Nov. 12, 1935. A. H. WATSON 2,020,388

ALARM CLOCK

Filed Oct. 3, 1931

Fig. 1

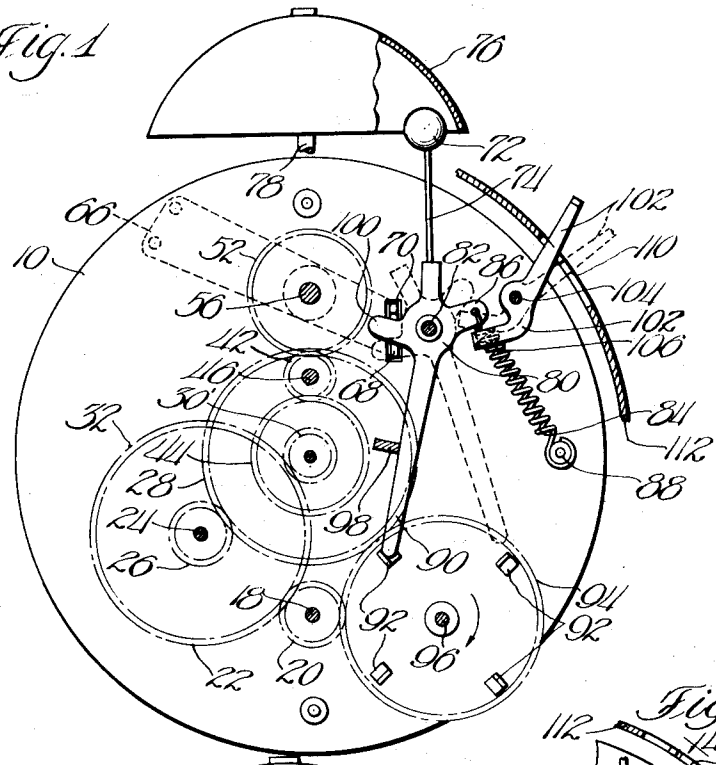


Fig. 2

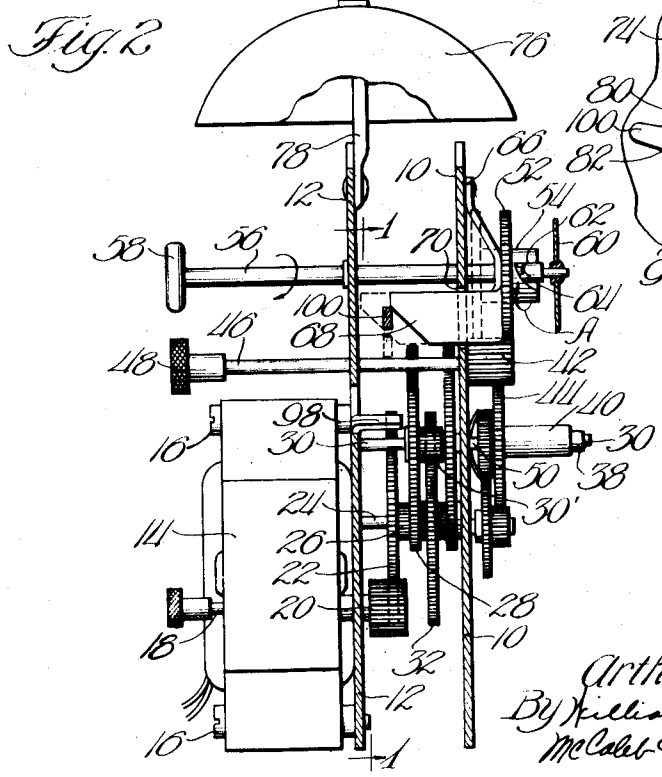


Fig. 3

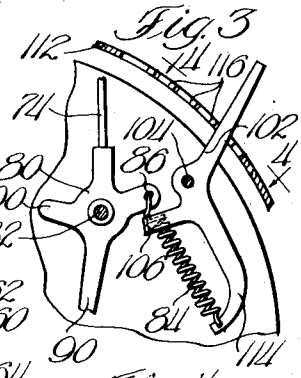
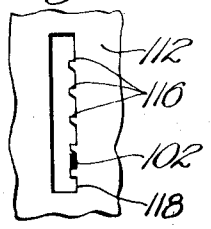


Fig. 4



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ALARM CLOCK

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Application October 3, 1931, Serial No. 566,667

1 Claim. (Cl. 58—16)

My invention relates generally to clocks and more particularly to the provision of improved alarm mechanisms for synchronous motor driven electric clocks.

