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(54) **Actuating and temporising system for devices with a timer control.**

(57) The system is applicable to devices with two cam rests, a slow cam rest and a fast cam rest, provided with a temporising element, and centres its characteristics in the fact that the said temporising element 12, assembled on an oscillating lever 24 moves from the inactive position 13 to the active position 14 by means of the intervention of a selection lever 17 and a clutch 21 which swings about an axis 22 stiffened to the lever 17, whereas the opposite movement, the return movement to the inactive position, is determined by the change in position of the selection lever 17 dragging clutch 21 and which in turn releases the oscillating lever 24, or only by changing the position of the clutch 21.

This system, applicable to the field of the household appliances, considerably increases programming capacity.

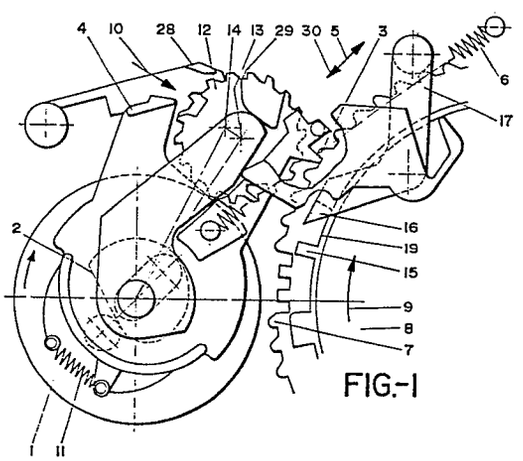

FIG.-I

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Description

ACTUATING AND TEMPORISING SYSTEM FOR DEVICES WITH A TIMER CONTROL

OBJECT OF THE INVENTION

The present invention relates to an actuating system for devices with a timer control constituted by a slow cam rest (timer cams) and, optionally, by a fast cam rest (inversion cams), where the slow cam rest is actuated stage by stage with sortable stop intervals of varying durations in accordance with previously established time sequences, and more specifically, those destined to control automatic clothes or dish washing machines, dryers and the like, whether the cam rests are shaped as a disc or as a drum.

The above types of machines have to be fitted with control devices having increasingly greater programming possibilities and as the temporising system is one of the aspects which condition such machines, there is a tendency to develop devices with a larger number of different stop intervals for the slow cam rest and at the same time the usual limitations of the application thereof are tried to be eliminated or reduced, so that the different stop intervals available may be freely selected for each stop position of the slow cam rest only in accordance with programming requirements.

BACKGROUND OF THE INVENTION

Many attempts have been made in this sense giving rise to very different types of actuating and temporising systems. Most of them are mechanical and are based on a single class of common elements: cogwheels, catches, excentric cams, retention and blocking elements, etc., and are characterized in their specific location and configuration of elements.

Spanish patent of invention 417,856 and certificate of addition 426,521 thereof refer to a device similar to the above-mentioned, where the stop intervals multiples of the basic interval are determined by throws of different amplitudes of a toothed temporising element having apertures of different depths inserted among its cogs, which temporising element may occupy at least two positions or heights roughly in the direction of a straight line passing through the turning centres of the slow cam rest and of the temporising element, in accordance with a programme carried by the slow cam rest, and the driving toothing of the latter may have at least two different heights, in a radial direction. This device therefore starts from a basic stop interval, which does not require the intervention of the temporising element, the other stop intervals being attained with its help by multiplying the basic stop interval, with the particularity that if the maximum throw of the temporising element is used up during a temporising or a series of successive temporisings, this will imply that a slow cam rest position to which a basic stop interval corresponds shall have to be adopted so that the temporising element may return to zero position, which constitutes a disadvantage since this implies a loss in programming capacity.

DESCRIPTION OF THE INVENTION

The present invention specifically tries to overcome the above disadvantage and consequently refers to a stage by stage actuating system of the slow cam rest, with stop intervals of varying durations which may be selected in accordance with previously established temporising sequences, for timer control, specifically for clothes or dish washing machines, dryers, or the like, irrespective of whether the cam rests are shaped as a disc or as a drum, and where the stop intervals multiples of the basic interval are determined by throws of different lengths of a toothed temporising element having apertures of different depths inserted among its cogs, which temporising element may occupy at least two positions or heights roughly in the direction of a straight line passing through the turning centres of the slow cam rest and of the temporising element, in accordance with a programme carried by the slow cam rest, and the driving toothing of the latter may have at least two different heights, in a radial direction, and it is possible to obtain as many consecutive stop intervals multiples of the basic interval as may be required, for the device allows the temporising element to return to zero when the slow cam rest moves one stage forward without having to go through a position to which a basic stop interval corresponds.

When the temporising element, which is preferably constituted in the shape of a wheel or a fraction thereof, is in a "rest" position, a first transport catch acts on the slow cam rest causing the same to move one stage forward (angular rotation fraction) upon the lapsing of each basic time interval. When the temporising element takes up an active position, a second transport catch causes such element to move forward stage by stage at the same time as it temporarily helps to keep the first catch away from the driving toothing of the slow cam rest, the latter remaining still for a time interval determined for each of its angular positions both by the shape of the temporising element and by the shape of the slow cam rest and which is equivalent to a whole multiple of the basic interval.

The stop intervals multiples of the basic interval may be attained if the temporising element starts to travel from a fixed starting point, to which it may return when the slow cam rest moves one stage forward, thereby generating "main" stop intervals, which are characterised in that any one of them may, together with the basic interval, be applied in any of the positions of the slow cam rest.

It is also possible for the temporising element not to return to point zero when, upon termination of one of these "main" temporisings, the slow cam rest moves one stage forward, the next temporising throw beginning from this new starting point, thereby generating stop intervals which we shall refer to as "auxilliary" because their duration may also be determined by the duration of the previously

applied interval.

The system which constitutes the object hereof allows a broad range of stop intervals to be attained without renouncing a simple construction implying a low cost together with the possibility of obtaining a high degree of reliability.

DESCRIPTION OF THE DRAWINGS

In order to complement the description being made and to assist a better understanding of the characteristics of the invention, a set of drawings is attached to the present specification wherein the following has been shown in an illustrative and non-limiting manner:

Figure 1 shows a basic temporising position where the temporising element is inactive.

Figure 2 corresponds to the instant when the temporising element has taken up an active position.

Figure 3 shows the device in a temporising phase.

Figure 4 corresponds to the system when the slow cam rest is about to move one stage forward and the catch acts on a "normal" cog of the driving toothing thereof.

Figure 5 refers to a position similar to the one shown in figure 4 but where the catch is at par with a "recessed" cog of the driving toothing of the slow cam rest and therefore does not act thereon.

Figure 6 indicates a position where the slow cam rest is about to pass and the catch acts on a "recessed" cog of the driving toothing thereof.

Figure 7 shows a position where the temporising element has returned to zero as the slow cam rest has moved one stage forward without going through a basic temporising position.

