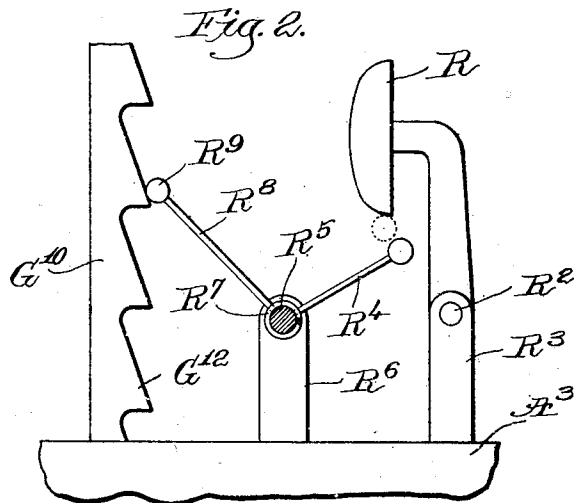
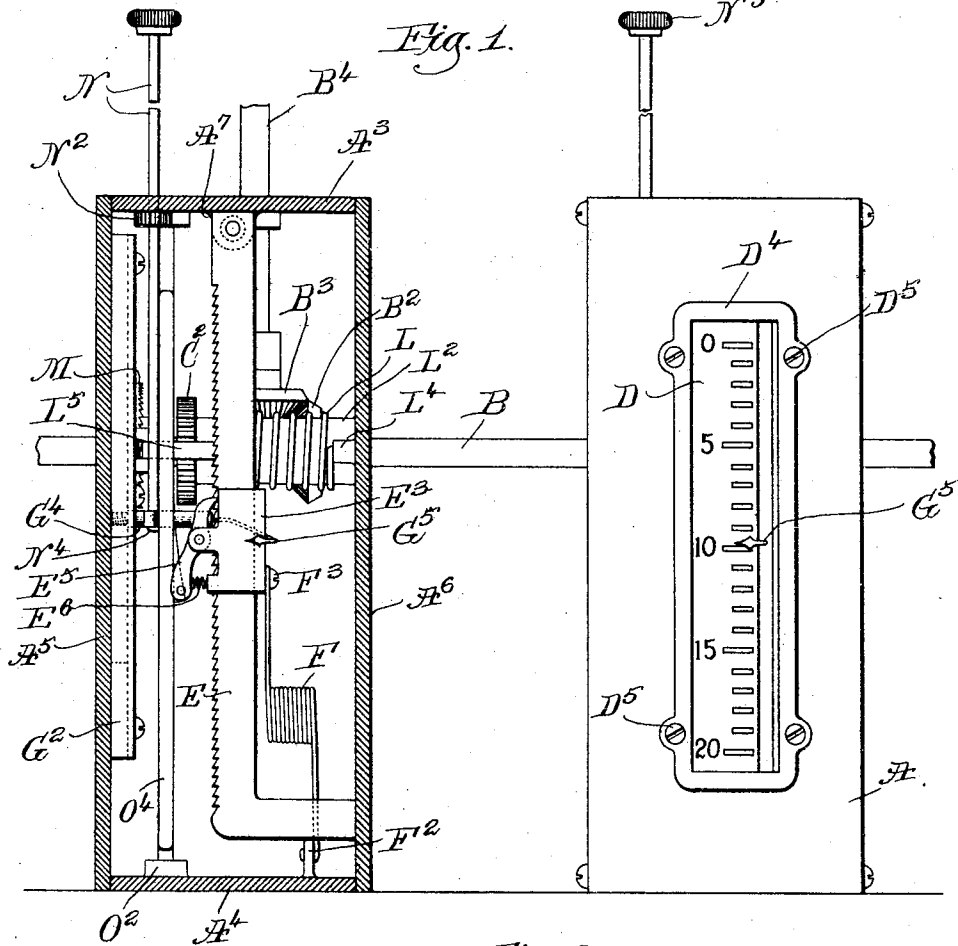


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TIME LIMIT ANNUNCIATOR.
APPLICATION FILED MAY 10, 1909.

961,276.

