April 23, 1935. C. BATTEGAY 1,998,435

TALKING CLOCK

Filed Nov. 11, 1932 2 Sheets-Sheet 1

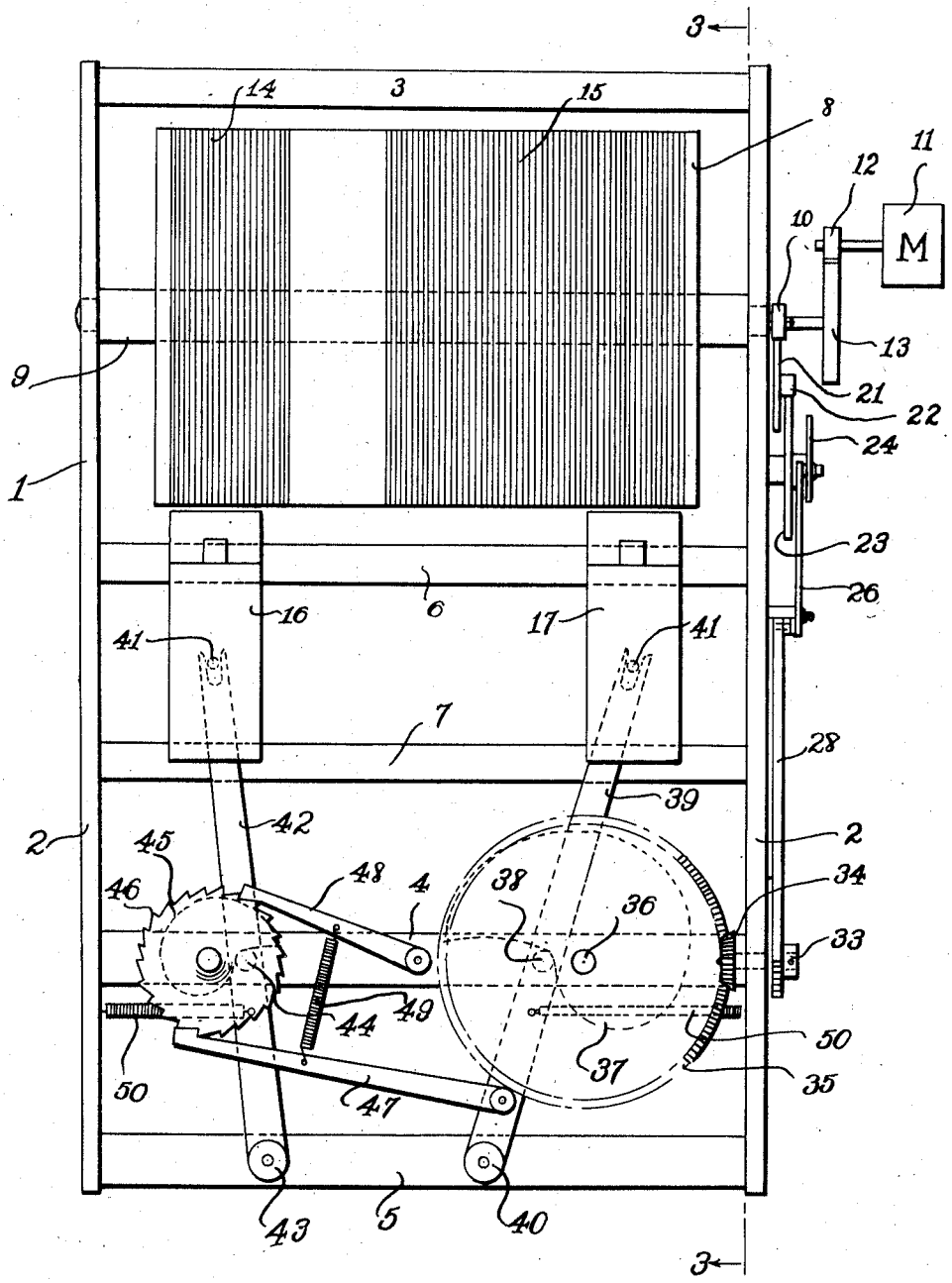


Fig. 1

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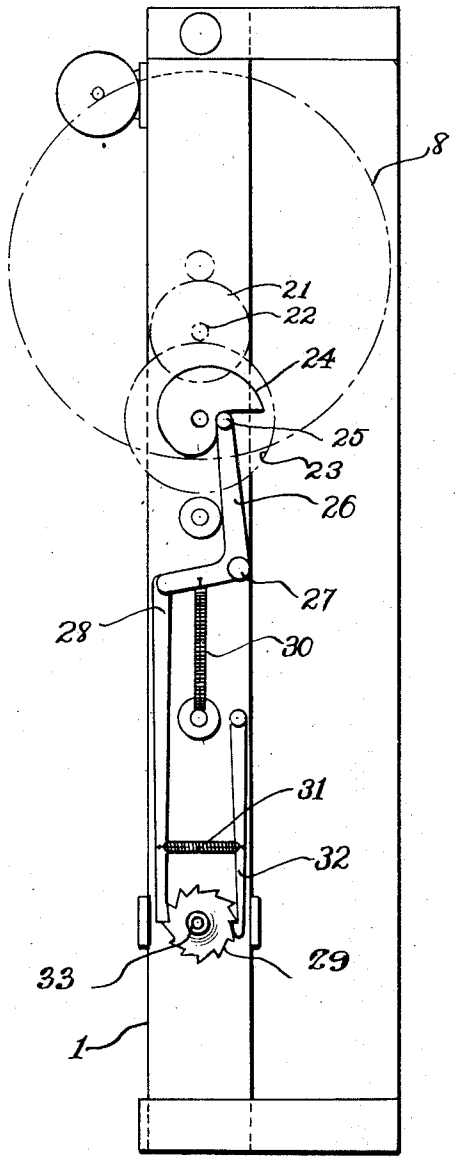


Fig. 2

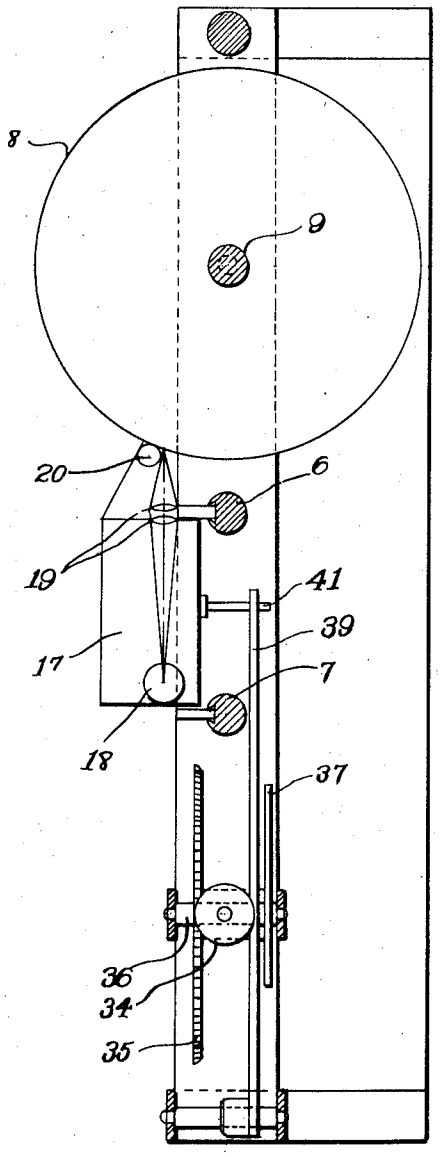


Fig. 3

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Patented Apr. 23, 1935 1,998,435

UNITED STATES PATENT OFFICE

1,998,435

TALKING CLOCK

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Application November 11, 1932, Serial No. 642,186
In France November 12, 1931

5 Claims. (Cl. 58—14)

This invention is a talking clock and relates more particularly to apparatus for the giving out of time signals acoustically at stated intervals. The apparatus is adapted for various uses among which, without limitation, may be mentioned the utilization of the apparatus for giving correct time in telephone systems, so that if a subscriber desires to know the time, he may call or dial a particular number and will be, as a result thereof, automatically given the correct time.