Figure 8 shows a different embodiment with the temporising element superposed to the slow cam rest.

Figures 9 and 10 show two working positions of another embodiment of the system shown in figures 1 to 7.

PREFERRED EMBODIMENT OF THE INVENTION

Operation of one of the versions of the system in which the temporising element is constituted by a cogwheel positioned at one side of the slow cam rest is described in detail and reference is made to a different embodiment of such system, and to a third version in which the temporising element, also shaped as a cogwheel, is superposed to the slow cam rest in the direction of its turning axis. All of this is not limitative, because, for example, the temporising element may adopt other shapes such as part of a cogwheel, etc.

In Figure 1, a cogwheel 1 is actuated with a continuous movement, in a known manner, by a motor and a transmission which are not shown. In certain versions, said cogwheel 1 may form part of a fast cam rest (inversion cams) generally used for the control of repetitive sequences, driving a load cam 2 with it.

Each time that said load cam 2, shown by the dotted line, turns following the rotation of wheel 1, first and second transport catches 3 and 4 move forwards and backwards in the direction indicated by arrows 5, such forward movement being encouraged by a spring 6. Instead of a simple load cam 2, as the one shown in the figures, other multiple type cams could be used, with more than one turning actuating or any other known mechanism, such as for example an excentric wheel, in order to provide catches 3 and 4 with their to and fro motion.

When the temporising system is in a rest position, the first transport catch 3 acts, whenever it makes a to and fro movement, or in other words, whenever a basic stop interval elapses, on the toothing 7 stiffened to the slow cam rest 8, causing it to move one stage forward in the direction of the arrow 9.

The first and second transport catches 3 and 4, which may be operatively related to each other, or, as shown in the figures, be formed as a single part, are resiliently attracted in the direction of the arrow 10, figure 1, by the spring 11.

The temporising mechanism is activated when, upon the one stage forward movement (which distance is equivalent to the angular space between two consecutive cogs of toothing 7), of the slow cam rest 8, the turning centre of slow cam rest 8, the turning centre of the temporising wheel 12, moves from the inactive position 13, to the position 14, figure 2. The position of the turning centre of the temporising wheel 12 changes upon actuation of the cam profile 15 stiffened to slow cam rest 8 on the feeler 16 of the selection lever 17 which pivots on the turning axis 18 causing the feeler 16 to move from a "low" position 19 to a "high" position 20. The movement of the lever 17 is transmitted to clutch 21, which is in turn rotatingly assembled on an axis 22 stiffened to lever 17 so that the end 23 of the said clutch 21, resting on selection lever 17, pushes an oscillating lever 24 assembled with freedom of rotation on the cogwheel shaft 25. The turning axis 13/14 of the temporising wheel 12 is firmly coupled to oscillating lever 24 abutment means, which are not shown, being provided between the axis and the temporising wheel 12 defining a starting point or "zero" position for temporising wheel 12, as well as resilient means, such as a spiral spring, which are not shown either, permanently attracting time wheel 12 towards the starting point abutment, against the direction indicated by the arrow 26 of figure 2.

When the turning centre of the temporising wheel moves from position 13 to 14, the second transport catch 4 becomes related to the temporising wheel 12 penetrating into a hole 27 thereof in order to allow the first transport catch 3 to continue to be in contact with the driving toothing 7 of slow cam rest 8 during the distance travelled by the stage. At the same time, a no return pawl 28 comes in contact with a peripheral toothing 29 of temporising wheel 12, and becomes resiliently related therewith so as to allow it to move forward in the direction of arrow 26 and avoid its returning. The no return pawl 28 is comprised by a single part, held in a fixed position by an appendix 44, figure 4, and provided with a resilient area 45 for its operation.

When catches 3 and 4 move backwards in the

direction of arrow 30, figure 1, the inclined surface 31, figure 2, of the second transport catch 4 acts as a slope and, resting on cog 32 of temporising wheel 12, causes the second transport catch to move from the level 33 in which it occupies on temporising wheel 12 in figure 2 to level 34 shown in figure 3, dragging the first transport catch 3 in order to separate it from driving toothing 7 of slow cam rest 8.

In the consecutive to and fro movements of transport catches 3 and 4, figure 3, the second catch 4, which is in contact with peripheral toothing 29 of temporising wheel 12, causes the latter to move forward stage by stage at the same time as it helps to keep the first transport catch 3 away from driving toothing 7 of slow cam rest 8, which remains motionless.

When the second transport catch 4 reaches a medium depth aperture 35, figure 4, of temporising wheel 12, it allows the first transport catch 3 to come in contact with driving toothing 7 of slow cam rest 8, causing the same to move one stage forward. In the event that a low profile cog 36, of driving toothing 7, were to correspond to the forward movement position described of the temporising wheel 12, as indicated in figure 5, the temporising wheel 12 would continue to move forward without the slow cam rest 8 moving forward until the deepest aperture 37 were reached, figure 6, which would allow the first transport catch to come in contact with the low profile toothing 36.

When slow cam rest 8 moves one stage forward, once the temporising device has been activated, it is possible to continue in three different ways:

1. - If slow cam rest 8 moves one stage forward when the second transport catch 4 reaches a medium depth aperture 35, figure 4, of temporising wheel 12 and feeler 16 of selection lever 17 remains in the higher area 20 of the cam profile 15 (does not fall and continues temporising).

In this case temporising wheel 12 does not return to zero position and continues to move forward stage by stage until the second transport catch 4 finds a medium depth aperture 35 or a deep aperture 37, figure 6, which may allow the first transport catch to reach toothing 7 of the slow cam rest.

2. - When the second transport catch 4 reaches a medium depth aperture 35, figure 4, or a deep aperture 37, figure 6 of time wheel 12, the slow cam rest 8 moves one stage forward, and feeler 16 of selection lever 17 falls to the lower area 19 of figure 1, of the cam profile 15.

The turning centre of temporising wheel 12 falls from position 14 to 13, figure 1, the no return pawl 28 and the second transport catch 4 move away from the peripheral toothing 29 of the temporising wheel, and the latter returns to its starting point due to the effect of a previously mentioned resilient spring which is not shown.

The temporising interval elapsing until slow cam rest 8 moves forward another stage is the basic interval.

3. - When the second transport catch 4 reaches a medium depth aperture 35, figure 4, of temporising wheel 12 slow cam rest 8 moves one stage forward and feeler 16 of selection lever 17 remains in the higher area 20 of the cam profile 15 stiffened to slow cam rest 8, but the internal cam profile 38, figure 7, acts on the feeler 39 of the clutch 21 which pivots on axis 22 and releases oscillating lever 24, allowing the centre of the temporising wheel 12 to move to the inactive position 13 and return to the starting point of its temporising throw, as described in the previous point. When the transport catches 3 and 4 move backwards in the direction of arrows 30, a spline 40 stiffened to the first transport catch 3 pulls from a projection 41 of the clutch 21 causing the same to move backwards, so that the wall 42 thereof, acting as a slope, pushes the oscillating lever 24 such that the temporising system is once again activated as in figure 2 and is therefore ready for another stop interval multiple of the basic interval.

