March 21, 1939. C. E. ROSS ET AL 2,151,618

REGISTERING DEVICE

Filed Feb. 1, 1938 2 Sheets-Sheet 1

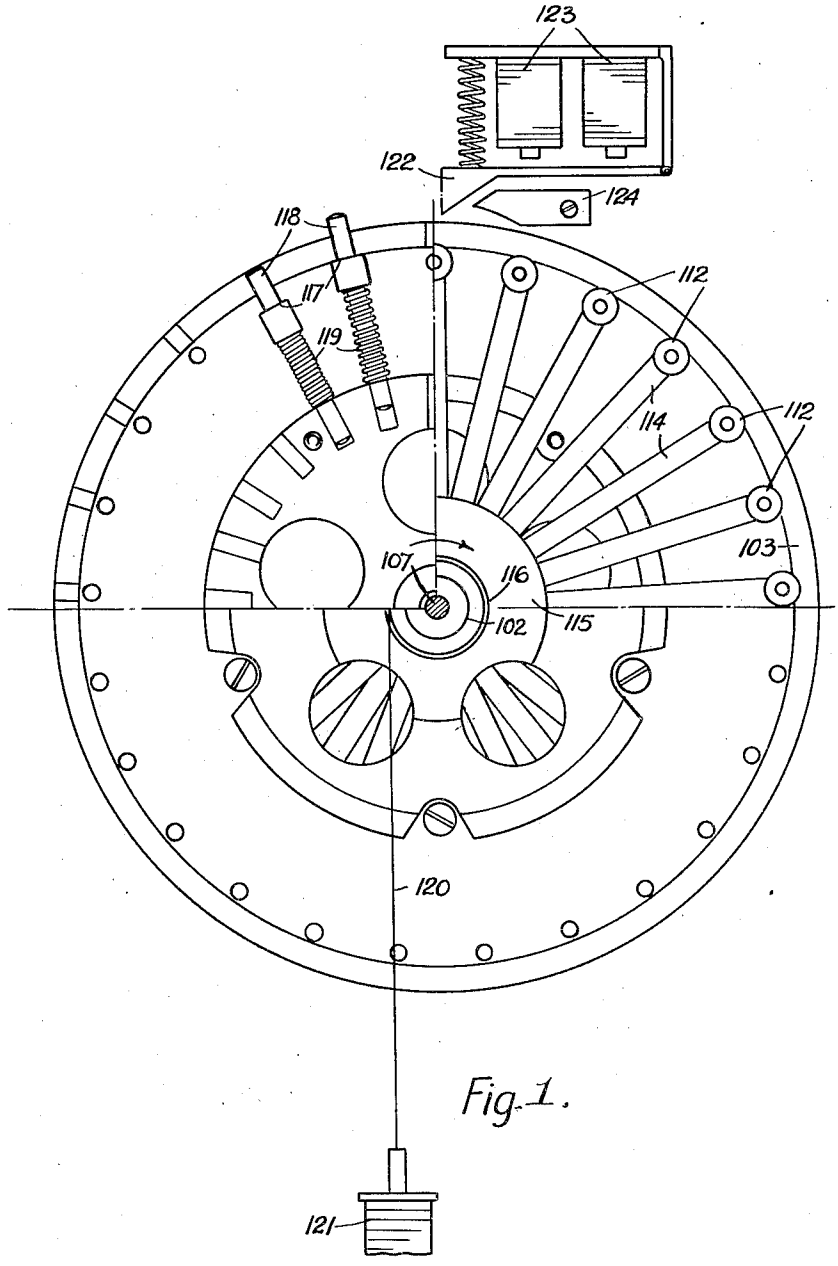


Fig. 1.