It is an object of my invention to provide an improved alarm mechanism for synchronous motor driven clocks which shall be simple in construction and operation, and which may be economically manufactured.

A further object is to provide an improved means for operating the clapper of an alarm clock.

A further object is to provide an alarm mechanism for synchronous motor driven clocks which is operated by the motor used to drive the time gear train.

A further object is to provide an improved alarm mechanism for synchronous motor driven clocks which may be used with synchronous motor driven clocks as at present made with a minimum number of changes in the construction and design of the clock.

Other objects will appear from the following description, reference being had to the accompanying drawing, in which

Fig. 1 is a vertical sectional view of the clock taken on the line 1—1 of Fig. 2;

Fig. 2 is a side elevation of the clock mechanism, portions of the frame being shown in section;

Fig. 3 is a fragmentary view of a modified form of the alarm setting mechanism; and

Fig. 4 is a fragmentary view of the mechanism shown in Fig. 3.

In synchronous motor driven clocks the motor is customarily designed so as to have power considerably in excess of that required to operate the time gear train. Due to this fact an alarm mechanism may be operated directly from the time gear train without affecting the operation of the latter. In this way the necessity for separate actuating means for the alarm mechanism is obviated and the additional cost of providing an alarm mechanism in a synchronous electric clock may be greatly reduced.

The alarm clock comprises the usual front and rear frames 10, 12 which are rigidly connected in the usual manner. A synchronous electric motor 14 is secured to the frame 12 by studs or rivets 16 and has a drive shaft 18, to the end of which a pinion 20 is secured. The pinion 20 meshes with a gear 22 which is rotatably mounted on a shaft 24 and rigidly secured to a pinion 26. The pinion 26 meshes with a gear 28 staked to a second hand shaft 30. The gear 28 is rigidly secured to a pinion 30' which drives a gear 32 and, through the usual intermediate gearing, drives the minute hand sleeve 38 and the hour hand sleeve 40. A pinion 42 meshes with a gear 44 which is rigidly secured to the hour hand sleeve 40, the pinion 42 being staked to the end of a shaft 46 at the opposite end of which a thumb piece 48 is secured. The thumb piece 48 serves as a means to set the hands, the spider spring 50 serving as the usual frictional connection between the gear train and the hands to permit setting of the hands without operating the entire gear train.

A gear 52 also meshes with the pinion 42 and preferably has the same number of teeth as the gear 44 and therefore makes one revolution in twelve hours. The gear 52 is rigidly secured to a hub or sleeve 54 which is rotatably and longitudinally slidable on a shaft 56, the shaft being journalled in the frames 10 and 12 and having a finger piece 58 secured to the rear end thereof.

The forward end of the shaft 56 is of reduced diameter to permit a small indicator hand 60 to be secured thereto, the indicator hand cooperating with the usual alarm setting dial (not shown). The sleeve 54 has a notch 62 formed therein in the usual manner.

A pin 64 projects radially from the shaft 56 and is adapted to cooperate with the right-hand (Fig. 2) end face of the sleeve 54 and the notch 62 in the usual manner. A spring 66 is secured to the front side of the frame 10 and has an aperture to receive the shaft 56 and normally tends to move the gear 52 and its sleeve 54 to the right (Fig. 2). The spring has a rearwardly projecting stop portion 68 which is slidable in an aperture 70 formed in the plate 10.

A clapper 72 is carried at the end of a resilient stem 74 and is adapted to strike against the bell 76 which is supported on the frame 12 in any suitable manner as by a rod 78. The stem 74 is secured to a four-armed lever 80 which is pivotally mounted upon a stud or shaft 82 and is resiliently held in the position shown in Fig. 1 by a tension spring 84, one end of which is secured to an arm 86 of the lever and the other end of which is anchored to a pin or stud 88 secured to the frame plate 10. The lever 80 has a long depending arm 90, the lower end of which is adapted to be engaged in succession by a plurality of lugs 92 struck outwardly from a gear 94 rotatably mounted on a shaft 96 and meshing with the pinion 20.

A stop 98 struck inwardly from the frame plate 12 is adapted to be engaged by the arm 90 of the

lever and thus limit clockwise (Fig. 1) movement of the latter. The lever 80 has an arm 100 which is adapted to cooperate with the stop portion 68 of the spring 66 in a manner which will hereinafter more fully appear.

