Dec. 4, 1934. J. L. CROZIER 1,982,982

SCHEDULE SIGNAL CLOCK

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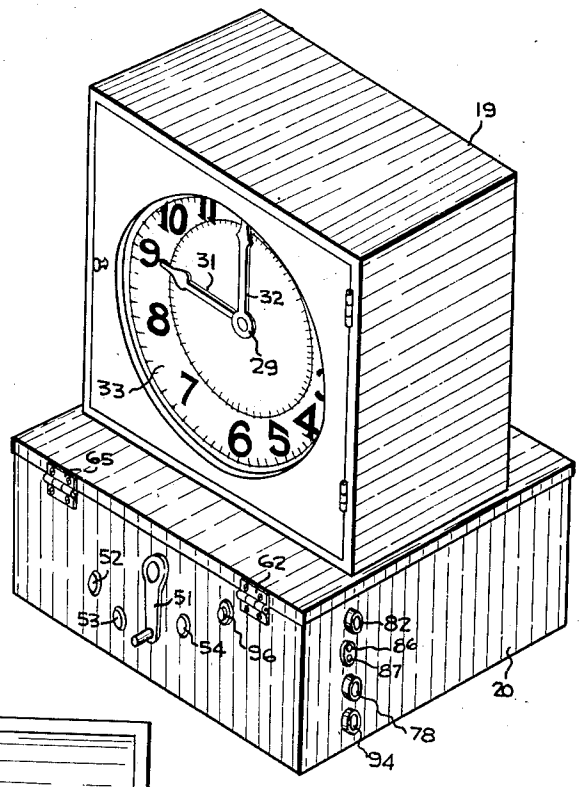
Fig. 1



