

### [54] CONTINUOUS WIPE-OUT CLOCKS

[76] Inventor: **Ronald William Ebdon**, 70 Vectis Rd., Gosport, England

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[52] U.S. Cl. .... **58/127 R, 58/126 R**

[51] Int. Cl. .... **G04b 19/00**

[58] Field of Search..... 40/28 R, 28 A, 28 C, 53 R, 40/30, 51, 61 A, 62, 52 R, 53 R, 33 R, 68, 132; 58/7, 111, 116 R, 124, 46, 126 E, 126 R, 126 A, 127 R, 128, 125 R, 125 B, 125 C

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Primary Examiner—Richard B. Wilkinson

Assistant Examiner—U. Weldon

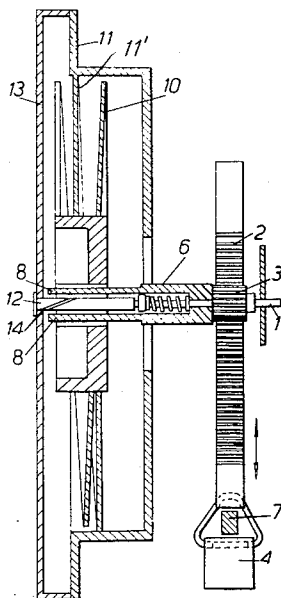
Attorney, Agent, or Firm—Molinare, Allegretti, Newitt & Witcoff

### [57] ABSTRACT

This invention relates to timing devices.

It is an aim of this invention to produce a timing device which provides a pictorial representation of the passage of time. This is achieved by defining a point in time by an interface between two adjacent surfaces of contrasting shades, and enabling this interface to move at a substantially constant speed which is related to the passage of time. The interface can thus "wipe out" the previously visible surface and replace it with another.

