March 1, 1938. A. W. KOSKI 2,109,962

TALKING CLOCK

Filed June 19, 1936 3 Sheets-Sheet 1

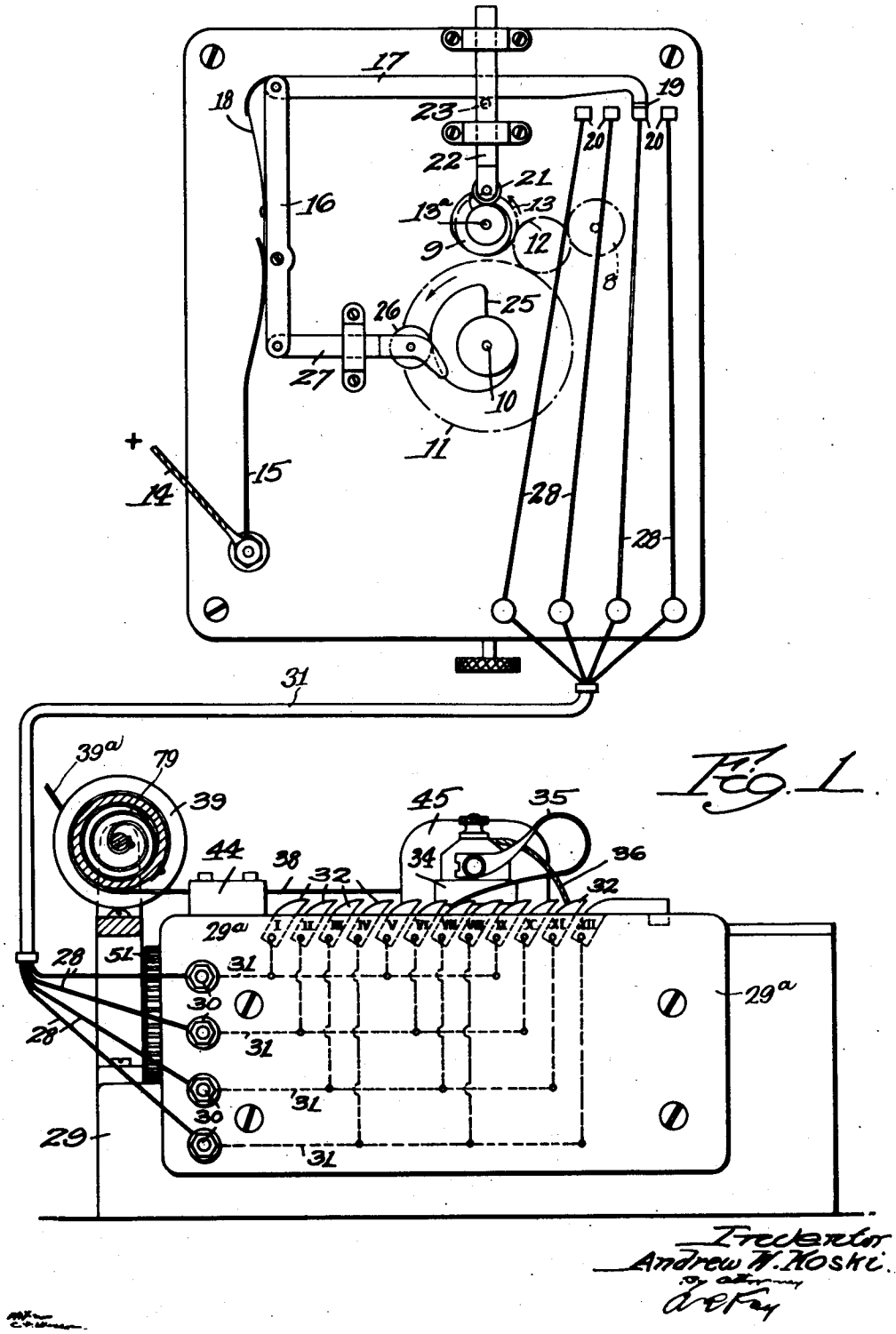



Fig. 1.

