Jan. 19, 1965 H. W. NASH ETAL 3,165,883

FAST DRAW TIMER

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FIG. 1.

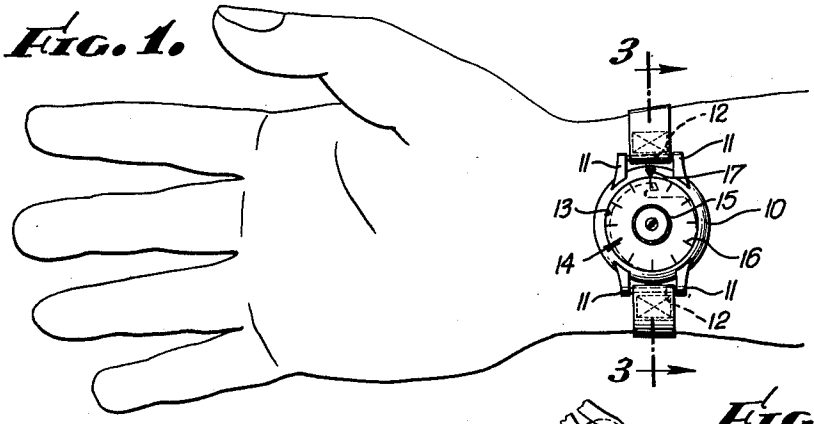


FIG. 2.

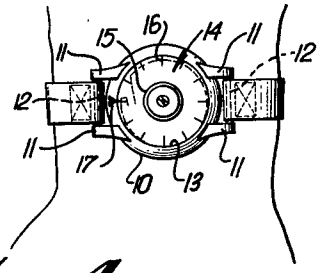


FIG. 3.

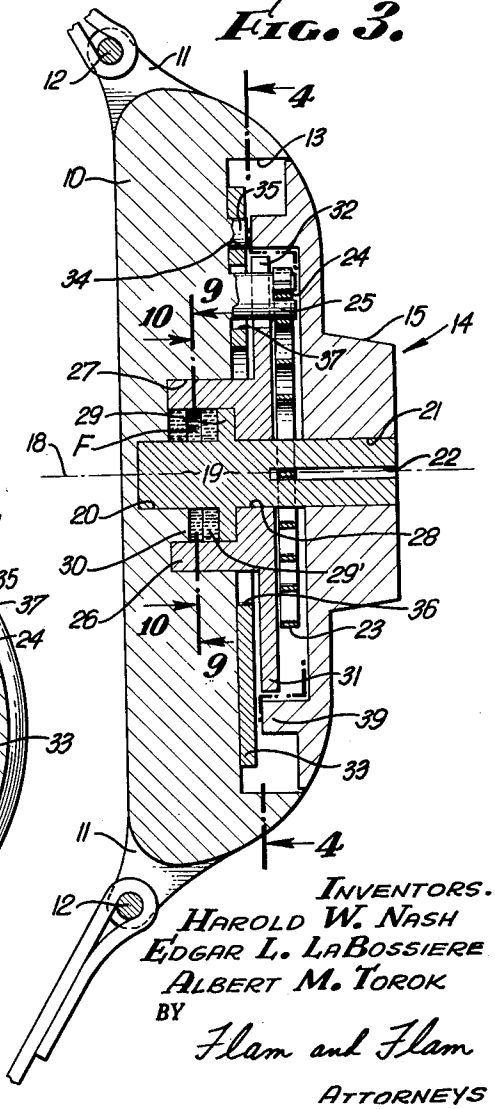
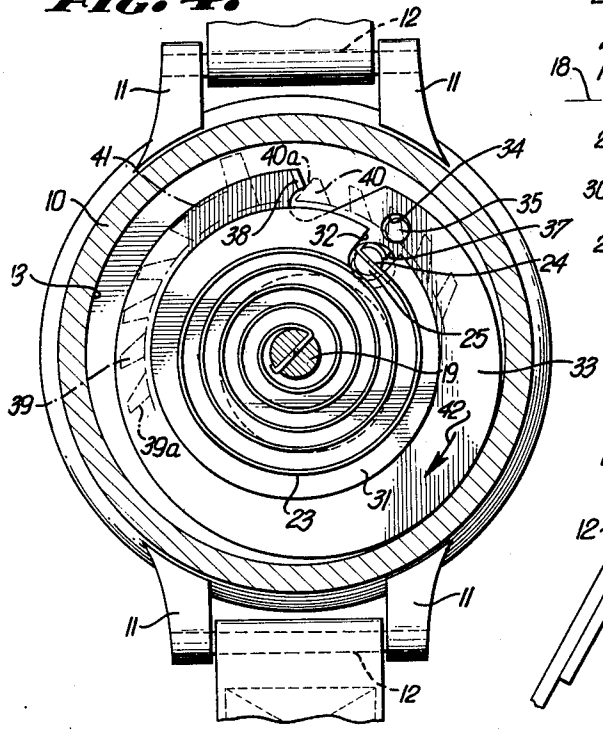


FIG. 4.