**10 Claims, 10 Drawing Figures**



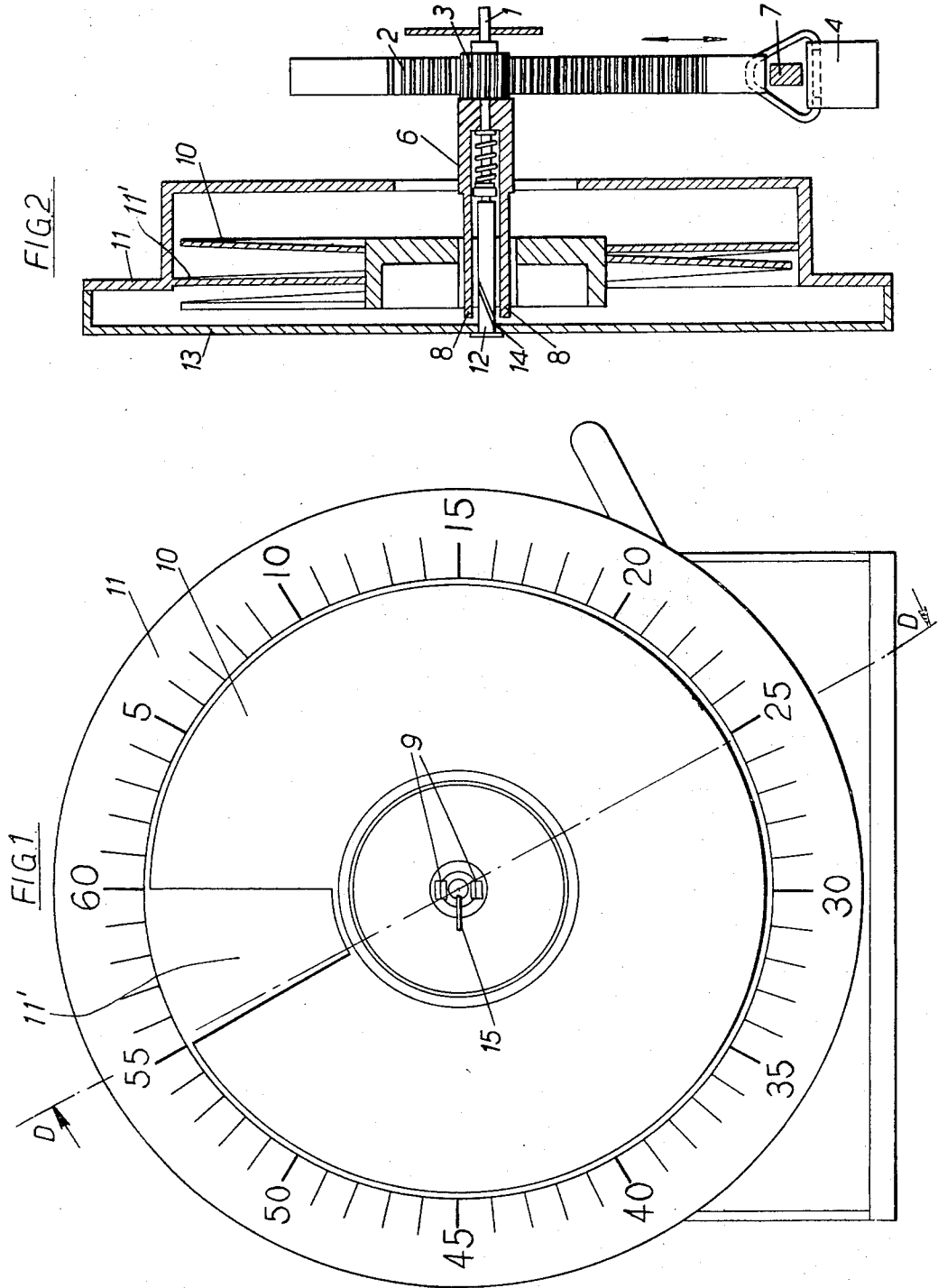


FIG 3

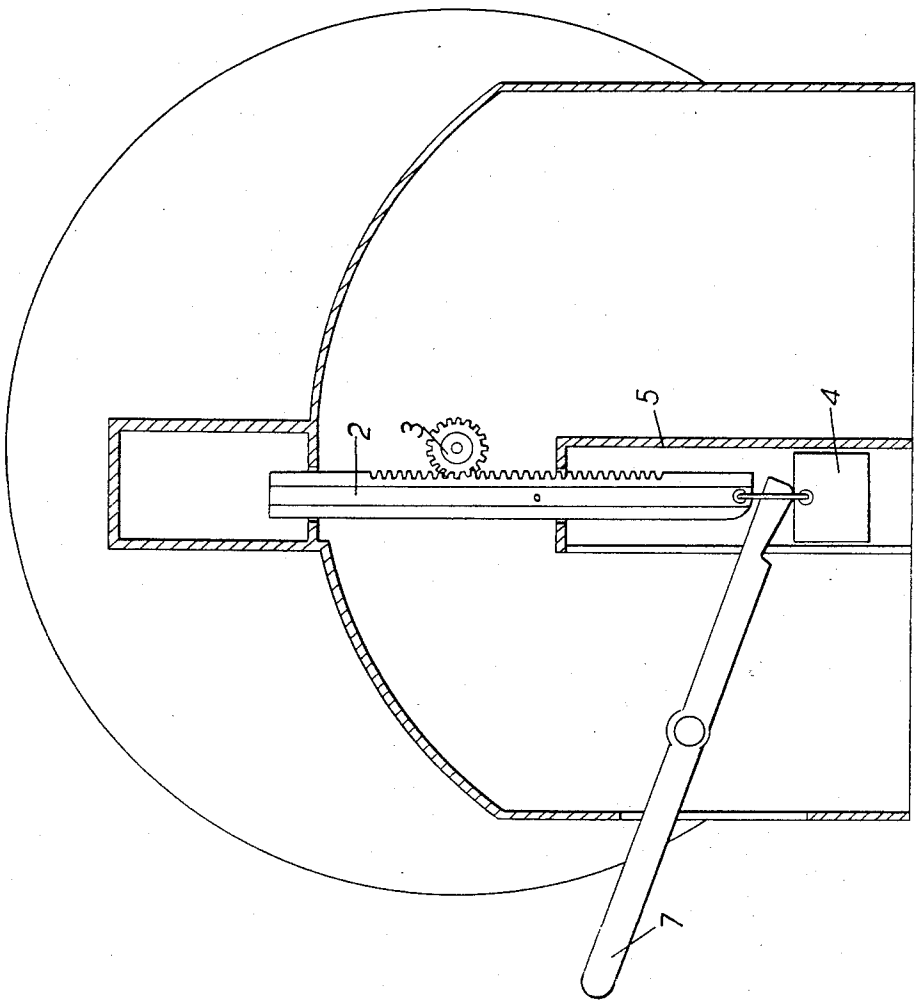
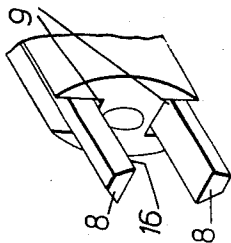


