

[54] **MECHANICAL IMPROVEMENT ON AN ALARM CLOCK**

[75] Inventors: **Roland Siefert**, Bad Durrheim; **Hans Seckinger**; **Herbert Krösche**, both of Schwenningen, all of Germany

[73] Assignee: **Kienzle Uhrenfabriken G.m.b.H.**, Germany

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[58] Field of Search 58/53-56;
248/114-116

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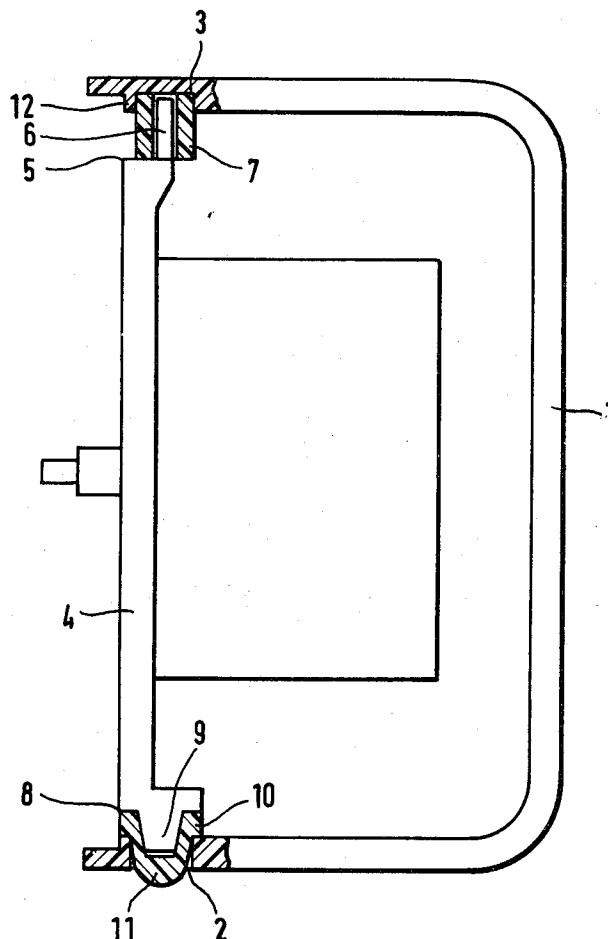
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Attorney, Agent, or Firm—Pugh & Laiche

[57] **ABSTRACT**

There is provided an alarm clock comprising an open-end clock case, a plate carrying the clock mechanism and an adjuster wheel for adjusting clock time and alarm time. The adjuster wheel is mounted for free rotation on a shaft which has a pinion mounted on one end for rotation therewith. The pinion co-acts with the adjuster wheel and drivingly engages the different gears of the clock hand and alarm hand adjusting mechanism. Located between the pinion and the adjuster wheel is a slip coupling. The clock case is provided with an opening through which the adjuster wheel protrudes and has further openings which receive corresponding studs located on the clock mechanism carrying plate. The studs have rubber surfaces and serve as feet for supporting the clock in its normal position of use.