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FIG. 5.

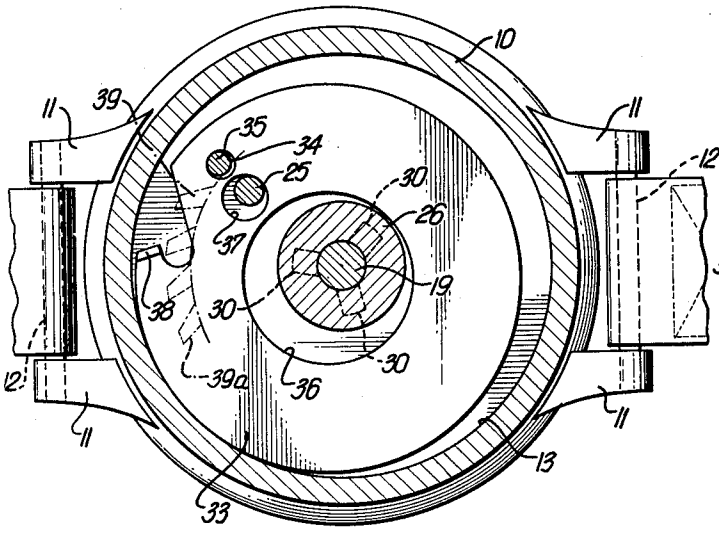


FIG. 6.

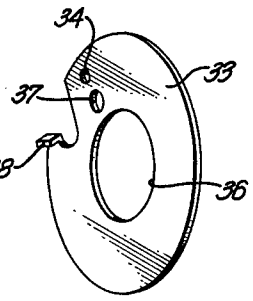


FIG. 8.

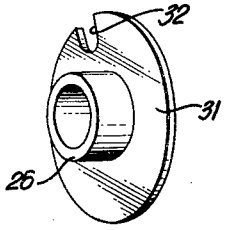


FIG. 7.

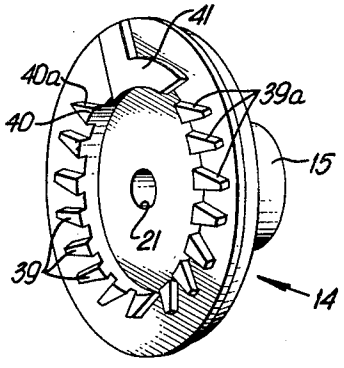


FIG. 9.

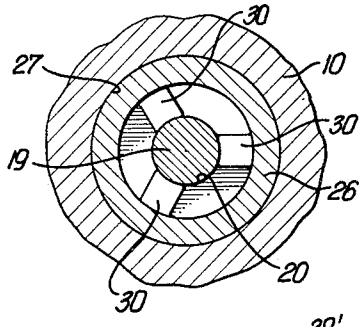
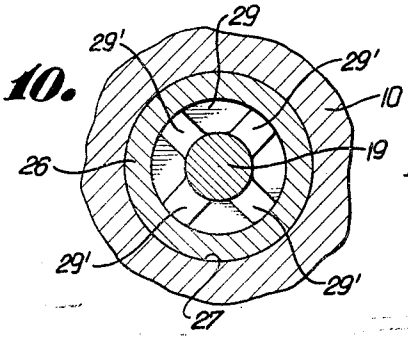


FIG. 10.



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3,165,883

FAST DRAW TIMER

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Filed June 14, 1962, Ser. No. 205,162
13 Claims. (Cl. 58—22.9)

This invention relates to a device for measuring elapsed time, and particularly to a timer device for use in connection with the measurement of elapsed time in practice gun draws.

So-called fast draw clubs have become increasingly popular. Various devices have been proposed for the measurement of elapsed time in gun draws. In some circumstances, electronics equipment of some substantial complexity is utilized for this purpose. The primary object of this invention is to provide a device for this purpose which is purely mechanical and which can be directly attached to the user's wrist as is a wristwatch.