FIG 4



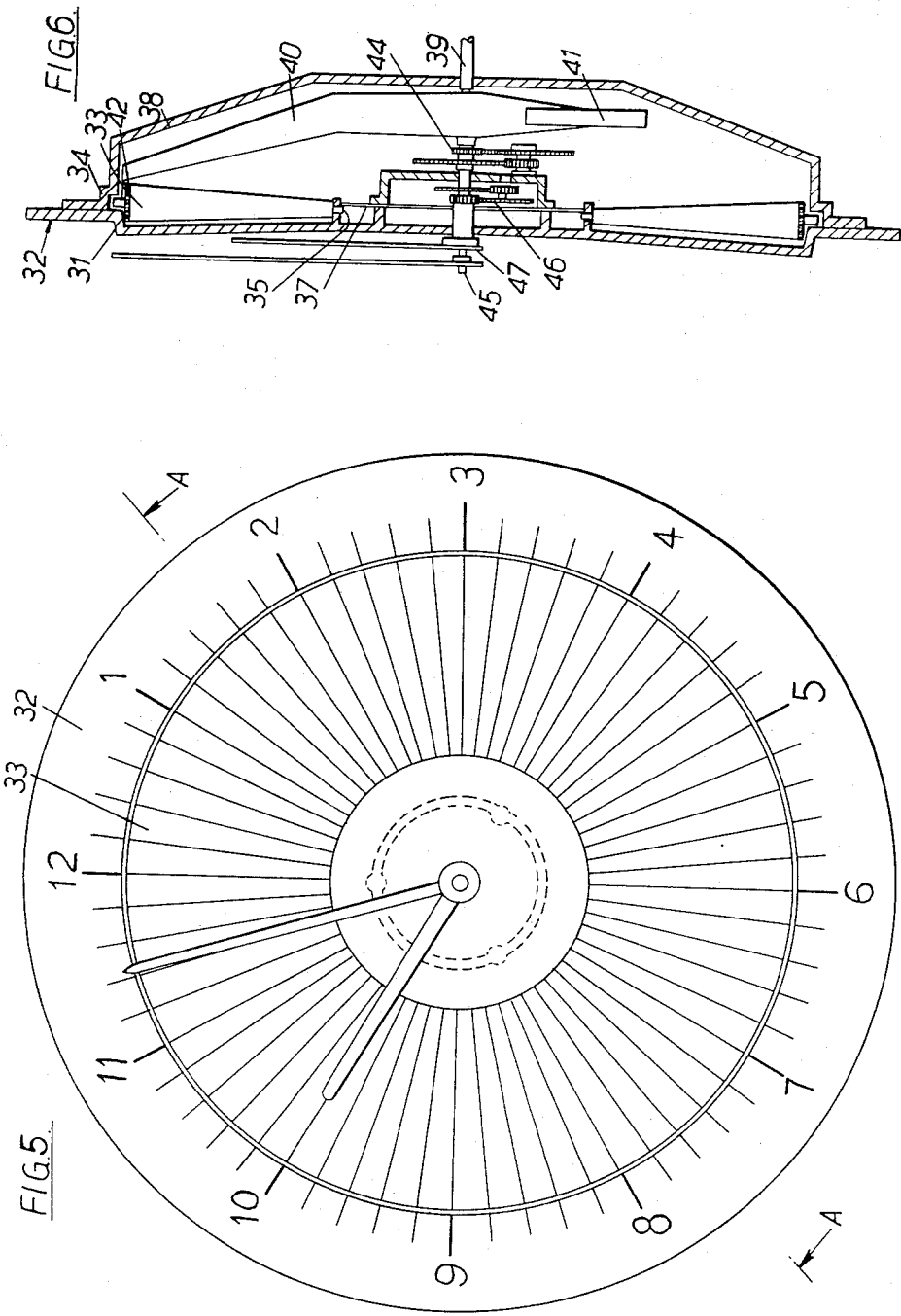


FIG.7

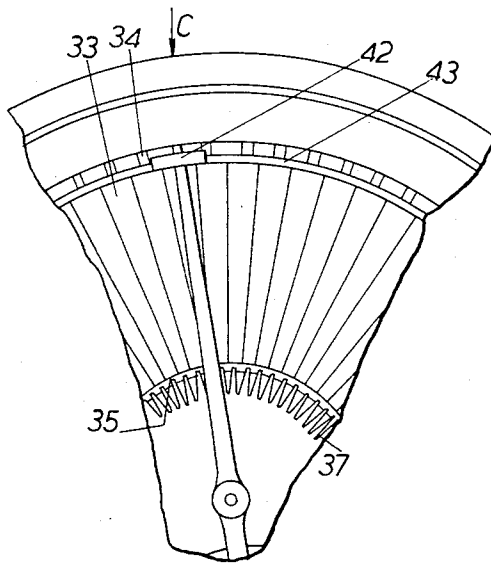


FIG.8

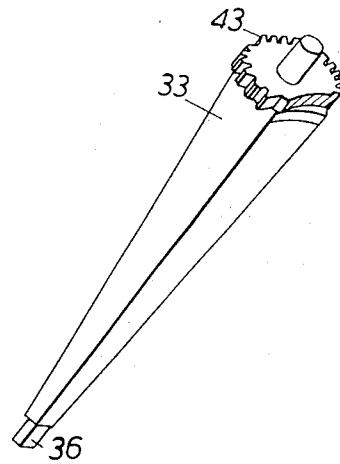


FIG.9

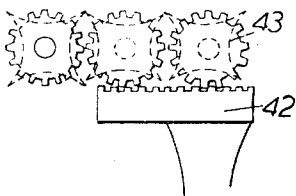
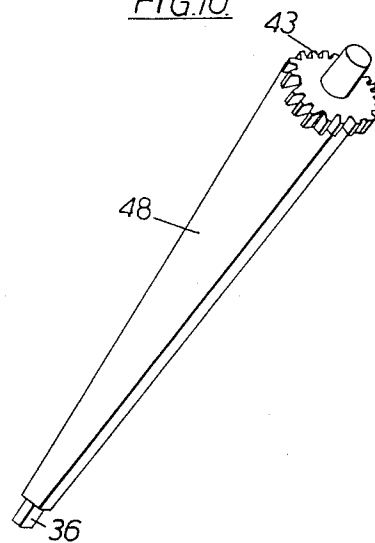


FIG.10



## CONTINUOUS WIPE-OUT CLOCKS

This invention relates to timing devices.

It is an aim of this invention to produce a timing device which provides a pictorial representation of the passage of time. This is achieved by defining a point in time by an interface between two adjacent surfaces of contrasting shades, and enabling this interface to move at a substantially constant speed which is related to the passage of time. The interface can thus "wipe out" the previously visible surface and replace it with another.

The interface would normally move in a circular arc and the movement would be controlled by some conventional means such as a pin pallet lever escapement mechanism associated with a rotational axis related to the movement of the interface. The arc can of course, be a complete circle and is conveniently surrounded by a scale defining units of time.

The mode of the invention may be included in a clock, designed for continuous running, or for a timer, designed only for occasional use. In the latter case it is an aim of the invention to provide a simple mechanical means of providing the motion. Such means might be a rack and pinion, the rack being moveable by the controlled absorption of potential energy. This may be achieved by controlling the movement of a falling weight, this movement causing the motion of the interface. To initiate this movement the weight may be raised from the rest position to a predetermined height and then released. The raising means, weight, and drive means may be so designed that movement of the raising means can reset the device and also, if required, the lever may arrest all motion of the device if held in a certain position.

A device according to the invention particularly suitable for use as a timer can comprise two coaxial helical surfaces each of small and substantially equal pitch, one fixed with its axis horizontal, the other mounted for axial rotation such that on rotation the other screws into the one, the leading edge of the other surface defining the interface. The extent of the inter-engagement of the surfaces can conveniently define a predetermined period of time, for example, 1 minute.

A device according to the invention suitable for use as a clock designed for continuous running may comprise a dial clock having a face including a plurality of petals (as herein defined), each one of which has at least two faces of contrasting shades and is mounted for rotation in response to movement of the clock hands.

A petal, as used herein, means a tapered elongate member, a plurality of which may be mounted contiguously to present an arcuate section. The section may be part of, or the whole of, an annulus. It may cover substantially the whole of a disc surface. Petals may be arranged co-extensively in groups of two or more to provide circular arcuate sections of different radii.