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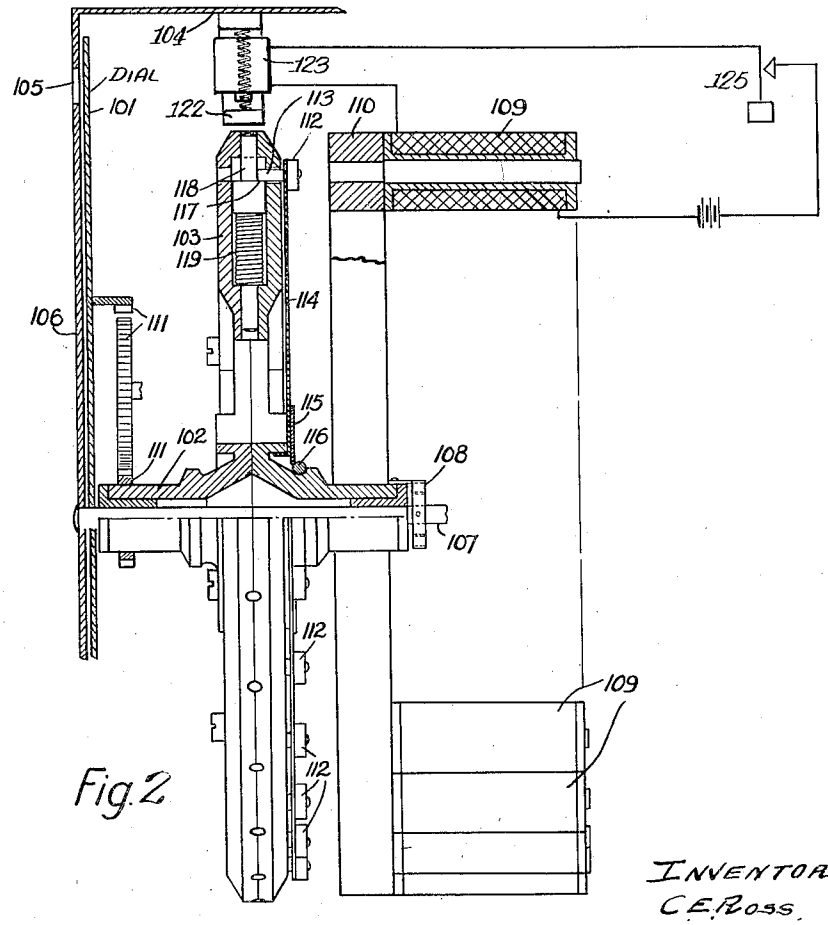


Fig. 2

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UNITED STATES PATENT OFFICE

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REGISTERING DEVICE

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In Great Britain December 17, 1936

4 Claims. (Cl. 235—92)

This invention relates to devices for registering the progressive totals of numbers added or subtracted in succession.

The principal object of the invention is to provide a device of this general character for automatically registering the progressive totals of hits or scores on targets or the like in games of skill.

In order that the invention may be readily understood it will now be described, by way of example only, with reference to the accompanying drawings in which:

Figures 1 and 2 are views illustrating an electrically operated device constructed in accordance with the invention and more particularly suitable for automatically registering the progressive totals of hits or scores on targets or the like games of skill; Figure 1 being an elevational view of the rotary drum of such device and certain associated parts; and Figure 2 being a partly sectional view through the rotary drum and certain associated parts.

Referring to the drawings, a rotatable scale member 101 is provided on a fixed shaft 107 on which is rotatably mounted the bearing bushing 102 of a drum member 103 of non-magnetic material so that the drum 103 is rotatably mounted on the shaft 107 in a fixed cylindrical casing 104 of non-magnetic material, the numbers on the rotatable scale or dial member 101 being arranged to be visible one at a time through a window 105 in a suitable cover plate 106. The drum member 103 is under the influence of a spiral spring 108 carried by the bushing 102 and the shaft 107, which spring 108 tends to rotate the drum 103, and hence through suitable reduction gearing 111, the rotatable scale member 101 rotatably mounted on the shaft 107, in a clockwise direction (Figure 1).

