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2,693,592

SIGNAL TIMING APPARATUS

Filed Aug. 28, 1951

2 Sheets-Sheet 1

FIG. 2.

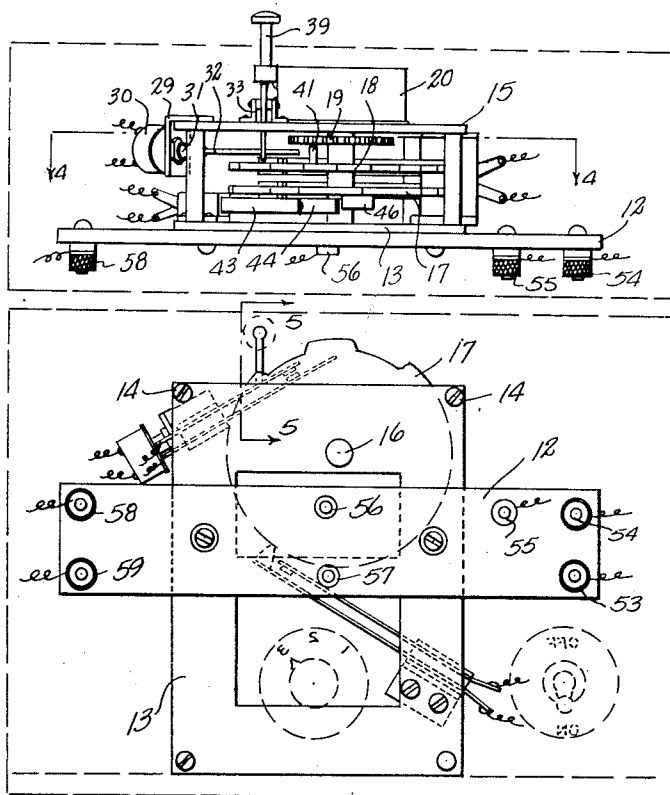


FIG. 3.

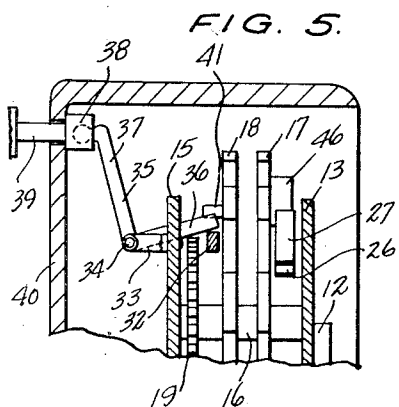


FIG. 5.

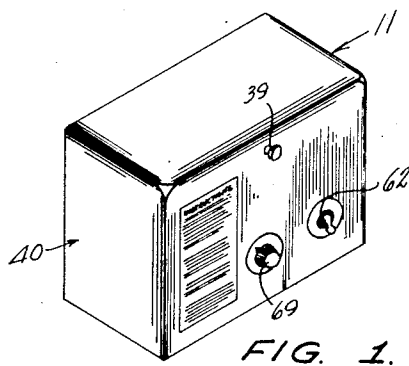


FIG. 1.

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FIG. 4.