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TALKING CLOCK

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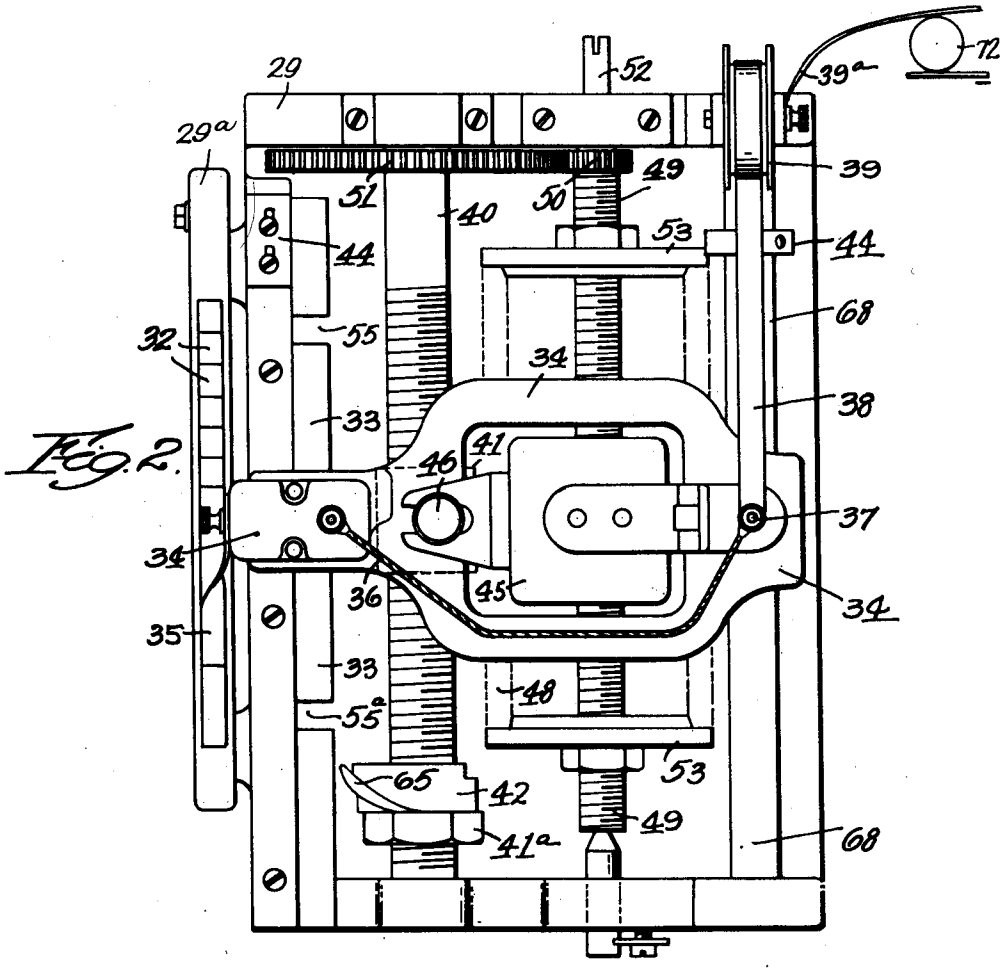



Fig. 2.