The clutch 21 has a resilient area 43, figure 7, so that if slow cam rest 8 is unduly actuated on by hand, the feeler 39 of clutch 21 may overcome the internal cam profile 38 without the system being impaired, the feeler and clutch forming a single part.

The turning centre of temporising wheel 12 moves from position 14 to position 13 without the help of specific means since both retention pawl 28 and the second transport catch 4, when acting on temporising wheel 12, generate a turning moment on the oscillating lever 24 in the suitable direction, having a sufficient magnitude to overcome the friction of the mechanism.

A pawl 46 which is resiliently applied against driving toothing 7 of slow cam rest 8, figure 6, ensures that the said cam rest is in a suitable position at all times.

In a second version, shown in figures 9 and 10, the clutch 21 is coupled by means of a continuous groove 47 on axis 22 stiffened to the selection lever 17, so that, in addition to pivoting about the said axis 22, it maybe displaced along groove 47. When the cam profile 38 acts on feeler 39 of clutch 21 it releases a projection 48, corresponding to the clutch, from a locking means 49 located in selection lever 17, and the said projection48 then slides along slope 50 of the selection lever 17, driven by the pushing force exerted thereon by oscillating lever 24, to a similar position to that shown in figure 10. Rearmament of the system takes place with the help of spline 40 stiffened to the first transport catch 3, as previously described.

In a third version, shown in figure 8, the temporising wheel 12 is superposed to cam rest 8 and is assembled on an oscillating lever 24 which is extended to an end 51 stiffened thereto, on which the clutch acts. The temporising wheel 12 is rotatingly assembled on a cylindrical area 52 of oscillating lever 24 and its centre may take up an active position 14 or an inactive position 13. A first transport catch 3, shown by the dotted line, is related to driving toothing 7 of slow cam rest 8 and a second transport catch 4 is related to toothing 29 of temporising wheel 12. There is also a retention pawl 28 for temporising wheel 12 which comes in contact

with the peripheral toothing thereof 29, only when its centre takes up the active position 14. The other elements, as well as the operation, are similar to the aforementioned description, which has therefore been omitted.

Claims

1. - Actuating and temporising system for devices with a timer control constituted by a slow cam rest (timer cam disc or drum) and optionally by a fast cam rest (inversion cam disc or drum), specifically for controlling automatic clothes or dish washing machines and the like, which are fitted with a toothed temporising element having apertures of varying depths inserted among its cogs, which temporising element and the cogs comprising the driving toothing of the slow cam rest may take up several positions or heights roughly in the direction to that of a straight line going through the turning centres of the slow cam rest and of the temporising element, depending on the specific angular position of the slow cam rest and in which actuation of the slow cam rest and of the temporising element takes place stage by stage by means of two transport catches which are operatively interrelated or constituted by a single part, characterised in that the position of the temporising element 12, the turning axis whereof 13/14 is assembled on the oscillating lever 24, moves from the inactive position 13 to the active position 14 by means of the intervention of a selection lever 17 and a clutch 21 assembled so that it may freely pivot on an axis 22 stiffened to the selection lever 17.

2. - Actuating and temporising system for devices with a timer control, in accordance with claim 1, characterised in that the return of the temporising element 12 to the inactive position 13 is determined either by the change in position of the selection lever 17 when going from level 20 to level 19 of the cam profile 15 stiffened to the slow cam rest 8, dragging clutch 21, which in turn releases oscillating lever 24 or by the change of position of the clutch 21 only, the oscillating lever also being released, in which case, the first transport catch 3, when moving backwards, in the direction of the arrow 30, engages with a spline 40, stiffened to catch 3, at the projection 41 of the clutch, dragging the latter and which, acting as a slope on the oscillating lever 24 once again places the temporising element 12 in its active position 14.

3. - Actuating and temporising system for devices with a timer control, in accordance with the previous claims, characterised in that the slow cam rest 8 is provided, stiffened thereto, with a cam profile 15 which acts on the selection lever 17 and another cam profile 38 which acts on the clutch 21.

4. - Actuating and temporising system for devices with a timer control, in accordance with previous claims, characterised in that the temporising element 12, which is positioned laterally with respect to the slow cam support 8 is in turn axially displaced with respect to the said slow cam rest, so that the catch 3 which acts on the slow cam rest 8 and is coplanar with the latter, is partially superposed to the said temporising element, at the same time as it acts thereon through its marginal area opposite the slow cam rest and through the transport catch 4.

5. - Actuating and temporising system for devices with a timer control, in accordance with claims 1 to 3, characterised in that the temporising element is superposed with the slow cam rest 8 in the direction of the turning axis thereof.

6. - Actuating and temporising system for devices with a timer control, in accordance with the previous claims, characterised in that the selection lever 17 is positioned so that it may freely pivot on a fixed turning axis 18, located in the opposite end of its cam feeler 16.

17. - Actuating and temporising system for devices with a timer control, in accordance with the previous claims, characterised in that the clutch 21 is positioned so that it may pivot on an axis 22 stiffened to the selection lever 17.

8. Actuating and temporising system for devices with a timer control, in accordance with the previous claim, characterised in that the clutch 21 is positioned so that it may pivot and move about an axis 22 stiffened to the selection lever, for which purpose it is fitted with a continuous aperture or groove 47.

9. - Actuating and temporising system for devices with a timer control, in accordance with the previous claims, characterised in that the free end of the clutch 21 opposite its cam feeler 39 rests on the selection lever 17 in order to accurately determine the active position 14 of the temporising element.

10. - Actuating and temporising system for devices with a timer control, in accordance with the previous claims, characterised in that the feeler 39 of the clutch 21 is joined to the body thereof by means of a resilient area 43, forming a single part.

11. - Actuating and temporising system for devices with a timer control, in accordance with the previous claims, characterised in that the retention pawl 28 of the time wheel 12 is constituted by a single fixed part, whereof the freedom of movement is exclusively provided by a resilient area.

12. - Actuating and temporising system for devices with a timer control, in accordance with the preceding claims, characterised in that the peripheral toothing and the toothing of the temporising element 12 are provided with apertures of varying depths in two superposed areas in the direction of the turning axis thereof.

13. - Actuating and temporising system for devices with a timer control, in accordance with the previous claim, characterised in that the temporising element is provided with only one toothing.

14. - Actuating and temporising system for devices with a timer control, in accordance with the previous claims, characterised in that the temporising element 12 is shaped as a wheel.

15. Actuating and temporising system for devices with a timer control, in accordance with the previous claims, characterised in that the temporising element 12 is constituted by a wheel fraction.