In the embodiment of the invention designed for continuous running each petal is provided with a toothed wheel at one end which engages with a corresponding member on a clock hand as the clock hand passes adjacent the petal. The clock would normally have two hands each being associated with a corresponding group of petals. The hands could be an hour hand and a minute hand.

In order that a petal may rotate without interfering with a stationary adjacent petal, the cross-section of each petal is preferably in the form of a pin-cushion distortion. In this way the presented surface does not present discontinuities as a petal rotates. Thus one face is wiped out and replaced by another without any large gaps appearing in either presented face. With this in mind a continuous running clock according to the invention has a dial face comprising a plurality of petals wherein each petal has sides of different colours and is shaded in the same way, the petals being so arranged on the clock face that one shade is presented on one side of the hand and another shade is presented on the other side.

The invention will be better understood when considered in the following two examples and reference will be made to the accompanying drawings wherein:

FIG. 1 is a view of face general assembly in one embodiment of the invention;

FIG. 2 is a section of FIG. 1 at arrows D—D (rack is on reverse side);

FIG. 3 is a rear view of FIG. 1 with back cover cut through to reveal contents;

FIG. 4 is a scrap view of sliding dogs in seconds dial drive of the embodiment of FIG. 1;

FIG. 5 shows the face general assembly of another embodiment of the invention;

FIG. 6 shows a section through FIG. 5 at arrows A—A;

FIG. 7 is a part view in the direction of arrow B in FIG. 6; the backing cover plate and the hour wheels cover plate are removed;

FIG. 8 is a perspective view of one of the four sided seconds "petals" with gear part cut away to emphasize the concaved faces of the embodiment in FIG. 5;

FIG. 9 is a part view in the direction of arrow C in FIG. 7 showing the gear end of three petals and the semicircular rack pad at the end of the cranked arm; and

FIG. 10 is a perspective view of one of the two sided seconds petals in the embodiment of FIG. 5.

One embodiment of the invention might be a 1 minute wipe-out clock face in seconds.

The main drive (FIG. 2) 1 is provided with its motion by means of a rack 2 and pinion 3. A weight 4 providing the energy and is contained within slots 5 to prevent undue movement. The drive 1 which is controlled to one revolution per minute by means of a pin pallet lever escapement of conventional design (not shown) is fed through a slipping clutch 6 which enables the rack 2 and weight 4 to be reset by the lever 7 after the passing of 1 minute, during which time the weight 4 will have reached the bottom.

The outer section of the clutch 6 is continued in the form of two dogs 8 (FIG. 4) which have a trapezoidal form to provide minimum frictional contact with the slots 9 in the seconds dial 10. The dogs 8 rotate the seconds dial 10 which is of helical form with a pitch of 7 mm. The clock face 11 which is injection moulded, defines in the center portion a corresponding helical fixed dial 11' of the same pitch and the seconds dial 10 is therefore "screwed" through the helical fixed dial portion 11' clock face 11 by its rotary motion. The clock face being white and the seconds dial of a dark colour gives the impression of a circular increasing band moving round the clock face until after 1 minute it is continuous.

To enable the seconds dial 10 to screw through the clock face 11 without touching any faces and to provide absolute minimum friction it is also carried on a front shell bearing 12 which is secured in a transparent cover 13 and is provided with a single helical groove 14 of 7 mm. pitch in which a pin 15 slides. The pin 15 is secured in the boss of the seconds dial 10 and thus guides it accurately and with the minimum of friction through the clock face.

The reset lever 7 serves the double purpose of resetting the motion and if it is squeezed sideways against its slot it will arrest the motion of the seconds dial.

Minimum friction is necessary with this mechanism, therefore, the parts 10, 8, 12 2 and 3 should preferably be made from acetal, nylon or similar low friction engineering plastics. Maximum clearance between the dogs 8 and the slots 9 (FIG. 4) is necessary for the angled contact edges 16.

The aim of this mechanism is to provide an instructive short timepiece for children to handle with safety, simple to operate (one lever) and no electricity or clockwork mechanisms.

An additional push on clock face is provided to convert the 60 second dial to a normal 12 hour clock face to show the relationship between them.

Another embodiment of the invention could take the form of a continuous wipe-out clock face for 12 hour working (in seconds).

Continuous wipe-out is achieved by means of a transparent injection moulded face (FIG. 6) 31 on which the usual 60 minute divisions and 12 hours are printed or a separate face may be bonded on to the periphery at 32, each minute sector is represented by an individual petal 33 which may have two, three or four faces of different colours.