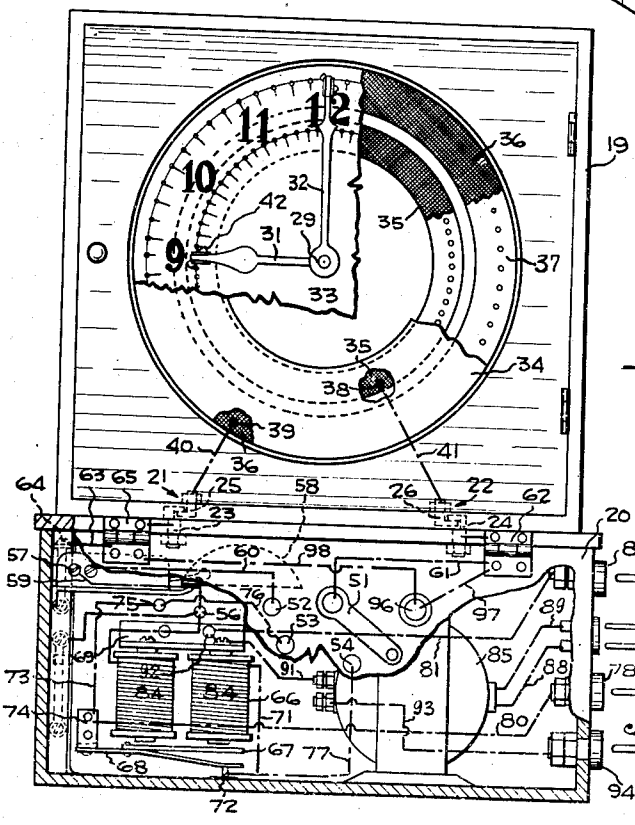


Fig. 2

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SCHEDULE SIGNAL CLOCK

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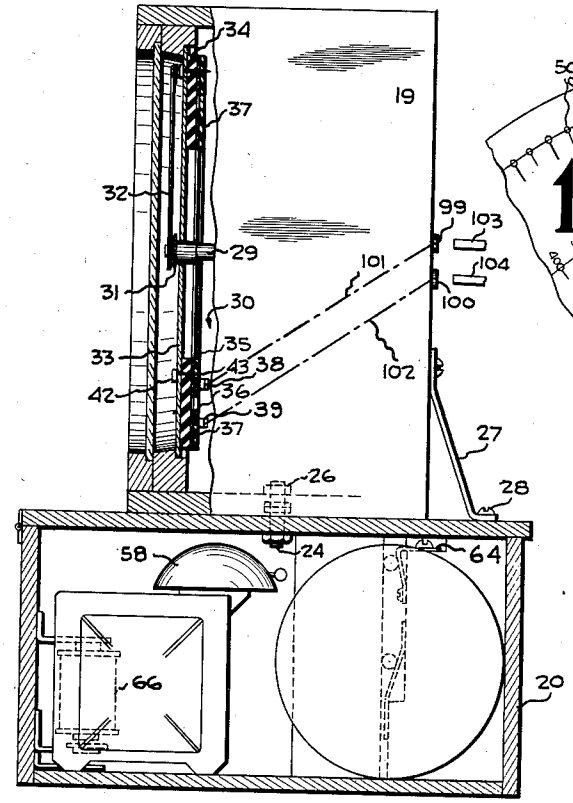