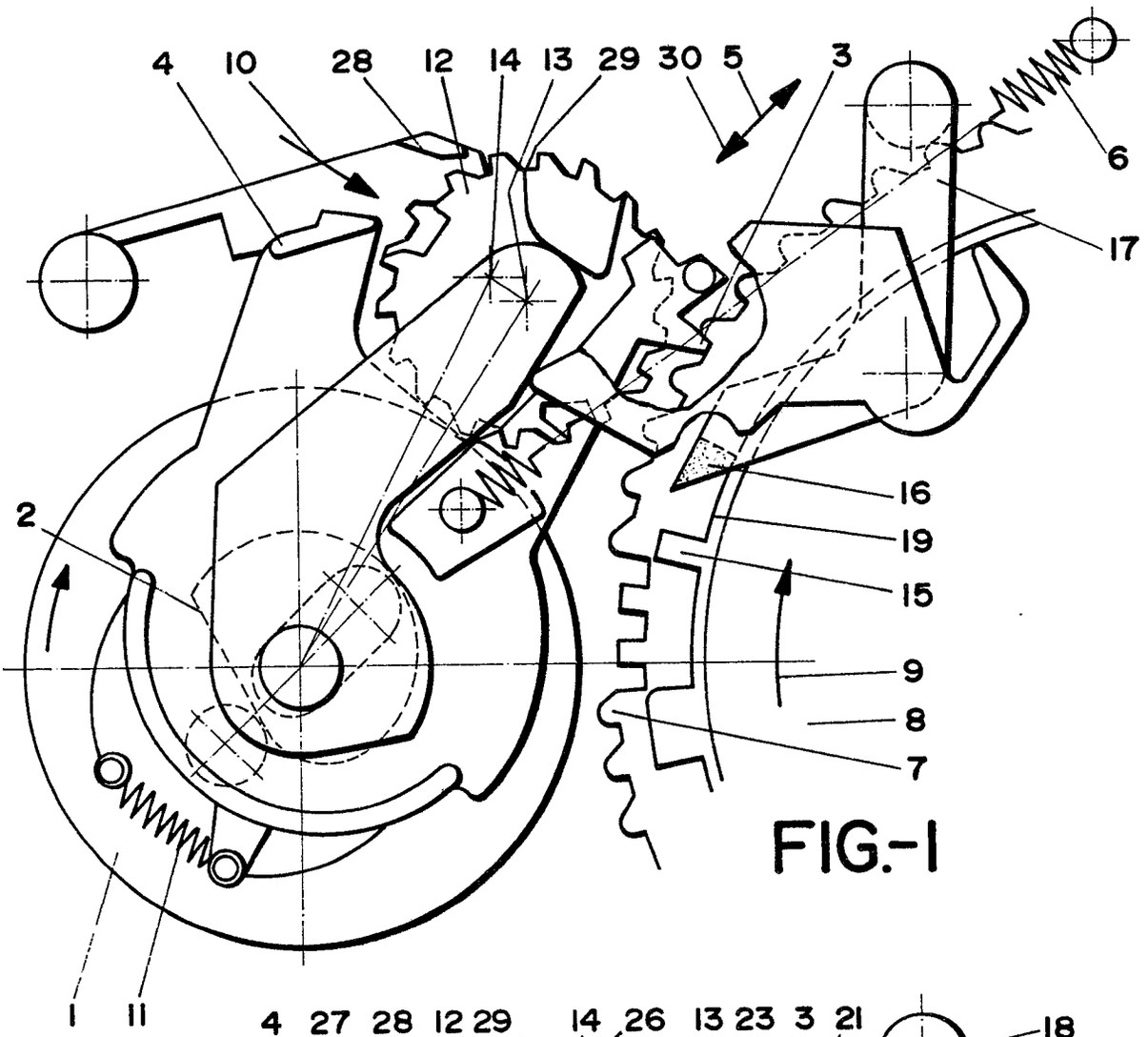
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FIG.-1

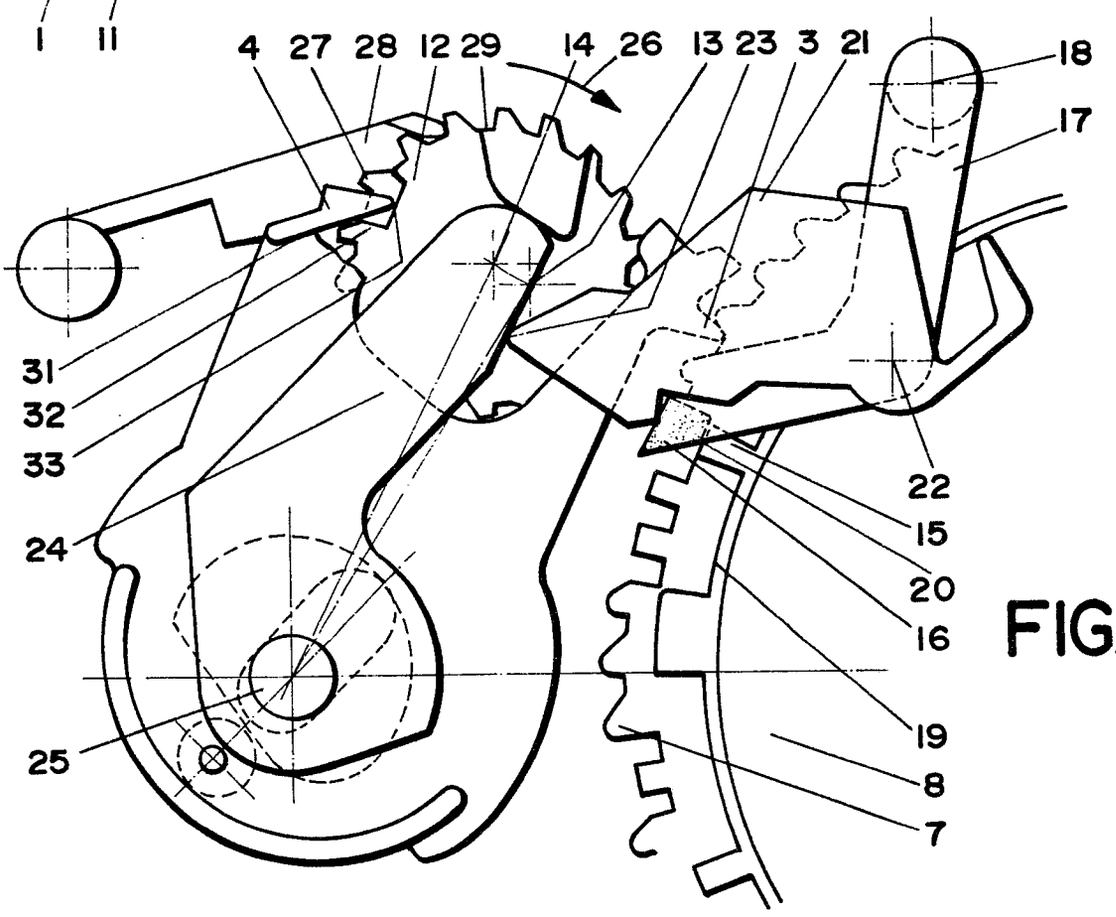
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FIG.-2