Patented June 14, 1910.

2 SHEETS—SHEET 1.



Witnesses.
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UNITED STATES PATENT OFFICE.

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TIME-LIMIT ANNUNCIATOR.

961,276.

Specification of Letters Patent. Patented June 14, 1910.

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To all whom it may concern:

Be it known that I, MORRIS WELSH, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Time-Limit Annunciators, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to what is herein termed a time limit annunciator, or a device for giving a sensory annunciation of the elapse of a predetermined period of time. Preferably this annunciation takes place by the ringing of a gong or bell.

The device is designed for any of the enumerable cases where it is desired to have the attention called to the elapse of a predetermined period of time. Examples of such uses are found in hospitals or in the sick-room where medicines must be given at regular periods; in hotel or domestic kitchens where various articles of food are to be cooked for certain lengths of time; in the playing of games where time limits are provided, and in many other cases.

The device of this invention may be arranged to announce the expiration of any desired limit of time, and also to announce the expiration of succeeding periods of time; and it is also arranged to keep track of simultaneously various periods of time and announce their several expirations, the number of such periods being controlled by the number of duplications of the main portion of the apparatus.

The nature of the invention will more fully appear from the accompanying description and drawings and will be particularly pointed out in the claims.

The drawings illustrate a preferred form of an apparatus embodying the invention.

In the drawings, Figure 1 is a front view of two units of the apparatus with the unit on the left having its face-plate removed to expose the interior mechanism. Fig. 2 is an enlarged detail view of an auxiliary mechanism concerned with the actuation of the expiration of successive periods of time. Fig. 3 is a side elevation of the unit shown at the left of Fig. 1 with the side plate of the casing removed. Fig. 4 is a top plan view of the same mechanism, partially in cross section.

The mechanism of the device in the specific form illustrated is inclosed in a rectangular box or casing, having the face-plate A, back-plate A², top-plate A³, bottom-plate A⁴, and side-plates A⁵, A⁶, and each such box or casing contains the mechanism for indicating the elapse of a predetermined period of time. When it is desired to provide for the indication of the elapse of various periods of time running simultaneously these boxes or casings are preferably duplicated, as indicated in Fig. 1, but its separation into separate boxes or casings is an immaterial feature of the mechanism and the mechanism can be otherwise arranged as desired.

In the form shown a horizontal shaft B runs through each unit of mechanism, box or casing, and this shaft is suitably driven, as by means of the bevel gears B², B³, from a vertical shaft B⁴ which has a uniform rotation. The rotation of the shaft B⁴ may, of course, be caused in any desired manner, but will usually result from connection with ordinary clock mechanism.

Each unit of mechanism is provided with a shaft C driven from the shaft B by a train of gears C², and according to the number or proportion of the gears C² the speed of the shaft C is controlled, so that the extent of the periods of time capable of being indicated by the particular unit of mechanism is governed, and may run from fractions of seconds up to hours and even longer periods, if desired.

In the construction illustrated in Fig. 1 the mechanism is assumed to be arranged for indicating the elapse of periods not exceeding twenty minutes.

As each unit of mechanism is in the preferred form illustrated of the same construction it will be necessary to describe but one in detail. It will be understood, also, that the mechanism illustrated is but a preferred form of the invention, and that the invention in its broader aspects may be embodied in various specific forms.

The face-plate is provided with a suitable graduated plate D, the graduations upon which correspond to the periods of time to be indicated by the particular unit of the device, and as shown in Fig. 1 these periods are illustrated as periods of twenty minutes or less. This graduated plate is shown as supported by a projection D² from the face-

plate, and is arranged behind a pane of glass D³ suitably held in place by a frame D⁴, attached by set-screws D⁵ to the face-plate.

