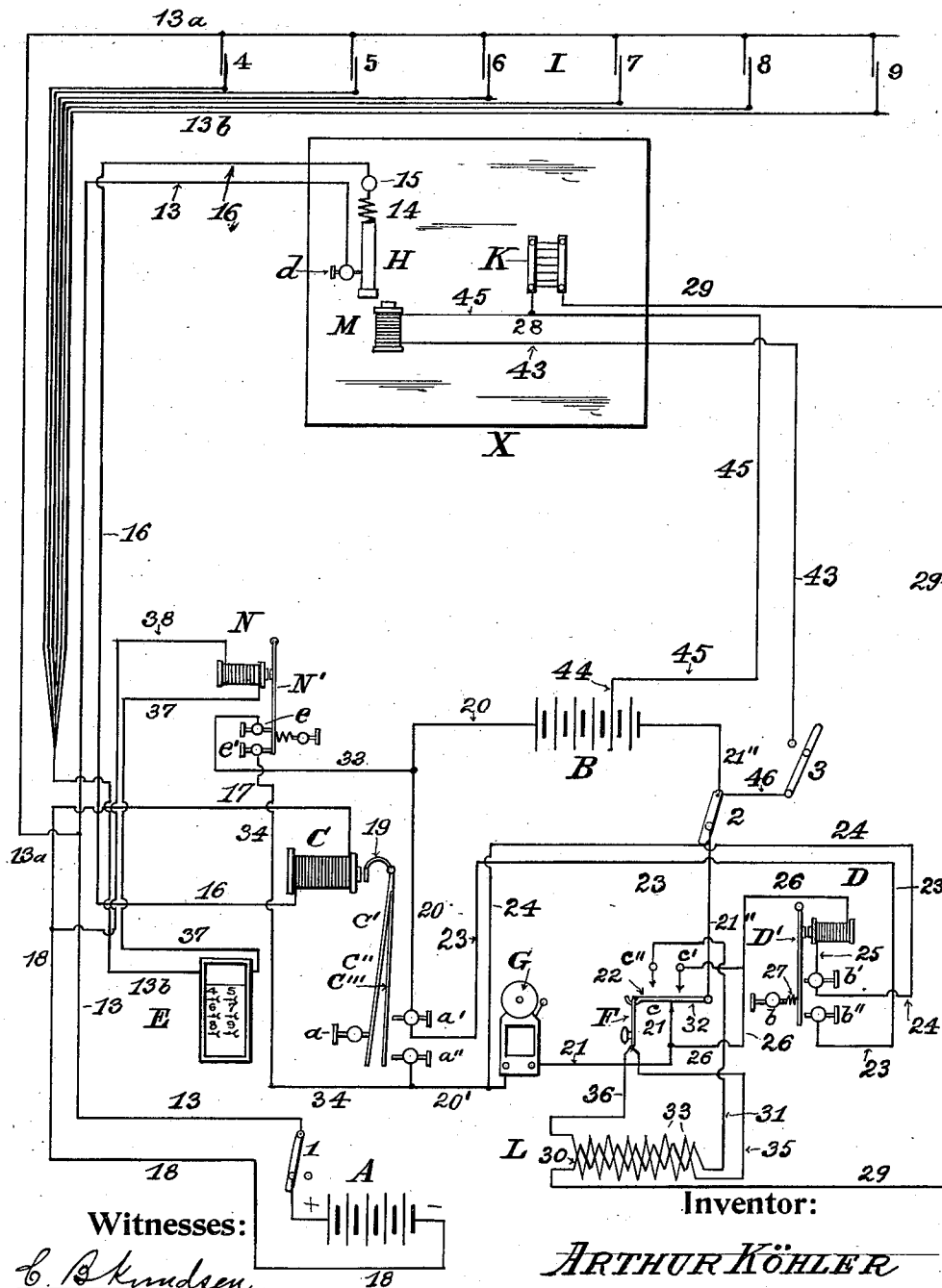


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BURGLAR AND FIRE ALARM AND TELEPHONE SYSTEM.
APPLICATION FILED JULY 31, 1911.

1,012,865.

Patented Dec. 26, 1911.



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UNITED STATES PATENT OFFICE.

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BURGLAR AND FIRE ALARM AND TELEPHONE SYSTEM.

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Specification of Letters Patent.

Patented Dec. 26, 1911.

Application filed July 31, 1911. Serial No. 641,469.

To all whom it may concern:

Be it known that I, ARTHUR KÖHLER, a subject of the Emperor of Germany, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Burglar and Fire Alarm and Telephone Systems; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which my invention appertains to make and use the same.

The object of the present invention is the production and installation of an electrically operated system whereby a safe, vault, strong box, or other structure may be protected from fire, burglars, or other interference, and their presence or an attempt to burglarize, be made known at a remote station, both giving a proper alarm and by connecting a telephone in such manner that it may be ascertained audibly what is going on at said safe or vault. To attain these desirable results, I construct this system substantially as shown in the drawings already referred to, and hereafter first fully set forth and described, and then pointed out in the claims, said drawings being a diagrammatic illustration of the preferred embodiment of my said invention.