FIG-3

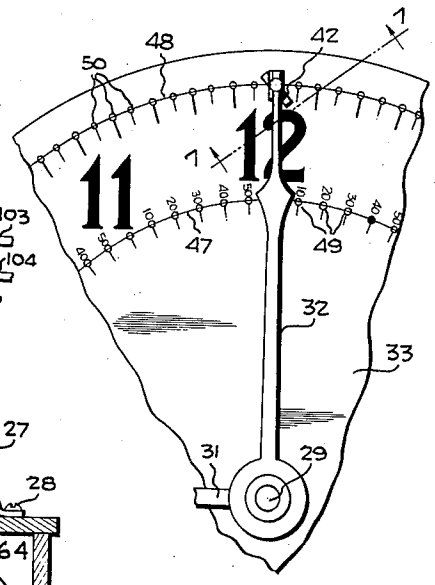

FIG-6

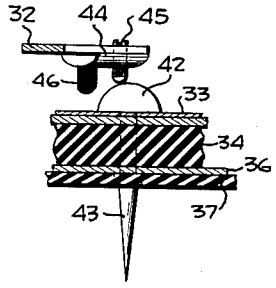

FIG-7

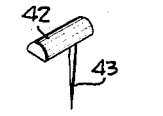

FIG-4

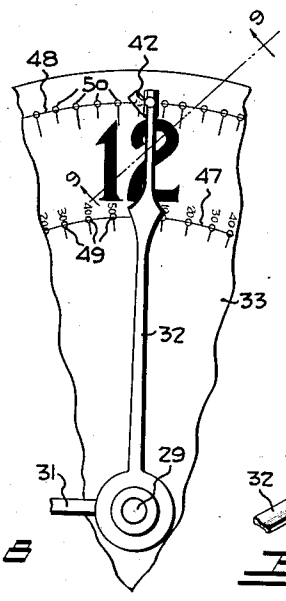

FIG-8

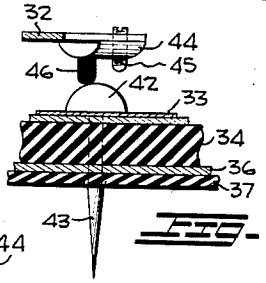

FIG-9

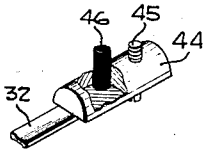

FIG-5

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SCHEDULE SIGNAL CLOCK

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FIG. 12

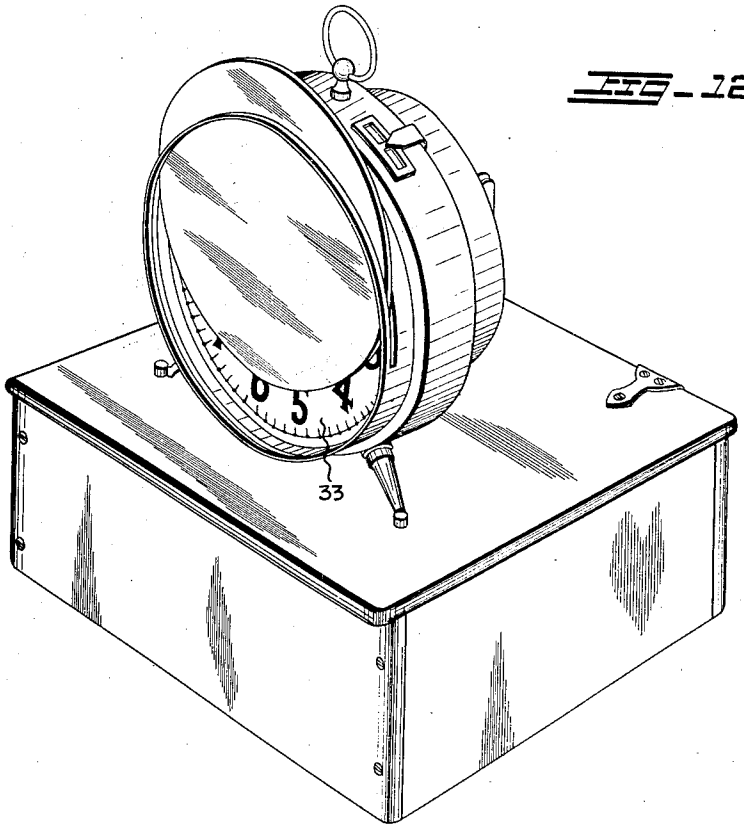
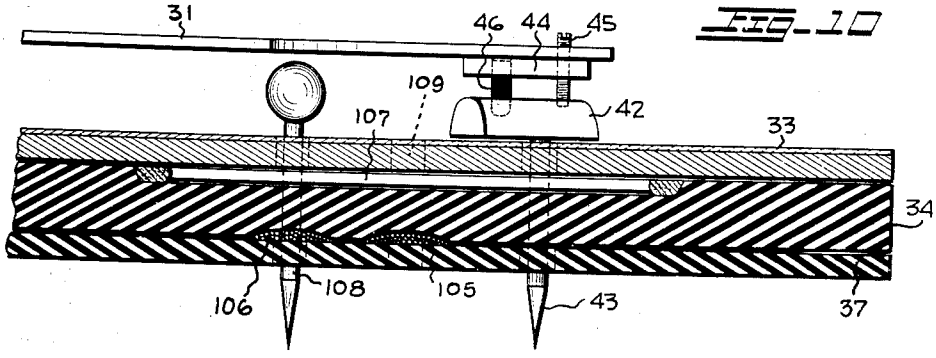


FIG. 10



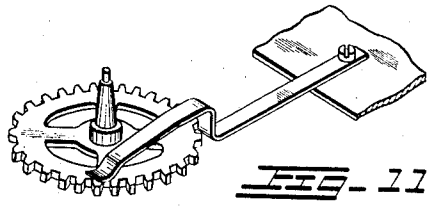


FIG. 11

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Patented Dec. 4, 1934 1,982,982

UNITED STATES PATENT OFFICE

1,982,982

SCHEDULE SIGNAL CLOCK

John Louis Crozier, Renton, Wash.

Application June 1, 1925, Serial No. 34,022

13 Claims. (Cl. 200—37)

My invention relates to a schedule signal clock. More particularly, my invention relates to an electrically operated schedule signal clock.

For purposes of illustration and definiteness of description, my invention will be set forth as specifically applied to a schedule signal clock for use in schools. But be it particularly noted that my invention is not to be restricted to any such definite application, but its application is co-extensive to all uses where the same or like problems and conditions obtain. To mention only a few of the uses to which my invention may be put, the same may be applied in hospitals to signal the time for the administering of medicines. Again, the said invention is applicable in depots for the despatch of common carriers. Also, my invention may be readily applied to the throwing of a switch for the setting into operation of mechanism where it is desired to set in motion certain mechanical devices or actuate valves or electric switches according to some predetermined plan.

Signal clocks as heretofore devised for said purposes are of expensive construction. The cost of installation is large, or the mechanism is so intricate and adjustments so delicate that they are not adapted to extensive common use. Many types have been suggested, some more simple than others, but as usually designed heretofore the simplification has been accompanied by a corresponding reduction in range or scope or variation of signalling. A primary object of my invention is to provide such a schedule signal clock which will be economical to manufacture and which will be economical as respects its installation, simple, economical, and convenient to install and to operate without reduction in range of signalling.