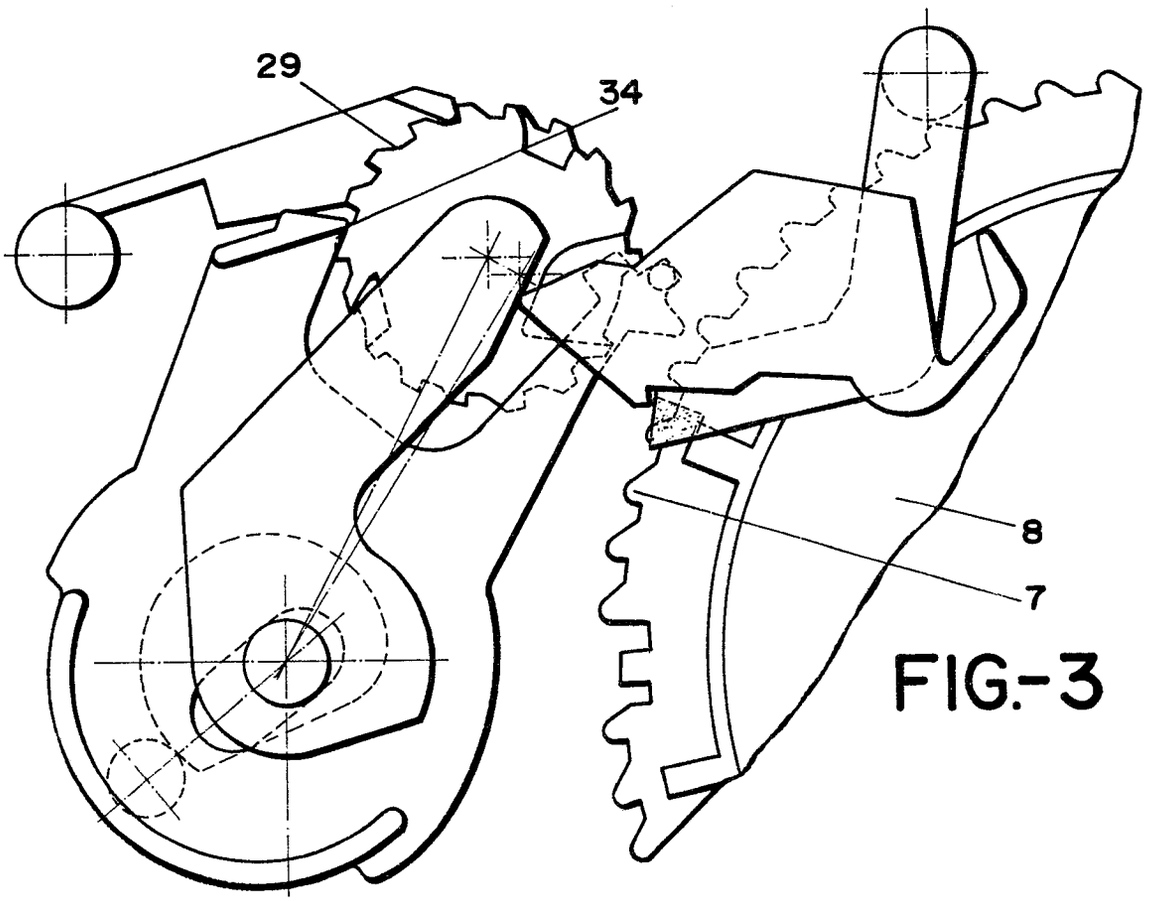

FIG.-3

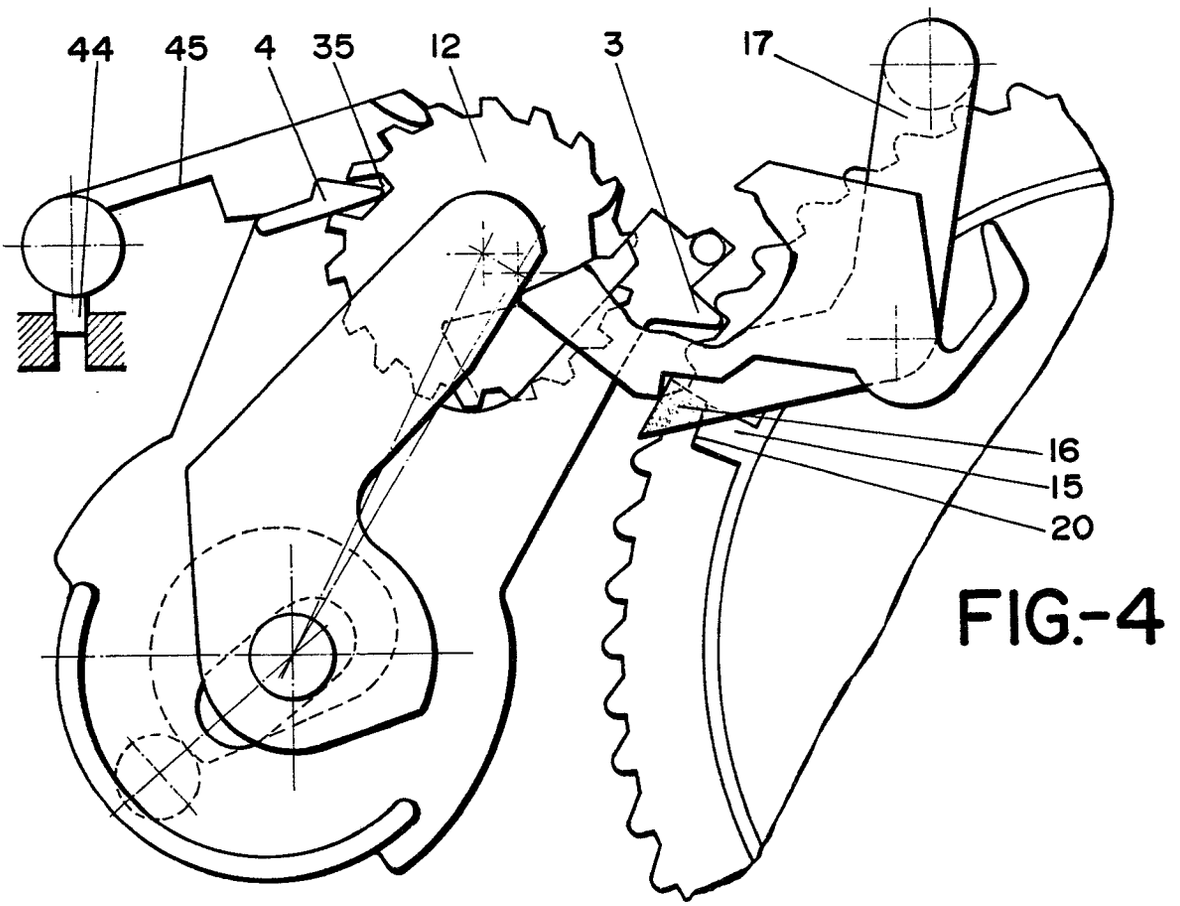

FIG.-4

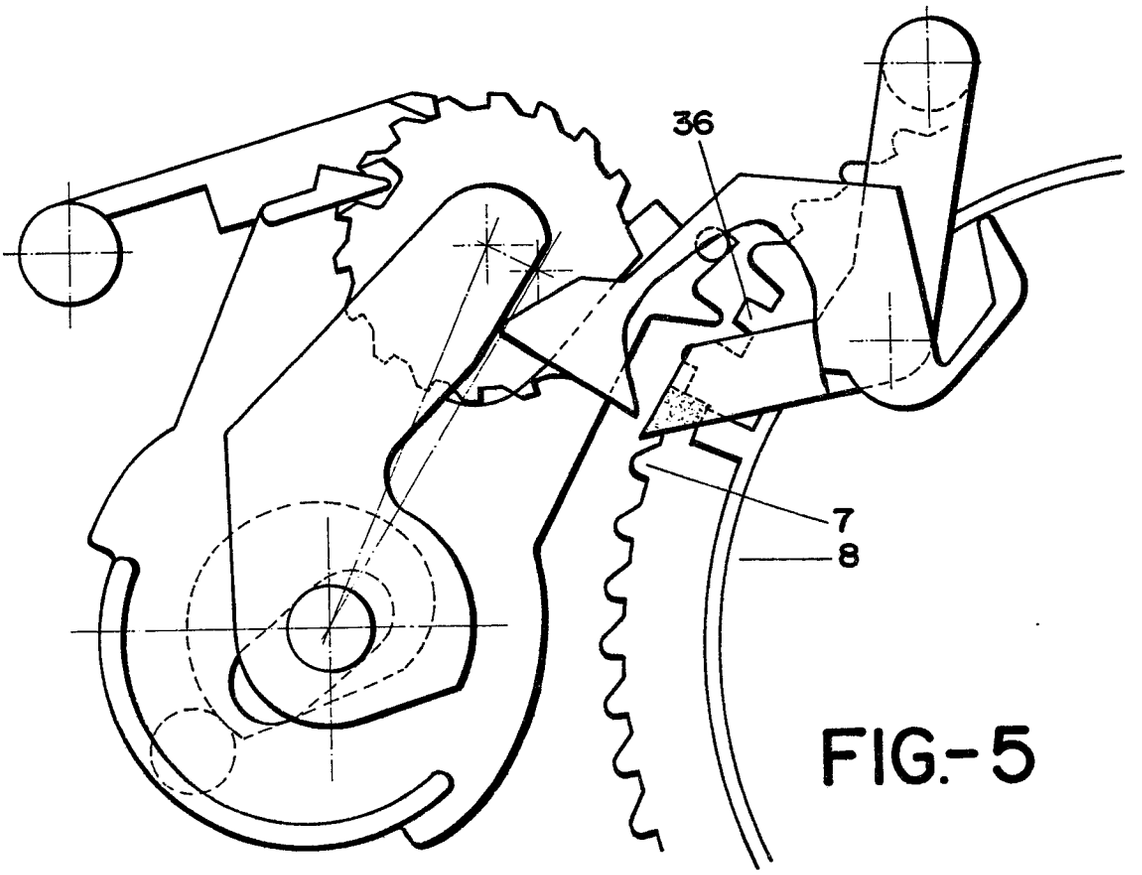