Another object of this invention is to provide a device of this character that is extremely simple in operation, and actuated or controlled by the movement of the arm away from and back to a starting horizontal position. For this purpose, use is made of a unique control device.

Another object of this invention is to provide a timer device of this character that is exceptionally rugged and durable and foolproof in operation.

This application is a continuation-in-part of our prior application Serial No. 65,978, filed October 31, 1960, now abandoned, and entiled Fast Draw Timer.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of one embodiment of the invention. For this purpose, there is shown a form in the drawings accompanying and forming a part of the present specification, and which drawings, unless as otherwise indicated, are true scale. This form will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of this invention is best defined by the appended claims.

Referring to the drawings:

FIGURE 1 is a pictorial view of a device incorporating the present invention and placed upon the wrist of a user, the user's arm being in a starting horizontal position;

FIG. 2 is a view similar to FIG. 1, but illustrating the orientation of the device when the user's arm is at or adjacent his gun holster;

FIG. 3 is an enlarged sectional view illustrating the component parts of the apparatus;

FIG. 4 is a sectional view on a slightly reduced scale and illustrating the parts in stopped position, corresponding to FIG. 1;

FIG. 5 is a sectional view similar to FIG. 4, but illustrating the apparatus in running position, corresponding to FIG. 2;

FIGS. 6, 7 and 8 are pictorial views illustrating respectively a weight, a cup and the dial forming a part of the present apparatus; and

FIGS. 9 and 10 are sectional views taken along planes corresponding to lines 9—9 and 10—10 of FIG. 3.

Placed upon the wrist of a user is a case **10** of generally circular form having ears or lugs **11** at which the strap mounting pins **12** may be detachably secured in a conventional manner. The case may be made of metal, plastic or other suitable material. Closing a generally circular shallow recess **13** is a dial, face plate member or rotor **14**. A central knob or hub portion **15** at the center of the annular dial may be angularly moved

by the user for purposes hereinafter described. Peripherally of the dial are scale markings **16** corresponding to time intervals. The scale markings **16** denote elapse of time by cooperation with a pointer **17** imprinted, in this instance, at the twelve-o'clock position on the case.

The dial **14** is mounted for angular movement about its axis **18** and the axis of the recess **13** by the aid of a shaft **19**. The inner end of the shaft is pivoted in a recess **20** extending inwardly from the bottom of the case or recess **13**. The outer end of this shaft **19** projects through a through aperture **21** at the center of the dial **14**. The coupling between the dial **14** and the shaft **19** is established by a yielding frictional grip. For this purpose, the outer end of the shaft **19** has a split formed by an axial cut **22**. The normal diameter of the shaft **19** at its outer end is greater than the diameter of the dial recess **21**. The shaft **19** furthermore is made of resilient, slightly flexible material. The coupling is thus established.

In a manner presently to be described, the dial **14** is capable of movement through approximately one revolution at a limited rate, and the movement of the user's arm from and to the position of FIG. 1 starts and stops the angular movement of the dial.

A coiled or convoluted spring **23** for providing the power to run the dial is accommodated in the case recess **13** immediately beneath the dial **14**. Its inner end is anchored at the bottom of the axial cut **22** of the shaft **19**, as shown most clearly in FIGS. 3, 4 and 5. The outer end of the spring **23** is anchored at an axial cut **24** in an anchor pin **25** formed integrally within the case **10**. The pin **25** projects outwardly from the bottom of the case recess **13** at a place located between the axis **18** and the outer boundary of the recess **13**. The end of the pin **25** clears the inner surface of the dial **14**.

By manually rotating the dial **14** in one direction, that is, in a clockwise direction as viewed in FIGS. 1, 2, 4 and 5, the spring **23** is more tightly coiled and energy is therein stored. Accordingly, the spring **23** is capable of driving the dial in a counterclockwise direction.

In order to limit the rate of angular movement of the dial **14**, damping means are provided. Yielding friction means in the form of slidably engaging parts could be provided. But since fluid friction is more predictable, a fluid coupling is provided instead.

A damping chamber is formed by a cup **26** which fits a recess **27** formed about the shaft **19** adjacent its pivoted end. The recess **27** is in the form of a step between the main case recess **13** and the shaft pivoting recess **20**. The cup **26** fits the recess, and a chamber for fluid F is formed about the shaft **19**. The shaft **19** passes with minimum clearance through an aperture **28** in the bottom of the cup to prevent escape of fluid.