In employing the hands of the clock as the mounting means for electrical contact points, a difficulty is at once encountered in that the friction developed by the contacting of the points must be of such small relative magnitude that said use of the hands will not interfere with said clock mechanism indicating the correct time. A primary object of my invention is to provide such an electrically operated signal clock.

Another primary object of my invention is to provide for an hour and minute signal, and have the signal repeated day after day without attention, and to provide for a plurality of such signals. Again, a primary object of my invention is to provide for a ready changing of the signals. Another primary object of my invention is to provide for long or short alarms and to provide for the operation of such a signal clock by using a current of minimum voltage and amperage, so that a dry battery is sufficient to operate the same, whereby places remote from regular electric power plants may be served with my invention. Furthermore, a primary object of my invention is to provide for a variation in the length of the alarm by providing a contact point having a curved bearing surface to operate in conjunction with another contact point which is disposed to move relatively with respect to said curved surface contact point, said second contact point having an elevated member or knob operatively disposed in close proximity thereto. A further primary object of my invention is to provide a signal clock having the electrical circuit mechanism disposed back of the dial member, whereby the same is protected from weather elements, unauthorized meddling and also unintentional interference while adjusting or changing the contact points for a change of schedule.

A clock mechanism, as usually designed and manufactured, for time pieces of moderate cost ordinarily does not maintain the movement of the hands with a refined uniform regularity throughout the entire three hundred and sixty degrees, owing to the play in the cog wheels and associated mechanism. Therefore, serious objection obtains to the employment of these more economical types of clock mechanisms to use in a schedule signal clock mechanism, where a considerable definiteness and precision is requisite. A primary object of my invention is to overcome such objection and to provide a schedule signal clock in which the clock mechanism may consist of one or more of these more economical types of clock mechanisms.

The above mentioned general objects of my invention; together with others inherent in the same, are attained by the mechanism illustrated in the following drawings, the same being merely preferred exemplary forms of embodiment of my invention, throughout which drawings like reference numerals indicate like parts:

Figure 1 is a view in perspective of a schedule signal clock embodying my invention;

Fig. 2 is a view in front elevation with portions broken away to disclose underlying parts;

Fig. 3 is a view in side elevation with portions broken away;

Fig. 4 is a view in perspective of the curved contact member of the make and break means;

Fig. 5 is a view in perspective of that portion of the make and break means disposed upon the clock hand;

Fig. 6 is an enlarged fragmentary view in front

elevation of a part of the clock dial showing the make and break device constituting a part of my invention;

Fig. 7 is a view in section on broken dotted line 7, 7 of Fig. 6;

Fig. 8 is an enlarged fragmentary view in front elevation of a part of the clock dial showing the make and break device in advanced position as respects Fig. 6, showing the circuit broken;

Fig. 9 is a view in section on broken dotted line 9, 9 of Fig. 8;

Fig. 10 is an enlarged view in section of a modified form of clock embodying my invention, said form providing for a multiplicity of circuits through the clock and showing the use of cables as well as the screen ring.

Fig. 11 is a view in perspective of a brake device which eliminates play or slackness in the gears of the clock mechanism, and insures uniform relative movement of the hands; and

Fig. 12 is a view in perspective of a modified form of a schedule signal clock embodying my invention, wherein the clock mechanism member consists of an alarm clock adapted for the purposes of my invention.

That portion of my invention, which will be hereinafter referred to as the "clock mechanism member" is provided with a housing 19. This clock mechanism member may be, and preferably is, disposed upon a base member 20, which functions as a housing for certain parts hereinafter set forth. The clock mechanism is preferably releasably connected to said base member by means of interlocking posts 21 and 22, Figs. 2 and 3, one part of which 23 and 24 is disposed in the housing 20 of the base member, and the other parts of which 25 and 26 are disposed in the clock mechanism member 19. These interlocking posts may be releasably held by means of the resilient member 27, one end of which is snapped under post 28 in the base member.