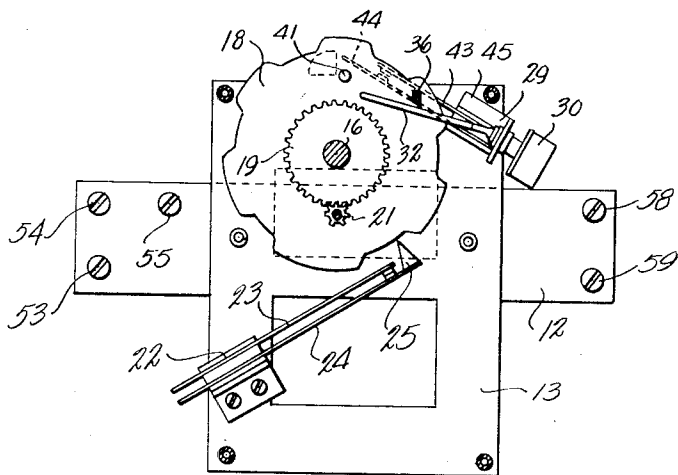
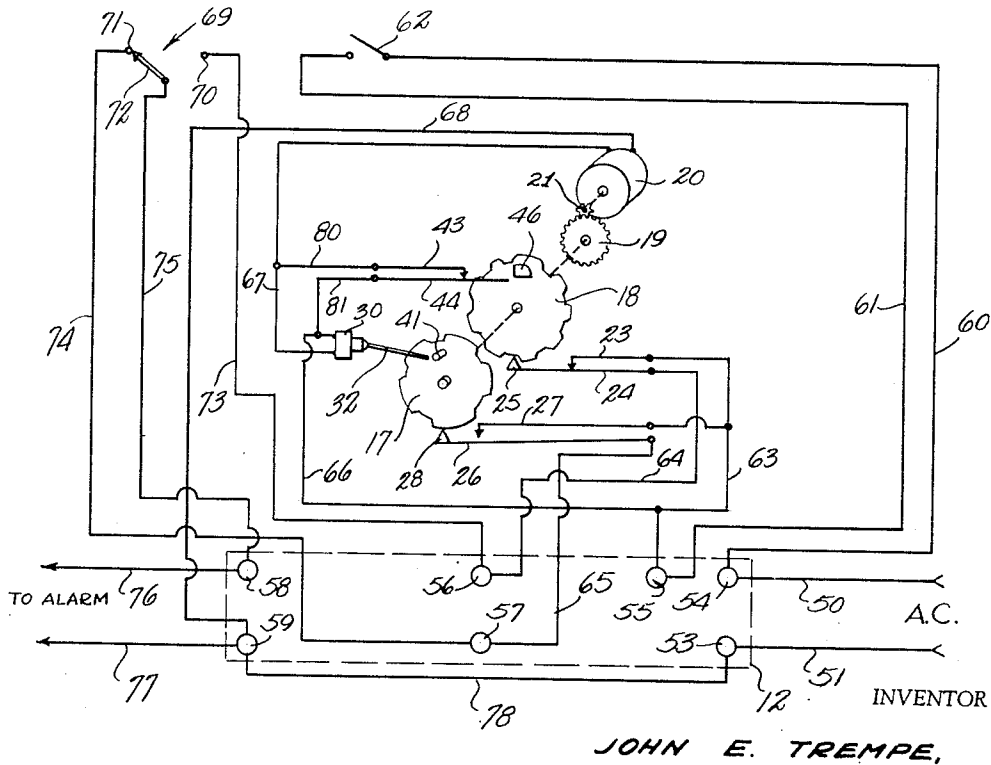


FIG. 6.



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## SIGNAL TIMING APPARATUS

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3 Claims. (Cl. 340—345)

This invention relates to alarm systems, and more particularly to a timing mechanism for automatically giving predetermined signals employing an existing fire siren apparatus or similar existing alarm device.

A main object of the invention is to provide a novel and improved automatic alarm device adapted to provide a timed signal when employed in conjunction with an existing fire siren or similar alarm device, the improved apparatus being simple in construction, involving relative few parts, and being reliable in operation.

A further object of the invention is to provide an improved alarm device adapted to provide a timed signal and usable with an existing fire siren installation or similar signal apparatus, the improved device being inexpensive to manufacture, being easy to install, requiring a minimum amount of human supervision and servicing, and being automatically reset at the expiration of a timed period of operation.

A still further object of the invention is to provide an improved alarm system adapted to be employed with an existing fire siren installation or similar signaling installation, the apparatus being arranged to provide any one of a plurality of different timed signals and being provided with means for selecting a desired timed signal, the apparatus being compact in size, being simple to operate, and being substantially tamper-proof.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a perspective view of an assembled timing unit constructed in accordance with the present invention;

Figure 2 is a top plan view of the timing apparatus employed in the assembly of Figure 1, the outer housing being removed;

Figure 3 is a rear elevational view of the timing apparatus shown in Figure 2;

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 2;

Figure 5 is an enlarged cross-sectional detail view taken on the line 5—5 of Figure 3;

Figure 6 is a schematic wiring diagram showing the electrical circuit employed in the timing apparatus of Figures 1 to 5.