The present invention embodies many improvements in systems of this general class, one of which improvements consists in the utilization of a light beam acting upon a photo electric cell or other light sensitive cell and controlled in turn by a moving clock controlled element so as to give signals of unusual clarity of tone, without scratching or other mechanical noises and to accomplish this result in a relatively simple and highly efficient manner. The invention also provides for the giving out of a time signal at an exact instant, so that correct time may be communicated.

Features of the present invention, other than those adverted to, will be apparent from the hereinafter detailed description and claims, when read in conjunction with the accompanying drawings.

The accompanying drawings illustrate one practical embodiment of the invention, but the construction therein shown is to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a front elevation of a talking clock embodying this invention.

Figure 2 is a side elevation of the structure shown in Figure 1.

Figure 3 is a section on the line 3—3 of Figure 1.

Referring to the drawings, 1 indicates the frame of the apparatus which may be of any suitable form depending upon the conditions of its mounting. As shown, however, it embodies two parallel uprights 2 mounted in spaced relation by cross bars 3, 4 and 5 and by guides 6 and 7 hereinafter referred to.

Mounted for rotation on a horizontal axis in the upper portion of the frame is a drum or cylinder 8 which cylinder is mounted on a shaft 9 journalled in the opposite sides of the frame and carrying near one end a pinion 10. This shaft is adapted to be driven by a motor synchronized by a clock. The connection between the motor and the shaft 9 may vary as desired, but for the purpose of illustration, the motor is indicated at 11 and drives a pinion 12 which meshes with a gear 13 fixed on the shaft, so that the cylinder is driven from this motor at a predetermined timed speed.

The cylinder 1 is of non-transparent character and is preferably of metal. I have found aluminum to give very satisfactory results for this purpose. In the surface of this cylinder are formed two series of grooves 14 and 15, the former of which corresponds to the hours of a day and the latter of which corresponds to the minutes, there being either twelve or twenty-four grooves in series 14 and sixty grooves in the series 15. There may be, if desired, a third series of grooves corresponding to an introductory clause or sentence as, for example, "It is exactly . . ." and there may be a fourth series of grooves, sixty in number, corresponding to seconds, if desired, but for the purpose of illustration, the two series of grooves 14 and 15 shown in the drawings will suffice to make the invention clear.

In the grooves are positioned appropriate indicia of time and I have found it highly practical and convenient to employ in these grooves records or strips of the same kind as are used in the reproduction of sound with talking motion pictures. These strips are cut into shape to fit into the grooves and are permanently secured therein and they may be in the form of a film or said records may be on phonographic paper, so as to give a good contrast for the reflection of light.

Extending across the frame directly below the cylinder are two guides 6 and 7 which are parallel to one another and on these guides are mounted two housings 16 and 17, the former of which is adapted to cooperate with the series of grooves 14 and the latter of which cooperates with the series of grooves 15. These two casings or housings are mounted for travel transversely of the frame on the guides 6 and 7. They may be secured to the guides in any suitable way, but, for the purpose of illustration, are shown as having a dove-tail connection therewith, so that they are free to slide and at the same time are guided for rectilinear movement. In each casing is mounted an optical system comprising a source of light 18 which may conveniently be a lamp. Suitable lenses 19 are positioned to focus the rays from the lamp upon the surface of the cylinder in a relatively small beam or ray adapted to focus in one groove at a time and positioned adjacent the point of impingement of the beam on the cylinder is a photoelectric cell 20, so situated that as the beam is projected upon the record strip in a groove, it will be reflected on to the photoelectric cell, so that as the cylinder rotates the record in the particular groove with