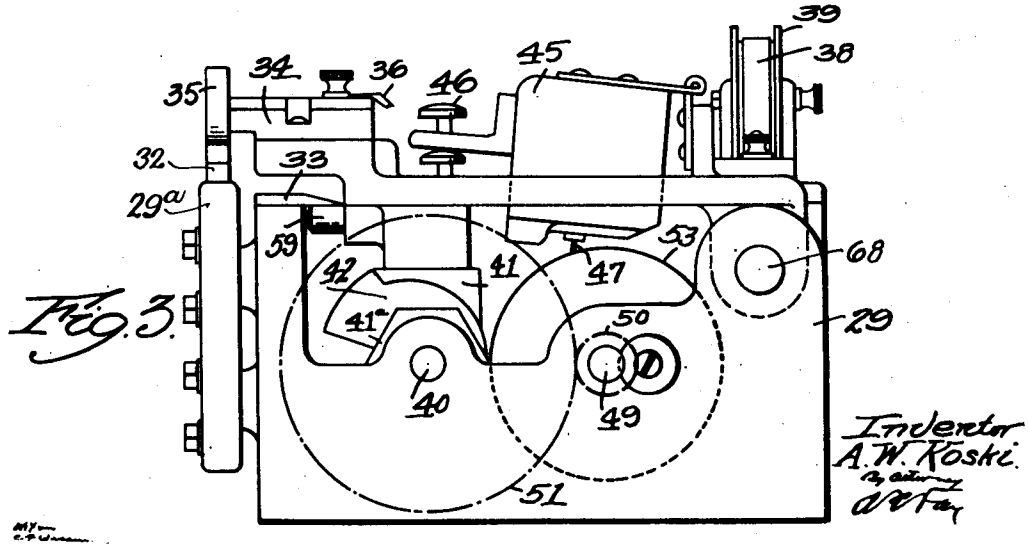



Fig. 3.

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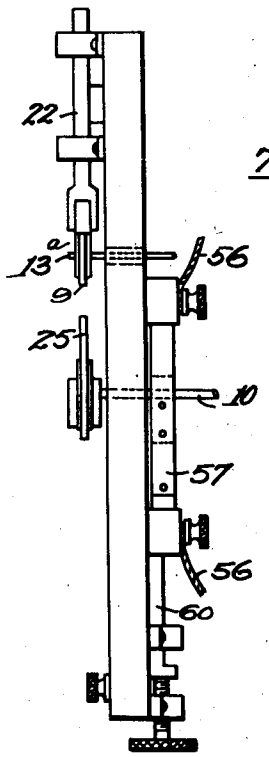



Fig. 7.

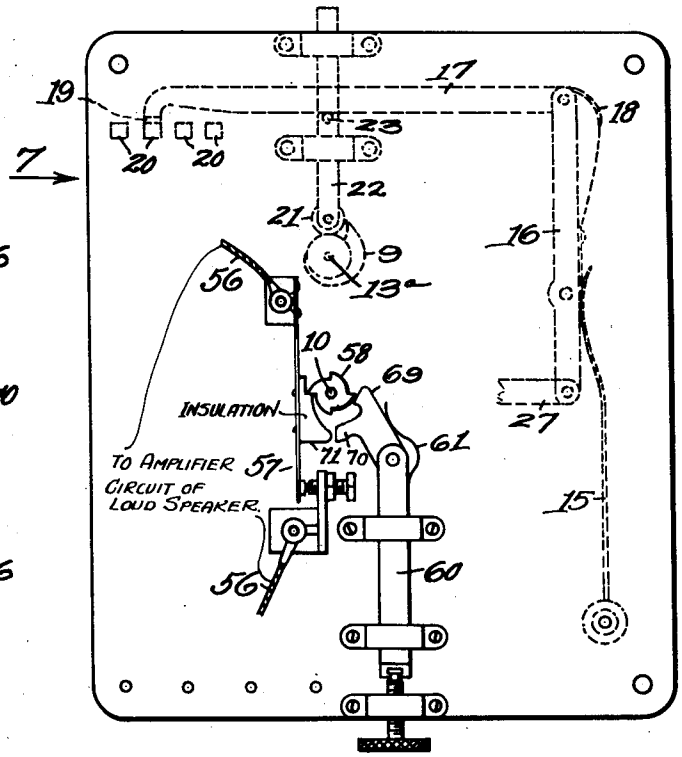



Fig. 6.

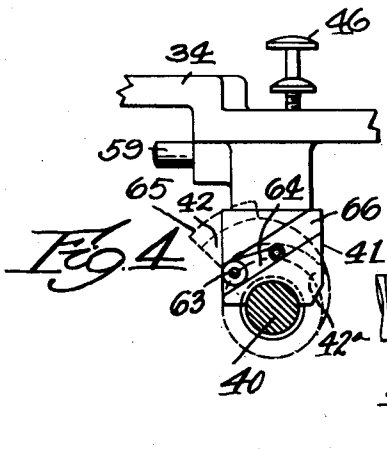



Fig. 4.