12 Claims, 3 Drawing Figures



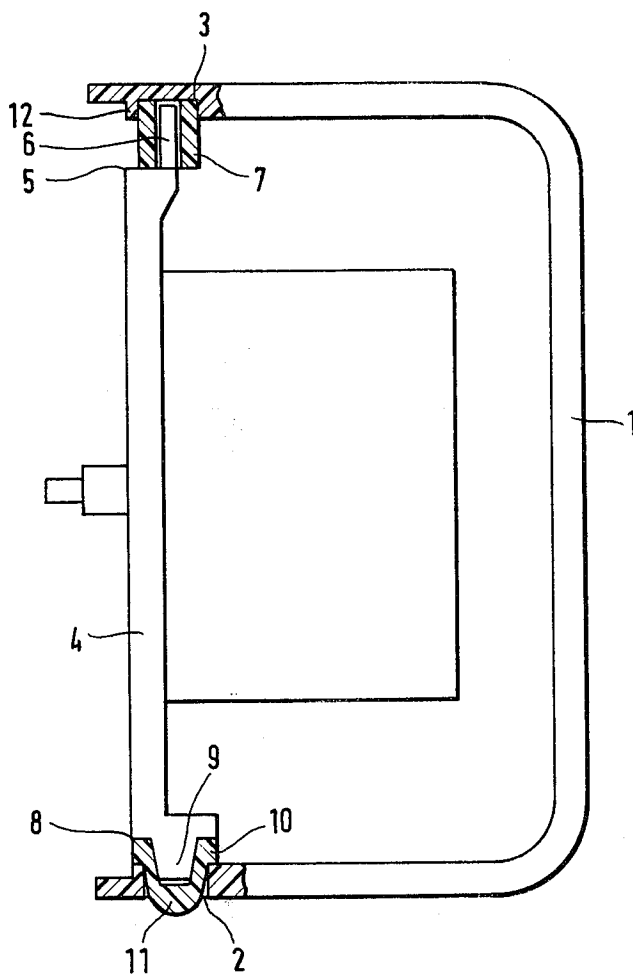


FIG. 1

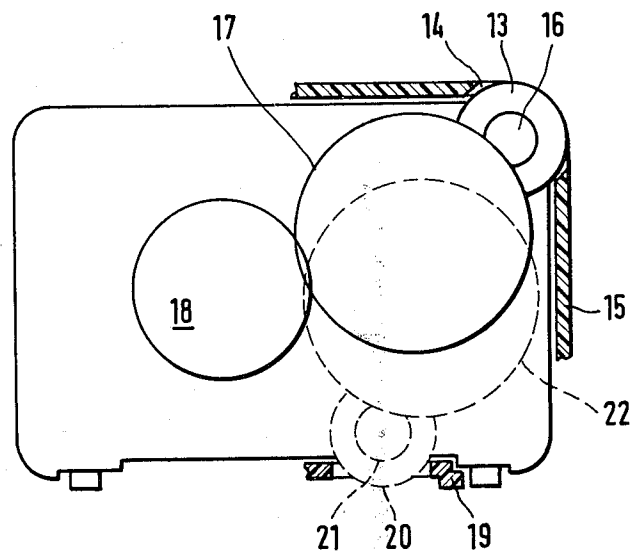


FIG. 2

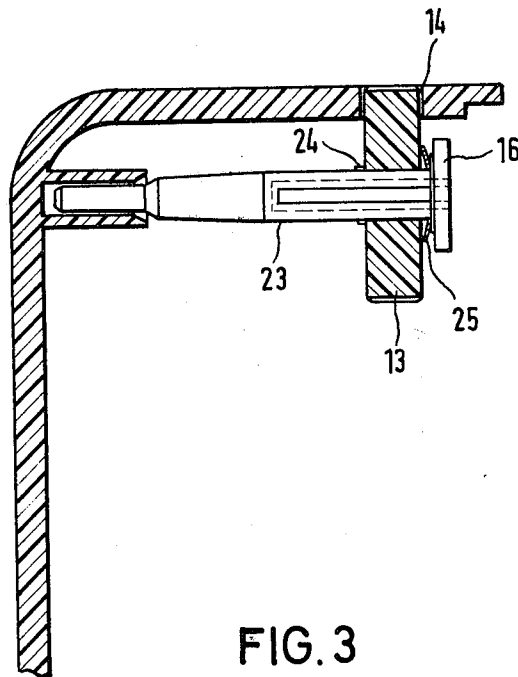


FIG. 3

MECHANICAL IMPROVEMENT ON AN ALARM CLOCK

BACKGROUND OF THE INVENTION

The present invention relates to improvements in alarm clocks and in particular to an improved mechanism for adjusting the position of the clock hands and for setting the alarm, and to a mounting arrangement for the plate carrying the clock works.

With alarm clocks of the type envisaged the alarm is tripped by virtue of the fact that when the set alarm time is reached, dogs, which are normally two in number, located on an alarm tripping wheel drop into corresponding notches located in the hour wheel (or vice versa), thereby bringing the two wheels together. As the hour wheel continues to rotate, the dogs are lifted out of the notches by means of an inclined surface, whereby the alarm tripping wheel and the hour wheel are moved axially away from one another.

The dogs will also fall into the notches if the hands of the clock are rotated anti-clockwise, whereby the alarm tripping wheel and the alarm pointer will be entrained with any further anti-clockwise movement of the hands, because in this direction of movement the dogs are not guided by the inclined surface but are forced against a vertical face of respective notches and cannot be lifted out of the latter. The same applies to the clock hands if an attempt is made to set the alarm by rotating for example the setting knob in the wrong direction.

A single direction of rotation is therefore generally prescribed for adjusting the clock hands, for example when setting the correct time, and for setting the alarm. However, if the user of the clock, either through forgetfulness or unwittingly, makes these adjustments in the wrong direction then the clock may be damaged; or at any rate there is unwanted interference with the time displayed by the clock or the time at which the alarm is set to go off. This kind of situation can also arise if the knob for adjusting the alarm and/or the hands, can be moved if accidentally touched.

An object of the present invention is therefore to design the mechanism for adjusting the clock hands or the alarm so that the danger of damaging the mechanism, should an attempt be made to make said adjustments in the wrong direction is at least substantially eliminated.

