May 2, 1961 F. MEYER 2,982,084

ALARM DEVICE

Filed July 23, 1957 2 Sheets-Sheet 1

FIG.1

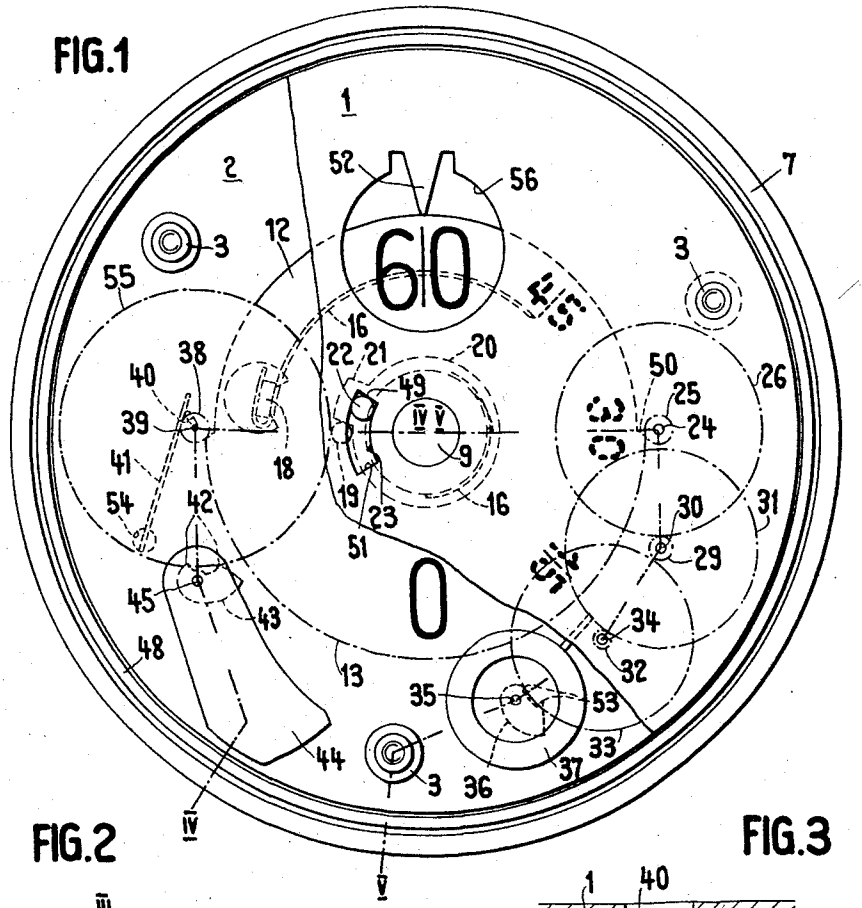


FIG.2

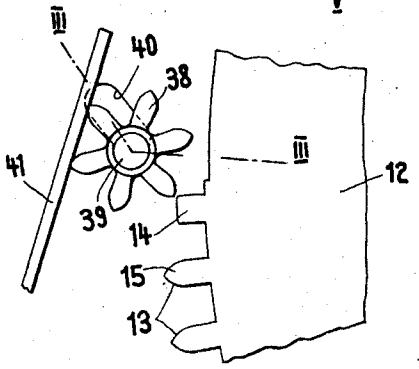
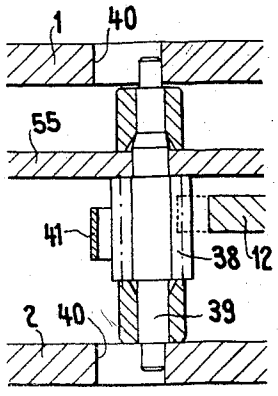


FIG.3



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May 2, 1961 F. MEYER 2,982,084

