

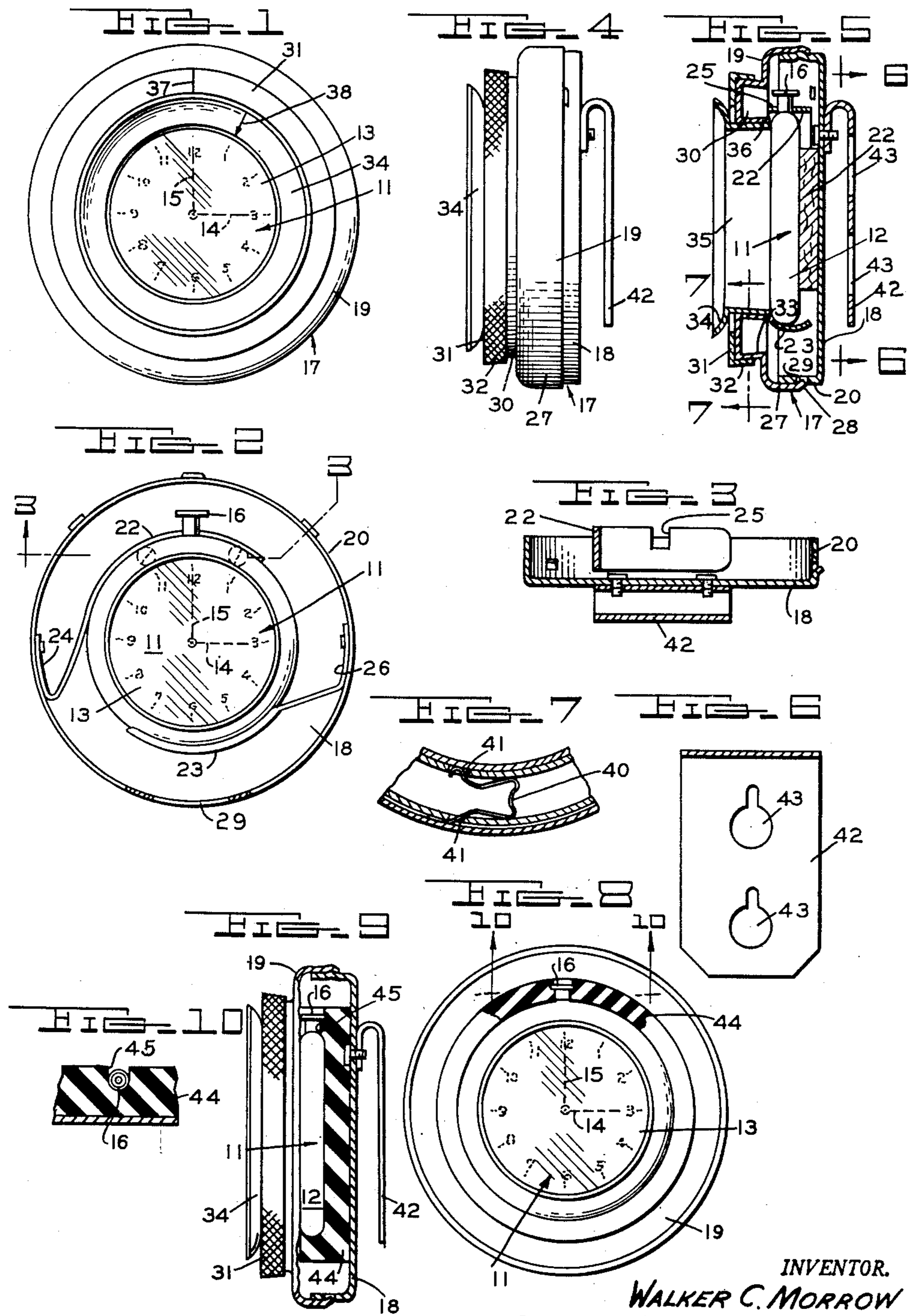
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TIMING DEVICE

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# UNITED STATES PATENT OFFICE

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## TIMING DEVICE

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4 Claims. (Cl. 58—126)

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This invention relates generally to timing equipment and has as one of its objects to provide a device capable of being employed in practically any instance where it is necessary or desirable to keep track of the expiration of predetermined time intervals.