A ratchet-bar E with its teeth inclined downwardly is located back of the face-plate and rigidly supported in a suitable manner, as by a screw connection E² to the side-plate A⁶, and a similar screw connection at the upper end to a lug A⁷ projecting from the top-plate A³. This ratchet-bar E is grooved longitudinally on its rear face, and a U-shaped slide E³ is mounted to move longitudinally of the ratchet-bar and is provided with a pin E⁴ sliding in the groove thereof. This slide E³ carries pivotally mounted thereon a pawl E⁵, normally held by a spring E⁶ in engagement with the ratchet teeth of the bar E. The slide E³ carries also a pointer or indicator E⁷, bent so as to allow its point to move up and down over the graduations on the graduated plate D.

A grasshopper spring F is connected at F² to the bottom-plate A⁴, and at F³ to the slide E³, and normally acts to elevate the slide when the pawl E⁵ is out of engagement with the ratchet teeth on the bar E. A gong H is mounted upon the top-plate A³, and a striker H² is carried by the slide E³, so that upon the release of the pawl E⁵ from the ratchet teeth of the bar E the grasshopper spring F throws the slide S upwardly causing the striker H² to sound the gong H.

A toothed rack G is arranged to slide parallel to the ratchet-bar E, and is herein shown as mounted to slide against the side-plate A⁵, being held and guided in place by a guide-bar G², secured by screws G³ to the side-plate A⁵, the said toothed rack G and guide-bar G² being provided with interlocking grooves and projections.

The toothed rack G carries a cross-bar G⁴, and a second pointer or indicator G⁵ is attached to this cross-bar and is bent to present its pointing or indicating end in front of the graduated plate to move up and down over the graduations thereof, and this pointer or indicator G⁵ is bent to extend around and in front of the pointer or indicator E⁷. The toothed rack G, with the indicator G⁵, is arranged after being set at its lowermost position to be moved upward with a uniform motion controlled by the time or clock mechanism, so that the indicator G⁵ travels over the graduations of the plate during the time indicated thereby.

The means illustrated for securing this upward movement of the indicator G⁵ are as follows. A toothed segment K is pivoted concentrically of the shaft C on the side-plate A⁵, a hollow journal K² projecting from the plate A⁵ being provided for that purpose. This segment engages the toothed rack G. A helical spring L is wound about a barrel L², arranged concentric to the shaft

C, and screwed on to a hollow projection L³ from the side-plate A⁶ concentric with the shaft C. This spring L is rigidly attached at one end, L⁴, to the side-plate A⁶, and at the other end to an arm L⁵ projecting from the segment K.

A ratchet wheel M is carried and driven by the shaft C, and a pawl M² engaging said ratchet wheel is pivotally mounted at M³ upon the segment K, and yieldingly held by a spring M⁴ in engagement with the teeth of the ratchet wheel M. These teeth are so inclined as to prevent the upward rotation of the segment K to elevate the toothed rack G faster than the rotation of the shaft C. It will thus be seen that the elevation of the toothed rack G is caused by the helical spring L and not by the driving element, or by the power obtained from the shaft B⁴. Thus the power for operating the mechanism of this invention is contained in itself, and is not a drain upon the time or clock mechanism, so that no matter how many units of the indicating mechanism are used each contains the power for its own movement and all that is required of the time or clock mechanism is to control the expenditure of that power.

The mechanism illustrated as a means for setting and releasing the indicators is as follows. A spindle N of polygonal cross-section passes through a small gear N² held against the top-plate A³ by a retaining plate N³, and is rotarily mounted at its lower end N⁴ in the cross-bar G⁴. The cross-bar G⁴ extends above a projection E⁸ from the slide E³ previously described.

A pawl releasing frame is pivotally mounted at its upper end at O in the top-plate A³ and at its lower end O² in the bottom-plate A⁴, and carries a gear O³ at its upper end engaging the gear N². This releasing frame comprises a bar O⁴, extending parallel to the path of movement of the slide E³, and adjacent to a pin E⁹ carried thereby. The releasing frame also comprises a curved bar O⁵ concentric with the shaft C and extending adjacent to the path of movement of the end of the pawl M². It will thus be seen that upon the swinging of the releasing frame the pawl E⁵ will be released from the ratchet teeth of the bar E, and the pawl M² will be released from the ratchet teeth of the ratchet wheel M. In the operation of the mechanism the releasing frame is automatically turned by a cam-like projection or continuation K³ of the segment K, which at the end of its movement comes into contact with the curved bar O⁵; and is manually turned by means of the milled head N⁵ of the spindle N.

