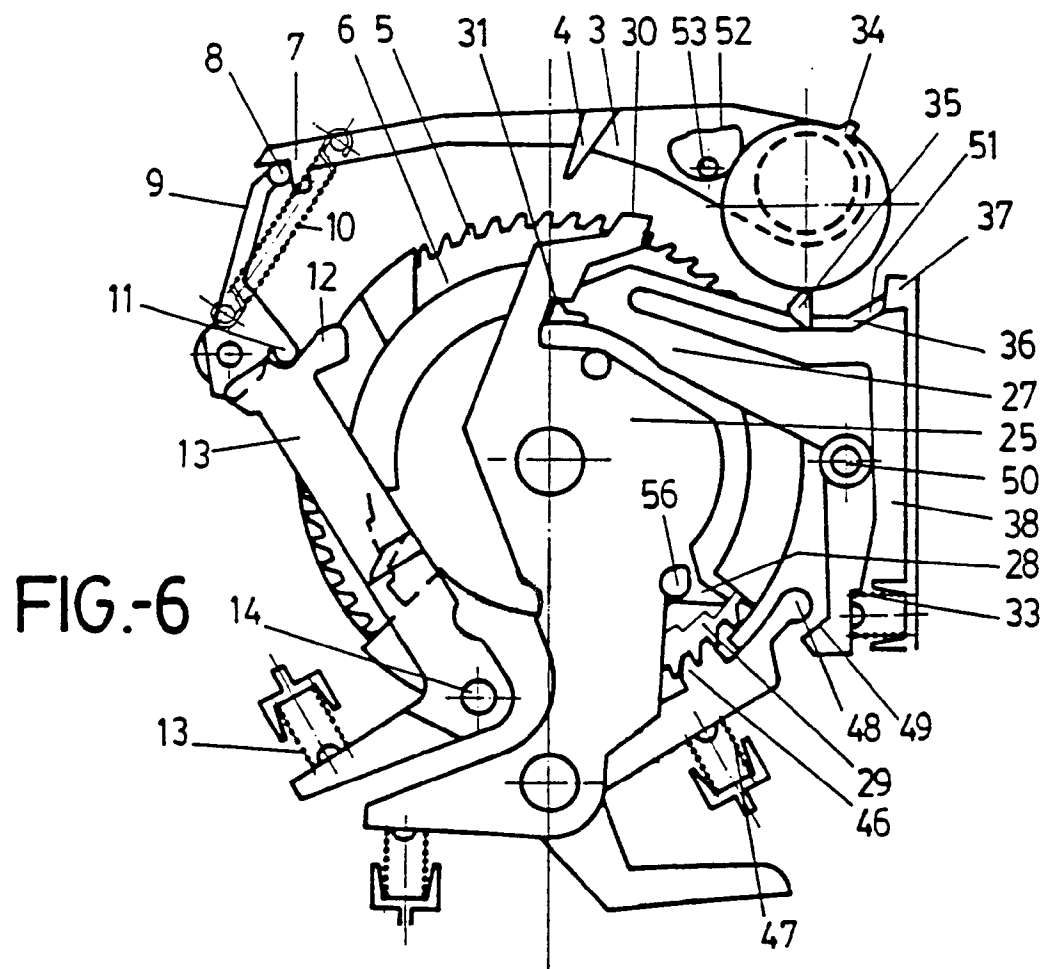
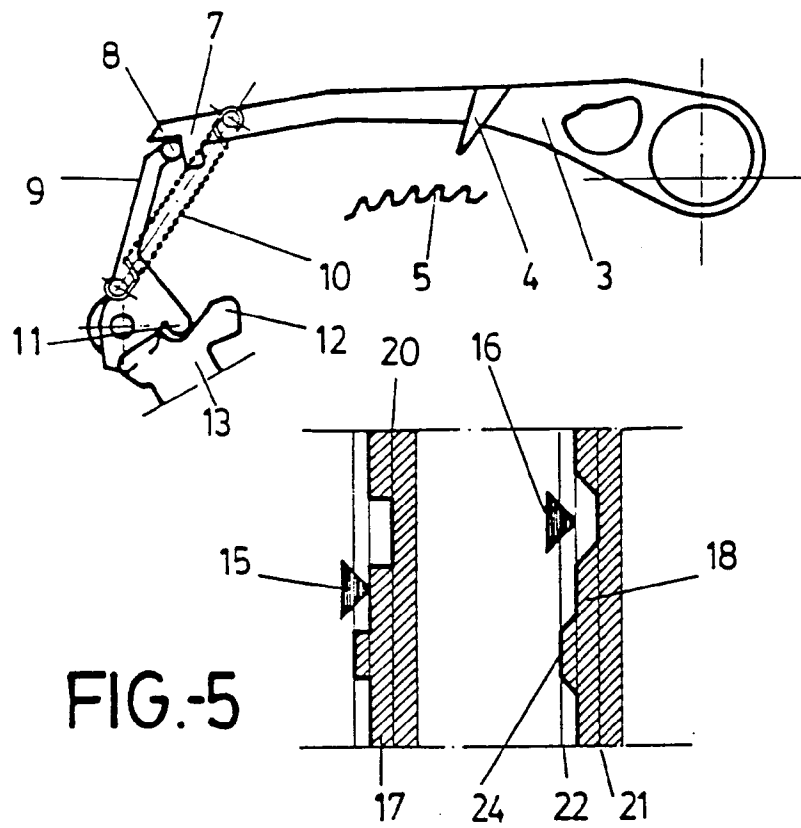