A number of electro-magnets 109 carried by a magnet supporting ring 110 suitably fixed in the casing 104 of the device have their axes parallel to that of the shaft 107 and are spaced equally around the ring 110 at positions corresponding to the numbers to be added or subtracted. In the present case there are actually twenty-five of these electromagnets corresponding to the numbers 0, 5, 10 . . . 115, 120, the reduction gearing 111 enabling the electro-magnets to be located around the whole periphery of the drum 103 instead of a portion only.

Armatures 112 adapted to cooperate with the electro-magnets 109 are carried by locking pins 113 of non-magnetic material mounted in apertures or recesses in the drum 103, the axes of these locking pins 113 extending parallel to the shaft 107 at the same distance from the axis of the shaft 107 as the axes of the electro-magnets 109. These locking pins 113 of which there are twenty-five are spaced apart equally around the drum 103 at positions corresponding to the numbers 0, 5, 10 . . . 115, 120.

Each locking pin 113 is carried by a blade spring 114, the twenty-five blade springs 114 being held in position adjacent the bushing 102 by a washer 115 and spring retaining member 116. Each locking pin 113 in its normal inner position which it assumes under the action of the associated blade spring 114 when the corresponding electro-magnet is de-energised cooperates with a shoulder 117 of a stop pin 118 so as to hold the latter in its inner position in which the outer end of the pin 118 is flush with the periphery of the drum 103, a spring 119 associated with each pin 118 tending to move the latter outwardly so as to project from the periphery of the drum 103.

A device, such as for example, a cord 120 adapted to be wound around the bushing 102 when the latter is rotated by the spiral spring 108 is provided for manually rotating the bushing 102, drum 103 and rotatable scale member 101 in an anti-clockwise direction to wind up the spring 108 and bring the number 0 on the rotatable scale 101 into view behind the window 105 in the cover plate 106. The pull on the cord 120 for rewinding may be arranged to be effected by an electro-magnet 121.

The electro-magnets 109 when energised are adapted to draw the locking pins outwardly in their respective apertures or recesses in the drum member 103 so that they release the stop pins 118 and permit them to be projected from the periphery of the drum 103.

A stop or abutment member 122 is provided adapted to extend into the path traversed by any stop pin, which has been caused to project from the drum 103, when the drum 103 is rotated by the spring 108. This abutment member 122 is adapted to be withdrawn from the path of such a stop pin by means of an electro-magnet 123.

Just beyond the position of this abutment member 122 in a clockwise direction a fixed ramp member 124 is provided which is adapted to return into the drum member 103 any locking pin 118 projecting from the drum member 103 when the latter is rotated by the spring 108 in a clockwise direction, any locking pin 118 so returned being then held in its inner position by the corresponding locking pin 113.

In order to prepare the device for use the energising circuit of the electro-magnet 121 is com-

pleted so as to energise the latter and exert a pull on the cord 120 and rotate the bushing 102, drum 103 and rotatable scale member 101 to the position in which the number 0 is visible through the window 105 in the cover plate 106, and the electromagnet corresponding to the number 0 is temporarily energised. This electro-magnet is the uppermost one, namely, that adapted to release the stop pin 118 just to the left of the abutment member 122. Thus the drum 103 is held in the prepared position by the stop pin 118 projected from the periphery of the drum 103 owing to the energisation of the electro-magnet corresponding to the number 0.

Now in order to add together the numbers 5, 25 and 40 the electro-magnet 109 corresponding to the number 5 is first energised so that the locking pin 113 opposite to this winding is moved outwardly from the shoulder 117 of the corresponding stop pin 118 thus permitting this pin to be projected from the periphery of the drum 103 by the spring 119, whilst at the same time, or a fraction of a second afterwards, the electro-magnet 123 cooperating with the abutment member 122 is momentarily energised so as momentarily to withdraw the abutment member 122 from the path of a previously projected stop pin 118 corresponding to the number 0 on the rotatable scale.