The shaft **19** has a circular flange **29**, the flat right-hand or outer side of which, as viewed in FIG. 3, is positioned adjacent the cup bottom. On the opposite side of the flange (see also FIG. 10) there are formed vanes **29'** exposed in the chamber. Companion vanes **30** integrally formed on the case extend upwardly or outwardly of the bottom of the recess **27**, as illustrated in FIG. 9. Fluid, such as silicone material or the like, establishes an hydraulic coupling between the case **10** and the shaft **19** by the aid of vanes **29'** and **30**. Relative rotation is thus resisted and the rate of angular movement of the dial **14** is limited.

To ensure appropriate operation, the cup **26** is prevented from moving angularly. For this purpose, the cup has a flange **31** extending radially outwardly from the base of the cup. This flange has a notch **32** (FIG. 8) that embraces the case pin **25**. The flange **31** defines with the inner surface of the dial **14** a shallow space in which the spring **23** is accommodated.

In order to control the stop and start movement of

the dial **14** whereby an elapse of time can be measured, a weight **33** (see also FIG. 6) is provided. The weight **33** is generally of disk form and occupies the space between the cup flange **31** and the bottom of the cup recess **13**. It has a diameter less than that of the cup recess **13**.

The weight **33** is mounted for pivotal movement whereby it may sense movement of the user's arm from the horizontal position illustrated in FIG. 1. Thus, the weight **33** has an aperture **34** mounted upon an integrally formed projection or axle **35**. The axle **35** projects upwardly or outwardly from the case recess **13**. In this instance, the axle **35** is located between the pin **25** and the outer wall of the recess **13**, as illustrated in FIG. 4. The weight is capable of oscillatory motion about the axis of the axle **35**. Engagement of the rim of the disk **33** with the side walls of the recess **13** determines opposite limits to the movement of the weight **33**.

The weight has a central aperture **36** to provide clearance about the cup **26** and an aperture **37** that provides clearance with respect to the pin **25** for all positions of the weight **33**. Of course, the pin **25** or the cup **26** might be used to limit movement of the weight instead of the case periphery.

The axle **35** is located at a place near, but angularly spaced from, the top of the case when the arm of the user is horizontal, as in FIG. 1. Thus, the axle **35** is located substantially at a one-o'clock position. This weight tends to move to the right but is stopped by the righthand side of the case recess. The eccentric relationship of weight and case is illustrated in FIG. 4. With reference to the case **10**, the weight **33** is at a counterclockwise-most position about the axle **35**.

When the arm of the user is moved from the horizontal position of FIG. 1 downwardly toward the position of FIG. 2, the weight **33** relative to thes case **10** shifts, as indicated in FIG. 5, and the weight moves to the opposite limited position illustrated. When a draw is made and completed, the arm of the user will move from the horizontal position of FIG. 1 downwardly and back to the position of FIG. 1. Correspondingly, the weight **33** will move from the relative position of FIG. 4 to the relative position of FIG. 5 and finally back to the relative position of FIG. 4. This movement thus controls the angular motion of the dial **14**.

For this purpose, the weight **33** has integrally formed thereon a detent or dog **38**. The detent is formed by bending up a triangular portion at one side of an oblique slot cut at the periphery of the weight **33**. The detent **38** extends upwardly from the plane of the weight and toward the case dial **14**.

The dial **14** on its inner surface has a series of teeth **39** that are circularly arrayed about the axis **18** and capable of cooperation with the detent **38** to stop or release the dial. The teeth **39** are formed in a slotted circular flange that peripherally encompasses the spring **23** and flange of the cup **26**, as illustrated in FIG. 3. The teeth **39** are, however, located substantially inwardly of the peripheral wall of the case recess **13**. When the weight **33** is in the position of FIG. 5, the projection or detent **38** peripherally clears all of the teeth **39**. However, in the position of FIG. 4, the detent **38** is positioned in the path of movement of the teeth. When the detent clears, the dial **14** is released, and when the detent is moved into the path of the teeth, the dial is stopped.

The leading surfaces **39***a* of all of the teeth save the first tooth **40**, that is, the surfaces facing in the direction toward which the spring **23** moves the dial **14**, are slightly reentrant in order that the force exerted by the spring **23** imposes a reaction on the detent **38**, having a substantial inward component. Thus, the action of the spring **23** is positively to lock the detent in place until the force exerted by the spring is deliberately released by retraction of the dial **14**. Accordingly, the reading at the pointer **17** may be taken without any hazard of losing the measurement thus obtained.