The operation of the mechanism thus described will be apparent. When it is desired to set the mechanism the milled head N⁵ is grasped and the spindle N depressed, thus carrying down the cross-bar G⁴ with

its connected indicator G^5 ; and since the cross-bar G^4 engages the projection E^8 of the slide E^3 that slide, with its connected indicator E^7 , is also carried down, the indicator E^7 being directly behind the indicator G^5 . During the downward movement of the spindle N the rack G turns the segment K and the pawl M^2 slides over the ratchet teeth of the ratchet wheel M , and at the same time the pawl E^5 slides over the ratchet teeth of the ratchet bar E , the springs L and F being thus placed under increased tension. By this movement of the spindle N the two indicators are set at the graduation indicating the length of time which has to elapse before the annunciation takes place. As illustrated at the right-hand of Fig. 1 they are set for ten minutes. If, for any reason, in pushing down the spindle N the indicators are carried too far they may be returned to the desired position by giving a slight rotary movement to the spindle N , thus causing the rotation of the releasing frame which releases the pawls M^2 and E^5 , and allows the indicators to be moved upwardly. As soon as the indicators are set at the proper position the indicator G^5 begins to move upwardly, the spring L acting to turn the segment K , which in turn elevates the rack G , carrying the cross-bar G^4 to which the indicator G^5 is connected, and the time or clock mechanism by means of its connections with the ratchet wheel M controlling the speed of the upward movement by the engagement of the ratchet wheel M with the pawl M^2 . When the indicator G^5 has arrived at its upper limit, indicated at the right-hand side of Fig. 1 as the zero point of the graduated plate, the cam-like projection K^3 of the segment K will have come into engagement with the curved bar O^5 of the releasing frame and thereupon releasing the pawl E^5 from engagement with the ratchet bar E ; the grasshopper spring F at once acts to throw up the slide S , and the striker H^2 comes in contact with the gong H , thus announcing the expiration of the period of time for which the device was set.

It will be noted that the indicator E^7 carried by the slide E^3 , remains at the lowermost position or the position to which it was set until the elapse of the predetermined period of time so that a simple glance at the graduated plate enables the observer to note the time for which the length of the period of time for which the device is set and the amount of time that has elapsed, at any moment.

Sometimes it is desirable to announce the expiration of intermediate successive periods of time during the movement of the indicators; as for example, the expiration of each five minute period during the movement of the indicator. This result may be secured by the means illustrated particu-

larly in Fig. 2, where G^{10} is a continuation of the rack-bar G , and is provided at one face with ratchet teeth G^{12} . A gong R is pivotally mounted at R^2 upon a projection R^3 from the top-plate A^3 . A striker R^4 is mounted upon a pin or shaft R^5 , carried by another projection R^6 from the top-plate A^3 , and a coiled spring R^7 tends to move the striker R^4 toward the gong R . An arm R^8 connected to the striker R^4 extends with its end R^9 in contact with the ratchet teeth G^{12} . The ratchet teeth G^{12} are so spaced that the bar G^{10} moves a distance equal to the distance between the ratchet teeth during the required successive periods; that is to say, if it is desired to indicate successive five minute periods the bar G^{10} will move each five minutes a distance equal to the distance between adjacent ratchet teeth. It will thus be seen that upon the upward movement of the bar G^{10} the striker will come into contact with the gong at each period indicated by a ratchet tooth. The pivoting of the gong R at R^2 enables it to be thrown out of operation so that this mechanism if attached to any unit need not be used save when desired.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A time limit annunciator comprising a uniformly driven element, an external source of power for uniformly driving said element, a plate graduated in time units, an indicator adapted to move over said graduations, an independent motive device for moving the indicator backward over the graduations and connections between said driven element and said indicator for governing the backward movement of the indicator from the driven element.