While timing devices embodying the features of this invention have numerous and diversified uses, nevertheless, they find particular utility when employed in the navigation of aircraft. As will be more fully hereinafter explained, a timing device constructed in accordance with this invention enables a pilot to keep accurate check of the actual flying time between any two points along the course of flight so that the aircraft may be navigated with a reasonable degree of accuracy with the aid of a chart of the course and a knowledge of the air speed of the aircraft.

With the above in view, it is an object of this invention to provide a device adapted for use in conjunction with a timepiece of orthodox design to indicate the expiration of a preselected period of time.

A more detailed feature of this invention is to provide a retainer for a conventional type timepiece such, for example, as a watch and having relatively rotatable parts equipped with reference marks positioned for cooperation with one of the hands of the timepiece, usually the minute hand. Thus by relatively adjusting the two parts relative to the timepiece, any specified portion of a sixty minute period may be indicated. This general arrangement is not only highly advantageous for use in the specific application noted above, but lends itself to the numerous other diversified uses, such for example, as assisting in processing foods and the like.

The foregoing as well as other objects will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawing, wherein:

Figure 1 is a plan view of a timing device embodying the features of this invention;

Figure 2 is a plan view showing certain parts of the device removed for the sake of clearness;

Figure 3 is a sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a side elevational view of the device shown in Figure 1;

Figure 5 is a sectional view through the device shown in Figure 1;

Figure 6 is a sectional view taken on the line 6—6 of Figure 5;

Figure 7 is a sectional view taken on the line 7—7 of Figure 5;

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Figure 8 is a plan view partly in section of a modified form of construction;

Figure 9 is a sectional view through the construction shown in Figure 8; and

Figure 10 is a sectional view taken on the line 10—10 of Figure 8.

Both embodiments of this invention are adapted for use in connection with an orthodox timepiece, such for example, as a watch 11 having a casing 12 within which the usual clock mechanism is installed and having a face 13. In accordance with conventional practice, an hour hand 14 and a minute hand 15 are positioned directly above the face 13 to sweep over the graduations ordinarily applied to the face 13. The hands are of course connected to the clock mechanism within the casing 12 by suitable shafts, and the spring of the clock mechanism is adapted to be wound by the usual stem 16.

With the above in view, reference is made to the embodiment of the invention shown in Figures 1 to 7 inclusive of the drawing, wherein it will be noted that the numeral 17 indicates a retainer formed of any suitable light weight material having the requisite strength, such for example, as metal or plastic. The retainer comprises a base 18 and a cover 19. The base 18 is cup-shaped having a bottom surface and having an annular upstanding wall or flange 20. A pad 21 of shock-resisting material, such for example, as felt, rubber or the like is secured to the inner surface of the bottom wall of the base 18 centrally of the retainer to provide a seat for the timepiece 11.

The timepiece 11 is held in position on the pad 21 by a pair of spring fingers 22 and 23. The finger 22 comprises a length of spring metal having one end 24 riveted or otherwise permanently secured to the inner surface of the flange 20 and having a reversely bent portion extending inwardly from the flange 20. The reversely bent portion is shaped to engage one side of the casing 12, and is formed with a slot or notch 25 for receiving the stem 16 of the timepiece. The finger 23 also comprises a length of spring metal having one end 26 secured to the inner surface of the flange 20 diametrically opposite the end 24 of the finger 22 and having the free end shaped to engage the casing 12 of the timepiece directly opposite the spring finger 24. Thus the timepiece 11 is provided with a shockproof mounting in the retainer 17.