ALARM DEVICE

Filed July 23, 1957 2 Sheets-Sheet 2

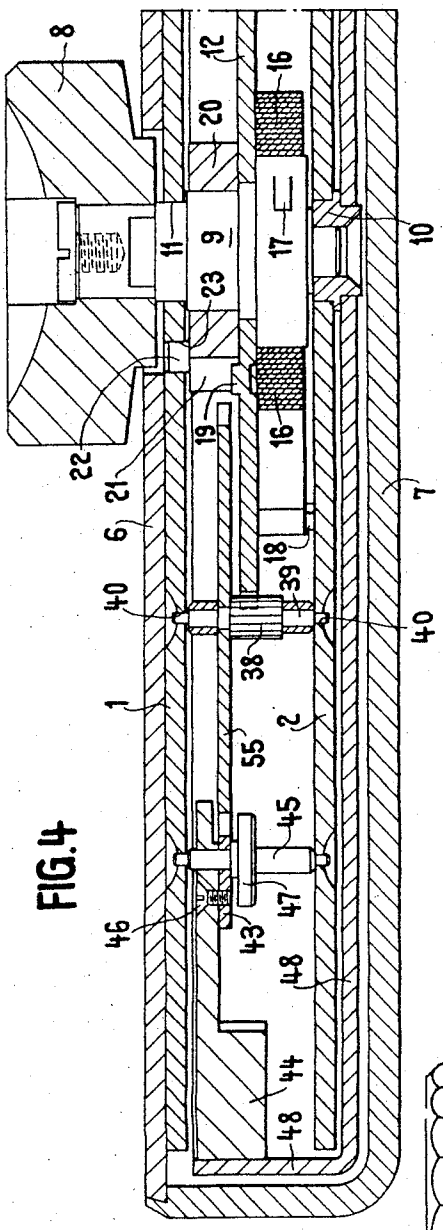

FIG.4

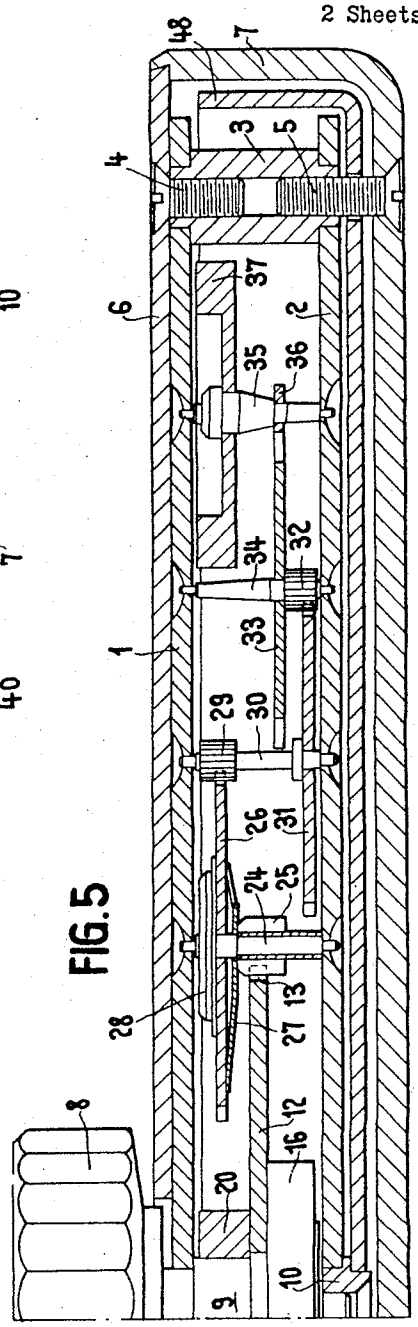

FIG.5

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ALARM DEVICE

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Claims priority, application Switzerland May 29, 1957

1 Claim. (Cl. 58—21.13)

The present invention relates to a timepiece of the type in which a single spring powers the time and alarm mechanisms.

An object of the invention is to provide a pocket size alarm device used to call a motorist's or an owner's attention of any other vehicle to the lapse of the parking time.

Another object of the invention is to provide an alarm device including a partially toothed drive wheel which over a part of a revolution is in engagement with the going movement and over another part of a revolution in engagement with the alarm movement.

