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2,214,534

PROGRAM CLOCK

Filed May 31, 1938

2 Sheets-Sheet 1

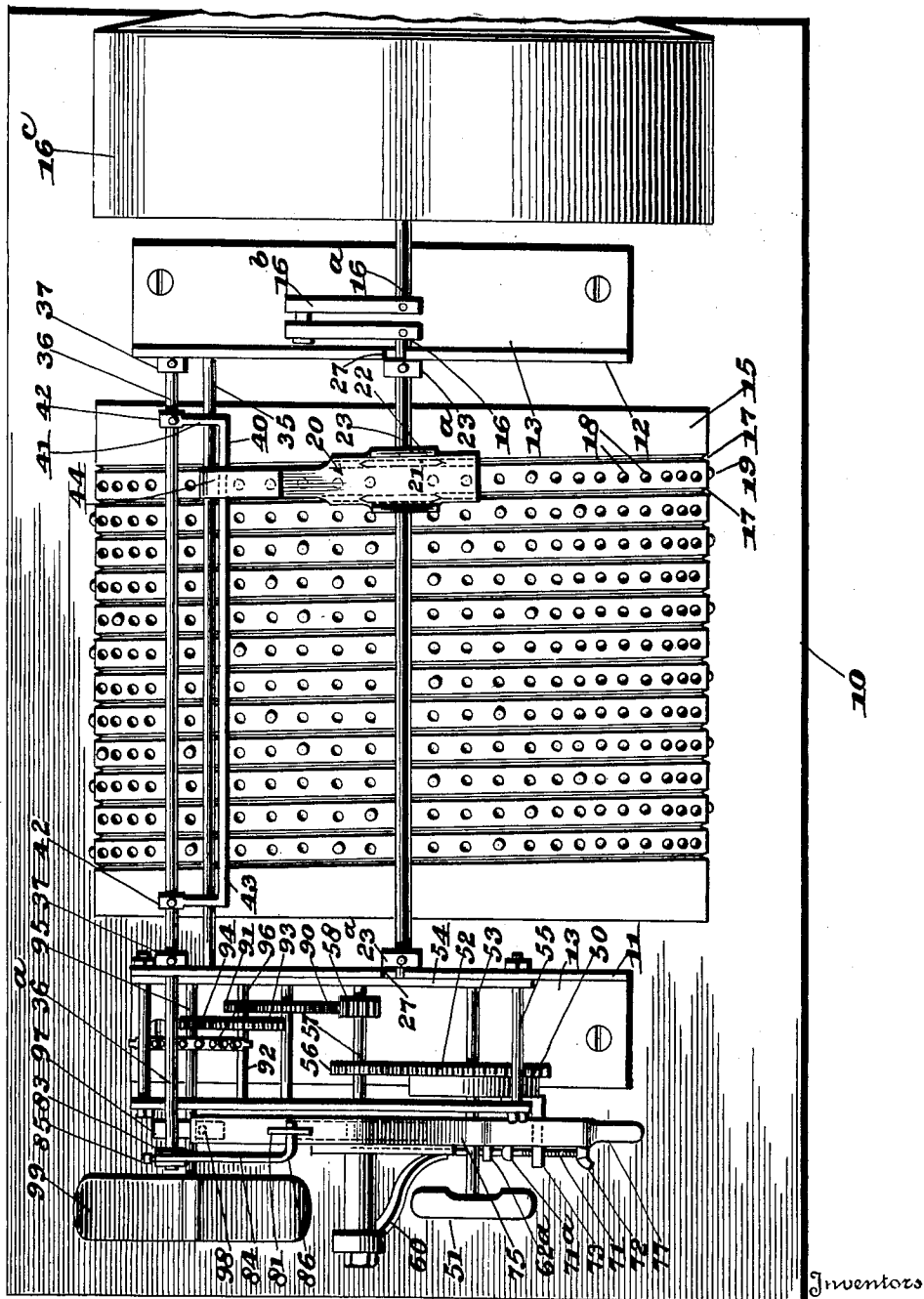


Fig. 1.

