A unitary, integrally arranged toy allowing simultaneous but independent interval timing and event counting through manipulation of appropriate buttons by fingers of one hand, the device including a button actuated elapsed time mechanism with a sweep seconds hand moving over a time indicating dial only as long as the button is depressed, and including a button actuated event counting mechanism with an event indicating wheel or disc visible through a window in the time indicating dial whereby a successively increasing numeral is seen with each separate button depression.

9 Claims, 2 Drawing Figures
HAND HELD TIMER-LAP COUNTER TOY

BACKGROUND OF THE INVENTION

The background of the invention will be set forth in two parts.

1. Field Of The Invention

The present invention pertains generally to the field of hand held indicating mechanisms and more particularly to devices used to determine the speed of moving bodies such as vehicles, animals, and the like, and also devices used to keep track of the number of events, such as laps about a track, moving bodies such as toy vehicles have made.

2. Description Of The Prior Art

Hand held devices which utilize clock mechanisms in order to determine the amount of time that has elapsed between separate manual depressions of an actuating start-stop button are well known. These mechanisms range from very complicated and accurate timepieces to relatively simple, less expensive devices with fewer and less costly parts. However, even these simple and less accurate timing devices are generally too fragile and relatively costly when considered for use by children who wish to time their toy vehicles traversing a track and/or to time the charge placed on a toy's rechargeable battery, for example.

Another instrument well known for many years is the event counter. This type of device may be either actuated automatically by the moving object itself, or actuated by hand for a more general use in counting the number of events that have taken place.

Where it is desired to both obtain the elapsed time it takes an event to occur and the number of such events that have taken place, it has been the practice to carry and use both a manually actuated stop watch and a manually actuated step counter, one in each hand. This procedure continuously occupies both hands of a person and prevents him from being able to write down timing and event data, for example.

At first glance, some time meters or instruments may seem to include a viewing portion indicating an event numeral indication and a button for actuating same. However, the numeral seen, usually through a window in the timing dial face, is an indication of the number of minutes and/or hours of elapsed time and not an indication of the number of external events which have occurred. Thus, one button is used both to start and stop the timing mechanism, and the second button is used to reset the timing mechanism and the time indicating portion to zero. It should thus be evident that an inexpensive, yet rugged and reliable hand held instrument which includes cooperating yet independent timing and counting mechanisms would constitute a significant advancement of the art.

SUMMARY OF THE INVENTION

In view of the foregoing factors and conditions characteristic of the prior art, it is a primary object of the present invention to provide a new and improved hand held timer-lap counter toy not subject to the disadvantages enumerated above.

Another object of the present invention is to provide a relatively inexpensive hand held timer-lap counter which allows both timing and event counting to be efficiently accomplished with the fingers of one hand.

Still another object of the present invention is to provide a relatively lightweight and compact hand held timer-lap counter which can be manipulated by one hand of even a child for numerous purposes including the timing of battery charging cycles and elapsed times of toy vehicles completing a circuit about a closed track system, as well as simultaneously counting the number of laps completed by such toys.

Yet another object of the present invention is to provide a rugged hand held timer-lap counter that includes a timing mechanism which is simply actuated only for the period of time that a single button is depressed.

A further object of the present invention is to provide a hand held timer-lap counter including a spring operated timing mechanism that may be simultaneously reset to zero while winding up its spring.

According to the present invention, a hand held timing-lap counter is provided for simultaneous but independent interval timing and event counting. The device includes an elapsed time mechanism mounted in a housing and having a visible time indicating portion. Also mounted in the housing is an event counting mechanism having a visible event indicating portion.

Further, actuation means are mounted in the housing and operatively coupled to the elapsed time mechanism and to the event counter mechanism for allowing simultaneous and independent actuation of these mechanisms through pressure on separate finger buttons or levers by fingers of a hand holding the housing, the elapsed time mechanism being actuated only as long as finger pressure is exerted on one of the buttons.

The actuation means may include a timer button arrangement and a spaced counter button arrangement extending from the housing for respectively engaging and actuating the elapsed time mechanism and the event counting mechanism. The visible time indicating portion of the elapsed time mechanism and the visible event indicating portion of the event counting mechanism may share space on the instrument's face for ease of computations.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by making reference to the following description taken in conjunction with the accompanying drawings in which like reference characters refer to like components in the several views.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a hand held timer-lap counter constructed in accordance with the present invention; and

FIG. 2 is an enlarged sectional representation of the mechanisms housed in the instrument seen in FIG. 1.