Other objects and features will be apparent as the following description proceeds reference being had to the accompanying drawings illustrating by way of example one embodiment of the invention and in which:

Fig. 1 is a schematic plan view of the device seen from the side of the winding knob;

Fig. 2 illustrates on a larger scale a detail of the alarm movement;

Fig. 3 is a sectional view taken along broken line III—III of Fig. 2; and

Figs. 4 and 5 are sectional views taken on a larger scale along the broken lines IV—IV and V—V respectively of Fig. 1.

The pillar plates 1 and 2 which may have exactly the same shape are mounted on spacing members 3 secured to a catch cover 6 and on the casing 7 by means of screws 4 and 5 respectively in such a way that the pillar plates 1 and 2 are not stressed and thus may be relatively thin. The winding stem 9 rigidly connected with the hand-operable winding knob 8 is journalled in a bearing 10 of the pillar plate 2 and in a bearing 11 of the pillar plate 1.

The drive wheel 12 rigidly connected with the winding stem 9 has a toothing 13 extending only over about half the circumference of the wheel 12 which also includes indices 0, 15, 30, 45, 60 indicating minutes and being distributed over half the circumference of the wheel 12 (Fig. 1). These indices become visible in a certain position through a window 56 with a hand 52 provided on the pillar plate 1 and the cover 6. Therefore, the drive wheel 12 simultaneously constitutes an indicating disc. The outermost teeth 14 at the two ends of the toothing 13 are shorter than the remaining teeth 15. In Fig. 2 only the outermost tooth 14 at one end is shown. Due to these shorter teeth 14 jamming or setting-up (described later on) is avoided.

The one end of a drive spring 16 is appended on the winding stem 9 as at 17 (Fig. 4) and the other end of the spring 16 is fixed to a lug 18 bent out of the pillar plate 2 as indicated in dotted lines in Fig. 1. In this way, the drive wheel 12 forms some sort of cover for the drive spring 16. The drive wheel 12 includes an abutment member or pin 19 made in one piece with it.

A rotatably movable member or disc 20 with a radially extending projection 21 providing two faces spaced a predetermined distance is loosely placed on the winding stem 9. A pin 22 is inserted in the disc 20 or is made

in one piece with it and enters stop means preferably in the form of a slot 23 of the pillar plate 1. The cooperation of the pins 19 and 22 and the slot 23 will be described later on. At the right of the drive wheel 12 (Fig. 1) a pinion 25 is journalled in the pillar plates 1 and 2 by means of a shaft 24. This pinion serves to cooperate with the toothing 13 of the drive wheel 12. A wheel 26 is loosely mounted on the shaft 24 and is pressed by means of a friction spring 27 abutting on the pinion 25 against a disc 28 rigidly fixed to the shaft 24. Therefore, the drive connection between the pinion 25 and the wheel 26 is attained by a friction coupling so that the wheel 26 under certain conditions, can remain at rest when the pinion 25 and the drive wheel 12 rotates.

The wheel 26 is in mesh with a pinion 29 of a shaft 30 journalled in the pillar plates 1 and 2, shaft 30 also carrying an intermediate wheel 31 in mesh with the pinion 32 of an escape wheel 33 which together with the pinion 32 is mounted on a shaft 34 journalled in the pillar plates 1 and 2. The escape wheel 33 has ratchet teeth and cooperates with a retarder 36 having two pallets 53 and being mounted on the balance shaft 35 journalled in the pillar plates 1 and 2. The balance 37 also carried by the shaft 35 is springless. The parts 25, 26, 29, 31, 32, 33, 36 and 37 constitute the going or retarding movement of the alarm device.

On the left in Fig. 1, there is the alarm movement. It includes a pinion 38 to mesh with the toothing 13 of the drive wheel 12. The shaft 39 of the pinion 38 is mounted in slots 40 of the pillar plates 1 and 2 in such a manner that it can be displaced parallel to itself in order to be passed by the toothing 13 on the winding of the drive spring 16, i.e. on rotation of the drive wheel 12 in the clockwise direction of Fig. 1 and to mesh with the toothing 13 to provide an alarm when the spring 16 is running down. Since the pinion 38 is not in permanent engagement with the toothing 13 during a complete revolution of the drive wheel 12, but must come into engagement with it at a certain moment, there exists the danger of jamming or setting-up between the teeth of the pinion 38 and the toothing 13 in spite of the shorter teeth 14.

