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F. MEYER

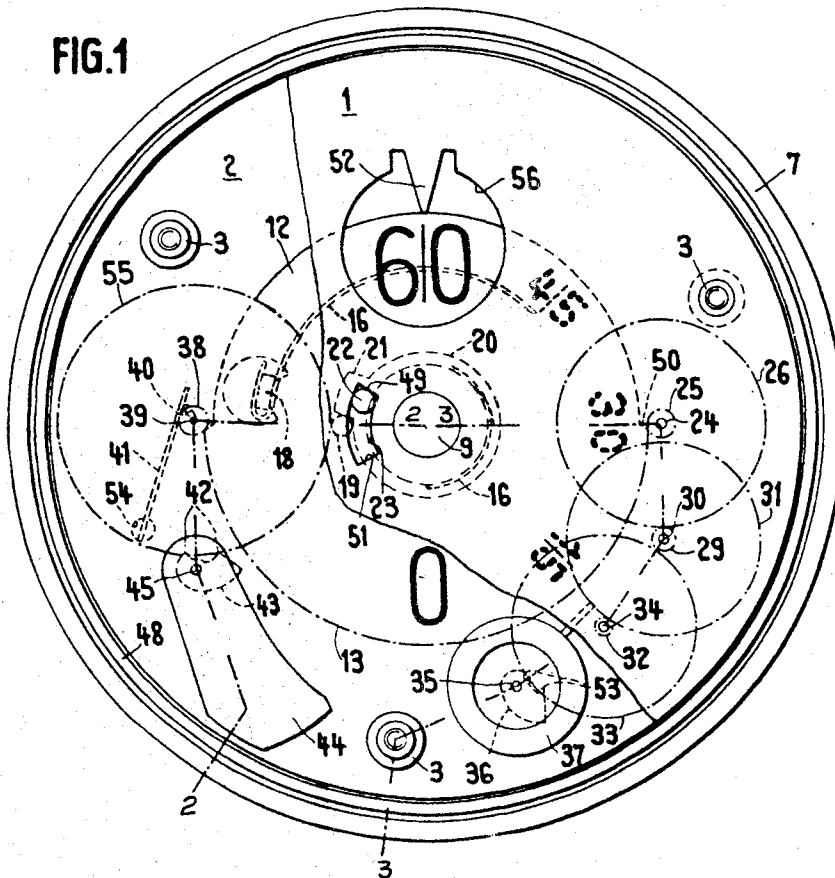
2,949,170

DEVICE IN TIME METERS FOR LIMITING AT TWO DETERMINED
END POSITIONS THE MOTION OF A MEMBER MOVABLE
IN TWO OPPOSITE DIRECTIONS