In the clock mechanism member, the clock shaft 29 of the clock actuating mechanism 30 is provided with the usual hour hand 31 and minute hand 32, back of which is disposed the clock dial 33, having thereon the usual time divisions and indicia thereof. To said dial, preferably on the back side, a sheet 34 of gripping non-conducting medium may be secured. Upon said sheet two or more concentric rings 35 and 36, respectively, of yielding pressure producing conducting medium are disposed. This medium may be in the form of a wire screen as illustrated for rings 35 and 36 in Fig. 2, or the medium may be in the form of twisted wire rings or cables as shown at 105 and 106 Fig. 10. Manifestly, the shaft 43 of the make and break means as hereinafter set forth may be passed through such a medium by forcing to one side the strands of wire comprising the screen ring or cable. When occasion requires a change in time of signals the shafts are withdrawn and re-inserted at the points of the dial desired. To more positively insure contact after successive insertions even at the same point, the elastic supporting member 34 and the supporting member 37 are provided. Such supporting members serve to put the screen or wire cable or ring under compression which actuates the wires back into position after being pressed to one side by the shaft 43 when said shaft 43 is withdrawn. This compression of the wire ring or cable is clearly shown in Fig. 10 for rings 105 and 106 where the same are shown considerably flattened. In Fig. 10, the ends of the plurality of wires clearly appear. The supporting members 34 and 37 act in a similar manner on the wire screen when in a flat annular ring 36, Fig. 2—the strands forming the meshes being actuated back into the original position occupied previous to the distortion incident to the shaft 43 pushing the wire to one side when the shaft was inserted. Manifestly, not only do the supporting members 34 and 37 by pressing the strands together tend to resist displacement or warping vertically, but also laterally, thereby insuring a positive firm contact with shaft 43 at all times upon successive insertions of the shaft 43. Thus is provided an exceedingly efficient and at the same time economical means for signals at all time divisions of the dial without separate sockets. In my invention the dial may be pierced at any time point in the annular ring so that even signals to the fraction of a minute may be made. Upon the rear side of said rings, a supporting back 37 for said rings is disposed to protect and hold said rings and other parts in position. Each of these rings respectively has an electrical contact post 38 and 39, which are preferably connected to the parts 25 and 26 of the interlocking posts by conductors 40 and 41.

A make and break means is provided between the clock hands 31 and 32 and the two concentric rings 35 and 36 as follows: A contact head, (see Figs. 4, 6, 7 and 8), having a curved bearing head 42 mounted on a shaft 43, is provided, so that said shaft may extend through and into either of said rings 35 and 36. The other contact head 44, (see Figs. 5, 6, 7 and 8), is formed with a conductor point 45 and an insulated or non-conducting elevating member or knob 46 disposed in close proximity thereto, the diameter of said knob or elevating member being preferably larger than said conductor point. The conductor point 45 is preferably removable and adjustable axially. The longitudinal axis of the head 42 may be adjusted by turning, which provides in part for the length of the alarm or signal given.

As respects the other contact points 42: These points may be disposed in the longitudinal axis of the clock hand, or they may be disposed otherwise as respects said axis.

Some conditions require signals to be of longer duration than other signals. It is therefore important for a schedule signal clock to have the length of its alarms or signals capable of being varied. This varying of the length of signals is accomplished through the curved bearing heads as follows, (see Figs. 6, 7, 8, and 9): The length of said signal or alarm depends upon: (*a*), the direction of the longitudinal axis of the curved bearing head 42; (*b*), the relative difference in length of the conductor point 45 and the elevating member or knob 46; (*c*), the difference in distance between the said conductor point 45 and the elevating member or knob 46; and, (*d*), the degree of curvature of the curved bearing of the head 42 relative to (*a*), (*b*), and (*c*) above. This appears from a consideration of said figures, since it is clear, as appears in Fig. 7, when the conductor point 45 touches the surface of the curved bearing head 42, the circuit as will appear hereinafter is completed, and said circuit will be completed until the movement of the hand brings the elevating member 46 into contact with said curved surface. Thereupon, as the further movement of the hand pushes the insulated elevating member 46 upon the curved surface of the head 42, the conductor point 45 is elevated and lifted above, or rides away from, the said curved surface of the head, so that the circuit is broken, as it appears from the position

illustrated in Fig. 9. Manifestly, if there is only a slight difference in relative length of the conductor point 45 and the said elevating member, said contact will be longer continued for the positions indicated in the drawings, and, manifestly, the longitudinal axis of the curved bearing head 42 may be adjusted by turning so that the time is delayed when the elevating member will come in contact with the curved surface of the said bearing, so that the lifting of the conductor point would be correspondingly delayed, and the duration of the signal would be correspondingly longer. The duration of the signal may be made to approach zero by: (*a*), shortening contact point 45; (*b*), shortening distance between point 45 and knob 46; (*c*), adjusting the position of the longitudinal axes of the curved bearing head 42 by turning in the proper direction; and, (*d*), increasing curved magnitude of curved bearing of head 42.