The 60 petals are located in pockets top 34 and bottom 35 by means of their studs (FIG. 6). The narrow end of the petal has a stud with two, three or four flats 36 on its O D (FIG. 8) (according to the number of faces) which are engaged by fingers blanked out of a thin circular spring steel plate 37, this applies gentle pressure to locate the faces of the petals after they have been turned on their axis. The stud at the wide end 34 of the petal is retained to revolve freely in its slot by the backup cover moulding 38.

The main drive 39, which revolved once per minute, has a cranked arm 40 with integral counter balance 41, the tip of the arm 40 is provided with a semicircular pad 42 with cycloidal gear teeth to engage with the gears at the large end of each petal 43. According to the number of faces on the petals, i.e. two, three or four, so the length of the pad will be determined, it being sufficient to provide one-half, one-third or one-fourth of a turn to each petal as it passes on its circular path. After it has passed each petal they are retained in line with the clock face by the aforementioned fingers of the spring steel plate 37 lightly pressing on the flats 36 provided around the bottom stud. Thus it will be seen that after each complete revolution of the arm (1 minute) the face will commence to wipe-out the previously "built-up" colour face with a different colour.

The main 1 r.p.m. drive 39 is fed through suitable reduction gearing 44 to a secondary piped spindle 45 for the minute hand and a further train of reduction gears

46 to the tubular mounted hour hand 47.

The main drive may be provided by means of a synchronous electric motor suitable geared or by a clock mechanism (not shown).

The petal faces may well carry a printed message or other suitable emblems or symbols for the purpose of information or advertising. The message thus building up during the passing minute and a fresh message then commencing while the former is wiped out. Up to four messages are possible.

It will be noted that the faces of the three and four faced petals are concaved to enable them to turn freely (FIG. 9) but the two sided petals may be flat faced (FIG. 10) 18.

The invention may be usefully used for teaching purposes demonstrating the importance of time.

I claim:

1. A timing device comprising a housing, a bearing member having a helical groove, a fixed dial, a movable, rotatable dial, and a pin secured to the rotatable dial adapted to engage said groove, each dial having a helical form and coaxially positioned relative to the bearing member, the rotatable dial being mounted for rotation in the housing and constrained to move through the fixed dial by said pin secured to the rotatable dial and engaging the helical groove formed in the bearing member and, means for imparting rotation to the movable dial.

2. A device according to claim 1 wherein the movable dial comprises a boss having two eccentric axial passages, which passages are adapted to receive two dogs of a rotatable drive member.

3. A device according to claim 1 wherein the dogs are of trapezoidal cross-section to minimize friction during relative axial movement of the dogs and passages.

4. A device according to claim 1 wherein the means for imparting rotation to the movable dial comprises means to provide potential energy to a rack and pinion, the rack being movable by the controlled absorption of potential energy.

5. A device according to claim 1 wherein the means to provide the potential energy comprises a weight attached to such rack releasably held at a predetermined height.

6. A device according to claim 5 including means for raising the weight to the predetermined height and subsequently releasing said weight.

7. A device according to claim 6 wherein the apparatus includes means for arresting all motion of the device.

8. A device according to claim 1 wherein said fixed dial and movable dial comprise first and second coaxial helical surfaces respectively, each of small and substantially equal pitch, the first surface fixed with its axis horizontal, the second surface mounted for axial rotation to screw into the first surface on rotation whereby the leading edge of the second surface defines a moving interface.

9. A device according to claim 8 wherein the maximum extent of the inter-engagement of the surfaces defines a predetermined period of time.

10. A device according to claim 9 wherein the period of time is 1 minute.

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# UNITED STATES PATENT OFFICE

## CERTIFICATE OF CORRECTION

Patent No. 3, 796, 043 Dated March 12, 1974

Inventor(s) Ronald William Ebdon

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

The above patent assigned to E. S. PERRY LIMITED

Signed and Sealed this

sixth Day of January 1976

[SEAL]

Attest:

RUTH C. MASON  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents and Trademarks



# UNITED STATES PATENT OFFICE

## CERTIFICATE OF CORRECTION

Patent No. 3,796,043 Dated March 12, 1974

Inventor(s) Ronald William Ebdon

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

The above patent assigned to E. S. PERRY LIMITED

Signed and Sealed this  
sixth Day of January 1976

[SEAL]

Attest:

RUTH C. MASON  
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