The cover 19 is provided with an annular flange 27 adapted to be sleeved over the annular flange or wall 20, and having a lip 28 at the free edge adapted to engage in a slot 29 formed in the wall

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20 to retain the cover in position on the base 18. The cover is provided with a central opening of sufficient diameter to expose the face 13 of the timepiece and is formed with an annular up-standing hollow rib 30 around the central opening.

An indicating ring 31, preferably although not necessarily, formed of the same material as the retainer, is supported on the top wall of the rib 30 for rotation and is provided with an inwardly extending flange 32 at the periphery adapted to telescopically engage the radially outer wall 33 of the rib 30. A second indicating ring 34 is rotatably supported on the cover 19 in concentric relation to the ring 31. As shown particularly in Figure 5 of the drawings, the second ring 34 is positioned at the top of the ring 31 and is provided with an annular inwardly extending flange 35 adapted to rotatably engage the inner wall 36 of the rib 30. Suitable reference marks 37 and 38 are respectively formed on the rings 31 and 34 in positions to selectively register with the graduations on the face of the timepiece 11.

The two rings are frictionally held in assembled relation to the cover by means of a U-shaped spring clip 40 shown in Figure 7 of the drawing as positioned between the walls of the rib 30 and having the free ends of the leg portions respectively extending through openings 41 in the walls of the rib for respective engagement with the flanges 32 and 36 of the rings. Thus the clip 40 not only frictionally holds the rings in assembled relation on the cover 19, but also functions to resiliently hold the rings in their relative adjusted positions.

For some uses of the device, it may be advantageous to provide for attaching the device to a support. This may be accomplished by a clip 42 having the upper end secured to the bottom wall of the base 18 and having bayonet type slots 43 for receiving fastener elements on any suitable support.

The embodiment of the invention shown in Figures 8 to 10 inclusive differs principally from the first described form of the invention in the manner in which the timepiece 11 is supported in the retainer. As shown particularly in Figure 9, a cup-shaped container 44 formed of a highly resilient material such, for example, as sponge rubber is secured to the inner surface of the base of the retainer. The container is of sufficient dimension to snugly receive the timepiece 11 and is formed with a recess 45 in one wall for accommodating the stem 16 of the timepiece. Thus the timepiece is protected against shock and is held firmly in position in the container without the necessity of providing the spring fingers previously described. With the above exceptions the construction of the device shown in Figures 8 to 10 inclusive may be the same as the construction of the device shown in Figures 1 to 7 inclusive, and corresponding parts are indicated by the same reference numerals.

Although it will be understood from the foregoing that the timing devices illustrated may be used in practically any instance where it is necessary or desirable to keep track of the expiration of predetermined time intervals, nevertheless, one particularly advantageous application is in the navigation of aircraft. Assuming for the purpose of this description that the point of destination of an aircraft is two hundred miles from the point of take-off, the navigator or operator selects a map of the area and draws a straight line from the point of take-off to the point of

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destination. The line thus drawn is then divided into twenty equal parts, so that the distance between adjacent divisions represents a ten mile leg. The outer ring 31 of the timing device is then adjusted or rotated to a position wherein the mark 37 registers with the minute hand 15 of the timepiece at the instant the flight is started, and the inner ring 34 is rotated to locate the marker 38 in a position to indicate the estimated time required to travel the length of the first leg, or in other words, ten miles. In arriving at this estimate, the operator is not familiar with the velocity of the air or the direction of the air in the zone of flight, and is therefore, forced to base the estimate solely on the cruising speed of the aircraft. For example, if it is assumed that five minutes will be required to traverse the first leg of the journey, the inner ring 34 is adjusted with its marker 38 positioned five minutes in advance of the marker 37. During the first leg of flight the pilot is usually over familiar territory and observes the landmarks along the line of flight. When the aircraft is directly over the landmark corresponding to the end of the first leg of flight on the map, the timepiece is also observed and the setting of the inner ring is corrected to compensate for air velocity or other conditions which may have altered the estimated cruising speed of the aircraft.