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2 Sheets-Sheet 2

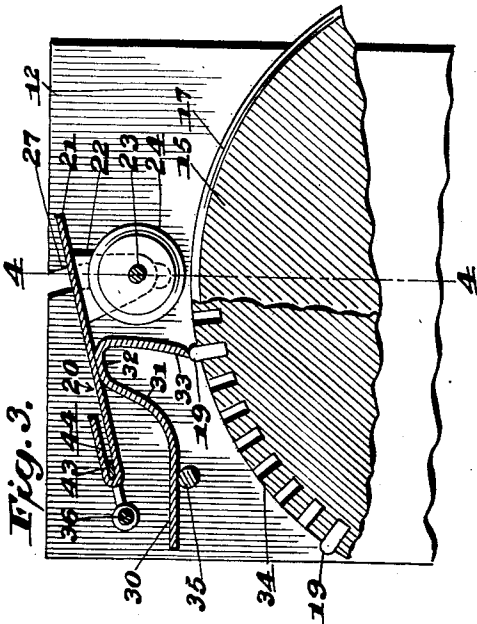
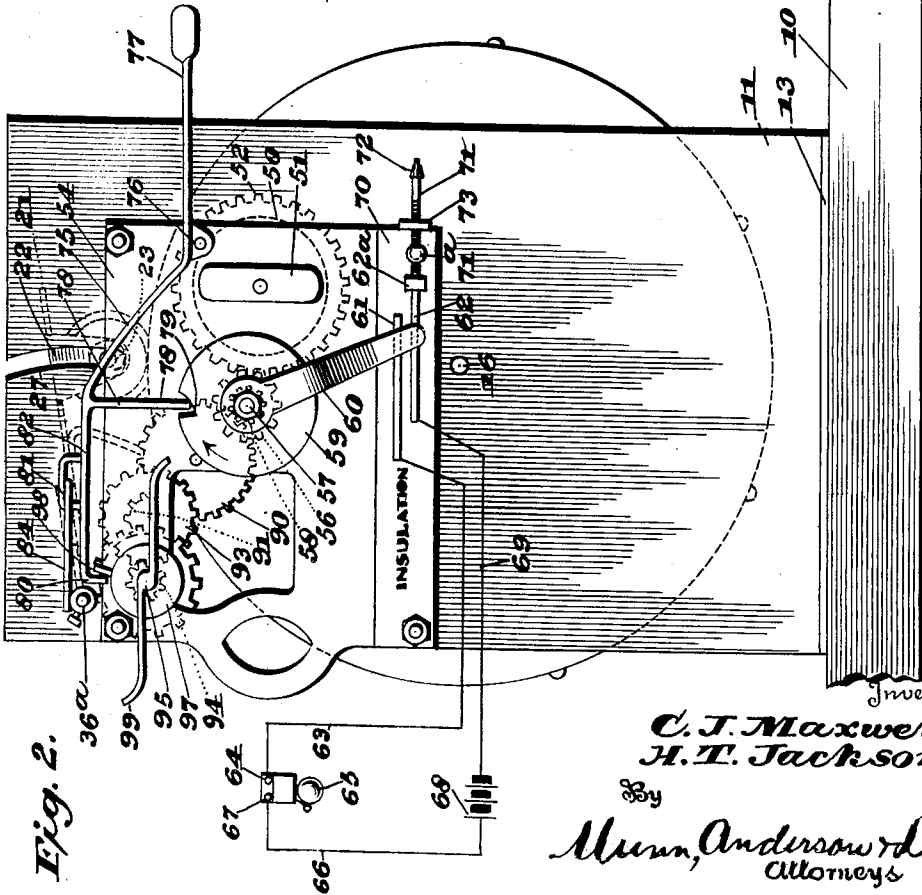
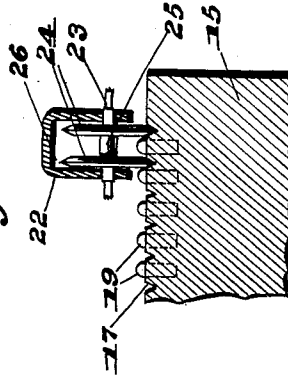


Fig. 4.



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PROGRAM CLOCK

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6 Claims. (Cl. 200—38)

This invention relates to a program clock.