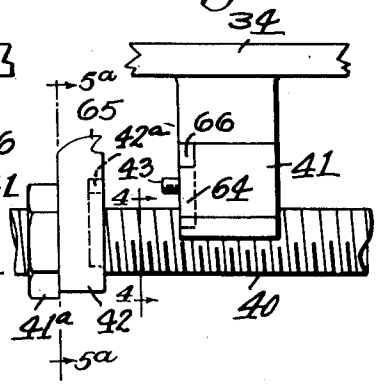
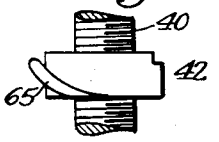



Fig. 5.



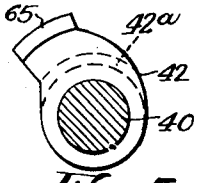




Fig. 5b.

Fig. 5a.

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# UNITED STATES PATENT OFFICE

2,109,962

## TALKING CLOCK

Andrew W. Koski, Fitchburg, Mass.

Application June 19, 1936, Serial No. 86,155

13 Claims. (Cl. 58—14)

The principal objects of this invention are to provide a clock, which will speak the hours in words, or other distinctive sounds, so constructed that it will take up no more than the ordinary space which a small clock occupies; to provide an automatic switch in combination with a phonograph, amplifier, and loud speaker; to provide a current distributor run by the clock for operating the automatic switch; to provide a control for heating the tubes of the amplifier connected with the loud speaker, all combined in a small space cooperating with each other, and to provide for the regular speaking of the words, or any other sound, which indicate the hours, and the return of the switch from the 12 o'clock position to the 1 o'clock position.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a side view of the automatic switch showing the twelve levers which are required and also showing the connected current distributors;

Fig. 2 is a plan of the automatic switch, the position of the phonograph record and its pick-up unit in the device and showing their associated parts;

Fig. 3 is an end view of the same;

Fig. 4 is a sectional view of the operating screw on the line 4—4 of Fig. 5 and an end view of a member which connects it with the phonograph and loud speaker to move them along, the cam fixed on the screw being shown in dotted lines because it is to the left of the line of section;

Fig. 5 is a side view of the same;

Fig. 5[a] is a sectional view of the cam for lifting the carriage on the line 5[a]—5[a] of Fig. 5;

Fig. 5[b] is an edge view thereof;

Fig. 6 is a plan of the control device for heating the speaker device, and

Fig. 7 is an edge view of the same.

The timing mechanism of this device is run by the minute wheel 8 (or gear) of the clock through an intermediate gear 12 which is in mesh with and drives gears 11 and 13. No further elements of the clock are shown but the power for the timing mechanism of this device is all obtained from the minute wheel of the clock through gear 12.

The circuit for the operating of the mechanism of the automatic switch and phonograph record involves a wire 14 which, through a spring 15, transmits the current to another spring 18 which is fixed on an insulating lever 16 which has pivoted thereon a brass beam 17. The spring 15 also serves to keep the roller 26 in contact with its cam 25 and downward pressure is exerted on the brass beam 17 through a spring 18 extending from the beam 17 and in contact with the spring 15 on the insulating beam 16. The spring 15 is fixed at the bottom. This brass beam 17 has a contact 19 and it is adapted to be moved by means of the lever 16 so that this contact will engage any one of the four contacts 20.

The beam 17 is operated by the shaft 13[a] which has a cam 9 which makes one complete revolution per hour. This cam operates a cam roller 21 on a slide 22, guided to slide vertically and having a pin roller 23 under the beam 17 so that this can be lifted and lowered by the rotation of the cam 9 every hour, to make and break the contact at 20.

On the shaft 10 is a cam 25 which cooperates with a roll 26 on a slide arm 27 pivotally connected with the end of the lever 16. This shaft 10 is geared to the clock works to turn one revolution every four hours in the present case. Therefore, it will intermittently reciprocate the beam 17 to move the contact 19 along the line of contacts 20. Every hour will bring the contact 19 into registration with one of the contacts 20 to complete one of the four circuits through four wires 28. This division of the operation into four parts is provided for the purpose of reducing the size of the instrument and the number of wires.

