W. J. COOK & M. W. BREUER.

ELECTRIC BELL.

APPLICATION FILED MAY 24, 1912.

1,109,969. Patented Sept. 8, 1914

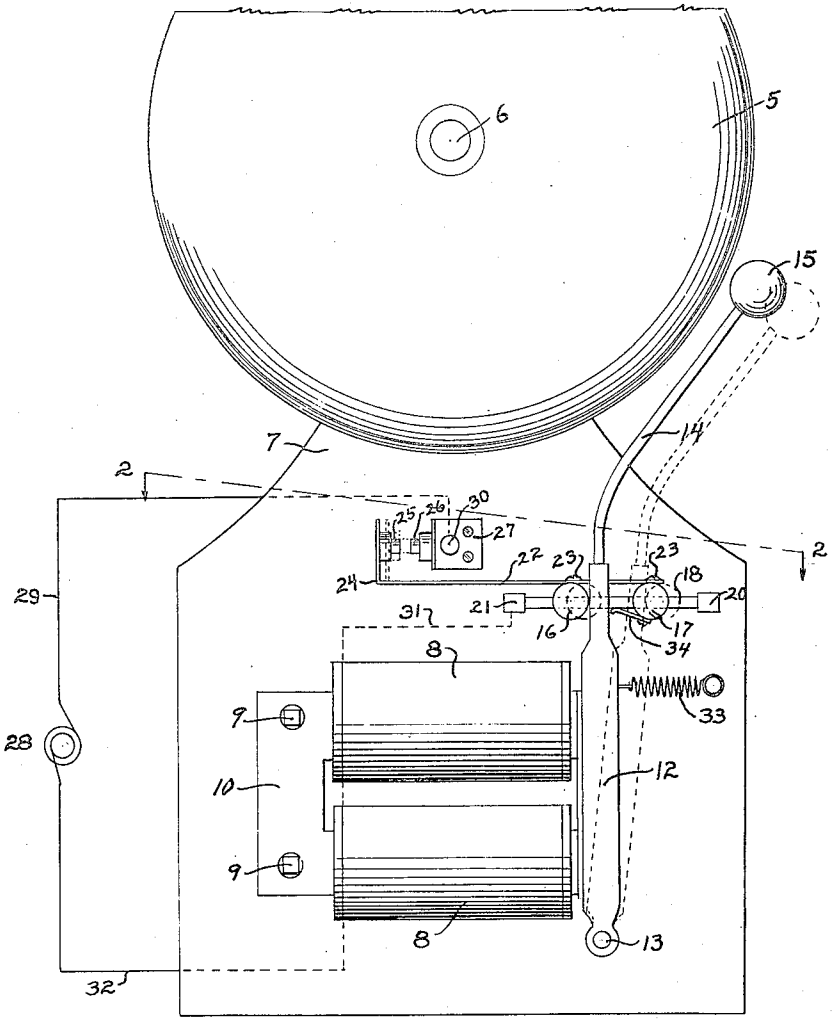


Fig 1

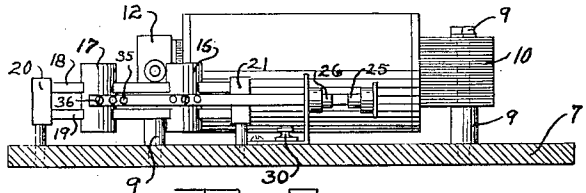


Fig 2

WITNESSES

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ELECTRIC BELL.

1,109,969. Specification of Letters Patent. Patented Sept. 8, 1914.

Application filed May 24, 1912. Serial No. 699,448.

To all whom it may concern:

Be it known that we, WILLIAM J. COOK and MARTIN W. BREUER, citizens of the United States, residing in the city and county of Denver and State of Colorado, have invented new and useful Improvements in Electric Bells; and we do declare the following to be a full, clear, and exact description of our invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to the figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in electric bells specially adapted for use with an alternating current, and has for its object the provision of a device of this class which will produce a slow and uniform resonation, obviating the rapid and irregular resonations which are usual in alternating current electric bells.