Referring to the drawings, the improved timing apparatus is designated generally at 11. Designated at 12 is a supporting plate, preferably of insulating material, which is disposed vertically and which is elongated in a horizontal direction, as shown in Figure 3. Transversely secured to the supporting plate 12 is a first vertically extending, rectangular plate member 13, and connected to the member 13 by respective corner bolts 14 is a second rectangular plate member 15 disposed parallel to the plate member 13 and rigidly secured in parallel relation therewith by the corner bolts 14. Journaled in the top portions of the plate members 13 and 15 and extending perpendicularly to said plate members is the shaft 16. Secured rigidly to said shaft in spaced relationship thereon are the respective cam wheels 17 and 18. Also secured rigidly to the shaft 16 and located adjacent the plate member 15 is the gear 19.

Secured to the plate member 15 is an electric motor 20 of the type employed in electric clocks. Secured on the motor shaft is a small gear 21 which meshes with the relatively large gear 19, as shown in Figure 4.

The periphery of each of the cam wheels 17 and 18 is serrated or notched in a different manner, so that

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the teeth on the periphery of one of the cam wheels are spaced differently from the teeth on the periphery of the other cam wheel. Secured to the plate member 13 is a first insulating bracket assembly 22 carrying the respective contact arms 23 and 24 arranged in the plane of the cam wheel 18, the contact arm 24 being resilient and normally engaging the contact arm 23. The end of the arm 24 has secured thereto an insulating follower lug 25 which is engageable with the periphery of the cam wheel 18 and is movable outwardly as it engages the teeth on the periphery of said cam wheel 18, whereby to disengage contact arm 24 from the stationary contact arm 23. As shown in Figure 4, when the cam wheel 18 rotates in a counterclockwise direction, as viewed in said figure, the lug 25 is intermittently moved outwardly to intermittently open and close the contacts on the arms 23 and 24. Secured to the plate member 13 is another bracket member carrying the contact arms 26 and 27, said contact arms 26 and 27 being resiliently biased into engagement with each other in the same manner as in the case of the contact arms 23 and 24. The contact arms 26 and 27 are disposed in the plane of the cam wheel 17, and the resilient arm 26 has secured to its ends a follower lug 28 engageable with the serrated periphery of the cam wheel 17, whereby the contact arm 26 is intermittently moved out of engagement with the stationary contact arm 27 responsive to the rotation of cam wheel 17.

Secured to the plate member 15 is an angle bracket 29 on which is mounted a conventional manual switch 30 of the toggle-snap type having the toggle lever 31 extending in a plane parallel to the plane of the plate member 15 and provided with the extension rod 32 rigidly secured thereto. Secured to the plate member 15 is a bracket 33, and pivoted at 34 to said bracket is the bell crank lever 35. One arm of said lever, designated at 36, overlies the extension rod 32, as shown in Figure 5. The other arm of said bell crank lever, designated at 37, is pivotally connected at its end by a ball-and-socket joint 38 to the ends of a horizontally extending push-rod 39. The push-rod 39 extends slidably through an aperture formed in the front wall of the protective housing 40 which contains the timing mechanism. From Figure 5 it will be apparent that when the push-rod 39 is moved inwardly by manual pressure thereon, the bell crank lever 35 may be rotated in a clockwise direction, causing the extension arm 32 to be depressed, thereby closing the switch 30, the switch 30 being open when the toggle lever 31 is in an elevated position.

Secured to the cam wheel 17 is a pin member 41 which is arranged to engage the extension rod 32 when said extension rod is in its depressed position, shown in Figure 6 and in Figure 4, responsive to the rotation of the cam wheel 17 in a clockwise direction, as viewed in Figure 6, through substantially one complete revolution, whereby the extension rod 32 will be elevated from its depressed position to its raised position, causing the switch 30 to be opened. As viewed in Figure 4, the extension rod 32 will be engaged when the cam lever 18 has rotated substantially one complete revolution counterclockwise, the pin member 41 engaging said extension rod 32 and causing the extension rod to be elevated to open the switch 30. Designated at 43 and 44 are respective contact arms secured to an insulating bracket 45 and disposed parallel to and adjacent the cam wheel 18. The contacts 43 and 44 are normally spaced apart, as shown in Figure 6. Designated at 46 is a projection secured to the cam wheel 18 and adapted to engage the ends of the longer contact arm 44 as the cam wheel 18 rotates clockwise, as viewed in Figure 6, and to move the contact 44 into engagement with the contact 43 shortly before the pin 41 engages the extension rod 32. The projection 46 is arranged to hold the contact 44 closed against the contact 43 until the cam wheel 17 rotates sufficiently to allow pin 41 to completely clear the ends of the extension rod 32, whereupon projection 46 releases the resilient contact arm 44 and allows said arm to separate from the contact 43.