which the beam impinges will be reflected upon the photoelectric cell in such manner as to govern and control its operation. Each cell is included in suitable electric circuits for amplification and transmission. As circuits of this kind for the amplification and transmission of current passage through an electric cell are old and well known, it has not been considered necessary to show them in the drawings. Any appropriate conventional photoelectric cell system may be employed in this connection.

As the grooves of the series 14 and 15 correspond to hours and minutes of the day, it is necessary to move the casings 16 and 17 in timed relation to the operations of the cylinder. This is accomplished in a manner next to be described. Meshing with the pinion 10 is a gear 21, which has a pinion 22 meshing with the gear 23 which carries rigidly therewith a cam 24. With this cam cooperates a cam follower 25 mounted on the bell crank 26 pivoted at its elbow at 27. To the opposite end of the bell crank is pivoted a link 28 which operates as a pawl against a ratchet 29. A spring 30 holds the follower in engagement with the cam and a spring 31 is interposed between the link 28 and a locking pawl 32, so that as the cam 24 is rotated the bell crank 26 is oscillated and imparts a step-by-step forward movement to the ratchet 29, the locking pawl 32 precluding retrograde rotation of this ratchet. The ratchet 29 is mounted on a stub shaft 33 which carries a bevel gear 34 meshing with a bevel gear 35 on a second perpendicular stud shaft 36 mounted between the spacers 4. Rigid with this bevel gear 35 is a cam 37 adapted to cooperate to act upon a cam follower 38. This cam follower 38 is carried by a link 39, the lower end of which is pivoted at 40 between the spacers 5 and the upper end of which is forked or bifurcated to straddle a pin 41 on the casing 17. A second link 42 is also pivoted at 43 between the spacers 5 and its upper end is bifurcated to cooperate with a similar pin 41 on the casing 16, all as clearly shown in Figure 1. This second link 42 carries a cam follower 44, which cooperates with a cam 45. This cam has rigid therewith a ratchet wheel 46 and is operated by a pawl 47 secured to the link 39. A locking pawl 48 locks the ratchet 46 against backward turning and is held in place by a spring 49.

It will be apparent that with the arrangement of parts shown and described, the rotation of the cylinder will bring about a simultaneous operation of the bell crank 26 which will operate through the link 28 and ratchet wheel 29 to rotate the bevel pinion 34 and the gear 35 to actuate the cam 37 and through this operation to move both the links 39 and 42 for the purpose of shifting the casings 16 and 17 in timed relation to the rotation of the cylinder. It may be here noted that the springs 50 serve to hold the respective cam followers 38 and 44 in engagement with their cams.

When the drum is driven at a constant speed by a motor synchronized by a clock, it drives all of the gears, ratchets, links, etc., governing the rotation of the cylinder and the synchronized movement of the casings 16 and 17, so that the beam of light from the source of illumination in each casing is caused to impinge upon corresponding grooves to be reflected on to the associated photoelectric cells and the current thereby produced is amplified according to known processes.

As a result of the structure shown, however, the casing 16 enclosing the optical system corresponding to the hours will be moved step by step into juxtaposition with the grooves of the respective hours in succession, while the casing 17 enclosing the optical system appropriate to the minutes will be moved step by step into juxtaposition with the corresponding grooves, so that at any particular minute the hour and minute can be transmitted.

The foregoing detailed description and the drawings set forth the invention in its preferred, practical form, but the invention is to be understood as fully commensurate with the appended claims.

