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SIGNAL DEVICE

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Fig. 1

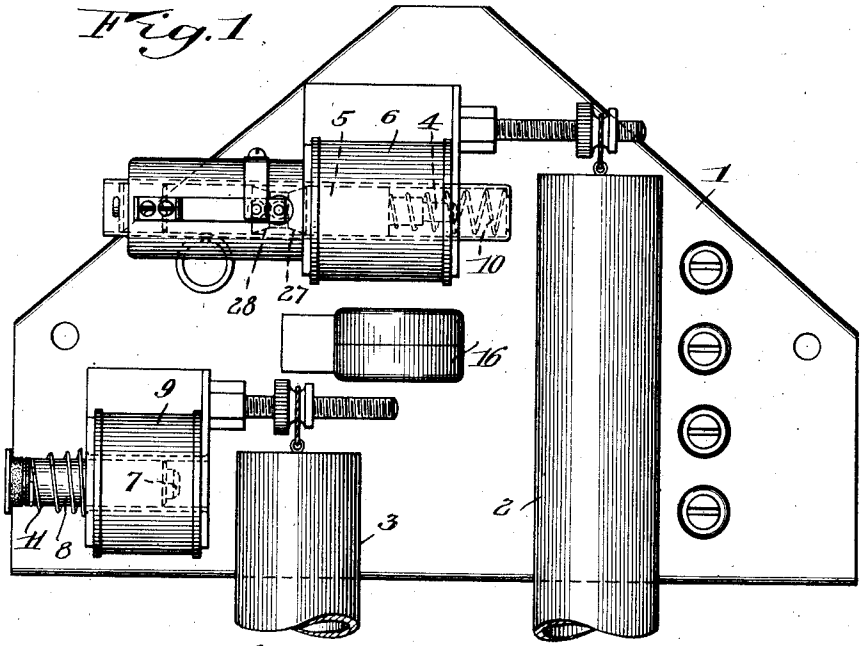
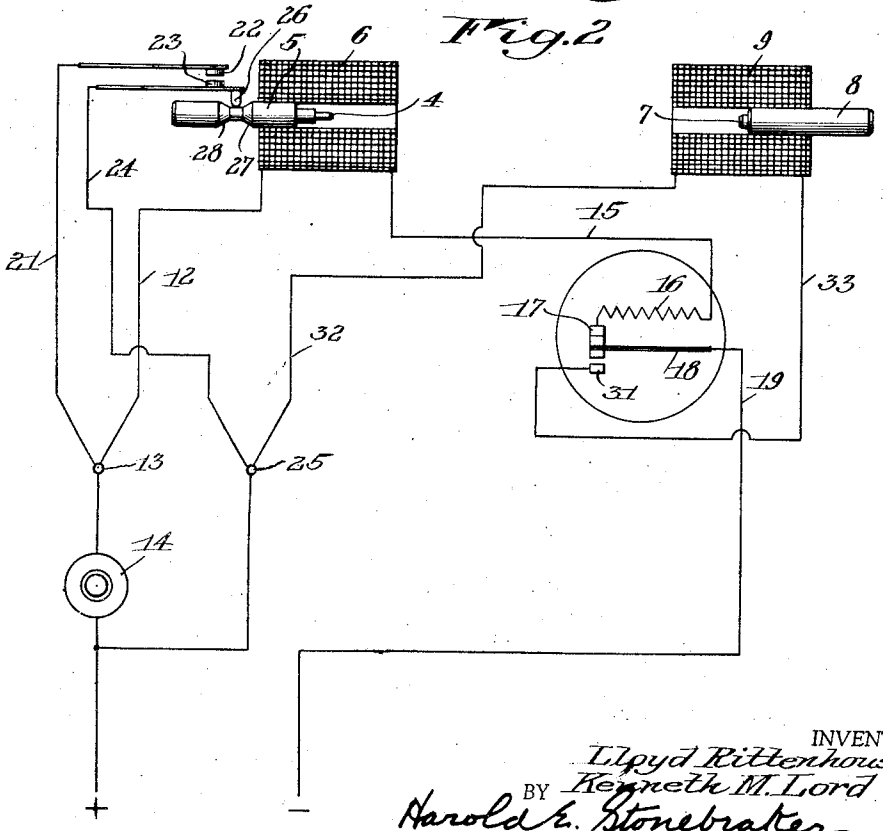


Fig. 2



INVENTORS
Lloyd Rittenhouse
Kenneth M. Lord
BY Harold L. Stonebraker,
Their ATTORNEY.