The drum member 103 is thus rotated rapidly by the spring 108 in a clockwise direction until brought to rest by the engagement of the stop pin 118 projected from the periphery of the drum 103 as a result of the energisation of the electro-magnet 109 corresponding to the number 5 with the abutment member 122, the electro-magnet 123 operating this abutment member 122 being deenergised by the time the said stop pin arrives at its position.

The drum member 103 will as will be evident have now rotated through one twenty-fifth part of a revolution and the number 5 will appear behind the window 105 of the cover plate 106, the gearing 111 and the spacing of the graduations on the rotatable scale member being suitably selected.

The electro-magnet 109 corresponding to the number 25 of the fixed scale is energised on closing of circuit at 125 whilst temporarily energising the electro-magnet 123, with the result that the drum member 103 will be rotated rapidly by the spring 108 through a further distance corresponding to five twenty-fifth parts of a revolution. The number 30 on the dial 101 will now appear behind the window 105. Similarly by energising the electro-magnet corresponding to the number 40 of the fixed scale whilst momentarily energising the electro-magnet 123, the drum member 103 will be rotated rapidly through a further eight twenty-fifth parts of a revolution and the result of the total is given by the number 70 appearing behind the window 105. By reversing the order of the numbers on the rotatable scale member 101 the device may be used for subtraction purposes in exactly the same manner, the zero position of the scale member 101 to which it is arranged to be reset by the cord 120 and electro-magnet 121 being the position in which the highest number on the scale and not 0 appears behind the window 105.

The device described with reference to the drawings is more particularly applicable to the automatic registration of hits or scores on targets or the like in games of skill. Arrangements have been proposed for completing an electric circuit associated with a zone or section of a target when the said zone or section is hit. With each individual zone or section of a target a different score may be associated. The target may be divided into a number of zones or sections corresponding to scores 5, 10, 15 . . . 115, 120, and the electric circuit associated with each zone may include the winding of the corresponding electro-magnet 109 mounted in the casing of the device hereinbefore described with reference to Figures 1 and 2, so that the winding of the electro-magnet 109 corresponding to the zone or section associated with the score 5 will be energised whenever that zone or section is hit or pierced.

As will be evident the electro-magnets corresponding to the numbers 5, 10, 15 . . . 115, 120, may be arranged for other adding or subtraction purposes to be energised by means of manually operable switch keys associated together on a suitable keyboard and each bearing the number of the corresponding winding, so that an addition or subtraction can be effected by successively depressing the keys corresponding to the numbers to be added or subtracted.

It will be evident that the invention is not limited to the particular construction and arrangement of the parts of the devices hereinbefore described which may be varied as desired to suit particular requirements without exceeding the scope of the invention.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A device for indicating the progressive totals of numbers added or subtracted in succession, comprising a rotatable dial member, means for rotating said member, a number of circumferential stop members carried by the rotatable member, a spring associated with each stop member for moving it to an operative projected position, retaining means for normally retaining the stop members in their inoperative positions, fixed setting means for selectively releasing the stop members from the retaining means, an abutment member normally in position in the path traversed by the stop pins, means for moving said abutment, and means for returning the stop members to their inoperative positions.

2. A device as claimed in claim 1 further comprising means for temporarily operating the abutment member out of the path traversed by the stop members.

3. A device as claimed in claim 1 comprising a fixed ramp member associated with the abutment member and constituting the means for returning the stop members to their inoperative positions.

4. A device for indicating the progressive totals of numbers added or subtracted in succession comprising a rotatable dial member, means for rotating said member, a number of circumferential stop members carried by the rotatable member, a spring associated with each stop member for moving it to an operative projected position, retaining means for normally retaining the stop members in their inoperative positions, fixed electro-magnetic setting means for selectively releasing the stop members from the retaining means, an abutment member at a fixed position in the path traversed by the stop pins, electro-magnetic means for temporarily operating the abutment member out of said path and a fixed ramp member for returning the stop members to their inoperative positions.

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