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

1. In an assembly of the character described, a suitable supporting frame, a rigid opaque cylinder mounted on said frame for rotation on its axis and provided on its surface with a plurality of series of relatively fixed axially spaced apart records corresponding to different fractions of time, an optical system for each series of records, guides on the frame for mounting said optical systems for movement in a direction parallel to the axis of the cylinder and in constantly spaced contiguous relation to the surface of the cylinder, each optical system comprising means for projecting a beam of light upon a juxtaposed record, and light sensitive time enumerating means positioned to be impinged by and operated in accordance with the beam reflected from said record, cams operable to control the movement of said optical systems longitudinally of the cylinder while the light sensitive means remains spaced a constant distance from the cylinder, a time controlled motor for rotating the cylinder at a constant speed, and operative connections between said motor and cams for driving the cams to cause movement of the optical systems in predetermined timed relation.

2. In an assembly of the character described, a rigid opaque cylinder mounted to rotate and provided on its surface with a plurality of series of axially rigidly attached, spaced apart reflectable records corresponding to different fractions of time, a time controlled motor for driving said cylinder at a predetermined speed, and a plurality of optical systems movable contiguously to the surface of the cylinder at a constant distance therefrom and in timed relation to the rotations of the cylinder and in a direction parallel to the axis of the cylinder to selectively position said optical systems successively in juxtaposition with the records of the respective series, each optical system comprising means for projecting a beam of light upon a juxtaposed record, and light sensitive time enumerating means positioned to be impinged by and operated in accordance with the beam reflected from said record.

3. In an assembly of the character described, a rigid non-transparent cylinder mounted to rotate on its axis and provided with rigidly attached axially spaced apart light reflectable records corresponding to successive hours of a day and successive minutes of the hour, a plurality of photoelectric cells mounted respectively to travel parallel to the axis of the cylinder at a constant distance therefrom and contiguously to its face into juxtaposition with the records of the hours and minutes in succession, and means associated with and moving in conjunction with each photoelectric cell for projecting a beam on to the juxtaposed record, whereby the beam may be reflected

in modified form on to the corresponding photo-electric cell for the purpose of controlling the operation thereof.

4. In an assembly of the character described, a rigid cylindrical record member mounted for rotation on its axis and adapted to be driven at a predetermined speed and having rigid therewith a plurality of series of light reflectable records corresponding respectively to different fractions of time, and an optical system associated with each series of records exteriorly of the cylinder and each of which optical systems is mounted for movement parallel to the axis of the cylindrical record member selectively into juxtaposition with each record of this respective series, each optical system including means for projecting a beam of light on the selected record, and light sensitive time enumerating means positioned to receive a beam of light reflected from said record.

5. In an assembly of the character described, a shaft mounted to rotate, a rigid cylindrical record member mounted on said shaft to rotate therewith and having a plurality of series of reflectable records corresponding respectively to different fractions of time, an optical system associated with each series of records exteriorly of the cylinder, guides for mounting said systems for movement parallel to the axis of the shaft and in close proximity to the surface of the cylinder, each optical system including means for projecting a beam of light on a selected record, and a light sensitive time enumerating means positioned to receive the light reflected from said record, means for driving the cylinder shaft and cylinder at a definite timed speed, a cam driven from said shaft, a bell crank operable by said cam to be oscillated thereby, a pawl operated by said bell crank, a ratchet adapted to be given step by step movement by said pawl, a bevel pinion rigid with the ratchet and driven thereby, a bevel gear meshing with said pinion and driven thereby, a cam rigid with the bevel gear and driven thereby, a fixed fulcrum, a lever pivoted at one end on said fixed fulcrum and secured at its other end to one of the optical systems, a follower associated with said lever and cooperating with the cam of the bevel gear to be operated thereby for the purpose of moving said optical system on said guides, a lever pivoted to the second optical system and having a cam follower, a cam cooperating with said cam follower to move the lever and shift the second optical system on its guides, a ratchet wheel rigid with the last mentioned cam, and a ratchet cooperating with said ratchet wheel and secured to the lever of the first optical system.

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