FIG.-4





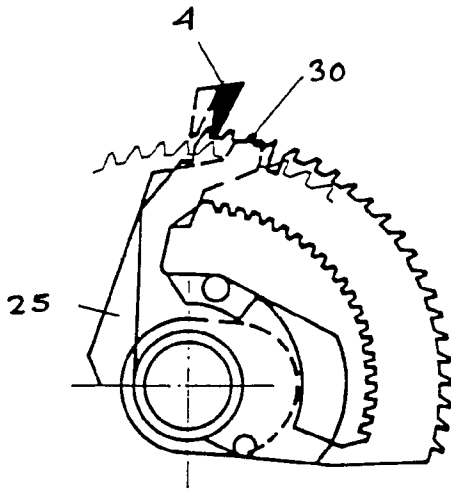


FIG.-10

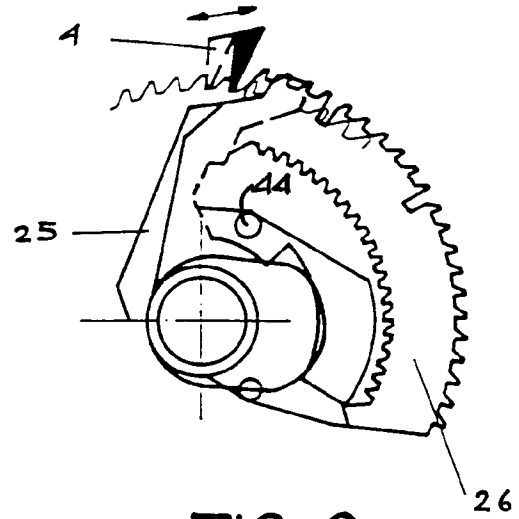


FIG.-8

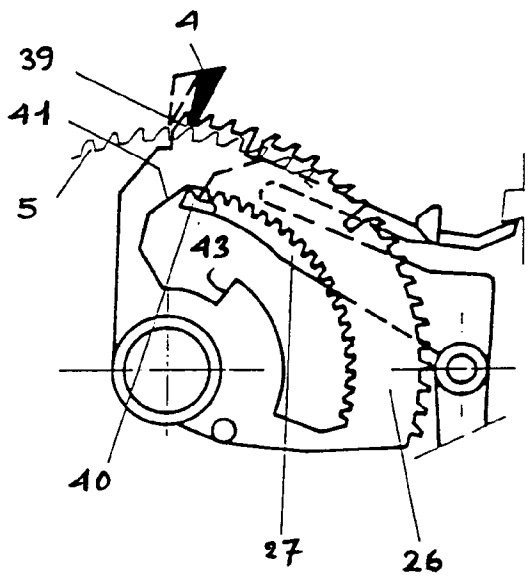


FIG.-9