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2 Sheets-Sheet 1

FIG. 1



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2 Sheets-Sheet 2

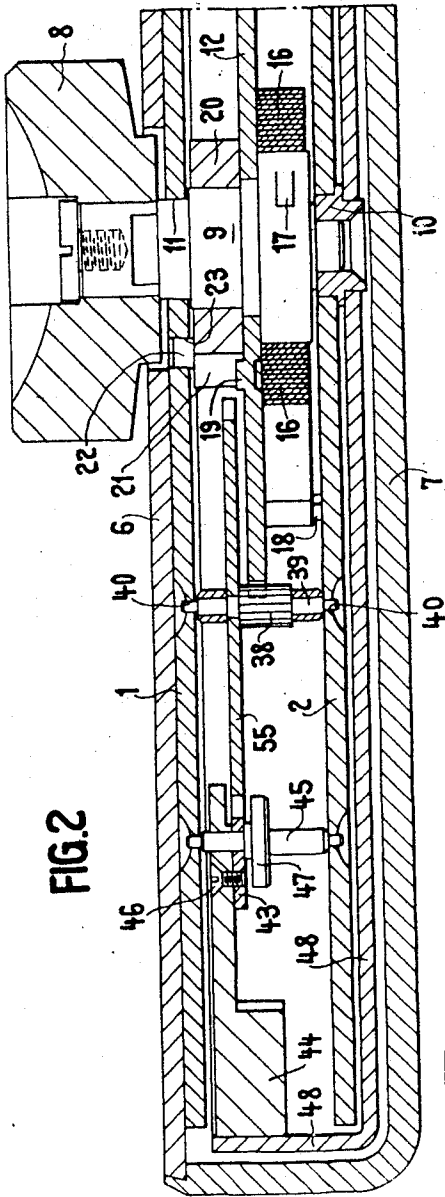


FIG. 2

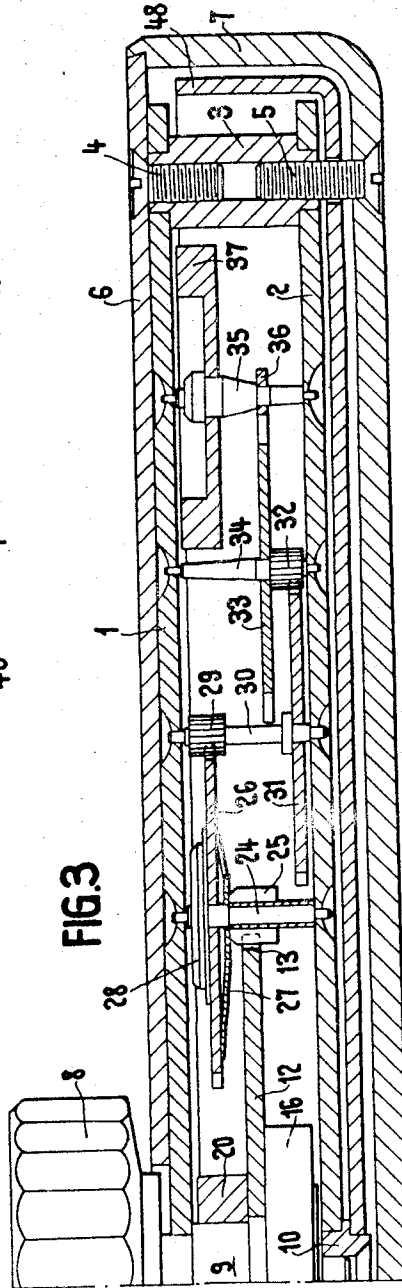


FIG. 3

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DEVICE IN TIME METERS FOR LIMITING AT TWO DETERMINED END POSITIONS THE MOTION OF A MEMBER MOVABLE IN TWO OPPOSITE DIRECTIONS

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3 Claims. (Cl. 185—43)

Object of the invention is a device used in time meters.

Further object of the invention is a device for limiting at two determined end positions the motion of a member movable in two opposite directions.

Another object of the invention is that coaxial to said member comprising a driver another member loosely rotatable relatively to said first member is provided, said second member including a first stop cooperating with said driver and a second stop entering and opening of a stationary part to cooperate with the end faces of said opening.

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.

Figs. 2 and 3 are sectional views taken on a larger scale along the broken lines 2—2 and 3—3 respectively of Fig. 1.

The device illustrated and described below is used in an alarm device forming object of the copending patent application, Ser. No. 673,681, filed the same day under the title "Alarm Device."

The pillar plates 1 and 2 are mounted on distance pieces 3 held on the catch cover 6 and on the casing 7 by means of screws 4 and 5 respectively. The winding stem 9 rigidly connected with the hand-operable winding knob 8 is journaled in a bearing 10 of the pillar plate 2 and in a bearing 11 of the pillar plate 1. The rotatable member forming a drive wheel 12 rigidly connected with the winding stem 9 has a tothing 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. The one end of a drive spring 16 is appended on the winding stem 9 as at 17 (Fig. 2) 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. The drive wheel 12 includes a pin-shaped stop or driver 19 made in one piece with it. A disc-like member 20 with a radially projecting nose-like stop 21 is loosely placed placed on the winding stem 9. A pin-like stop 22 is inserted in the disc 20 or is made in one piece with it and enters a slot-like opening 23 of the pillar plate 1. The cooperation of the pins 19 and 22 and the slot 23 with its end faces 49, 51 will be described later on. At the right of the drive wheel 12 (Fig. 1) a pinion 25 is journaled in the pillar plates 1 and 2 by means of a shaft 24. This pinion serves to cooperate with the tothing 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. The wheel 26 is in mesh with a pinion 29 of a shaft 30 journaled in the pillar plates 1 and 2, shaft 30 also carry-

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ing 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 journaled in the pillar plates 1 and 2. The escape wheel 33 has ratchet teeth and co-operates with a pallet or retarder 36 having two noses 53 and being mounted on the balance shaft 35 journaled 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 tothing 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. A leaf spring 41 bears in the rest position of the pinion 38 against two adjacent teeth of the pinion 38 in order to hold the pinion in a position where setting up of the teeth of the parts 38 and 13 is prevented with absolute safety. An end bent at right angle of the spring 41 is 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 journaled in the pillar plates 1 and 2. For emitting alarm signals the hammer 44 strikes against a bell 48 fixed to the bearing 10. The wheel 55 enters the space axially limited by the hammer 44 and a collar 47 of the shaft 45.