In these drawings, X designates a safe, vault, strong box, or other structure which it is desired to protect from fire, and burglars, and which may, therefore, be of any of the various constructions usual in this class of buildings. To the door or any other part of this structure X there is affixed a vibrator H, comprising a metallic electro conductor suspended by a delicate spring 14, from an insulated binding post 15, said vibrator being normally in contact with an adjusting screw at *d*, which is also an insulated binding post. This vibrator H is included in a normally closed electro circuit which includes a battery A, or other source of electric energy, the leads 13 of which connect the positive pole of the said battery A to the binding post *d*, the return being from the binding post 15 to the negative pole of said battery A, by the wires 16, 17, and 18. In this circuit there is included a relay C, the pivoted armature C' of which has a terminal 19, which is normally attracted to, and in contact with, the

magnet of the relay C. This armature has two converging members of which the member C'' contacts with an adjusting screw *a*, when the electromagnet mentioned is excited, said armature, when not influenced by said magnet contacting with two contacting points *a'*, *a''*, by its other member C''', as will hereinafter more fully appear.

The normally closed circuit described is opened and closed by the vibrator H swinging, pendulum-fashion, should any vibration or other disturbance of, or on, the safe cause this vibrator to tremble and thus make and break contact with the point *d*. When the vibrator breaks contact with the point *d*, to open the described circuit, the magnet of the relay C will demagnetize and its armature will swing into vertical position by gravity, thereby closing a circuit, which, in order to differentiate it from the normally closed circuit, I shall hereafter call the main circuit. This main circuit includes an alarm bell G, and a telephone receiver F, the current being derived from a battery B, from the positive pole of which leads a wire 20, to a binding post and contact point *a'*, while a wire 20' leads from a second binding post and contact point *a''* to the alarm bell G, and from thence a wire 21 leads to the hook 32, of a telephone receiver F. From the pivotal point of this hook leads wire 21'', to the negative pole of the battery B. It will thus be observed that as long as the closed or primary circuit remains closed, the main circuit remains open at the contact points *a'*, *a''*; but as soon as the primary circuit is opened by the vibrator swinging from its contact point *d*, the main circuit will be closed at the contact points *a'*, *a''*, by the member C''' of the relay C, the current flowing from the battery through the wire 20, member C''', wire 20', bell G, wire 21, hook 32, and wire 21'', thereby ringing the bell G and indicate that unusual conditions exist at the safe or vault X.

In order that any noise at, disturbance of, or interference with, the safe X may be distinctly heard at the station where the alarm bell G is installed, I place on one of the walls of, or near the safe a microphone K, of usual and well-known construction. This microphone K is placed in a circuit of lower voltage than the capacity of the battery B, preferably by connecting one of its intermediate positive elements 44, the cur-

rent flowing through the lead 45 to one of the terminals 28, of said microphone, and thence through the lead 29, to the primary winding 30, of an induction coil L, and from thence by the lead 31 to the contact point c'' of the telephone receiver, thence through the hook 32 to return by way of the lead 21'' to the negative pole of the battery B. This circuit is normally open at the points c'' , c' , but since, in order to listen to the speaking of the receiver, it is necessary to remove the same from the hook 32, this hook will swing upwardly in the usual manner and thereby close the microphone circuit. The induced current for the telephone receiver is obtained from the secondary winding 33 of the induction coil L, by the wiring 35, 36, in the usual manner.

Inasmuch as the vibrator H when disturbed will cause in the primary circuit a series of short vibrations, and since the alarm bell G responds to these vibrations but imperfectly, and might not ring at all if the frequency of the vibrations in the primary circuit and those in the main circuit, or rather of the bell, are alike, I place in the main circuit a relay D. The magnet of this relay is energized by a current leading from the lead 20 near the contact point a' by way of the lead 23 to the contact point b'' , and through the armature D' of the relay to the contact point b' , and thence through the lead 24, to the lead 20' and through the bell G and the course already described with reference to the bell-ringing circuit.

The magnet of the relay D is energized by the current flowing from the contact point b' by the lead 25 through the winding of the coil and thence to the contact point c of the hook 32 to return by the way already described; a branch of the lead 26 leading to the contact point c' . Thus when the vibrator H has caused the main circuit to be closed current will flow through the main circuit and also through the relay D and attract its armature D', thereby connecting contact points b' , b'' , so that, should now the vibrator be at rest and the main circuit open at a' , a'' , the bell will still continue to ring until the receiver is removed from its hook when the circuit through the relay D will be opened at the point c ; the magnet of the relay D will demagnetize and the armature D' pulled from the contact points b' , b'' , by a spring 27, attached to the contact screw b .