DESCRIPTION OF THE INVENTION

Referring now to the drawing, and more particularly to the hand held timer-lap counter of FIG. 1, there is shown an instrument case or housing 11 having a cylindrical outer side wall 13, a circular disc back plate 15 with a circular lip portion 17, and a transparent front cover 19 having a serrated sloping edge portion 21 and a relatively flat center portion 23 through which timing
indicia 25 and event counting indicia 27 respectively are seen on a dial faced plate 29 and on a counter disc 31.

Extending beyond the housing 11 is a timer button 33 having a stem 35 extending through an appropriate lip surrounded opening 37 in the side wall 13, the button being flanked by finger guide walls 39 braced by tabs 41. Spaced from the timer button 33 but similarly arranged, is an event counting button 43 with a stem 45 extending through a housing opening 47 and flanked by walls 49 reinforced by tabs 51.

Elapsed time is indicated on the dial face plate 29 by noting the position of a movable seconds hand 53 relative to the uniformly spaced and marked timing indicia 25, while numeral 27 representing the number of events that have taken place, is read through an appropriate opening or window 55 in the lower portion of the dial plate 29.

As can be seen from this figure, the instrument is easily held in one hand 57 and the two buttons 33 and 43 are so located to be readily accessible to the thumb 59 and the index finger 61, for example. An apertured post 63 may also be provided extending from the side wall 13 to accommodate a neck strap 65 so that the instrument will remain in easy reach when needed.

The event counting mechanism is best viewed in FIG. 2 and includes an axial rod 67 extending from the stem 45. The rod 67 has an inwardly pointing conical tip portion 69, and the button 43, the stem 45, and the rod 67 and tip portion 69 may be a single integrally molded unit. Inward movement of the rod 67 causes its tip 69 to engage an engagement portion 71 of a resilient member 73 to move inwardly, generally in the direction of the center of the instrument. The member 73 is anchored at only a single support post 75 by a conventional rivet or screw 77, and this member includes a support portion 79, a detent portion 81 bent inwardly and at an angle with respect to the support portion, and a pawl portion 83 with a bent tip 85. The pawl portion also extends generally in the direction of the center of the instrument from one end of the engagement portion 71, and its tip 85 engages a series of ratchet teeth 87 of a ratchet wheel 89. The wheel 89, in this embodiment is integrally molded on an interface of the counter disc 31, coaxial with the axis 91 thereof. As can be seen in the figure, the detent portion 81 and the pawl portion 83 engage the ratchet teeth 87 both along lines (not shown) which lie on one side of the axis 91 so that only rotation of the ratchet wheel 89 in the direction indicated by arrow 93 is possible.

With reference to the elapsed time mechanism, FIG. 2 illustrates that a rod 95 with a conical tip 97 extends from the stem 35 in a manner similar to the configuration of the event counting mechanism, the tip 97 engaging an engagement portion 99 of a bent resilient rocker release arm 101 which is anchored only at one end 103 to a stationary post 105 by a rivet or screw 107, or by any other conventional means. Inward movement of the conical tipped rod 95 depresses the resilient rocker release arm 101 as indicated by the dashed outline 109 so that the arm's other end 111 moves away from contact with a first leg 113 of a first circular segment portion 115 of a rocker member 117. The member 117 also includes a second circular segment portion 119 similar to the first and centrally connected thereto by a bridge portion 121 having a centrally located rocker bearing aperture 123 pivotally held by an appropriately dimensioned stationary rocker bearing post 125. In this way, the portions 115 and 119 may alternately rotate in either a clockwise or counter-clockwise direction, as indicated by the double headed arrow 127.