2. A time limit annunciator comprising a uniformly driven element, an external source of power for uniformly driving said element, a plate graduated in time units, an indicator adapted to move over said graduations, an independent motive device for moving the indicator backward over the graduations, connections between said driven element and said indicator for governing the backward movement of the indicator from the driven element and means controlled by said motive device for giving a sensory indication of the return of said indicator to a predetermined point.

3. A time limit annunciator comprising a uniformly driven element, an external source of power for uniformly driving said element, a plate graduated in time units, two indicators adapted to move over said graduations, means whereby said indicators may be set forward to the desired graduation, an independent motive device for moving one of said indicators backward over the graduations and connections between said

driven element and said indicator for governing the backward movement of the indicator from the driven element.

4. A time limit annunciator comprising a
5 uniformly driven element, an external
source of power for uniformly driving said
element, a plate graduated in time units, two
indicators adapted to move over said gradu-
10 ations, means whereby said indicators may
be set forward to the desired graduation,
an independent motive device for moving
one of said indicators backward over the
graduations, connections between said
15 driven element and said indicator for gov-
erning the backward movement of the indi-
cator from the driven element and means
controlled by said motive device for giving
a sensory indication of the return of said
indicator to a predetermined point.

20 5. A time limit annunciator comprising
a uniformly driven element, an external
source of power for uniformly driving said
element, a plate graduated in time units, two
indicators adapted to move over said gradu-
25 ations, means whereby said indicators may be
set forward to the desired graduation, an
independent motive device for moving one of
said indicators backward over the gradu-
ations, connections between said driven ele-
30 ment and said indicator for governing the
backward movement of the indicator from
the driven element and means controlled by
said motive device and set into operation
upon the return of said indicator to a prede-
35 termined point for sounding an alarm.

6. A time limit annunciator, comprising a
uniformly driven element, a plate gradu-
ated in time units, two indicators adapted to
move over said graduations, means whereby
40 said indicators may be set forward to the
desired graduation, connections between said
driven element and one of said indicators for
governing the movement of said indicator
backward, means controlled by the parts thus
45 governed from said driven element and set
into operation upon the return of said indi-
cator to a predetermined point for releasing
and returning the second indicator to said
point and for simultaneously sounding an
50 alarm.

7. A time limit annunciator comprising
a uniformly driven element, an external
source of power for uniformly driving said
element, a plate graduated in time units, two
55 indicators, means whereby said indicators
may be set forward to the desired graduation,
motive devices independent of each
other and of said source of power for moving
said indicators backward, connections be-
60 tween said driven element and one of said
indicators for governing the movement of its
motive device in moving the indicator back-
ward, and connections for setting into oper-
ation the second motive device upon the re-
65 turn of the first indicator to a predetermined

point to release and return the second indi-
cator to said point.

8. A time limit annunciator, comprising a
uniformly driven element adapted to be
operated from a clock mechanism, a plate 70
graduated in time units, two indicators,
means whereby said indicators may be set
forward to the desired graduation, motive
devices for moving said indicators backward
over said graduations, connections between 75
said driven element and one of said indicators
for governing the movement of its motive
device in moving said indicator backward,
means actuated upon the return of said indi-
cator to a predetermined point for simul- 80
taneously giving an alarm and releasing and
returning the second indicator to the said
point.

9. A time limit annunciator, comprising a
uniformly driven element adapted to be 85
operated from a clock mechanism, a plate
graduated in time units, an indicator adapt-
ed to move over said graduations, a rack bar
carrying said indicator, a segmental gear
engaging said rack-bar, a spring for moving 90
said gear and rack bar in one direction, a
ratchet connection between said gear and
said driven element for securing the uniform
movement of said rack bar in said direction
and for allowing the free movement of said 95
rack bar in the opposite direction, a spring
for moving the second indicator in the first
mentioned direction, means for retaining the
second indicator in position at the desired
graduation, and means for releasing said 100
second indicator upon the return of the first
indicator to a predetermined point.