From each of the contacts 20 extends a wire 28 to a binder 30. From these binders extend four wires 31 horizontal in the present instance. Each of these wires 31 connects with three of a set of metal teeth 32 numbered in Roman numerals and representing the hours. They are spring pressed and pivoted on an insulating support 29[a] carried by a frame or casing 29. The arrangement is such that three of these spaced apart teeth are connected to one of the contacts 30 in regular order. These parts are contained in a support 29[a] carried by the casing or frame 29 which is provided with a guide 33 along which travels a carriage 34. The carriage is supported and guided on the other side by a guide 66.

It will be seen that one of the wires 31 is thus energized once every four hours and connected in regular order with one of the teeth 32. The carriage carries a spring metal contact 35 which, in a manner to be described, moves along the teeth and contacts with one of them after another through the series and always springs over the sharp edge of a tooth, when the carriage

moves along, so that it will come into contact with the next one. This entirely releases the former tooth from any present electrical connection with the circuit containing the motor 72. The carriage is provided with a wire 36 which carries the current from the wire 14 through any one of the teeth 32 to a binder 37 electrically connected to the wire 36 and the return tape 38.

This binder 37 is connected to a thin flexible brass tape 38 wound on a spring drum 39 insulated from and mounted on the casing or frame 29 and always kept under tension by the spring drum. The spring 79 in this drum is wound so that it normally tends to contract. The carriage is moved by this tape to an adjustable stop 44. This tape also conducts the current between the binder 37 and a conductor 39a which is connected with the distributing automatic switch motor 72 and one main of a source of power. Therefore, when the spring 35 is in contact with one of the metallic teeth 32 and the contact 19 engages one of the contacts 20, the current is on and the carriage is moving, as will now appear.

A screw threaded shaft 40 is mounted on the frame and cooperates with and supports a half nut 41 on the carriage 34. The half nut 41 is provided with a roller 43 on an arm 64 pivoted at 63 on the half nut 41 in a slanting slot 66. A cam 42 is rotatable with the screw shaft 40 and has a concentric groove 42a. This cam 42 is adjustable, of course, along the screw and is held by a check nut 42a. The roller 43 can swing freely in the inclined slot 66. 65 is a safety projection on the cam 42. The cam 42 constantly rotates. The half nut 41 feeds on the screw 40 up toward the cam 42 and finally the roller 43 enters the groove 42a. After this the screw can rotate one or more times while the roller 43 is moving into the groove 42a until it is seated against the bottom of said groove. Then it engages the outside cam surface of the cam 42 and is forced to climb up that surface, raising the roller 43 and the half nut 41. When it reaches the wedge shaped projection 65 that will throw the roller back and start the carriage 34 back, if the spring drum and tape do not do that as they are supposed to do.

The pick-up unit 45 is electrically connected to a loud speaker (not shown) and is adjustable through a screw 46 so as to bring the instrument point 47 into contact with the phonograph cylinder 48 which is carried by a shaft 49. The shaft 49 has a pinion 50 meshing with a gear 51 on the shaft 40 so that the motor 72, which is coupled on a coupling 52, can rotate both shafts at the same time. Although the shaft 49 is screw threaded full length this is done for the purpose of providing means for adjustably holding two heads 53 which support, between them, the cylindrical phonograph record 48 which rotates constantly as long as the shaft 52 is connected with the motor 72 and the circuit is closed so that the motor is running. The carriage 34 is provided with a roller 59 (Fig. 4) which on reaching slot 55a (Fig. 2) is raised above the guide 33 by the action of the projection 65 disengaging the half nut 41 from the threaded shaft 48. The roller 59 then rests on the guide 33 allowing the carriage to return to the first position by rolling back on guide 33. At slot 55 it will fall back into the power position below the guide and the half nut 41 will mesh with the screw 40. The cam 42 raises the carriage 34 and the projection 65 will cause it to start back by force, if necessary. On the forward trip when the needle 47 is in contact with the record the carriage will be held in position by the under side of guide 33.