In order to avoid such setting-up a leaf spring 41 is in contact with the circumference of the pinion 38 and, in the position of the pinion 38 according to Fig. 2, bears against two adjacent teeth of the pinion 38 in such a manner, that setting-up between the teeth of the parts 38 and 13 is definitely avoided in that the tooth of the pinion 38 which first comes into contact with a tooth of wheel 12 is properly positioned by the spring 41. In order to secure the spring 41 its end away from the pinion 38 is bent at a right angle and pressed into a hole 54 of the pillar plate 2. The shaft 39 carries a wheel 55 with ratchet teeth, cooperating with the drive member 43, having two teeth 42, of an alarm hammer 44. Member 43 and hammer 44 connected together by means of a screw 46 are rigidly fixed to the shaft 45 journalled in the pillar plates 1 and 2. For emitting alarm signals the hammer 44 strikes against a bell 48 fixed to the bearing 10. Since on displacement of the pinion shaft 39 in the slots 40 tilting of this shaft becomes possible, a collar 47 is provided on the shaft 45 at the side of the member 43 away from the hammer 44. The wheel 55 enters the space axially limited by the hammer 44 and the collar 47, in such a manner that on tilting of the shaft 39 the wheel 55 cannot disengage from member 43.

The illustrated and described device works as follows:

In the position of the several parts as shown in Fig. 1 the device is wound up for the period of an hour. In the window 56 the index "60" of the drive disc or wheel 12 is visible, i.e. the alarm movement 38, 55, 43, 44, 48

becomes effective after the expiration of sixty minutes. In the initial position of Fig. 1 the pin 19 of the drive wheel 12 is between the disc 20 and the wheel 55. The projection 21 of the disc 20 bears from the top in Fig. 1 against the pin 19, while the pin 22 contacts the end face 49 of the slot 23. The toothing 13 is disengaged from the pinion 38 and is immediately before its engagement with the pinion 25. Now, when the drive wheel 12 under the action of the drive spring 16 begins to rotate in the anticlockwise direction of Fig. 1 the toothing 13 at once engages the pinion 25 which through the intermediary of the friction spring 27 drives the wheels and pinions 26, 29, 31, 32 and 33.

The retarder 36, under the aid of the balance 37, regulates or retards respectively the speed of the going or regulating movement and thereby the speed of the drive wheel 12 against the action of spring 16 in such a manner that the drive disc or wheel 12 turns during an hour by half a revolution in the anticlockwise direction of Fig. 1. When the index "0" of the disc 12 appears in the window 56, i.e., when an hour has lapsed, the end 50 of the toothing 13 shown at the right side in Fig. 1 comes within reach of the pinion 38 so that the teeth 14 and 15 engage the pinion 38 and the wheel 55 is turned in the clockwise direction of Fig. 1 and oscillations are imparted to the member 43 by cooperation of the teeth of the wheel 55 with the teeth 42 of the member 43, so that the hammer 44 strikes against the bell 48. The drive wheel 12 is not in engagement with the going and regulating movement during the driving of the alarm movement 38, 55, 43, 44, so that the spring 16 can develop its full power for operating the alarm movement and in consequence can impart to the drive wheel 12 a much greater speed than before so that this wheel runs through the second half revolution, during which alarm is given, in a very short period (e.g. in 5 to 10 seconds).

At the beginning of the above-described running-down movement the pin 19 of the wheel 12 leaves the projection 21 and, at a certain moment of the unwinding motion, strikes against the projection 21 from the other side (from the top in Fig. 1). The pin 19 by means of the projection 21 then carries the disc 20 along in the anticlockwise direction until the pin 22 strikes against the end face 51 of the slot 23 of the pillar plate 1 so that the drive wheel 12 is stopped and the alarm ceases. This occurs at the moment when the pin 19 arrives again in the position of Fig. 1 with the exception that the projection 21 now lies in Fig. 1 below the pin 19. From this end position where again the index "60" is visible in the window 56 the wheel 12 can no longer turn in the anticlockwise direction since the pin 22 strikes against the stationary end face 51.