10. A time limit annunciator, comprising
a uniformly driven element adapted to be 105
operated from a clock mechanism, a plate
graduated in time units, two indicators
adapted to move over said graduations, a
reciprocatory rack bar carrying the first in-
dicator, a segmental gear engaging said rack
bar, a spring for moving said gear and rack 110
bar in one direction, a ratchet connection be-
tween said gear and said driven element for
securing the uniform movement of said rack-
bar in said direction and for allowing the
free movement of said rack bar in the oppo- 115
site direction, a spring for moving the sec-
ond indicator in the first mentioned direc-
tion, means for retaining the second indi-
cator in position at the desired graduation,
and means for releasing said second indi- 120
cator upon the return of the first indicator to
a predetermined point.

11. A time limit annunciator, comprising
a uniformly driven element adapted to be 125
operated from a clock mechanism, a plate
graduated in time units, an indicator adapt-
ed to move over said graduations, a rack
bar carrying said indicator, a segmental gear
engaging said rack bar, a spring for mov- 130
ing said gear and rack bar in one direction,

a ratchet connection between said gear and said driven element for securing the uniform movement of said rack bar in said direction and for allowing the free movement of said rack bar in the opposite direction, a spring for moving the second indicator in the first mentioned direction, means for retaining the second indicator in position at the desired graduation, means for releasing said second indicator upon the return of the first indicator to a predetermined point, and means operated by said second indicator when released for sounding an alarm.

12. A time limit annunciator, comprising a uniformly driven element adapted to be operated from a clock mechanism, a plate graduated in time units, a rack bar movable parallel to said plate and carrying an indicator, a spring for moving said rack bar upwardly, a ratchet bar mounted parallel to said plate, a slide mounted on said ratchet bar and carrying a second indicator, a pawl carried by said slide and adapted to retain the slide at any given position, a second spring for moving said slide upwardly when released by the pawl, a segmental gear engaging said rack bar, ratchet connections between said gear and said driven element for governing the movement of the rack bar upwardly but allowing its free movement downwardly, and means carried by said gear for releasing said pawl.

13. A time limit annunciator, comprising a uniformly driven element adapted to be operated from a clock mechanism, a plate graduated in time units, a rack bar movable parallel to said plate and carrying an indicator, a spring for moving said rack bar upwardly, a ratchet bar mounted parallel to said plate, a slide mounted on said ratchet bar and carrying a second indicator, a pawl carried by said slide and adapted to retain the slide at any given position, a second spring for moving said slide upwardly when released by the pawl, a segmental gear engaging said rack bar, ratchet connections between said gear and said driven element for governing the movement of the rack bar upwardly but allowing its free movement downwardly, and means carried by said gear for releasing said pawl, a bell, a striker carried by said slide and adapted to con-

tact with said bell upon the release of said pawl to sound an alarm.

14. A time limit annunciator, comprising a uniformly driven element adapted to be operated from a clock mechanism, a plate graduated in time units, a rack bar movable parallel to said plate and carrying an indicator, a spring for moving said rack bar upwardly, a ratchet bar mounted parallel to said plate, a slide mounted on said ratchet bar and carrying a second indicator, a pawl carried by said slide and adapted to retain the slide at any given position, a second spring for moving said slide upwardly when released by the pawl, a segmental gear engaging said rack bar, ratchet connections between said gear and said driven element for governing the movement of the rack bar upwardly but allowing its free movement downwardly, means carried by said gear for releasing said pawl, and means for manually moving said rack bar.

15. A time limit annunciator, comprising a uniformly driven element adapted to be operated from a clock mechanism, a plate graduated in time units, a rack bar movable parallel to said plate and carrying an indicator, a spring for moving said rack bar upwardly, a ratchet bar mounted parallel to said plate, a slide mounted on said ratchet bar and carrying a second indicator, a pawl carried by said slide and adapted to retain the slide at any given position, a second spring for moving said slide upwardly when released by the pawl, a segmental gear engaging said rack bar, ratchet connections between said gear and said driven element for governing the movement of the rack bar upwardly but allowing its free movement downwardly, means carried by said gear for releasing said pawl, and means for manually simultaneously releasing said pawl and said ratchet connections whereby the indicators may be set to any desired position.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

MORRIS WELSH.

Witnesses:

MABEL PARTELOW,
THOMAS J. DRUMMOND.