Accordingly, there is provided in accordance with one aspect of the invention an alarm clock comprising a spindle, an adjuster wheel freely rotatable on said spindle, a pinion co-operating with said adjuster wheel and mounted to said spindle for rotation therewith, and spring means located between the adjuster wheel and the pinion to provide frictional driving contact therebetween, the arrangement being such that said driving contact ceases when the force required to rotate said pinion exceeds a pre-determined magnitude. The alarm adjuster wheel is arranged at a corner of the clock case and can be operated through a slot or opening formed at said corner, while the clock hand adjuster wheel can be operated through a slot or opening formed at the bottom of the case.

The mechanism of clocks of the type envisaged is generally assembled complete on a plate arranged to carry the clock mechanism or works, which plate at the time of final assembly of the clock is simply mounted

in an open-front clock case and the case then closed off at the front.

For attachment purposes, the plate carrying the works is inserted into the case, the studs on the plate are engaged in corresponding recesses in the case, while utilizing the elasticity of the material of the case to facilitate the mounting of the plate therein. It is well known in this context to make the studs of an elastic material. These studs are components which are separate from the plate carrying the works and which can be attached thereto.

In order to give these clocks a certain degree of resistance to slipping, hitherto rubber feet have been adhered to the base of the case in a separate operation of manufacture. It has been found in this respect that after some years the adhesive becomes brittle and the feet tend to drop off.

According to a second aspect of the invention there is provided an alarm clock comprising an open-end clock case and a plate on which the clock works are mounted and which is arranged to close said case, wherein the clock case has further openings on one side thereof and at least one recess on the side opposite said further openings arranged to receive corresponding studs of which at least the outer surfaces are covered with an elastic material, and wherein the elastic surface of the studs received in said further openings protrude therethrough to form feet for the clock.

BRIEF DESCRIPTION OF THE DRAWINGS

A method of performing the invention will now be disclosed with reference to the accompanying drawings in which:

FIG. 1 is a schematic cross-sectional view through the clock face.

FIG. 2 is a schematic arrangement showing the adjuster wheels in the clock.

FIG. 3 is a view in cross-section of an adjuster wheel, a pinion, a friction coupling and a spindle forming part of a mechanism for adjusting the hands of a clock or an alarm setting.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The case 1 has holes 2 disposed on the face on which it is to stand and is provided internally on the side opposite said face with one or more recesses 3. Both the holes 2 and the recesses 3 are used as attachment points for a plate 4 carrying the works. The entire mechanism of the clock is attached to one side of the plate while the bezel is attached to the other side. Arranged on the top 5 of the plate 4 as seen in the drawing is one or more first studs 6 which may have any cross-sectional shape and which are intended to engage recesses 3. Placed over each of the studs 6 is a cover member, for example a sleeve 7 of an elastic material, for instance rubber. The external dimensions of the sleeves 7 are so chosen that they are a light push fit in the recess 3.

At the bottom 8 of the plate 4 as seen in the drawing there are arranged as many second studs 9 as the clock is to have feet, generally two. The second studs 9 may have any desired cross-sectional shape. Conveniently, when seen in longitudinal cross-section the studs 9 may have a trapezoidal configuration, as shown in the drawing. This configuration facilitates the assembly and removal of the plate 4 into and out of the clock case. The

second studs 9 are also provided with an elastic component cover member, such as the cup shaped member 10 shown in FIG. 1. As will be seen from the Figure, when the plate 4 is inserted in its correct position, the studs 9 will force the member 10 through the associated hole 2 to project beyond the bottom face of the case, as shown at 11.

When mounting the plate 4 in the clock case the the bottom studs 9, with the elastic members 10 fitted thereto are introduced into the holes 2. The plate 4 is then forced downwards, thereby compressing the elastic members 10, and the case is widened vertically so that the top stud or studs 6, having an elastic cover member fitted thereto, can be passed beneath a small retaining lip 12 located on the clock case, and engaged in the recess or recesses 3.

The projecting parts 11 of the elastic members 10 form the non-slip feet of the case. Thus, the design illustrated avoids the need for the separate attachment of feet to the case, by modifying conventional components required to close off the case and to mount the plate carrying the works in said case, without incurring any additional costs. Moreover, the invention ensures absolutely permanent attachment of non-slip feet without the need for an adhesive. The plate carrying the works is secured in the case 1 through the elastic members 7, 10. Penetration of dirt through the holes 2 is prevented by circumferential projections arranged on the members 10 and bearing against the edge of the holes 2.

The works of the clock have been shown purely diagrammatically in FIG. 1.

FIG. 2 illustrates how the adjuster wheels of the clock hand and alarm setting mechanism may be arranged in the clock case 1. Thus, an alarm adjuster wheel 13 is located at an upper corner of the case and extends through a slot or opening 14 in the wall 15 of the case, thereby enabling the wheel to be rotated from outside the case, for example by using the thumb. To facilitate rotation of the wheel, the wheel may be knurled and the case curvature in the vicinity of the opening 14 may be substantially the same as that of the periphery of the adjuster wheel projecting through the opening.