Another object of the invention is to provide a simple, effective and inexpensive electric bell for use with an alternating current.

While our improved electric bell is specially designed for use with an alternating current and with the above objects in view, we wish it understood that the same may be effectively used to great advantage with a direct current, and for certain purposes our improved electric bell will be found to be almost indispensable for use with a direct current.

With the foregoing objects and others in view, we will proceed to describe our invention in detail with reference to the accompanying drawing, in which is illustrated an embodiment thereof.

In this drawing,—Figure 1 is a plan view of our improved electric bell. Fig. 2 is a cross section of the same, taken on the line 2—2 Fig. 1.

Corresponding and like parts are referred to in the following description and indicated in all the views in the accompanying drawing by the same reference characters.

The numeral 5 designates the resonating part of a bell, supported by means of a post 6 upon a base 7. Also mounted upon the base 7, is an electro-magnet 8, secured thereto by means of bolts or posts 9, passing through the poles 10 of the said electro-magnet and entering the base 7. An armature 12 is pivoted upon the base 7 as shown at 13 and arranged adjacent the poles of the said electro-magnet 8, whereby when the said electro-magnet is energized the said armature will be drawn into engagement with the poles of said electro-magnet. To the free extremity of this armature 12, a rod 14 is connected, the said rod being provided at its outer extremity with a tappet 15, adapted to be operated, in a manner later to be described, to strike the resonating part 5 of the bell.

The free extremity of the armature 12 passes between two cylinders 16 and 17, which are slidably mounted upon separated bars 18 and 19, supported by posts 20 and 21, secured to the base 7. These cylinders 16 and 17 are provided with openings through which the bars 18 and 19 pass. A bar 22 is secured to the cylinders 16 and 17 by means of screws 23, and has one extremity turned at right angles as shown at 24 and carrying a contact 25, adapted to engage an opposing contact 26, secured to the base 7 as shown at 27. These contacts 25 and 26 are alternately brought into and out of engagement with each other by the movement of the armature 12 for alternately closing and breaking the circuit through the electro-magnet 8.

Before proceeding further with our description of the operation of the device, we will trace the circuit in which the electro-magnet 8 is located. From one pole of a source of energy 28, a conductor 29 leads to a binding post 30 of the contact 26; from which the current passes through the contacts 26 and 25, when in engagement with each other, through the bar 22, cylinder 16, bars 18 and 19 and a conductor 31, connected with said bars 18 and 19, to one pole of the electro-magnet 8, the current then passing through the coils of the said electro-magnet and returning to the source of energy 28 through a conductor 32, connected with the opposite pole of the said electro-magnet and leading to the minus pole of the said source of energy.

Now when the electro-magnet 8 is energized the armature 12 will be drawn thereto, which will result in causing the tappet 15 to strike the resonating part 5 of the bell. During the movement of the said armature into engagement with the electro-magnet 8, the said armature will engage the cylinder 16 and slide the latter upon the bars 18 and 19,

carrying the bar 22 therewith, whereby the said bar will be moved sufficiently to disengage the contact 25 from the contact 26, thus breaking the circuit through the said electro-magnet and deënergizing the latter. A spiral spring 33 is connected at one extremity with the armature 12 and at its other extremity with the base 7, whereby as soon as the circuit has been broken through the electro-magnet 8, the said spring will pull the armature away from the said electro-magnet. While the said armature 12 is being moved away from the electro-magnet 12 under the influence of the spring 33, the said armature will engage the cylinder 17 and slide the latter upon the bars 18 and 19, carrying the bar 22 therewith until the contact 25 is brought into engagement with the contact 26, whereby the circuit will be closed through the electro-magnet 8 and the armature again drawn into contact with the electro-magnet, causing the tappet to strike the resonating part 15 of the bell. By virtue of this alternate closing and breaking of the circuit through the electro-magnet, controlled in the particular manner by the particular mechanism, a slow regular or uniform stroke of the armature is obtained, causing a uniform resonation of the bell and obviating the rapid and irregular resonations which are produced by an alternating current with the bells heretofore known of.