An object of the invention is the provision of a device for regulating the frequency of signals in a program clock and for regulating the length of the signals in a simple and efficient manner.

Another object of the invention is the provision of a device for producing periodic signals in which a rotatable means controls the frequency of the signals while releasing a signal actuating mechanism which controls the duration of the signal in connection with means which will vary the time during which the signal remains audible.

A further object of the invention is the provision of a program clock in which a means for regulating the frequency of signals controls the release of operating mechanism for the signal whereby an arm is rotated and moves over a pair of contacts being adjustable towards and away from each other for varying the time during which the signal is operated.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawings forming a part of the specification; nevertheless, it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications as define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a plan view of a program clock with parts removed showing portions of the internal mechanism.

Figure 2 is an end view of the program clock with the cover removed.

Figure 3 is an enlarged fragmentary vertical section of the device for regulating the frequency of the signals.

Figure 4 is a fragmentary vertical section taken along the line 4—4 of Figure 3.

Referring more particularly to the drawings, 10 designates a base member on which are mounted spaced plates or standards 11 and 12. These standards are provided with an angular portion 13 which is secured to the base 10 by any suitable means and these standards provide bearings for the various shafts employed in the construction.

A cylinder 15 is mounted on a shaft 16 which is carried in a bearing by the members 11 and 12 and the shaft is driven by the "minute" shaft 16a. It is connected to the shaft 16 by a universal connection 16b. The shaft 16a is driven by a clock mechanism 16c. This clock mechanism may be of any of the well known mechanical or electrically operated types.

This cylinder is provided with a continuous spiral groove 17 and between the sections of the spiral groove are located a plurality of perforations 18 which are spaced in such an angular relation that these perforations have their centers exactly six degrees apart so that the distance of the travel of a point on the circumference of the cylinder between two perforations will equal one minute.

A plurality of pins 19 are adapted to be inserted in these perforations along the spiral path of the perforations around the cylinder and when it is known what time it is desired to produce signals these pins may be properly positioned in the perforations to produce the required signals at predetermined periods. In other words, if the signals are required every thirty minutes, then the pins will be placed at diametrically oppositely spaced points. In other words, it must be borne in mind that if the pins were placed in each of the perforations signals would be produced every minute. In order to increase these periods the pins will be eliminated between a pair of pins to give the required period.

A carriage, generally designated by the numeral 20 consists of a plate 21 which has a pair of depending ears 22 which are provided with passages between the lower ends to receive a shaft 23. The ears slide along this shaft in a manner which will be presently described. A pair of wheels 24 are rotatably mounted on the shaft 23 and are spaced a predetermined distance from each other by a sleeve 25 which is received by the shaft 23 and located between the wheels. The peripheries of these wheels are V-shaped in cross section as shown at 26 to ride in the complementary shaped grooves 17 in the cylinder 15. The opposite ends of the shaft 23 are shown more particularly in Figure 3 as received by arcuately shaped slots 27 formed in the standards 11 and 12 so that the shaft 23 may raise or lower for a purpose which will be presently explained.

A strip of metal bent to the shape shown in Figure 3 has a horizontal portion 30 and a V-shaped extension 31 which has a bight portion 32 connected to the under face of the plate 21. The free end of the V-shaped member forms a finger 33 which normally rides on the curved surface 34 of the cylinder 15 and this curved surface is located between the sections of the spiral groove 17. This finger is slightly sheared off at its free end where it engages the curved surface of said cylinder. A fixed rod 35 is supported by the standards 11 and 12 and is in

a position to support the free end of the member 30 in a predetermined position.

A shaft 36 is mounted in bearings in the standards 11 and 12 and collars 37 are secured to the shaft and engage the side walls of said standards for maintaining the shaft in position. A U-shaped member generally designated by the numeral 40 has its parallel arms 41 provided with collars 42 which are secured to the shaft 36. The bight portion 43 of said U-shaped member extends across the top of the cylinder 15 and is received by a return bent portion 44 formed on one end of the plate 21 so that when this end of the plate is elevated the bight portion 43 is likewise elevated for rocking the shaft 36.