The tubes of the amplifier connected to the lour speaker are not shown but a current is supplied to them for heating them through two wires 56 normally separated but connected through a switch 57 once every hour by a four-pointed cam 58 on the shaft 10. This cam is backed up by a lever 69 on an adjustable slide 60 and pushed inwardly by a spring 61. The circuit is normally open at the lower end at 57 and is allowed to be closed by the spring attached to and forming part of the switch 57 by a slight turn of the cam 58 which occurs slightly before the lever 69 is released by another tooth of the cam 58. The length of the contact is controlled by the adjustment of the slide 60 by means of a thumb screw at the bottom. The contact is opened by the projection 70 engaging and moving an insulated piece 71 on the spring of the switch 57. The thumb screw is turned to adjust the slide 60 up and down and therefore to move the lever 69 up and down to such a point that the four lobes of the cam 58 will in turn raise the projection 70 away from the insulated piece 71 and allow the switch 57 to move in and close at the desired time. The cam 58 opens it.

It will be seen that, with the help of the current distributor or automatic switch, which is run by the clock and the motor 72, the phonograph needle 47 and its pick-up unit 45 will be moved along twelve spaces to represent twelve hours and then returned to its original position by the spring drum and tape 38. The phonograph cylinder 48 can be marked so as to announce one o'clock, two o'clock, etc. as the hands on the clock reach those positions for indicating the same, if hands are used. The size of the whole device is reduced by the use of the cam 25, as has been described, and the current to control the heating of the tubes of the amplifier is only a small addition to the regular parts of a clock.

The current is from the power line through the wire 14, spring 15, spring 18, longitudinally reciprocating beam 17 to a contact 19. This contact, as has been explained, will come into contact regularly with the four contacts 20, one by one, as the beam 17 moves over these contacts and the cam 9 makes and breaks the contacts 19 and 20 in regular order. From these four contacts four circuits are provided through the wires 28 to the binders 30 and the four wires 31. Each of these four wires is connected with three of the teeth 32 so that eventually all twelve of these teeth will be connected individually in the circuit in regular order and transmit power to the spring 35 and carriage 34. From this carriage through the wire 36 the current passes through the return tape 38 on the spring drum 39 which is provided with a spring, that will wind up the tape and does not have to be wound up itself, because the spring is of the type which normally remains contracted. From this tape and drum the current is carried through the wire 39a back to the motor 72, and to the other end of the line. The motor operates to turn the shaft 52 and the screw 49 intermittently. The phonograph cylinder 48 rotates with this screw 49 because its heads are fixed to it. The pick-up unit 45 moves along this screw for twelve hours. Then the carriage is pulled back by the spring drum. This is done by the roller 59 being moved up at the end

of the stroke through the notch 55ª, lifting the needle off the cylinder and also lifting the half nut 41 off the screw 40 which is driven through gears by the screw shaft 49. The roller 58 moves back on the top of the guide 33 until it reaches the notch 55 when it falls down again. On the forward movement the roller 58 moves along the bottom of the guide 33 which keeps it at that level.

The half nut 41 is provided with a roller 43, as stated, on an arm 64 pivoted at 63 on this half nut. This roller 43 can move up and down in the so-called slot 66 on the half nut. In their motion to the left, as shown in Fig. 5, near the end of the stroke the roller 43 will enter the groove 42ª in the cam 42 which is fixed to the screw shaft 40 and rotates with it and also with the check nut 41ª. Therefore, after this contact, a few turns of this shaft 40 will move the roller 43 and the half nut 41 carrying the carriage 34 up out of contact with the screw shaft 40. After this action has taken place the guide 33 keeps the half nut off the screw so that it can move back to initial position.