FIG.-5

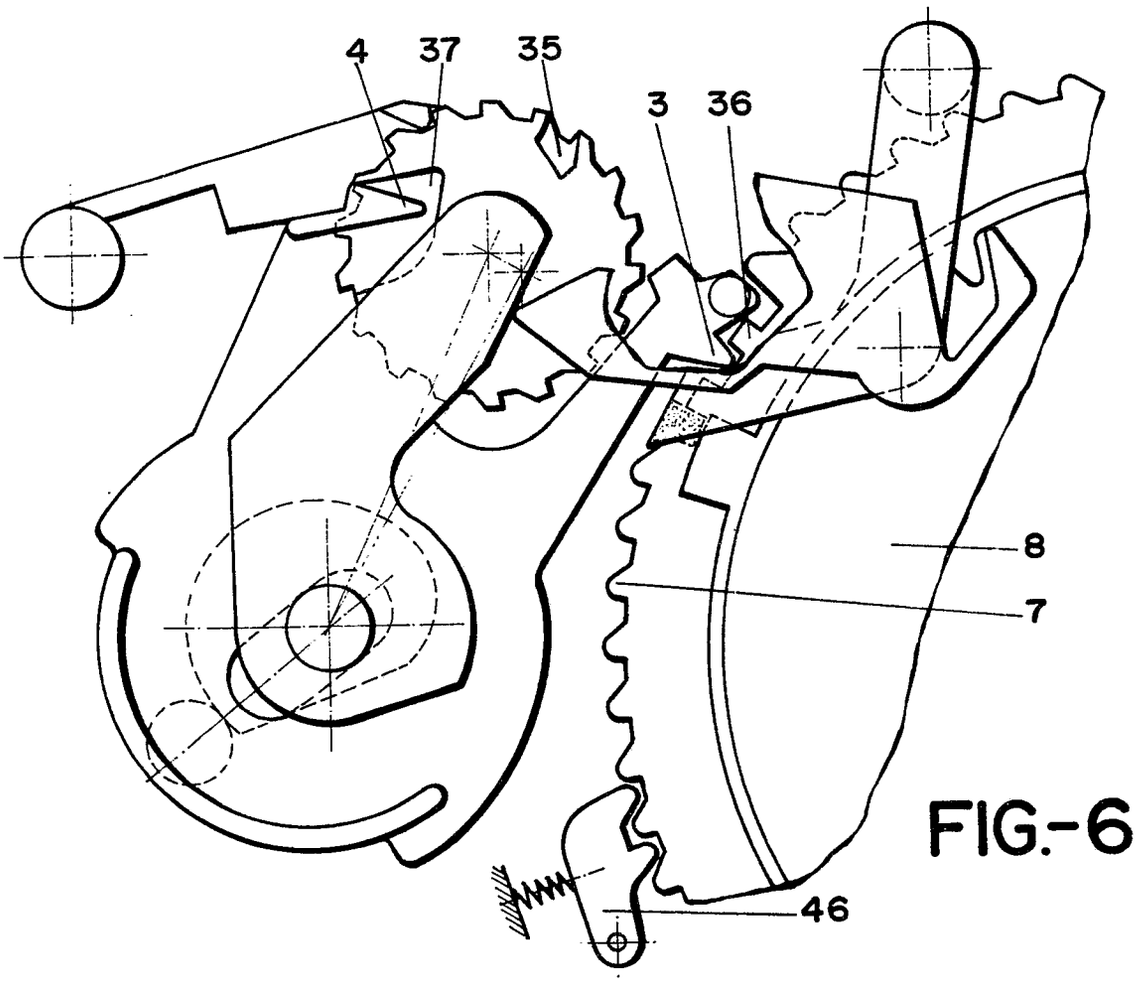

FIG.-6

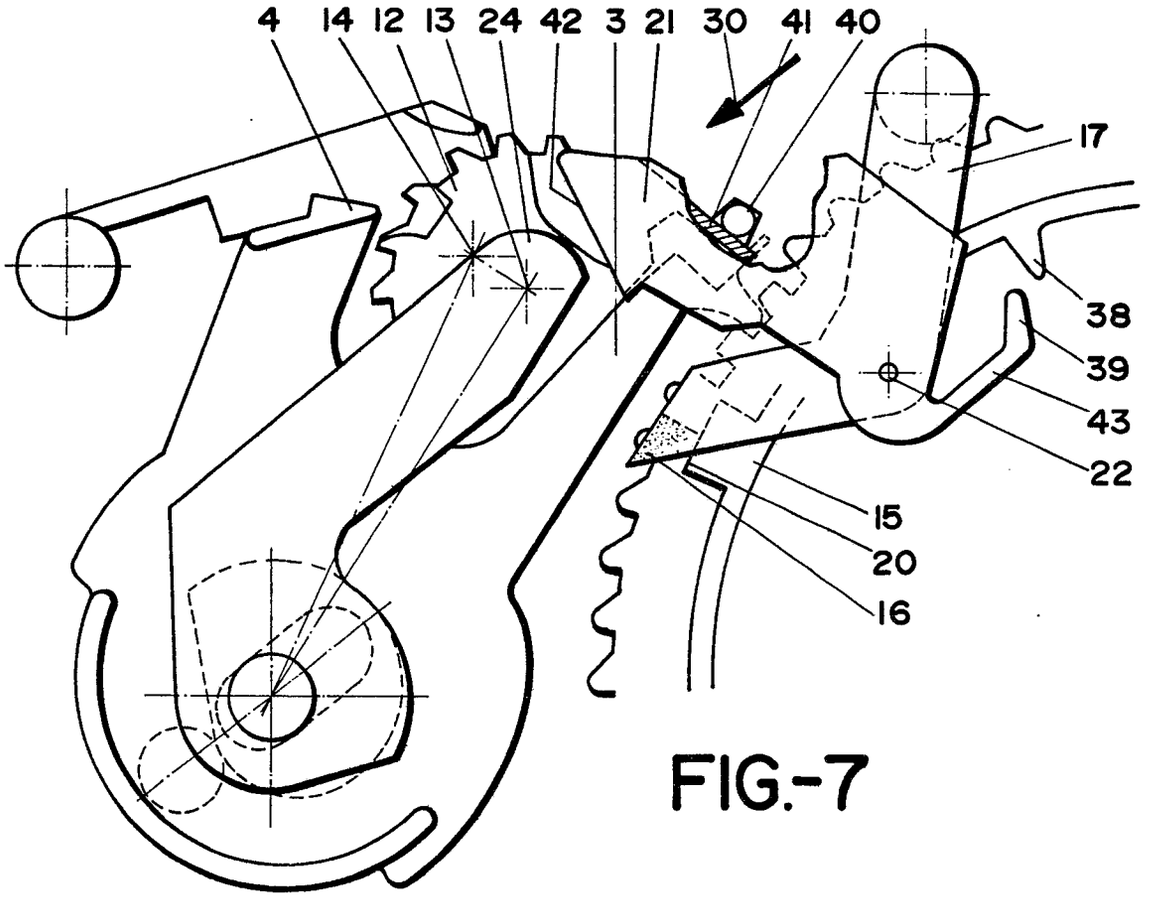
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