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. 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 nose 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 tothing 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 constraint of the drive spring 16 begins to rotate in the anticlockwise direction of Fig. 1 the tothing 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 constraint 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 the previously adjusted hour has lapsed, the end 50 of the tothing 13 shown at the right side in Fig. 1 comes within reach of the pinion 38 so that the tothing 13 engages the pinion 38 and the wheel 55 is turned in the clockwise direction of Fig. 1 and the hammer 44 strikes against the bell 48. The drive wheel 12 being not in engagement with the going and regulating movement during the driving of the alarm movement 38, 55, 43, 44, 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 nose 21 and, at a certain moment of the unwinding motion, strikes against the nose 21 from the other side (from the top in Fig. 1). The pin 19 by means of the nose 21 then

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carries the disc 20, 22 loosely placed on the winding stem 9 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 alarm ceases. This occurs at the moment when the pin 19 arrives again in the position of Fig. 1 with the exception that the nose 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. On this rotation the toothing 13 jumps over the pinion 38 during the first half revolution of the wheel 12. When the fore end of the toothing 13 comes in engagement with the pinion 25, only the pinion 25 of the complete going and regulating movement rotates. During winding also the pin 19 has been carried along in the clockwise direction, i.e., has left the nose 21 in order, towards the end of the revolution, to strike against the nose 21 from the other side (from bottom in Fig. 1) and to carry the nose 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, nose 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 nose 21 and the slot 23, therefore, constitute a device for limiting the motion of the drive wheel 12 and thereby of the winding stem 9, allowing to limit two determined end positions for the winding stem 9 with the aid of the wheel 12.

The novel device cannot only be used in alarm devices, but in every kind of time meter where it is the question of limiting the motion of a member movable in two opposite directions in two determined end positions.

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 as may come within the purview of the appending claims.

I claim:

1. A timer including a drive spring, a hand operable winding stem adapted to be rotated to wind the spring, a drive wheel attached to the winding stem for rotation therewith, a first stop member carried by the drive wheel, a rotatable member in axial alignment with the drive wheel, a second stop member carried by the rotatable member, a pair of fixed abutting members spaced a predetermined distance and adapted to limit the arcuate movement of the second stop member, and a third stop member carried by the rotatable member made of a predetermined width thus providing two sides thereof, the third stop member to engage the first stop member, so that at the rundown position of the drive spring the movement of the winding stem is limited by the first stop

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member in contact with one side of the third stop member and the second stop member in contact with one of the pair of fixed abutting members, and in the wound position the movement of the winding stem is limited by the first stop member in contact with the other side of the third stop member and the second stop member in contact with the other of the pair of fixed abutting members.

2. A timer including a drive spring, a hand operable winding stem adapted to be rotated to wind the spring, a pillar plate, a drive wheel attached to the winding stem for rotation therewith and carried by the pillar plate, a first pin carried by the drive wheel, a rotatable member in axial alignment with the drive wheel, a second pin carried by the rotatable member, the pillar plate having a slot therein of predetermined length and adapted to limit the arcuate movement of the second pin, and a stop member carried by the rotatable member made of a predetermined width thus providing two sides thereof, the stop member adapted to engage the first pin, so that at the rundown position of the drive spring the movement of the winding stem is limited by the first pin in contact with one side of the stop member and the second pin in contact with one end of the slot, and in the wound position the movement of the winding stem is limited by the first pin in contact with the other side of the stop member and the second pin in contact with the other end of the slot.

3. A timer including a drive spring, a hand operable winding stem adapted to be rotated to wind the spring, a pillar plate, a drive wheel attached to the winding stem for rotation therewith and carried by the pillar plate, a first pin carried by the drive wheel, a collar member rotatably carried by the drive wheel and in axial alignment therewith, a second pin carried by the rotatable collar member, the pillar plate having an arcuate shaped slot therein of a predetermined length and adapted to limit the arcuate movement of the second pin member, and a stop member extension projecting radially from the rotatable collar member made of a predetermined width thus providing two sides, the stop member extension adapted to engage the first pin member, so that at the rundown position of the drive spring the movement of the winding stem is limited by the first pin member in contact with one side of the stop member extension and the second pin in contact with one end of the slot, and in the wound position the movement of the winding stem is limited by the first pin in contact with the other side of the stop member extension and the second pin in contact with the other end of the slot.

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