Assume that contact 19 is on contact 20 at the 1:00 o'clock position and roller 26 is on the high point of the cam 25 (1:00 o'clock position) and spring contact 35 is on the contact tooth 32 marked I (bottom of Fig. 1). The clock will then announce the time as 1:00 o'clock due to the fact that the circuit through the motor 72 which drives the phonograph cylinder has been closed and said motor will run until spring contact 35 drops onto the contact tooth II, thus breaking the circuit. After this, lever 17 will move up off of contact 20 and at the same time will move to the left in a position above the second contact 20 due to the action of cams 9 and 25. Then when 2 o'clock is ready to be announced, lever 17 drops, owing to roller 21 falling off of the high edge of cam 9, and contact 19 comes into contact with the second contact 20, thus completing the circuit again and announcing the hour. The phonograph will again run until spring contact 35 drops off of contact tooth II onto contact tooth III, and the cycle of operations is repeated.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. In a talking clock, the combination of a series of teeth, means for connecting each tooth with a source of power to electrically energize it, means for energizing said teeth in succession, an hour apart, a carriage movable along said series of teeth and having a contact for engaging them one at a time during the progress of the carriage along the series, means for moving the carriage from one end of the series to the other, means connected with the carriage for conducting the current through any one of said teeth, and a phonograph connected with all of the first named means so as to be adapted to announce the hours in words, one at a time, as the contact engages the several teeth.

2. In a talking clock, the combination of a series of teeth, means for connecting each tooth with a source of power to electrically energize it, means for energizing said teeth in succession, an hour apart, a carriage movable along said series of teeth and having a spring contact for engaging them one at a time during the progress of the carriage along the series, means for moving the carriage from one end of the series to the other, a flexible tape, a spring drum on which the tape is wound, for drawing the carriage back to the starting point and conducting the current to any one of said teeth, and a phonograph connected with all of the first named means so as to be adapted to announce the hours in words, one at a time, as the spring contact engages the several teeth.

3. In an electric clock, the combination with a clock mechanism, of cams operated thereby, a series of four contacts, means by which the cams close said contacts in order, a series of four wires, each connected with one contact, a series of twelve teeth, each three of which are connected with one of said wires, the first four of said teeth being connected with the four different wires respectively and the same with the second four and the third four, a carriage having a contact adapted to move over the teeth, means for moving said carriage, a phonograph, and means whereby the phonograph will announce the hours in order as the carriage contact engages the several teeth and the cam closes the contacts one by one.

4. In a talking clock, the combination with a clock mechanism, of a cam operated thereby, a slide arm operated by said cam, an insulated lever pivotally connected with the slide arm, a source of electric power having a conducting spring resting on said lever, a conducting beam pivotally connected with the opposite end of the insulated lever and free to move longitudinally, a shaft operated by the clock mechanism, and having a second cam, a slide operated by said second cam, a pin on the slide under the beam for raising and lowering it in accordance with the operation of the last named cam, a contact on the end of the beam, and a series of contacts in alignment in position to be engaged by the contact on the beam in accordance with the longitudinal position of the beam as controlled by the first named cam and adapted to be lowered into its contact with one of the several contacts by the second named cam.

5. In a talking clock, the combination with a clock mechanism, of a cam operated thereby, a first slide arm operated by said cam, a shaft operated by the clock mechanism and having a second cam, a second slide operated by said second cam, a pivoted and sliding beam, a lever operatively connecting the first slide and beam to operate the latter, a pin on said second slide under the beam for raising and lowering the beam in accordance with the operation of the last named cam, a contact on the end of the beam, and four contacts in alignment in position to be engaged by the contact on the beam in accordance with the longitudinal position of the beam as controlled by the first named cam and adapted to be lowered into contact with one of the four contacts by the second named cam, for controlling the announcement of the hours in accordance with the connection of the contact on the beam with the four other contacts.

6. In a talking clock, the combination with four contacts, means for intermittently connecting each of said contacts with a source of electric power, four binders connected with said contacts, four wires each connected with one of said binders, a series of twelve timing teeth, three of said teeth being connected with each of said wires in regular order, a carriage movable along the teeth and having a spring contact adapted to engage the teeth, one by one, as the carriage moves over them, means for moving the carriage,

and a phonograph controlled by the position of the carriage for announcing the time in words, each of said teeth controlling the announcement of its specific hour.

7. In a talking clock, the combination of a casing, two screw-threaded shafts carried by said casing, means for gearing said shafts together to cause them to rotate at different speeds, a phonograph cylinder on one shaft, a carriage having a half nut engaging the other shaft for moving the carriage therealong, a pick-up unit on the carriage having a phonographic pin for engaging said cylinder, a stationary series of teeth representing the twelve hours of the clock, a contact on the carriage for engaging said teeth, one by one, as the carriage moves, means for electrically connecting said teeth with one terminal of a source of power in regular order, and an electric connection from said contact on the carriage for conducting a current to the opposite terminal.