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SIGNAL DEVICE

Lloyd Rittenhouse, Honeoye Falls, and Kenneth M. Lord, Canandaigua, N. Y., assignors to The A. E. Rittenhouse Co., Inc., Honeoye Falls, N. Y., a corporation of New York

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3 Claims. (Cl. 177—7)

This invention relates to a signal device, with more particular reference to the general type of construction including one or more chime elements with electromagnetically operated striker mechanism, and it has for its purpose to provide a simple arrangement that is economical to manufacture, and which will effectively control the time of opening of the circuit to the electromagnetic mechanism after it has been manually closed.

Heretofore in the operation of such chime signals where operated by a manual switch located in the same circuit with a striker operating electromagnetic coil, a chime is struck as frequently as the push button or switch is operated, and where two chime elements are successively struck by an electromagnetically actuated striker moving in opposite directions upon closing and opening the circuit, the first chime element is struck the moment the switch is closed but the second chime element is not struck until the switch is released. Upon such release, the second chime element is struck and the first chime element can be immediately struck again by again operating the switch, resulting in a quick succession of tones from both chime elements as fast as the switch is closed and opened.

A purpose of the present invention is to prevent this kind of operation, so that there is always a fixed predetermined period of time between the successive striking of two electromagnetically operated chime elements, or between similar successive operations of a single or double chime signal device, such interval being not dependent on the length of time the switch or push button is held closed.

A more particular object of the invention is to afford a construction whereby when the manual switch of such an electromagnetically operated signal device is operated, a main controlling circuit is closed and remains closed for a predetermined time even though the manual switch is immediately released, at the end of which interval a second circuit is closed and remains closed for a predetermined time, so that successive signals cannot be given except with a definite period of time between them, this interval being determined automatically by control means within the mechanism, and beyond the control of the operator.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear clearly from the following description when read in conjunction with the accompanying drawing, the novel features being pointed out in the claims following the specification.

In the drawing:

Fig. 1 is a view in front elevation of a signal device including two chime tubes with a solenoid controlling each and showing the invention applied thereto, and

Fig. 2 is a diagrammatic view of the circuits which control the operation of the several parts.

Referring more particularly to the drawings in which like reference numerals refer to the same parts throughout the several views, 1 designates a base plate or support carrying suitable brackets from which are suspended the chime elements in the form of tubes 2 and 3.

The chime tube 2 is engaged by a suitable electromagnetically operated striker, which in the present instance is in the form of a striker tip 4 carried by a plunger 5, forming part of a solenoid including the coil 6, while chime tube 3 is engaged by a striker tip 7 on the plunger 8 forming part of a solenoid including the coil 9, though it will be understood that coils may be used to operate strikers other than as parts of a solenoid plunger, as herein shown.

The plunger 5 is withdrawn from the chime tube 2 after the latter is struck, and then returned to its initial position, by a spring 10, while the plunger 8 is likewise moved away from the chime tube 3 immediately after impact of the striker 7 therewith, and then returned to its initial position, by the spring 11, as usual in devices of this character.

Referring to Fig. 2, the coil 6 is controlled by a main circuit, and to this end is connected at one end to a conductor 12 leading to a binding post 13 and thence through a push button switch 14 to one side of the line, while the other end of coil 6 is connected by conductor 15 through a heater coil 16 to a contact 17, thence through a bimetallic spring-action switch 18 to a conductor 19, and to the other side of the line. The bimetallic switch 18 is normally in the position shown in Fig. 2, closing the circuit through contact 17, so that when the push button switch 14 is operated, the coil 6 is immediately energized and the plunger 5 moves to bring its striker tip against the chime tube 2.

It is desirable to maintain the main circuit to the coil 6 closed for a predetermined time whether or not the manual switch 14 is held closed or immediately released, and this is accomplished by providing a secondary shunt circuit around the manual switch 14 and governing such secondary circuit by means of the striker, or plunger 5.

This secondary circuit includes a conductor 21 extending from the binding post 13 to a spring contact 22, arranged to be engaged by a spring contact 23, from which a conductor 24 leads to a binding post 25 and thence to the same side of the line as conductor 12. The spring contact 23 carries a projection 26 that engages a recess 27 in the plunger 5. Consequently as the plunger is drawn inwardly upon closing the circuit to

the coil 6 through the manual switch 14, the projection 26 is moved outwardly by the beveled surface 28 on the plunger, causing spring contact 23 to engage the contact 22 and closing the secondary circuit at that point, and thus holding the main circuit closed after the manual switch 14 is released.