It will be noted that the shaft or rod 23 also has a collar 23a secured to its opposite ends and abutting the adjacent faces of the standards 11 and 12 for maintaining the shaft against slippage from the arcuate slots 27.

A device for controlling the length of the signals and a device for releasing the actuating mechanism for the signal timing device is shown more particularly in Figures 1 and 2. This mechanism consists principally of a spring driven motor 50 which is wound by a key 51 and which operates a gear 52. The motor, in turn, drives a shaft 53 to which the gear 52 is connected. All of these parts are carried by a frame generally designated by the numeral 54 and having horizontal posts 55 for maintaining the elements of the frame in a predetermined position. This frame is secured in any approved manner to the outer face of the standard 11.

The gear 52 drives a gear 56 which revolves a shaft 57 and a gear 58 rigid with the shaft 57. A disc or ratchet wheel 59 rotating anti-clockwise is secured to the shaft 57 and a circuit closing member 60 is formed as an arm which is rigidly connected with the shaft 57 located outwardly of the disc 59.

A pair of contact members 61 and 62 are located in spaced parallel relation. The member 61 is connected by a wire 63 to one binding post 64 of a bell or other signal 65. A wire 66 connects the other binding post 67 with a battery generally designated by the numeral 68. A wire 69 also connects this battery with the other contact member 62.

An insulating block 70 rigidly supports the contact 61 while the contact 62 is adjustably mounted on the block and movable with respect to the fixed contact 61. The member 62 is guided along the block 70 by means of a screw 71 rotated by a handle 72 and this screw is threaded into a nut 73 carried by the block 70. Thus, it will be seen that when the handle 70 is rotated in one direction or the other the contact member 62 is moved towards or away from the adjacent end of the fixed contact 61 for decreasing or increasing the time when the signal 65 is placed in circuit with the battery 68. The screw 71 has a universal connection at 71a with the contact member 62 which is held in position by a guide 62a.

A control lever generally designated by the numeral 75 is pivotally mounted at 76 on the frame 54 and is provided with an expansion 77 for manually manipulating the lever when desired. The lever is provided with a finger 78 which projects into a notch 79 on a ratchet wheel 59 for permitting levers 75 to be lowered for a purpose to be described. This lever has a lip 80 at its extreme outer end. A U-shaped member 81 is mounted on the top of an extension 82 of the lever 75.

The shaft 36 is extended as shown at 36a and this extension passes through the frame 54 and projects beyond the outer face of the frame to receive a collar 83 to carry an arm 84. This collar is secured to the extension 36a by a set screw 85. The arm 84 has a finger 86 which projects laterally and is received by the U-shaped member 81 on the lever 75 so that when the shaft 36 is rocked the arm 84 will be rocked for raising the lever 75 to release the finger 78 from the notch 79 of the ratchet wheel 59.

The gear wheel 58 secured to the shaft 57 drives a gear wheel 90 which in turn drives a gear 91 secured to the shaft 92. A gear 93 secured to the shaft 92 drives a gear 94 which in turn drives a shaft 95. This shaft drives a toothed wheel 96.

A disc 97 is secured to the shaft 95 and this disc is provided with a radially disposed pin 98 projecting radially from the periphery of the disc 97 and which is adapted to engage the lip 80 on the outer end of the lever 75.

The operation of my device is as follows: In this type of construction it is desired to produce signals periodically and the periods in this device are controlled by the proper positioning of the pins 19 in the perforations 18 in the cylinder 15.

When the cylinder is being rotated by the clock mechanism 16c the wheels 24 will ride in a pair of sections of the spiral groove 17 so that the carriage or plate 20 will move along a horizontal plane in a straight line directly across the length of the cylinder 15 since the carriage is maintained in such straight line movement by the rod 23.

As the cylinder revolves under the carriage 20 the carriage is gradually shifted to the left in Figure 1, but during each complete rotation of the cylinder the finger 33 of the member 30 will engage the pins 19 periodically for elevating the bight portion 43 of the carriage 20. The wheels, however, will remain in engagement with the spiral groove. The arcuate slots 27 permit the operator to raise the wheels from the tracks at the end of the day and place them in the initial position of the tracks for a new setting of signals for the next day.