The dial of the clock, besides being provided with a minute circle 48, is preferably also provided with one or more hour circles 47, a fragmentary view of which dial appears in Fig. 6. To illustrate the method of setting and adjusting the contact heads to give the signals at different time periods, the following example will be set forth: We will assume that it is desired to give a signal at nine o'clock. To this end, a contact head 42 is inserted in perforation 49 in the hour circle in nine o'clock position, and another contact head 42 is disposed in the perforation 50 in the minute circle in the sixty minute or zero position. Thus, it is clear that, assuming for the present that the posts 38 and 39 are operatively connected to a source of electrical energy, the circuit will be completed through the hands of the clock when the conductor point 45 of the hour hand comes in contact with the curved surface of the contact head 42 on the hour circle, and the conductor point 45 of the minute hand comes in contact simultaneously with the curved surface of the contact head 42 in the minute circle, and will continue so until one conductor point 45 or the other is lifted away from its respective contact head 42 by the advance of non-conducting elevating member 46 upon curved bearing 42.

It is obvious that any number of signals may be set, and that these signals will be repeated day after day without change.

The base member, with its contents and wiring connections, will next be described.

A switch 51, (Fig. 2), having a contact post 52 for a bell signal and contact post 53 for a buzzer and contact post 54 for a relay, would be used in connection with an exterior alarm circuit.

A conductor 55 is provided to connect the positive post of the battery to a convenient post 56, which post in turn is connected to the post 57, (Fig. 2), of a signal bell 58 by conductor 59. Conductor 60 connects the other post of said bell to switch post 52, said switch member 51 being connected by conductor 61 to the hinge 62. Conductor 63 connects the negative post 64 of the battery to the hinge 65. Obviously, therefore, when the hands of the clock are in such position as to complete the circuit as heretofore described and the switch 51 is closed, there would be a completing of the circuit through the bell signal 53, which would cause the same to ring and give the alarm.

When the signal consists merely of a small bell or buzzer member, which may be positioned within the base member, the mechanism is adapted for use in a single room or for local use. However, it may be desired to have said signal means govern the operation of an exterior alarm circuit in which circuit a series of bells are disposed in other rooms. To operate said exterior circuit, it may be necessary to have a source of electrical energy of considerably larger magnitude than that which passes through the clock. It will be understood that in a schedule signal clock mechanism it is preferable that the current passing through the local mechanism be small, so as to avoid all difficulties incident to excessive arcing. For this larger service, well known relay devices may be used in their well established manner for operating the larger signal and the relay devices operated by the switch 51.

The wiring and the mechanism heretofore described have all been based on using the dry battery current as the source of electrical energy in the circuit through the clock, and batteries, transformers, or other electrical source may be substituted and used upon standard equipment wired therefor.

There may be occasions to have an alarm given in cases of emergency, such as a fire in a school building, without waiting until the circuit might be closed through the clock hands to operate the alarm. To this end, the emergency button 96 is provided with conductors 97 and 98, which connect it to the hinges 62 and 65 of the cover, so that the interior battery circuit may be completed and an alarm device set in operation regardless of the time, and without disturbing the regular operation of the clock, as will appear from the drawings.

On the other hand, there may be occasions, such as during the night when it may not be desired to have the signals given, and to this end, all that is necessary is to move the switch member 51 into intermediate or non-engaging position with respect to the switch posts 52, 53, and 54, Fig. 2.

For some purposes, it may be desirable to have the base member in a locked compartment, i. e., more or less remote from the clock mechanism proper. To this end, sockets 99 and 100 with conductors 101 and 102 are provided in the clock mechanism. The sockets may receive plugs 103 and 104 corresponding to plugs 83 and 89. In this instance, exterior sockets 99 and 100 could be connected to the posts 23 and 24 of the base member by conductors of any desired length. As illustrated, the clock mechanism is readily detachable, so that it may be used apart from any signal mechanism.