Attention is here called to the fact that the armature 12 almost completes its limit of movement in either direction before shifting the bar 22 for breaking or closing the circuit through the electro-magnet. In other words the cylinders 16 and 17 are sufficiently separated from each other to permit of the desired movement of the armature 12 to and from the electro-magnet before breaking or closing the circuit, as the case may be. Thus a slow, regular or uniform movement of the armature is maintained regardless of the normal influence of the alternating current to produce an irregular and rapid movement. Since the tappet is connected with the armature 12, a corresponding slow and regular or uniform stroke is imparted to the said tappet, causing the latter to produce, by striking the resonating part 5 of the bell, slow and regular or uniform resonating.

The electro-magnet 8 changes its polarity so rapidly that the spring 33 does not have time to act to pull the armature 12 away from the said electro-magnet 8 between alternations of the current. In other words, the magnetic influence of the electro-magnet 8 is at zero for so short an interval that before the armature has yielded to the force of the spring 33, the electro-magnet 8 will have regained its attractive force, whereby the spring 33 will not pull the armature 12 away from the said electro-magnet 8 until the circuit through the said electro-magnet 8 has been broken.

Attention is here called to the fact that the cylinder 17 is provided with a light leaf spring 34, which engages the bar 19, whereby the bar 22 is held against accidental movement or displacement, making it necessary that the cylinders be engaged by the armature 12 for breaking and closing the circuit through the said electro-magnet.

We employ the cylinders 16 and 17 because they afford a sort of cam surface to be engaged by the armature, thus reducing to a minimum the friction which would otherwise be produced, and insuring the positive operation of the armature.

The bar 22 is provided with a number of perforations 35 for the reception of a screw 36, whereby the space between the two cylinders 16 and 17 may be varied for regulating the stroke of the armature 12. In other words, by sliding the cylinder 17 farther down on the bar 22 and passing the screw 35 through one of the other perforations, the distance between the two cylinders will be shortened and the circuit will be closed and broken by a shorter stroke of the armature, thus producing more rapid resonations of the bell.

While we have described and illustrated herein a specific form of our invention, we wish it understood that we are not limited thereto, and that the same may be modified and varied without departing from the spirit of our invention or the scope of the appended claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:—

1. An electric bell, comprising a resonating member, an electro-magnet, an armature for said magnet, means for normally holding said armature away from said magnet, a tappet carried by said armature, a circuit make and break device operable by said armature, said circuit make and break device comprising a movable member, separated members to which said movable member is secured, a bar located in the circuit of said electro-magnet and upon which bar said separated members are slidable, the said armature passing between said separated members and adapted to engage one of said separated members to shift the movable member of the circuit make and break device into the circuit closing position, whereby the armature is drawn to the electro-magnet and the tappet caused to strike the resonating member, the said armature adapted to engage the other separated member during its movement toward the electro-magnet to move the said movable member of the said circuit make and brake device to the circuit breaking position, whereby the armature is allowed to be drawn away

from the said electro-magnet and carry the tappet therewith.

2. An alternating current electric bell, comprising a resonating member, an electro-magnet, an armature for said electro-magnet, means for normally holding said armature away from said electro-magnet, a tappet carried by said armature, means operable by said armature for alternately closing and breaking the circuit through said electro-magnet, comprising a movable contact member, separated members to which said movable contact member is secured, a bar located in the circuit and upon which said separated members are movable, the armature passing between said separated members and adapted to engage one of said separated members to shift the movable contact member into the circuit closing position, whereby the armature is drawn to the electro-magnet and the tappet caused to strike the resonating member, the said armature engaging the other separated member during its movement toward the electro-magnet to move the movable contact member to the circuit breaking position, whereby the armature is allowed to be drawn away from the electro-magnet and carry the tappet therewith away from the resonating member.