8. In a talking clock, the combination of a casing, two screw-threaded shafts carried by said casing, means for gearing said shafts together to cause them to rotate at different speeds, a phonograph cylinder on one shaft, a carriage having a half nut engaging the other shaft for moving the carriage therealong, a pick-up unit on the carriage having a phonographic pin for engaging said cylinder, a stationary series of teeth representing the twelve hours of the clock, a spring contact on the carriage for engaging said teeth, one by one, as the carriage moves, means for electrically connecting said teeth with one terminal of a source of power in regular order, an electric connection from said spring contact on the carriage for conducting a current to the opposite terminal, a flat flexible tape connected with said electrical connection on the carriage electrically and mechanically for conducting a return current, a motor electrically connected with said tape, and means for winding up said flat tape to bring the carriage back to its original position.

9. In a talking clock, the combination of a series of teeth, means for electrically energizing said teeth in succession an hour apart, a carriage movable along said series of teeth and having a contact for engaging them one at a time, means for moving the carriage from one end of the series to the other, means connected with the carriage for conducting the current to any one of said teeth, and a phonograph connected with all of the first named means and arranged and adapted to announce the hours, one at a time, as the contact engages the several teeth.

10. In a talking clock, the combination with a clock mechanism, of a cam operated thereby, a conducting beam free to move longitudinally, a shaft operated by the clock mechanism and having a second cam, a pin under the beam operated by the last named cam for raising and lowering it in accordance with the operation of the last named cam, a contact on the end of the beam, and a plurality of contacts in alignment in position to be engaged by the contact on the beam in accordance with the longitudinal position of the beam as controlled by the first named cam and adapted to be lowered into its contact with one of the contacts by the second named cam.

11. In a talking clock, the combination of two screw-threaded shafts, geared together to rotate at different speeds, a phonograph cylinder on one shaft, a carriage having means engaging the other shaft for moving the carriage therealong, a pick-up unit on the carriage having a phonographic pin for engaging said cylinder, a series of teeth representing the twelve hours of the clock, a contact on the carriage for engaging said teeth, one by one, as the carriage moves, means for electrically connecting said teeth with one terminal of a source of power in regular order, and an electric connection from said contact on the carriage for conducting a current to the opposite terminal of said source of power.

12. In a talking clock, the combination of a phonograph cylinder, means cooperating therewith for announcing the hours, a pick-up unit, a point on the pick-up unit engaging the cylinder, a carriage on which said pick-up unit is mounted, a series of twelve teeth including a No. 1 tooth, a spring contact on the carriage through which one of said teeth will be connected to one side of a source of electrical power whenever the carriage moves to bring the spring contact into contact therewith, a flat flexible conducting tape electrically connected to said spring contact, a drum on which said flat tape is adapted to be wound, a spring for winding up the tape on the drum and drawing the carriage backwardly and quickly along its course and an electric conduit connected to the other side of said source of power and connected with at least one of said teeth to form an electric circuit when the tooth contacting with the spring contact is the same as the tooth connected to said electric conduit.

13. In a talking clock, the combination of a phonograph cylinder, means for announcing the hours in language, a pick-up unit, a point on the pick-up unit engaging the cylinder, a carriage on which said pick-up unit is mounted, means for feeding the carriage from one end of its course to the other, a series of twelve teeth including a No. 1 tooth, a spring contact on the carriage through which one of said teeth will be connected to one side of a source of electrical power whenever the carriage moves to bring the spring contact into contact therewith, a flat flexible conducting tape electrically connected with said spring contact, a drum on which said flat tape is adapted to be wound, a spring for winding up the tape on the drum and drawing the carriage backwardly and quickly along its course, an electric conduit connected to the other side of said source of power and connected with at least one of said teeth to form an electric circuit when a tooth contacting with the spring contact is the same as the tooth connected with said electric conduit, a stop for stopping the carriage in position for the spring contact to be ready to engage the No. 1 tooth, and an electric circuit having branches adapted to be connected with said teeth one by one and comprising said tape.

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