Referring now to Figure 6, 50 and 51 designate the line wires leading to a suitable power source. 12 designates the terminal strip on which are mounted the respective

terminals 53 to 59. The line wires 50 and 51 are connected to the respective terminals 54 and 53. Connected between terminals 54 and 55 by respective wires 60 and 61 is a manually operated main control switch 62. The stationary contact 23 is connected to terminal 55 by a wire 63, and the contact arm 24 is connected to the terminal 56 by a wire 64. The contact arm 27 is connected to wire 63, and the contact arm 26 is connected to terminal 57 by a wire 65. One terminal of switch 30 is connected by a wire 66 to the wire 63, and the other terminal of switch 30 is connected by a wire 67 to one terminal of the motor 20. The other terminal of the motor 20 is connected by a wire 68 to the terminal 59. Designated at 69 is a single-pole, double-throw selector switch having the respective stationary contacts 70 and 71, and having the switch pole 72. Contact 70 is connected by a wire 73 to the terminal 56, and contact 71 is connected by a wire 74 to the terminal 57. The switch pole 72 is connected by a wire 75 to the terminal 58. Designated at 76 and 77 are respective wires leading to the alarm circuit, as for example, to the operating relay of a fire siren system of the type wherein the siren is deenergized when the relay is energized, and wherein the siren becomes energized when the current is interrupted to the relay. In other words, the system may be of the type wherein the siren is deenergized when a potential is applied to the wires 76 and 77 across the terminals 58 and 59, and wherein the siren becomes energized when the circuit connected to wires 58 and 59 is broken.

It will be understood that the siren apparatus may be conventional fire siren equipment controlled by suitable switch means associated therewith and not forming any part of the present invention.

In operation, the desired type of signal is selected by placing the switch pole 72 into a corresponding circuit-making position, such as, for example, into engagement with the contact 71. The switch 62 is closed and the push-rod 39 is then moved inwardly to cause the extension rod 32 to be depressed, closing the switch 30. This completes the energizing circuit from motor 20, as follows: Line wire 50, terminal 54, wire 60, closed switch 62, wire 61, terminal 55, wire 66, closed switch 30, wire 67, motor 20, wire 68, terminal 59, and a wire 78 connecting terminal 59 to terminal 53 and hence to the opposite line wire 51. When motor 20 becomes energized, it rotates shaft 16, causing the cam wheels 17 and 18 to be simultaneously rotated therewith. The engagement of the follower lug 28 with the serrated periphery of cam wheel 17 causes the alarm circuit to be intermittently opened by the intermittent opening of the contact arms 26 and 27, in a circuit arranged as follows: Line wire 50, wire 60, switch 62, wire 61, terminal 55, wire 63, contact 27, contact 26, wire 65, terminal 57, wire 74, switch contact 71, switch pole 72, wire 75, terminal 58, wire 76, the alarm relay, wire 77, wire 78, terminal 53, and the remaining line wire 51. The intermittent opening of the circuit of the alarm relay causes the siren to alternately become energized and deenergized in a sequence of signals whose relative length and timing are determined by the configuration of the toothed periphery of the cam wheel 17. Said periphery may be arranged to provide one of the conventional air raid signals or similar signals.

As soon as the motor 20 becomes energized, the cam wheel 17 begins to rotate in a clockwise direction, as viewed in Figure 6, causing the pin 41 to travel therewith, and as soon as the cam wheel has made substantially a complete revolution, the pin 41 engages the extension rod 32 and elevates said extension rod, causing the switch 30 to be opened. The contacts 43 and 44 are connected across the terminals of the switch 30 by respective wires 80 and 81. Shortly before the pin 40 engages the extension rod 32, the projection 46 engages the end of the resilient contact arm 44 and moves said contact arm into engagement with the contact arm 43, short circuiting the switch 30, and allowing the motor 20 to remain energized for a sufficient period to permit pin 41 to completely clear the elevated extension rod 32. As soon as pin 41 has cleared the rod 32, the projection 46 releases the contact arm 44 and allows said arm to separate from arm 43, opening the energizing circuit of the motor 20, since the switch 30 has been previously opened. The operation of the timing apparatus is thus automatically terminated and the cycle may be repeated by again pushing the operating rod 39 inwardly to close toggle switch 30 and again energize the motor 20.