In order to protect the safe or vault X from fire, I install in the building near the safe, and elsewhere, if desired, a fire alarm system I, including a series of electro thermostats 4, 5, 6, and so forth, arranged in parallel, as shown. The current for these thermostats is derived from the battery A, and is by way of the lead 13, 13^a, to which

one of the terminals of the thermostats are attached. Each of the opposing elements of these thermostats has a return wire 13^b, which wires are shown separated for some distance in the drawings, but which, in practice, will be bundled in a cable to lead to an annunciator E, which has as many drops as there are thermostats in the installation, the wires 13^b being separated at this annunciator and each one connected to its respective drop. The thermostats are so constructed that when any one thereof is exposed to heat above the highest atmospheric temperature, its terminals will contact and close the fire-alarm circuit and cause the respective pointer in the annunciator to drop and indicate the station at which abnormal heat exists. And in order that the alarm bell G may give the necessary alarm, I include in the fire alarm circuit described a relay N, the magnet of which is energized by an electric current derived from the lead 13^b, through the annunciator and thence by way of lead 37 through the magnet of the relay N, to return by the wires 38 and 18 to the negative pole of the battery A. The armature N', of the relay N is constructed the same as the armature of the relay D, so that when it is attracted by the magnet thereof, it will close a circuit at the two contact points e , e' , so that current derived from the lead 20 through the lead 33 to the contact point e , through the armature N' to contact point e' , and thence through the lead 34, connects to the lead 20', thereby bringing the alarm-bell ringing circuit into action to give the first alarm, at the same time also including the telephone receiver, in the manner heretofore described. The relays N, C, and D, the annunciator E, bell G, and the telephone receiver F are all mounted upon a marble or slate slab, as well as the switches 1, 2, and 3, so that they are arranged in a compact manner.

In order that the various circuits and instruments may be tested at any time for operativeness, there is connected to the main circuit a switch 3, which when closed causes current to flow from the intermediate positive element of the battery B through the lead 45 to an electromagnet M, located in close proximity to the vibrator H. When this magnet is energized it will attract the vibrator H, (pulling it from its contact d and opening the primary closed circuit) close the main circuit, and set in operation all the devices and instruments heretofore described.

Attention is now called to the fact that inasmuch as the primary circuit that connects the safe, vault, etc., to the alarm system, is a normally closed circuit, it follows that should an attempt be made by burglars to disable the system by cutting the leads of the primary circuit or destroying the vi-

brator and the microphone, which are the only instruments in the system that can be reached by burglars, the effect will be that the main circuit will be instantly closed and the alarm given at the remote station to indicate abnormal conditions at the safe.

Having thus fully described this invention, I claim as new, and desire to secure to me by Letters Patent of the United States—

1. In a system of the nature described, a normally closed electro circuit, a vibrator in said circuit constructed to open and close said circuit when disturbed or vibrated, a relay in said circuit, said relay having an armature, a normally open main circuit, said armature being constructed to close and open said main circuit when the normally closed circuit is opened and closed by said vibrator, an alarm bell in said normally open circuit, a telephone receiver connected to said main circuit, a microphone transmitter located adjacent to said vibrator and connected electrically to said telephone receiver, a shunt circuit connected to said main circuit, and a relay in said shunt circuit constructed to keep the main circuit closed when the armature of the first mentioned relay opens the main circuit.

2. In a system of the nature described, a normally closed primary electro circuit, a spring-suspended, electro-conductive vibrator in said circuit, a contact point in said circuit adjacent to said vibrator, said vibrator contacting with said contact point when at rest, a relay in said circuit, said relay having an armature, a main circuit, opposing contact points in said main circuit, said armature being constructed to close said main circuit when the primary closed circuit is opened at said contact points, a microphone transmitter located near said vibrator, a battery constructed to supply current to the main circuit, a lead connect-

ing one of the positive elements of said battery to said microphone transmitter, a telephone receiver connected to said microphone transmitter and to the negative pole of said battery, and an alarm bell in said main circuit, whereby when said primary circuit is opened, said main circuit is closed and the alarm bell caused to ring, the microphone circuit being opened and closed by removing the telephone receiver from its hook and returning the same thereto.

3. In a system of the nature described, a normally closed electro circuit, a vibrator in said circuit constructed to open and close said circuit when disturbed or vibrated, a relay in said circuit, said relay having an armature, a normally open main circuit, said armature being constructed to close and open said main circuit when the normally closed circuit is opened and closed by said vibrator, an alarm bell in said main circuit, a telephone receiver connected to said main circuit, a microphone transmitter located adjacent to said vibrator and electrically connected to said telephone receiver, a shunt circuit connected to said main circuit, a relay in said shunt circuit constructed to keep the main circuit closed when the armature of the primary circuit opens the main circuit, and a testing circuit including a magnet located in close proximity to said vibrator to disconnect the same from its contact point, there being a switch in the shunt circuit whereby said magnet is energized by closing said last-named circuit.

In testimony that I claim the foregoing as my invention, I have hereunto set my hand in the presence of two subscribing witnesses.

ARTHUR KÖHLER.

Witnesses:

M. F. SULLIVAN,
MICHAEL J. STARK.