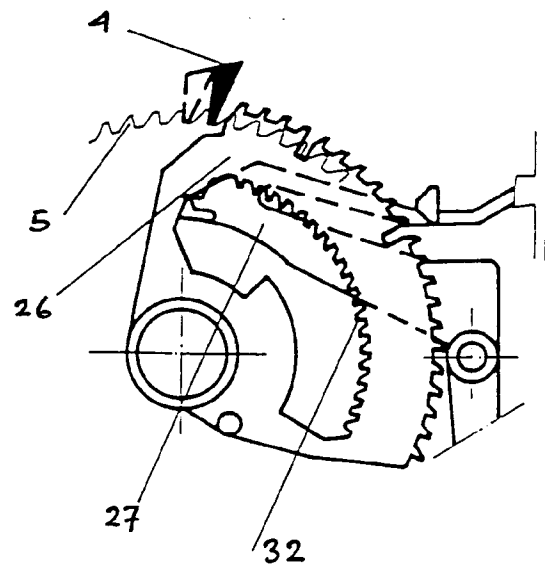


FIG.-7

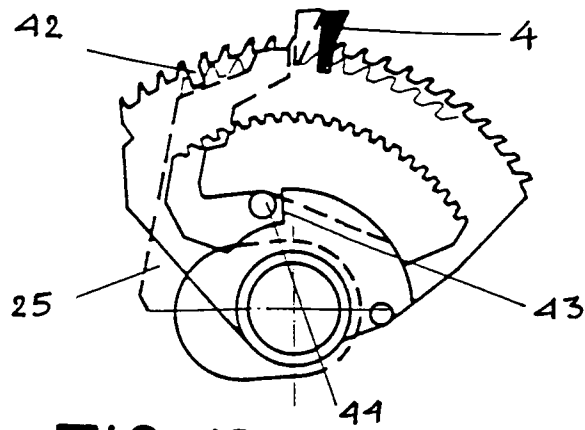


FIG.-13

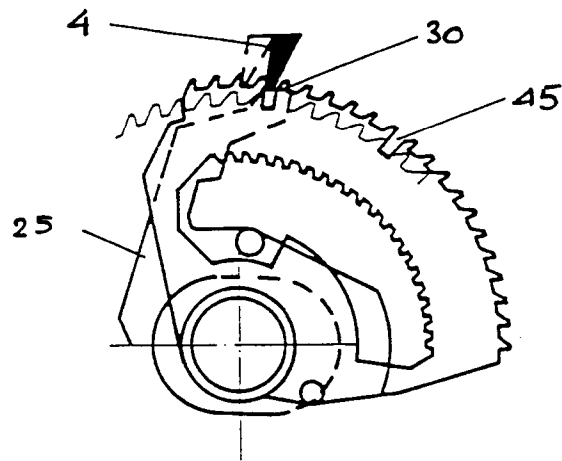


FIG.-12

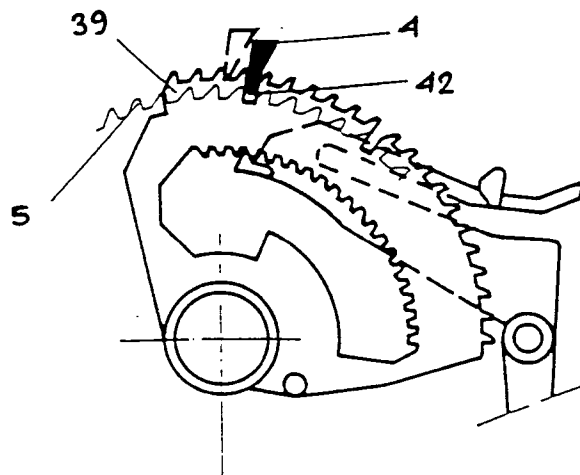


FIG.-11