Such reciprocal movement of the rocker member 117 is caused by the force first exerted on an inner surface 129 of a second leg 131 of the first segment portion 115 by the rotational bias of one of six arms 133 of a star wheel and escapement pinion 135 mounted on a rotatable bearing post 137. The member 135 is biased by a spring loaded gear train, to be later described, to rotate in a counter-clockwise direction as shown by arrow 139. When the rocker release arm 101 is in its inactivated position (solid outline) the force on the member 117 by the star wheel arm 133 is counter balanced by the arm 101 and the rocker 117 cannot move. However, when the arm is moved to its other position as indicated by outline 109, the member 117 rotates clockwise until stopped by another arm 133 striking an outer surface 141 of a second segment 119. The latest mentioned star wheel arm 133 will always be the second arm, in a clockwise direction, from the one initially engaging the first segment's second leg 131.

The force of this action on the curved outer surface 141 causes the member 117 to reverse its direction until again stopped, this time by the star wheel arm 133 disposed between the two first mentioned arms. As long as the release arm 101 is in the position 109, this reciprocating action will continue until the spring loaded mechanism arrangement is wound down.

The gear train biasing the star wheel 135 includes an integral pinion gear 145 beneath the arms 133, which pinion meshes with a third wheel and pinion 147 that also engages a second wheel and pinion 149, as shown in the figure. These elements are rotatably anchored by respective rotating pivot posts 151 and 155. The pinion of the latter element is meshed with the larger wheel gear of a first wheel and pinion gear 157 which is fixedly mounted on a relatively large and generally centrally located main shaft 159 extending beyond the gear train mechanism in both directions (front and back). Although not shown in great detail, it should be realized that the fixed anchor posts are mounted on a primary or main plate 161 and that the gear train pivot pins or posts are rotatably held in appropriate bearing holes in the plate 161 and in a spaced secondary plate 163 in a conventional sandwich arrangement.

The biasing force is delivered to the gear train by a gear segment 165 fixedly mounted on a pivot pin 167 which also extends through appropriate bearing holes in the plates 161 and 163. The gear 165 includes an attachment point 169, and a conventional elongated coil spring 171 is attached at one of its ends 173 to the point 169 and at its opposite end 175 to an anchor tab 177 extending upwardly from the main plate 161.

In operation, the elapsed time mechanism is first "wound-up" by manually turning a winding button (not shown) mounted on the back end of the main shaft 159 so that the first wheel and pinion 157 moves in the direction indicated by arrow 179. This action causes the gear 165 to rotate in the opposite direction 181, since its teeth 183 are meshed with the pinion 185 of the first wheel pinion 157. The spring 171 is thus
stretched until the segmented gear 165 reaches a limit stop post 187 extending from the main plate 161. It will be noted that the time indicating hand 53 is attached to the main shaft 159 and the winding process moves the hand 53 counter-clockwise to a zero reset position.

The winding operation is not coupled through the gear train to the star wheel 135 because of a special mounting arrangement of the second wheel and pinion 149. Instead of simple circular holes in the plates 161 and 163 to accommodate the pivot pin 155, the latter pin rides in a slightly elongated slot whereby rotation of the first wheel and pinion 157 in the direction 179 causes the wheel and pinion 149 to move away and disengage from the third wheel and pinion 147. However, once external torque is removed from the main shaft 159, the spring 171 biases the segment 15 in a rotational direction opposite that of arrow 181. This bias is transmitted through the gear train and causes the pin 155 of the second wheel and pinion 149 to move toward the pin 151 and the appropriate teeth of wheels and pinions 147 and 149 are thereby meshed. Not until the star wheel 135 is released by the rock member 117 to rotate in the direction 139 can the gear train operate to decrease the tension in the spring 171.

Release of the rocker member 117 by the depression of the button 33 thus allows the spring loaded gear segment 165 to rotate the first wheel 157 in a direction 189, the second wheel in the opposite direction 191, and the third wheel in a direction 193. Of course, release of pressure on the button 33 allows the tip 111 of the resilient arm 101 to again engage and halt the rocking motion of the member 117, and in turn, the rotation of the entire gear train including the main shaft mounted time indicating hand 53.

Independent of the operation of the elapsed time mechanism, but simultaneously operable therewith, is the event counting mechanism. Here, the depression of the button 43 causes the conical tipped shaft 67 to engage and force the engagement portion 71 of the resilient member 73 away from the side wall 13. This causes the tip portion 85 to push against one side of one of the series of ratchet teeth 87 of the disc 31. The rotational action of the disc is sufficiently restrained by the resilient detent arm portion 81 riding over the teeth 87, and the inward travel of the depressed button 43 restricted by the lipped aperture 47, so that only one tooth is passed by the detent arm 81 for each separate depression of the button 43. Where the ratchet wheel has 26 teeth 87, 26 successively increasing indicia numerals 27 are carried on the outer surface of the disc 31, from 0 to 25 for example. Thus, when the numeral 0 is seen through the window 55, the numeral 10 will be visible after the button 43 is depressed 10 times. An exposed portion of disc 31, shown in FIG. 1, allows the operator to manually reset the event counting indicia 27.