At the starting position, however, the detent **38** is only very delicately engaged and the spring **23** does not preclude movement of the weight away from locking position. Thus, the first tooth **40** has its leading surface sloped in the opposite direction, as at **40***a*, so that upon the slightest movement of the weight from the position of FIG. 4, the dial is freed. Measurement of elapsed time thus begins virtually instantaneously.

In operation, after a reading is completed, the dial **14** is returned to the starting position illustrated in FIG. 4 for engagement of the detent **38** with the leading surface **40***a* of the tooth **40**. At this position, adequate energy is stored in the spring **23** to cause the dial to move through one revolution. In order to facilitate the placement of the detent **38** at the leading surface of the first tooth **40**, a stop in the nature of a radial bar **41** is formed in the cover just beyond the tooth **40**. As the force is applied upon the dial **14** against the action of the spring **23** and in the direction of the arrow **42** in FIG. 4, the detent **38** by cam action rides upwardly, outwardly and over the teeth **39** and finally over the tooth **40**. Ultimately the stop bar **41** engages the detent **38**. The dial **14** is then carefully released when the arm of the user is horizontally held, as viewed in FIG. 1, so that the leading face **40***a* of the tooth **40** then engages the detent. When the draw starts, the detent **38** moves and the dial rotates. When the draw is completed, the detent **38** enters immediately between the teeth then adjacent the detent. The pointer **17** indicates elapsed time.

The angular motion of the dial **14** can be made faster or slower by controlling the tension of the spring **23**. This may be accomplished by coiling or uncoiling the spring while the dial **14** is held stationary. To achieve this, a narrow blade screwdriver or the like may be inserted in the end of the axial cut **22** of the shaft, the dial **14** restrained, and the shaft together with the anchored end of the coil spring **23** rotated until the desired tension is achieved. For the use of the apparatus by persons of lesser skill, the rate of angular motion of the dial may purposely be small by virtue of such adjustment. The parts are so designed that for one setting of the spring, the dial **14** rotates at the very slow rate of one revolution in two or three seconds, and for another setting of the spring, rotates at the faster rate of, say, one revolution in somewhat less than a second. The markings **16** in any case display time increments of the order of fractions of a second.

The inventors claim:

1. In a fast draw timer: a case member; means for attaching the case member to the arm of a user; a movable member mounted by the case member for movement in a path fixed with respect to the case; power means interposed between the case member and the movable member for urging the movable member in one direction in its path; movable means sensitive to the orientation of the case member with respect to the horizontal for releasing and stopping the movable member; means controlling the speed of the movable member so that the movable member assumes a number of discernible positions during the running time of the order of a second; and pointer means carried by one of the members for indicating time increments of the order of fractions of a second and corresponding to successive positions of the movable member.

2. In a fast draw timer: a case having provisions for attachment to the wrist of a user; said case having a recess; a generally circular dial plate; means mounting said dial plate on the case for angular movement about an axis transverse to said dial plate; said dial plate forming a cover for said recess; a spring in the recess and connected to the case and the dial plate for urging the dial plate in one direction; yielding means reacting between the dial plate and a wall of the recess for limiting the rate of angular movement of the dial plate; said dial plate having a series of teeth exposed in the recess; and

a weight pivoted on the case and having a part movable into and out of the path of movement of the teeth in accordance with the orientation of the case for stopping and releasing the dial plate.

3. The combination as set forth in claim 2 together with stop means for determining a limit to the angular movement of said rotor in the other direction, said stop means when operable positioning one of said teeth for engagement with said weight part, all of the other teeth having leading surfaces oriented so that the spring normally urges the weight part, once engaged, more firmly into engaged position.

4. The combination as set forth in claim 3 in which said reacting means comprises viscous fluid, and means for confining the viscous fluid in the recess.

5. In a fast draw timer: a case having provisions for attachment to the wrist of the user, and having a circular recess; a circular dial fitting the recess and having a central aperture; said dial having an inner side exposed in the recess; a shaft having one end pivoted at the bottom of said recess and its other end frictionally engaged in said central aperture; a cup forming with the bottom of the case recess, a fluid chamber; the shaft extending through said chamber; vane means carried by the shaft and the case and exposed in the cup in opposed relationship to each other; fluid in the cup forming a hydraulic coupling between the vane means; a disk pivoted on the case for limited swinging movement in the recess in accordance with the orientation of the case with respect to the horizontal; and a drive spring in the recess and urging the dial in one angular direction; said dial having a series of teeth at its inner side arrayed circularly about the shaft for movement in a circular path; said disk having a projection movable into and out of the path of the teeth for stopping and releasing the dial.