When the bight portion 43 of the member 40 is elevated the shaft 36 will be rocked. The rocking of the shaft 36 will raise the free end of the arm 84 (Fig. 1) and likewise the finger 86. The raising of said finger will raise the lip 80 at one end of the lever 75 so that said lip will release the pin 98. The raising of the lever will also raise the finger 78 from the notch 79 of the ratchet wheel 59 and as the motor 50 rotates the various gears and the arm 60 the finger 78 will ride on the rim of the wheel 59. The release of the pin 98 releases the disc 97 and a governor 93 mounted on the outer end of the shaft 95. The notch 79 permits the finger to drop therein so that the lever 75 may be lowered to allow the lip 80 on the lever 75 to engage the pin 98.

When the arm 60 is revolved its free end will move over the parallel contact members 61 and 62 and close the circuit to the signal 65 and this signal will continue in operation as long as the arm 60 is engaging both of the contacts 61 and 62. As soon as the arm, however, clears the contact 62 the circuit will be broken and the signal will be stopped.

The length or duration of the operation of the signal 65 will depend upon the positioning of the movable contact 62 with respect to the fixed contact 61. An increased duration is obtained by

moving the contact 62 toward the left in Fig. 2. By moving said contact in the opposite direction a decrease in the period for which the signal is operated is caused.

5 It will be seen from this construction that a very simple and efficient mechanism is employed for controlling the periods by which the signal 65 is set in operation in combination with a mechanism for controlling the time during which
10 the signal is maintained in operation.

The essential use of lip 80 is to release the member 97 to permit the associated gears to revolve.

15 The finger 78 is adapted to seat within the notch 79 and ride out of the notch automatically when the gears start to revolve for the purpose of raising the lip 80 to release the member 98.

We claim:

1. In a program clock, a cylinder provided with
20 a spiral groove, means for rotating the cylinder, a carriage mounted on the cylinder and having a pair of wheels received by sections of the groove, means for guiding the carriage longitudinally in a straight line along the cylinder,
25 means for periodically elevating the carriage, an electric circuit, means for closing the circuit, means for operating the closing means, and means actuated by the raising of the carriage for setting in motion the operating means for the
30 closing means.

2. In a program clock, a cylinder provided with a spiral groove, a carriage mounted on the cylinder and having wheels received by sections of the groove, means for maintaining the carriage in a
35 straight line longitudinally of the cylinder, means for periodically raising the carriage, a circuit closer, operating means for the circuit closer, means for retaining the operating means inactive, and means actuated by the carriage when
40 the carriage is raised for releasing the retaining means.

3. In a program clock, a pair of spaced contacts forming the terminals of a circuit, means for adjusting one of the contacts relative to the

other, a hand movable over the spaced contacts for bridging the contacts and for closing the circuit, means for rotating the hand, means for retaining the rotating means against operation, and means periodically operated for releasing the retaining means. 5

4. In a program clock, a pair of parallel elongated contact members forming the terminals of an electric circuit, one of said contact members being fixed in position, the other contact member
10 being slidably mounted, means for moving the end of the slidable contact member toward and away from one end of the fixed contact member, a hand movable over on the contact members for closing the circuit, means for rotating
15 the hand, means for retaining the rotating means against operation, and means actuated periodically for releasing the retaining means.

5. In a program clock, a pair of spaced contacts forming the terminals of an electric circuit,
20 a rotatable means engageable with the contacts for closing the circuit, means for rotating the last mentioned means, a governor operated by the rotating means, a pivoted lever having means
25 for retaining both the governor and the rotating means against actuation, means operated periodically for actuating the lever to release the governor and the rotating means.

6. In a program clock having a cylinder provided with a spiral groove, a wheeled carriage engaging the groove, means for maintaining the carriage along a straight line longitudinally of
30 the cylinder, means for periodically raising the carriage, a U-shaped member having its bight portion connected with the carriage and adapted to be oscillated when the carriage is elevated, a rock shaft rigidly connected with the U-shaped member, a switch for making and breaking an
35 electric circuit, operating means for the switch, and means connected with the shaft for setting the operating means in motion. 40

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