A different signal may be selected by moving the switch

pole 72 of switch 69 into engagement with the contact 70. When the switch pole 72 engages the contact 70, the alarm circuit is intermittently opened and closed by the movements of the follower lug 25 as it travels along the toothed periphery of the rotating cam wheel 18. The signaling circuit is then as follows: Line wire 50, terminal 54, wire 60, switch 62, wire 61, terminal 55, wire 63, contact arm 23, contact arm 24, wire 64, terminal 56, wire 73, contact 70, switch pole 72, wire 75, terminal 58, wire 76, the alarm relay, wire 77, wire 78, terminal 53, and the remaining line wire 51. Obviously, by employing a selector switch having more than two stationary contacts and by employing a corresponding number of cam wheels and circuit-opening and closing contact arms associated therewith, additional timed signals of desired characters may be provided by the mechanism.

With the alarm system set up in its normal condition, namely, with the siren control relay connected directly to the wires 76 and 77 and with the timing apparatus in operation, the siren would provide the particular interrupted signal determined by the position of the switch pole 72. Should it be desired to provide continuous energization of the siren during this period, it is merely necessary to open the switch 62, thereby deenergizing the motor 20 and opening the relay circuit controlling the siren, thus causing the siren to operate continuously.

It will be readily apparent that although the mechanism described has been disclosed as employed in connection with a "closed circuit" type of siren control circuit, the same apparatus may be employed in conjunction with an "open circuit" type of siren control installation by arranging the contact arms 26 and 27 so as to be normally open and to be intermittently closed by the engagement of its follower lug 27 with the associated cam wheel 17, the same arrangement being provided in connection with the contact arms 23 and 24. In an "open circuit" type of installation, the contact arms would be normally open and the follower lugs engaging the cam wheel peripheries would be mounted on the upper resilient contact arms, whereby said upper resilient contact arms would be intermittently forced into engagement with the lower contact arms to provide the intermittent closure of the alarm circuit.

While a specific embodiment of an improved timing mechanism for an alarm system has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In an alarm system, an alarm circuit, an interrupter switch in said circuit, rotary cam means arranged to intermittently actuate said switch, a driving motor mechanically connected to said cam means, energizing circuit means connected to said driving motor, a two-position switch in said energizing circuit means, said two-position switch having two positive positions, one open and the other closed, a normally open switch connected across said two-position switch, manually operated means for closing said two-position switch, means mechanically connected to said cam means and arranged automatically to open said two-position switch after a predetermined cycle of rotation of said cam means, and further means connected to said cam means and arranged to automatically close said normally open switch shortly prior to the opening of said two-position switch by said mechanically connected means and to release said normally open switch after said mechanically connected means has cleared said two-position switch.

2. In an alarm system, an alarm circuit, an interrupter switch in said circuit, a rotary cam arranged to engage said interrupter switch and to intermittently open said switch responsive to rotation of said cam, a driving motor mechanically coupled to said cam and arranged to rotate the cam responsive to energization of the motor, an energizing circuit connected to the motor, a two-position switch in said energizing circuit, having two positions, one open and the other closed a first projection on said cam arranged to engage said two-position switch and automatically move the two-position switch to open position after substantially one complete revolution of the cam following closure of the two-position switch, a second projection on said cam, and normally open switch contacts connected across the two-position switch and arranged to be automatically closed by said second pro-

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jection shortly prior to engagement of the first projection with said two-position switch and to be released after said first projection has cleared the two-position switch.

3. In an alarm system, an alarm circuit, a plurality of normally closed interrupter switches, means selectively connecting said interrupter switches in said alarm circuit, respective rotary cams peripherally engaging the respective interrupter switches and arranged to intermittently open said interrupter switches responsive to rotation of said cams, a driving motor mechanically coupled to said cams and arranged to rotate the cams responsive to energization of the motor, an energizing circuit connected to the motor, a two-position switch in said energizing circuit, said two-position switch having two positive positions, one open and the other closed, a first projection on one of said cams arranged to automatically engage said two-position switch and move the two-position switch to open position after substantially one complete revolution of said one of

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the cams following closure of the two-position switch, a second projection on another cam, and normally open switch contacts connected across the two-position switch and arranged to be automatically closed by said second projection shortly prior to engagement of the first projection with said two-position switch and to be released after said first projection has cleared the two-position switch.

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