Fig. 10 shows a form of my signal clock in which I provide a plurality of separately insulated rings 105 and 106 of electrically conductive material and further provide a plurality of independently insulated radially disposed bars or springs 107. The rings 105 and 106 may be connected with any desired external circuits by posts similar to 38, and electrical connection between contact points 42 and any of the rings 105, 106 may be made by inserting contact pins 108 in holes 109, so that they pass between and in contact with bars 107 and through the rings 105 and 106, it being understood that pin 43 on contact point 42 also makes electrical contact with certain of the bars 107. In this way any desired number of external circuits may be controlled.

Obviously, changes may be made in the forms, dimensions and arrangements of the parts of my invention, without departing from the principle

thereof, the above setting forth only preferred forms of embodiment.

I claim:

1. In combination with an electrically operated schedule signal clock, two electrical contacting members disposed for relative movement one with the other, one of said members having a conductor point and an elevating knob in operative spaced relation to each other, and the other of said members being formed with a curved bearing surface.

2. In combination with an electrically operated schedule signal clock, a contact member oblong in form and having a curved bearing surface, said member being radially, angularly adjustable whereby the duration of the completed circuit is in part controlled.

3. In combination with an electrically operated schedule signal clock, a make and break device embodying a member having an elevating knob and a contact point in operatively disposed spaced relation to each other, whereby the duration of the completed circuit is in part controlled.

4. In combination with an electrically operated schedule signal clock, a make and break device embodying a member having an elevating knob and a contact point disposed in operative spaced relation to each other, said knob having a relatively larger contact area than said contact point, whereby the duration of the completed circuit is in part controlled.

5. In an electrically operated schedule signal clock, a ring of conducting wire screen and a sheet of gripping non-conducting medium disposed on one side of said ring, said non-conducting medium supporting said ring and augmenting the yielding pressure of said ring.

6. In an electrically operated schedule signal clock, a releasable electrical contact member and a ring of yielding pressure producing conducting medium in which said member may be releasably secured.

7. In an electrically operated schedule signal clock, a releasable electrical contact member and a ring of conducting wire screen in which said member may be releasably held.

8. In an electrically operated schedule signal clock, a releasable electrical contact member, a ring of yielding pressure producing conducting medium in which said member may be releasably held and a sheet of gripping non-conducting medium disposed on one side of said ring, said non-conducting medium supporting said ring and augmenting the yielding pressure of said ring.

9. In an electrically operated schedule signal clock, a ring of conducting wire screen, a sheet of gripping non-conducting medium disposed on one side of said ring, said non-conducting medium supporting said ring and augmenting the yielding pressure of said ring, and a releasable electrical contact member laterally engaging said screen.

10. In combination with an electrically operated schedule signal clock, two electrical contacting members disposed for relative movement one with the other, one of said members having a conductor point and an elevating knob in operative spaced relation to each other and the other of said members being oblong in form and having a curved bearing surface, said member being radially angularly adjustable whereby the duration of the completed circuit is in part controlled.

11. In an electrically operated schedule signal clock, a dial provided with a plurality of apertures disposed in a circle; and a plurality of electrically interconnected laterally yielding electrical conductors forming a ring disposed coaxial with and in close proximity to said apertures, whereby means to releasably connect electrical contact members to any point of the circle of said dial is provided.

12. In an electrically operated schedule signal clock, a dial provided with a plurality of apertures disposed in a circle; and a plurality of electrical conductors in the form of a wire screen ring disposed coaxial with and in close proximity to said apertures, whereby means to releasably connect electrical contact members to any point of the circle of said dial is provided.

13. In an electrically operated schedule signal clock, a dial provided with a plurality of apertures disposed in a circle; a plurality of electrically interconnected laterally yielding electrical conductors forming a ring disposed coaxial with and in close proximity to said apertures; and a sheet of gripping non-conducting medium disposed to bear against said ring, said non-conducting medium supporting said ring and augmenting the lateral pressure between members of said ring.

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