Assuming that strong head winds are encountered and that ten minutes were required to complete the first leg of the journey instead of five minutes as originally calculated, the inner ring is relatively adjusted so that the marker 38 on the inner ring is ten minutes in advance of the marker 37 on the outer ring. Thus at the expiration of the next ten minutes of flight, the aircraft should be in a position above the second leg of the journey. Thus the pilot has a reasonably accurate check on his position at all times throughout the flight.

The outer ring 31 is set at the start of the flight, and is not changed until a landing is effected. Thus it is used as a constant reference to the total elapsed time in the air. After several points have been crossed, it often happens that there is some confusion in the pilot's mind as to just which point is next. Knowing the ground speed as computed on the first leg and verified on each succeeding leg, it is only necessary to refer to the total elapsed time as shown by the mark 37, and divide by the time required for each leg. In this way he can definitely establish his position on his chart. Also the fuel consumption is determined by hours of flying rather than distance covered, and it is of the utmost importance on long flights that total time of flight be constantly evident.

Mounted on the instrument panel directly in the line of vision and convenient to reach, this instrument eliminates the need for keeping notes (very difficult when flying a small type aircraft) and working with a wrist type watch.

What I claim as my invention is:

1. A device of the class described comprising a cup-shaped retainer adapted to hold a timepiece with the face thereof visible through the open end of the retainer; a pad of shock resisting material forming a seat for the timepiece, spring arms engageable with the timepiece to hold the latter in seating engagement with the pad, a ring supported on the retainer for rotation, a second ring supported for rotation relative to the first ring about the axis of rotation of the latter ring and having a central opening through which the face

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of the timepiece is visible, and reference marks on the rings adapted to selectively register with the graduations on the face of the timepiece.

2. A device of the class described comprising a cup-shaped retainer adapted to hold a time-  
piece with the face thereof visible through the  
open end of the retainer, a removable cover for  
the retainer having a central opening, a ring sup-  
ported on the cover for rotation, a second ring  
supported on the cover in concentric relation to  
the first ring for rotation relative to the latter  
and having an opening therethrough exposing  
the face of the timepiece, a spring carried by  
said cover and frictionally engageable with both  
of said rings for holding the latter in assembled  
relation to the cover, and reference marks on the  
rings adapted to selectively register with the  
graduations on the face of the timepiece.

3. A device of the class described comprising  
a cup-like base member, a removable cover mem-  
ber for said base member, said cover member  
having a central opening therein, means in one  
of said members for mounting a watch with its  
face exposed through the opening in said cover  
member, said means comprising a pair of spring  
arms disposed diametrically in said base mem-  
ber, one of said arms having a transverse notch  
therein for receiving the stem of the watch, the  
other arm being curved transversely to interfit  
with the edge of the watch opposite to the stem,  
said cover member having a forwardly projecting  
annular mounting flange surrounding the open-  
ing, an outer rotatable indicating ring having a  
rearwardly extending annular flange engaging  
the outer surface of said mounting flange, an  
inner rotatable indicating ring having a rear-  
wardly extending annular flange engaging the  
inner surface of said mounting flange, and  
indicia on said rings for indicating starting or  
predicted positions of the hands of the watch.

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4. A device of the class described comprising  
a cup-like base member, a removable cover mem-  
ber for said base member, said cover member  
having a central opening therein, means in one  
of said members for mounting a watch with its  
face exposed through the opening in said cover  
member, said cover member having a forwardly  
projecting annular mounting flange surrounding  
the opening, an outer rotatable indicating ring  
having a rearwardly extending annular flange  
engaging the outer surface of said mounting  
flange, an inner rotatable indicating ring having  
a rearwardly extending annular flange engaging  
the inner surface of said mounting flange, and  
indicia on said rings for indicating starting or  
predicted positions of the hands of the watch,  
said mounting flange having radially spaced inner  
and outer walls, said walls having openings  
therethrough, and spring means located in the  
space between said walls, said spring means hav-  
ing portions extending through said openings in  
frictional contact with the rearwardly extending  
flanges on said rings.

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