FIG.-7

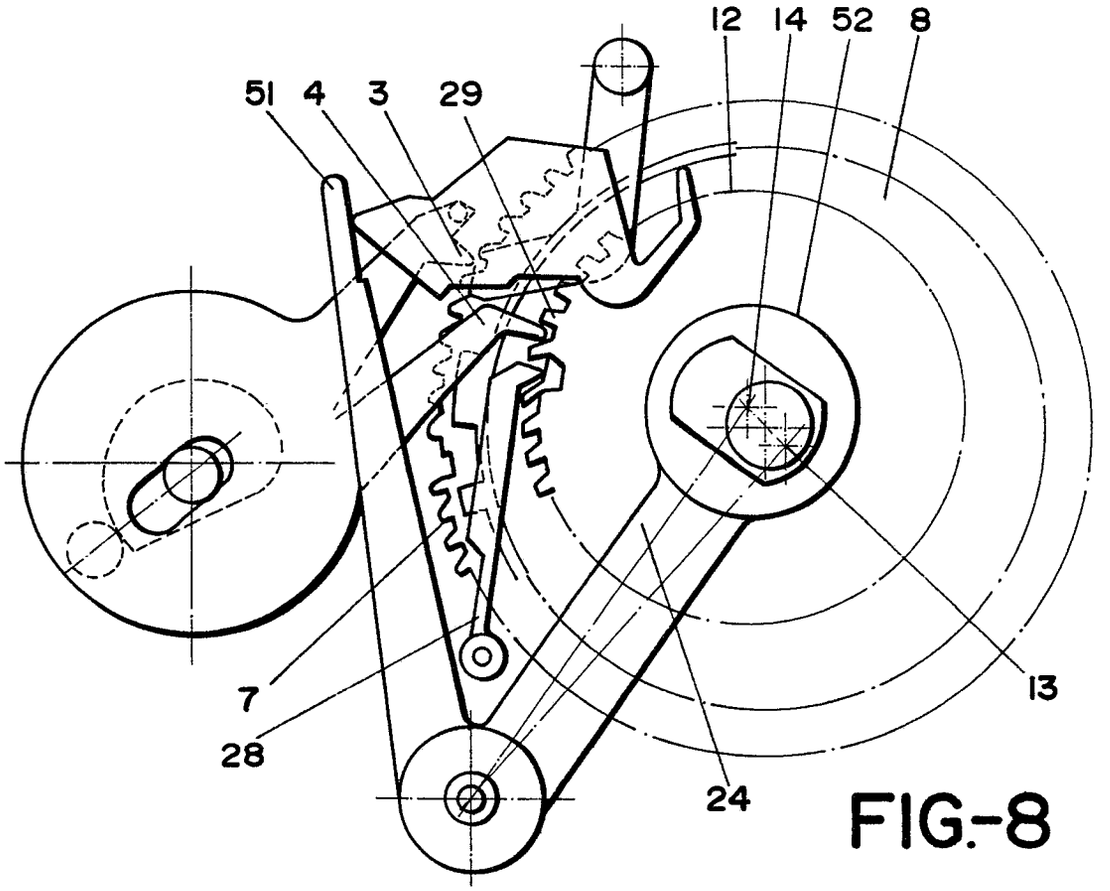
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FIG.-8