Thus it can be seen that the toy herein described has the advantage of not requiring confusing and complicated multiple button depressing action for starting and stopping the timing mechanism and a separate button for zero reset thereof. Another advantage illustrated is the automatic timing arb feature which is accomplished merely by winding the spring mechanism.

It should therefore be evident from the foregoing that this toy instrument is capable of providing much instructive entertainment, is extremely useful and versatile, is simple in construction and operation and is not costly and fragile. The materials used in fabricating the various elements and components of this toy are not critical and any material and process for forming and shaping same which will have similar characteristics may be substituted for those specifically identified. For example the entire housing, dial plate, buttons and counting disc may be of any moldable plastic material, while the gear train, escapement, resilient actuation members and structural plates may be stamped or otherwise formed from suitable metals.

Accordingly, it is intended that the foregoing disclosure and showings in the drawing shall be considered only as illustrations of the principles of this invention.

What is claimed is:

1. A hand held timer-lap counter for simultaneous but independent interval timing and event counting, comprising:
   a housing;
   an elapsed time mechanism mounted in said housing and having a visible time indicating portion; and
   an event counting mechanism mounted in said housing and having a visible event indicating portion; and

actuation means mounted in said housing and operatively coupled to said elapsed time mechanism and to said event counting counter mechanism for allowing simultaneous and independent actuation of said mechanisms through pressure on separate finger buttons by fingers of a hand holding said housing, said elapsed time mechanism being actuated only as long as finger pressure is exerted on one of said buttons.

2. A device according to claim 1, wherein said actuation means includes a timer button arrangement and a spaced counter button arrangement extending from said housing, said timer button arrangement engaging said elapsed time mechanism, and said counter button arrangement engaging said event counting mechanism.

3. A device according to claim 2, wherein said elapsed time mechanism includes a spring-loaded gear reduction train and a governor star wheel escapement with a rocker member and a resilient rocker release arm, said arm being moved to release said rocker member to operate said elapsed time mechanism by an inward movement of said timer button arrangement in contact therewith.

4. A device according to claim 3, wherein said gear reduction train includes a housing anchored coil spring and a pivoted gear segment attached to said coil spring biasing the rotation of said gear segment in one direction.

5. A device according to claim 4, wherein said time indicating portion is a fixed dial and a sweep seconds hand rotatably mounted centrally in said dial, and wherein said elapsed time mechanism also includes a main arbor extending beyond said dial to which said sweep seconds hand is mounted, the opposite end of said arbor extending beyond a rear face of said housing permitting rotation of said arbor to enable tensioning of the coil spring, said arbor fixedly carrying a first spur wheel and pinion as a portion of said gear reduction train.
6. A device according to claim 2, wherein said event counting mechanism includes a counter wheel with event counting indicia on an outer face thereof and with a fixed ratchet wheel on an inner face thereof, said event counting mechanism also including a resilient pawl arrangement fixedly anchored in said housing and engaging said ratchet wheel, said pawl arrangement being moved to advance said counter wheel one step at a time by an inward movement of said counter button arrangement in contact therewith.

7. A device according to claim 6, wherein said ratchet wheel has a series of ratchet teeth about its periphery, and said pawl arrangement includes a bent resilient member having a detent end slidably engaging said ratchet teeth upon inward movement of said counter button arrangement, said bent resilient member being fixedly anchored to said housing intermediate said ends thereof.

8. A device according to claim 6, wherein time indicating portion includes a dial, and wherein said counter wheel is rotatably disposed beneath said dial, said dial including a window therethrough exposing only one event indicating indicia at a time.

9. A device according to claim 8, wherein said housing includes a transparent front face visibly exposing said dial and said window, said front face also including a cut-away portion physically exposing an edge of said counter wheel for external manual reset manipulation thereof.