6. In a fast draw timer: a case having provisions for attachment to the wrist of the user, and having a circular recess; a circular dial fitting the recess and having a central aperture; said dial having an inner side exposed in the recess; a shaft having one end pivoted at the bottom of said recess and its other end frictionally engaged in said central aperture; a disk pivoted on the case for limited swinging movement in the recess in accordance with the orientation of the case with respect to the horizontal; and a drive spring in the recess and urging the dial in one angular direction; said dial having a series of teeth at its inner side arrayed circularly about the shaft for movement in a circular path; said disk having a projection movable into and out of the path of said teeth for stopping and releasing the dial.

7. In a fast draw timer: a case having provisions for attachment to the wrist of the user, and having a circular recess; a circular dial fitting the recess, and having a central aperture; a shaft having one end pivoted at the bottom of the recess; the other end of said shaft having an axial cut, and frictionally engaged in said aperture of said dial plate; and a coiled spring having its inner end anchored at the bottom of said shaft cut, and its outer end attached to the case and providing motive power for said dial; the end of said cut being accessible exteriorly for insertion of a narrow tool whereby the spring force exerted on the dial at a given position of the dial is adjusted.

8. In a fast draw timer: a case having provisions for attachment to the wrist of the user, and having a circular recess; a circular dial fitting the recess, and having a central aperture; a shaft having one end pivoted at the bottom of the recess; the other end of said shaft having an axial cut, and frictionally engaged in said aperture of said dial plate; a coiled spring having its inner end anchored at the bottom of said shaft cut, and its outer end attached to the case and providing motive power for said dial; the end of said cut being accessible exteriorly for insertion of a narrow tool whereby the spring force exerted on the dial at a given position of the dial is adjusted; and yielding means retarding the angular movement of said dial.

9. In a fast draw timer: a case having provisions for attachment to the wrist of the user, and having a circular recess; a circular dial fitting the recess, and having a central aperture; a shaft having one end pivoted at the bottom of the recess; the other end of said shaft having an axial cut, and frictionally engaged in said aperture of said dial plate; a coiled spring having its inner end anchored at the bottom of said shaft cut, and its outer end attached to the case and providing motive power for said dial; the end of said cut being accessible exteriorly for insertion of a narrow tool whereby the spring force exerted on the dial at a given position of the dial is adjusted; yielding means retarding the angular movement of said dial; and means responsive to the orientation of the case for releasing and stopping the dial.

10. In a fast draw timer: a case having provisions for attachment to the wrist of the user; a dial; means mounting the dial on the case for angular movement; a weight mounted on the case for limited movement in a path and urged by gravity toward one limited position when the user's arm is horizontal, and toward another limited position when the user's arm is away from horizontal; said dial having a series of teeth arrayed in a circle intersecting said path whereby the motion of the dial is locked or released in accordance with the position of the weight; and means for driving the dial in one direction.

11. The combination as set forth in claim 10 together with a stop carried by the dial for determining a starting position of said dial in which said weight is positioned for cooperation with one of said teeth, and in which only the other teeth have leading surfaces producing by reaction upon said weight, a force thereon maintaining it in locked position under the force of said driving means.

12. The combination as set forth in claim 10 together with a stop carried by the dial for determining a starting position of said dial in which said weight is positioned for cooperation with one of said teeth, and in which only the other teeth have leading surfaces producing by reaction upon said weight, a force thereon maintaining it in locked position under the force of said driving means, the teeth having trailing surfaces producing by reaction upon said weight, a force thereon urging it toward released position as the dial is retracted against the force of said driving means.

13. In a fast draw timer: a case member; means for attaching the case member to the arm of a user; a movable member mounted by the case member for movement in a path fixed with respect to the case; power means interposed between the case member and the movable member for urging the movable member in one direction in its path; movable means sensitive to the orientation of the case member with respect to the horizontal for releasing and stopping the movable member; means controlling the speed of the movable member so that the movable member assumes a number of discernible positions during the running time of the order of a second; pointer means carried by one of the members for indicating time increments of the order of fractions of a second and corresponding to successive positions of the movable member; and means for adjusting the rate of angular movement of the movable member.

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