The lever 80 is adapted to be shifted to the dotted line position shown in Fig. 1 so that the end of its arm 90 will lie outside of the path of the lugs 92 by a lever 102 frictionally pivoted upon a stud 104 and having its inner extremity 106 bent inwardly to engage the arm 86 of the lever 80. The outer portion of the lever 102 projects through a slot 110 formed in the clock shell 112.

The alarm mechanism above described is, as far as the user is concerned, operated in the usual manner, the hand 60 being set at the time at which the alarm is to be sounded by clockwise (direction of arrow in Fig. 2) rotation of the finger piece 58. Rotation of the shaft 56 will cause the pin 64 to engage the sloping surface of the notch 62 and cam the sleeve 54 and gear 52 to the left (Fig. 2), whereupon the arm 100 of the lever 80 will be cammed downwardly by the spring stop portion 68, swinging this lever 80 to the dotted line position shown in Fig. 1, where the end of the arm 90 is clear of the path of movement of the lugs 92.

As the sleeve 54 is rotated by the time gear train, its notch 62 will come in alignment with the pin 64 at the time for which the alarm mechanism was set, at which time the spring 66 will force the gear 52 and sleeve 54 outwardly to the position shown in full lines in Fig. 2 and thereby remove the stop portion 68 from the path of the arm 100 so that the spring 84 will be permitted to swing the lever 80 clockwise to the position shown in full lines in Fig. 1. When in this position the lugs 92, which form part of the continuously rotated gear 94, successively engage the lower end of the arm 90, swing the lever 80 counter-clockwise approximately to the dotted line position (Fig. 1), and then release the lever, whereupon the spring 84 will rapidly swing the lever clockwise to the full line position of Fig. 1, in which position movement is arrested by the lug 98. The clapper 72 has sufficient inertia and its stem 74 is sufficiently resilient so that when the lever 80 is arrested by the lug 98 the clapper will continue its clockwise swinging movement and strike the bell 76. This striking operation is continued until the alarm is shut off by swinging the lever 102 clockwise to the dotted line position shown in Fig. 1, whereupon the lever 90 is removed from the path of the lugs 92.

In Figs. 3 and 4, I have shown a slightly modified construction of the striking mechanism in which the alarm set lever 102 has a depending arm 114 formed integrally therewith and to which the spring 84 is anchored. The lever 102 is slightly resilient and, because of this resiliency, adapted to engage any one of a plurality of notches 116 formed in the shell 112. By shifting the lever 102 to the different notches 116, the tension on the spring 84 may be varied and the force with which the clapper strikes the bell, and hence the degree of loudness of the alarm, is varied. The shell 112 also has a notch 118 in which the lever 102 is adapted to engage when it is desired to shut the alarm off. This alarm control means shown in Figs. 3 and 4, has not only the advantage of permitting adjustment of the volume of the alarm signal, but also simplifies the manufacture and assembly of the mechanism. Instead of having the lever 102 engage in notches as illustrated, it may be frictionally mounted on its stud 104 so that it will be frictionally retained in any adjusted position.

It will be noted that the alarm will operate periodically every twelve hours if it is not shut off by the lever 102. The time during which it is operative is, of course, dependent upon the shape of the notch 62 and the shape of the stop portion 68, which may be varied so that the alarm will operate for a comparatively short time. The speed of rotation of the gear 94 is preferably such that the bell is rung once every few seconds, thus providing an alarm which is not particularly irritating and which could be permitted to operate during the interval while the pin 64 is in the notch 62 without great annoyance. In this way the alarm may be set at the desired time and the alarm will thereupon function every twelve hours without any further attention whatsoever on the part of the user.

It will be seen that I have provided an improved alarm mechanism in which the power which drives the time gear train is utilized to actuate the alarm. I have, therefore, eliminated the necessity for the use of additional spring or other motor means for driving the alarm mechanism and greatly simplified the construction of the alarm clock and materially reduced the cost of manufacture. If desired, the gear 94 may be made an integral part of the time gear train and thus further reduce the cost of the alarm mechanism.

The invention is capable of wide variation within equivalent limits and I contemplate such variation as may be desirable or useful in the particular adaptation of the invention shown, or in its adaptation to other devices. I do not restrict myself in any unessential particulars, but what I claim and desire to secure by Letters Patent is:

In an alarm clock, the combination of a timing mechanism, a motor for driving said mechanism, an alarm device associated with said mechanism, said device including a clapper, means for moving said clapper positively in one direction, a spring for moving said clapper in the opposite direction, and manually settable means operable to render said clapper inoperative or to vary the tension on said spring.

ARTHUR H. WATSON.