The main circuit governing the coil 6 thus remains closed for a predetermined fixed period, and until the heater coil 16 has developed enough heat to affect the bimetallic switch 18 and move it away from engagement with contact 17 to break the main circuit at that point. At the instant that the circuit to coil 6 is broken, it is desirable in the present embodiment to close a circuit to coil 9, and this is accomplished when the bimetallic switch 18, upon breaking engagement with contact 17, moves into engagement with the contact 31, the switch 18 being always in engagement with contact 17 or contact 31, depending upon the temperature produced by the heater coil.

A circuit to coil 9 is then completed from binding post 25 through conductor 32 to one end of the coil 9 and from the other end of the coil 9 through conductor 33 to contact 31 and through the bimetallic switch 18 to conductor 19 to the other side of the line. Thus the circuit to the coil 9 remains closed until the bimetallic switch 18 has cooled off sufficiently to cause it to move away from engagement with contact 31 and to be restored to engagement with contact 17. At this time, the plunger 5 will already have been returned to initial position by its controlling spring, and the contacts 22 and 23 will have been separated.

The operation of the construction briefly is as follows: Upon closing the manual switch 14, coil 6 is immediately energized by closing the main circuit through binding post 13, conductor 12, conductor 15, heater coil 16, contact 17, bimetallic switch 18 and the conductor 19. Immediately upon movement of the striker, or plunger 5 from its initial position toward the chime tube 2, the circuit is closed to the coil 6 around the manual switch 14, through the shunt circuit including binding post 25, conductor 24, contacts 23 and 22, conductor 21, binding post 13 and conductor 12, and the main circuit to coil 6 remains closed until the bimetallic switch 18 is operated by the heater coil 16, disengaging contact 17 and moving into engagement with contact 31, whereupon a circuit is closed to the second coil 9 through conductors 32 and 33, contact 31, bimetallic switch 18 and conductor 19. This latter circuit remains closed until the bimetallic switch has cooled sufficiently to restore it to its normal position.

With this arrangement, the second chime tube cannot be struck until a predetermined interval has elapsed after the striking of the first chime tube, and the operation cannot be repeated until a predetermined interval has elapsed after the second chime tube has been struck, dependent upon the operation of the heater coil 16 and bimetallic switch 18.

It is thus impossible to obtain a series of signals in quick succession, or to operate the signal by manipulating the manual switch 14 twice in quick succession, since the second operation of the manual switch will not effect a striking of a chime tube until the bimetallic switch 18 has been restored to its normal position by cooling.

The invention is also applicable to an electromagnetically operated single chime signal, or to the type of chime signal in which one striker actuator is employed to strike successively two opposed chime elements, thus fixing the interval between two successive movements of a single striker actuator in opposite directions, the striker being held in proximity to the first chime element until the main coil circuit is opened by the automatic controlling mechanism whereupon the striker would be released and returned to strike the second chime element.

While the invention has been herein disclosed in conjunction with a particular arrangement and as applied to two electromagnetically operated units and controlling circuits therefor, it will be understood that it is not restricted to the precise details herein set forth, and the application is intended to cover such changes or other adaptations as may come within the purposes of the improvement and the scope of the following claims.

We claim:

1. In a signal device, the combination with a pair of sound elements and electromagnetically operated striker mechanism therefor embodying a pair of coils and a striker for each coil, a main circuit in which one of said coils is located, a manual switch in said main circuit, a circuit controlling the other coil, means controlled by the striker of said main circuit acting to hold said circuit closed after the manual switch is released, and means acting automatically to open said circuit and to close the circuit to the other coil after a predetermined period of time.

2. In a signal device, the combination with a pair of sound elements and electromagnetically operated striker mechanism therefor embodying a pair of coils and a striker for each coil, a main circuit in which one of said coils is located, a manual switch in said main circuit, a second circuit connecting the main circuit and the other of said coils, an electro-responsive switch acting alternately to connect and disconnect said circuits, means in said main circuit governing said electro-responsive switch, and a shunt circuit controlled by the striker of said main circuit acting to hold said main circuit closed after the manual switch is released.

3. In a signal device, the combination with a pair of sound elements and electromagnetically operated striker mechanism therefor embodying a pair of coils and a striker for each coil, a main circuit in which one of said coils is located, a manual switch in said main circuit, a second circuit connecting the main circuit and the other of said coils, an electro-responsive switch acting alternately to connect and disconnect said circuits, means in said main circuit governing said electro-responsive switch, a shunt circuit around the manual switch of said main circuit, a switch in said shunt circuit in the path of the striker of said circuit and adapted to be engaged and moved thereby to close the shunt circuit when said striker is operated.

LLOYD RITTENHOUSE.
KENNETH M. LORD.