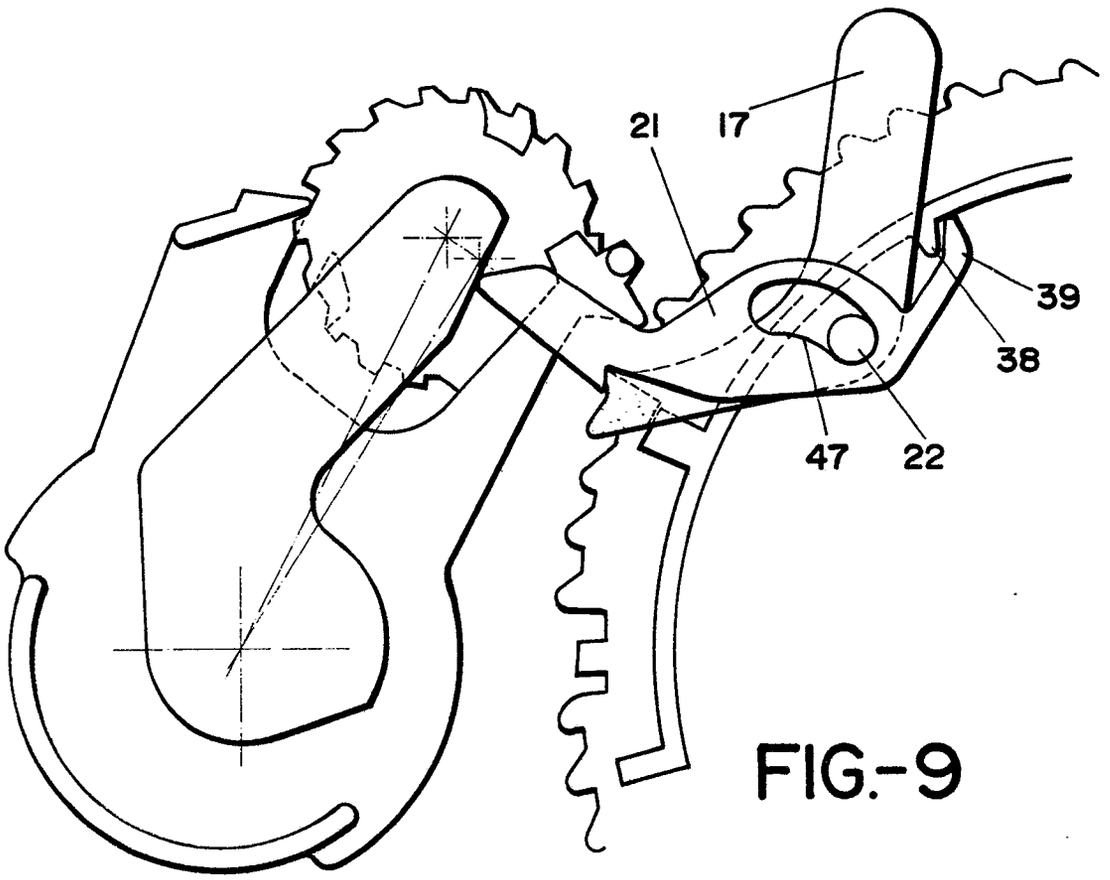

FIG.-9

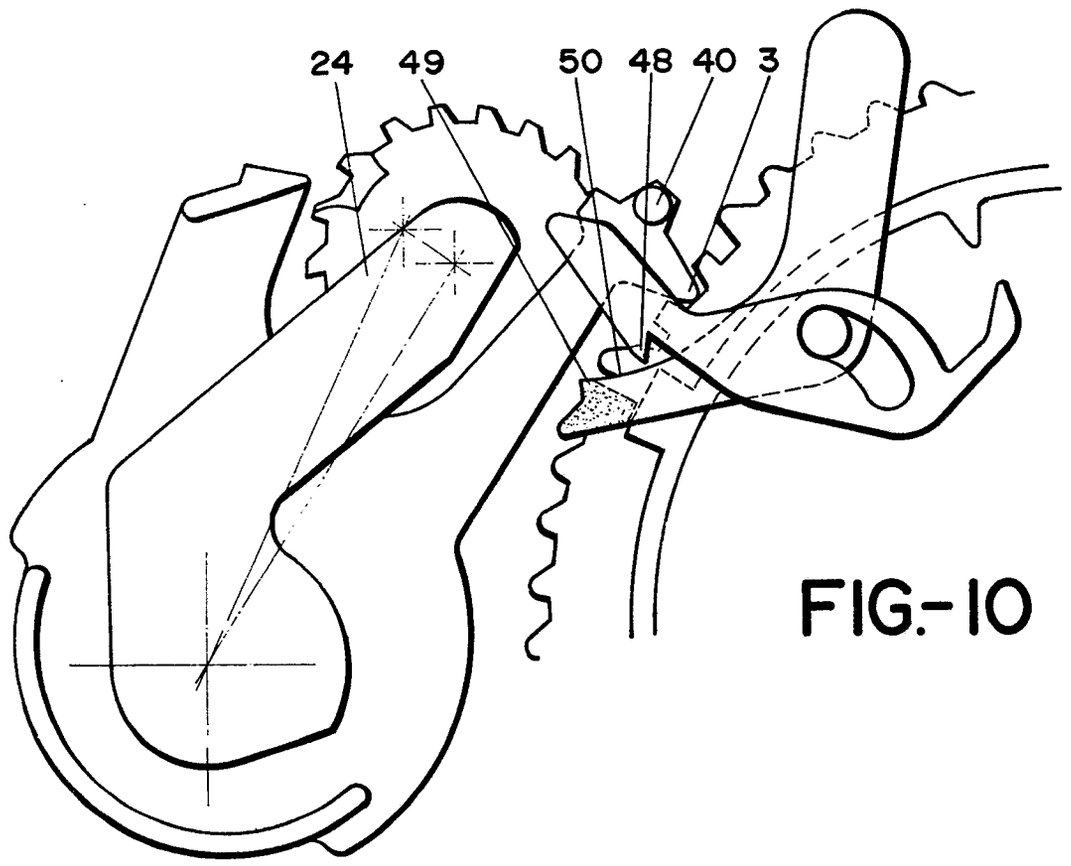

FIG.-10