In order to rewind the now unwound device for another period of one hour the drive wheel 12 is turned in the clockwise direction of Fig. 1 by a complete revolution by means of the winding knob 8. At the beginning of this winding movement the toothing 13 strikes against the pinion 38 and forces the shaft 39 with the pinion 38 away from itself along the slots 40 and against the action of the spring 41 so that the toothing 13 jumps over the pinion 38. When the fore end of the toothing 13 arrives in reach of the pinion 25, the latter engages the toothing 13 and is rotated while the resistance produced by the going and regulating movement prevents the wheel 26 from turning, which is possible because of the friction spring 27. During the winding operation the pin 19 has been carried along in the clockwise direction, i.e., has left the projection 21 in order, towards the end of the revolution of the drive wheel 12, to strike against the projection 21 from its bottom side (Fig. 1) and to carry the projection 21 with the disc 20 and the pin 22 along in the clockwise direction until the pin 22 strikes against the end face 49 and pin 19, projection 21 and pin 22 are again in the position of Fig. 1 out of which the wheel 12 can no longer be turned in the clockwise direction because the pin 22 strikes against the stationary end face 49. The cycle as described above may now be repeated.

The pins 19 and 22, the projection 21 and the slot 23, therefore, constitute a stopping device for the drive wheel 12 and thereby for the winding stem 9 with the aid of the wheel 12. It is understood that the disc or wheel 12 can be adjusted to any time period from 0 to 60 minutes, for which periods simply a winding rotation of less than 360° becomes necessary. Should it be desired to adjust the device already wound-up to a smaller time period the wheel 12 is turned in the anticlockwise direction, which will be possible due to the friction spring 27 in spite of the engagement of the pinion 25 in the toothing 13.

Obviously, by appropriate selection of gears as is well known in the art the mechanism running period of other than 60 minutes might be obtained.

While I have shown and described one embodiment of my invention I do not wish to limit the scope thereto but reserve the right to make such modifications and rearrangements that may come within the purview of the appending claim.

I claim:

A timer and alarm device of the type wherein a time mechanism operates for a predetermined set interval and thereafter the time mechanism ceases operation and an alarm signal is actuated, the device including a clockwork gear train and an alarm gear train powered by a single drive spring, a centrally mounted hand operable winding stem adapted to be rotated to wind the spring, a bearing member to journal the winding stem, a drive wheel attached to the winding stem for rotation therewith and having indicia thereon, gear train disengaging means wherein during the winding operation the alarm gear train and the clockwork gear train are disengaged from the drive wheel and during the running operation the clockwork gear train is first engaged with the drive wheel and then disengaged from the drive wheel and thereafter the alarm gear train is engaged with the drive wheel, the clockwork gear train including a toothed escape wheel, a shaft-mounted double-toothed pallet in engagement with the escape wheel, and a balance carried by the shaft mounting for the pallet, the teeth of the pallet adapted to alternately engage the teeth of the escape wheel to cause the balance to oscillate, thereby providing a self-starting device, the alarm gear train including a toothed escape wheel, a shaft-mounted double-toothed alarm pallet in engagement with the escape wheel, a hammer carried by said last mentioned shaft mounting, and a bell in juxtaposition to the hammer for striking thereby, the improvement wherein the alarm bell at its center is fixedly attached to the bearing member which is the sole support therefor.

References Cited in the file of this patent

UNITED STATES PATENTS

628,042	Schulze	July 4, 1899
1,068,395	Schaumburg	July 22, 1913
1,804,138	Yeilder	May 5, 1931
1,916,033	Baltsois	June 27, 1933
2,094,162	Scott	Sept. 28, 1937
2,150,633	Rhodes et al.	Mar. 14, 1939
2,311,242	Michaels	Feb. 16, 1943
2,480,760	Morse	Aug. 30, 1949
2,604,753	Doertenbach et al.	July 29, 1952
2,656,672	Webber	Oct. 27, 1953
2,661,591	Thiebaud	Dec. 8, 1953
2,667,921	Doyle	Feb. 2, 1954
2,707,371	Kocher	May 3, 1955
2,787,464	Davidson et al	Apr. 2, 1957