The alarm adjuster wheel 13 is connected to the alarm adjuster pinion 16 via a slip coupling, hereinafter described with reference to FIG. 3, and the pinion 16 operates an alarm tripping wheel 18 over an intermediate gear 17.

As will be seen from FIG. 2, a similar arrangement is provided for the clock hand adjusting mechanism. Thus a clock hand adjuster wheel 20 is received in an opening in the bottom side 19 of the case and protrudes therethrough. As with the alarm adjuster wheel, the clock hand adjuster wheel may also be connected to a pinion, such as that shown at 21, through a slip coupling, which pinion 21 is arranged to drive a wheel (not shown) of the hand mechanism, for example the minute wheel or the change wheel for the hand system, over an intermediate gear 22.

The manner in which the alarm adjuster wheel 13 is connected to its pinion is shown in FIG. 3, although it will be understood that the hand adjuster wheel 20 may be connected to its pinion 21 in a similar manner.

As will be seen from FIG. 3, the alarm adjuster wheel 13 is arranged on a spindle 23 so that on the one hand it is rotatable in relation thereto, and on the other hand, as illustrated, projects through the opening 14 in the

wall 15 of the case. The alarm adjuster wheel 13 bears against a collar 24 on the spindle 23.

Between the alarm adjuster pinion 16, which may be firmly screwed onto the spindle 23 or fitted thereto in any other appropriate way, and the alarm adjuster wheel 13, there is arranged a spring washer 25 which serves as a friction coupling.

As long as the rotation of the pinion 16 is offered no appreciable resistance in the clock mechanism, the pinion is moved by the spring 25 as the adjuster wheel 13 rotates, due to the friction coupling. A similar arrangement may be provided for the clock hand mechanism.

If an attempt is made to rotate for example the adjuster wheel 13 in the wrong direction, whereupon the movement is resisted by virtue of the fact that a dog has dropped into engagement, for example, with the alarm adjuster mechanism, the adjuster wheel 13 will slip in relation to the pinion 16.

The invention described unites a particularly neat arrangement of the adjuster wheels with a means of protecting the alarm adjuster and the clock hand adjuster mechanism against damage. Even if the adjuster wheels are incorrectly operated, the adjuster mechanism will not be damaged as a result hereof.

To facilitate the support of the spindle 23, the spindle is carried at one end thereof in a relatively long bearing. Furthermore, the wheel 13 is accurately guided in the opening 14 so that a secure bearing is achieved without the need for additional bearing devices.

Although the invention has been described and illustrated with reference to a number of embodiments, these embodiments are not restrictive, but may be modified in accordance with the accompanying claims.

What is claimed as invention is:

1. An alarm clock comprising:
 - a) an open-end clock case; and
 - b) a plate on which the clock works are mounted and which is arranged to close said case, said clock case having further openings on one side thereof and at least one recess on the side opposite said further openings, said further openings and said recess being arranged to receive corresponding studs located on opposite sides of said plate, at least the outer surfaces of said studs being covered with an elastic material, the elastic surfaces of the studs being received in said further openings and protruding therethrough to form feet for the clock.
2. The alarm clock of claim 1 wherein the plate carrying the works when seen in the normal standing position of the clock has one stud at the top thereof and two studs at the bottom.
3. The alarm clock of claim 2 wherein said two studs have a trapezoidal configuration when viewed in longitudinal section.
4. The alarm clock of claim 1 wherein said elastic surfaces are made of rubber.
5. The alarm clock of claim 1 wherein there is further included:
 - a) a spindle; and
 - b) an adjuster wheel mounted for free rotation on said spindle, said adjuster wheel being accommodated in an opening in a wall of said clock case and terminating at least substantially flush with the outer surface of said wall.
6. The alarm clock of claim 5, wherein said opening for said adjuster wheel is located at one corner of the case.

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7. The alarm clock of claim 6, wherein the curvature of said case corner corresponds substantially to the curvature of said adjuster wheel.

8. The alarm clock of claim 5, wherein the opening for the adjuster wheel is provided at the underside of the clock case. 5

9. The alarm clock of claim 5, wherein one end of said spindle is inserted in an elongate bearing to support the spindle along a substantial length thereof, and wherein said adjuster wheel is positively guided in said opening. 10

10. The alarm clock of claim 5, wherein there is further included:
a pinion which co-operates with said adjuster wheel
and is mounted to said spindle for rotation there- 15

with; and

spring means located between said adjuster wheel and the pinion for providing frictional drive therebetween, the arrangement being such that said drive ceases when the force required to rotate said pinion exceeds a pre-determined magnitude.

11. The alarm clock of claim 10, wherein there is further included:

a collar against which said adjuster wheel bears and which is located on said spindle and which serves as a stop for said wheel.

12. The alarm clock of claim 10, wherein said pinion is screwed or press fitted onto said spindle.

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