3. An electric alarm, comprising a resonating member, a tappet for said resonating member, electro-magnetic means for operating said tappet, means operable by the movement of said tappet for alternately breaking and closing the circuit through said electro-magnetic means, comprising a movable contact member, separated members to which said movable contact member is secured, a bar upon which said separated members are movable, the movement of the tappet in one direction operating upon one of said separated members to shift the movable contact member into the circuit closing position, whereby the tappet is operated upon by the electro-magnetic means to cause the same to strike the resonating member, the movement of the tappet toward the resonating member operating upon the other separated member to shift the movable contact member to the circuit breaking position, and means which when the electro-magnetic means is deënergized draws the tappet away from the resonating member.

4. An electric bell, comprising a resonating member, an electro-magnet, an armature for said electro-magnet, a tappet carried by said armature, means for holding said armature away from said electro-magnet when the latter is deënergized, and a circuit make and break device, said circuit make and break device comprising a longitudinally movable bar, separated members to which said longitudinally movable bar is secured, a member located in the circuit of said electro-magnet and upon which member said separated members are movable, the said separated members being arranged in the path of the armature, one of said separated members being adapted to be acted upon by the movement of the armature away from the said electro-magnet to shift the said longitudinally movable bar into the circuit closing position, whereby the armature is drawn to the electro-magnet and the tappet caused to strike the resonating member, the other separated members being adapted to be acted upon by the movement of the said armature toward the electro-magnet to shift the said longitudinally movable bar to the circuit breaking position, whereby the armature is allowed to be drawn away from the said electro-magnet and carry the tappet therewith away from the resonating member.

5. An electric bell, comprising a resonating member, an electro-magnet, an armature for said electro-magnet, means for normally holding said armature away from said electro-magnet, a tappet carried by said armature, a circuit make and break device operable by the movement of said armature, said circuit make and break device comprising a longitudinally movable bar, separated members to which said bar is secured, a member located in the circuit of said electro-magnet and upon which member said separated members are movable, the said separated members being adjustable to vary their distance apart, the said armature passing between said separated members and adapted to engage one of said separated members to shift said longitudinally movable bar into the circuit closing position, whereby the armature is drawn to the electro-magnet and the tappet caused to strike the resonating member, the said armature being adapted to engage the other separated member during its movement toward the said electro-magnet to move the said longitudinally movable bar to the circuit breaking position, whereby the said armature is allowed to be drawn away from the said electro-magnet and carry the tappet therewith away from the resonating member.

6. An electric alarm, comprising a resonating member, a tappet for said resonating member, electro-magnetic means for operating said tappet, a movable contact member operable by the movement of said tappet for alternately breaking and closing the circuit through the said electro-magnetic means, a bar located in the circuit of said electro-magnetic means and upon which said movable contact member is movable, means carried by the said movable contact member and acted upon by the movement of the tappet in one direction to shift the movable contact member into the circuit closing posi-

tion, whereby the tappet is operated upon by the electro-magnetic means to cause the same to strike the resonating member, the movement of the tappet toward the resonating member acting upon said means to shift the movable contact member to the circuit breaking position, and means which when the electro-magnetic means is deënergized, draws the tappet away from the resonating member, substantially as described.

7. An electric alarm, comprising a resonating member, a tappet for said resonating member, electro-magnetic means for operating said tappet, means operable by the movement of said tappet for alternately breaking and closing the circuit through the said electro-magnetic means, comprising a movable contact member, separated members connected with said movable contact member, the movement of the tappet in one direction operating upon one of the said separated members to shift the movable contact member into the circuit closing position, whereby the tappet is operated upon by the electro-magnetic means to cause the same to strike the resonating member, the movement of the tappet toward the resonating member operating upon the other separated member to shift the movable contact member to the circuit breaking position, means which when the electro-magnetic means is deënergized draws the tappet away from the resonating member, and a spring carried by one of said separated members and engaging the bar upon which said separated members are movable for the purpose set forth.

8. Mechanism of the class described, comprising an electro-magnet, an armature therefor, means normally acting to hold the armature away from said electro-magnet, a circuit make and break device for said electro-magnet, comprising a fixed bar, separated members slidably mounted upon said fixed bar, a movable contact bar carried by said separated members, the said armature being pivoted at one extremity and its free extremity projecting between said separated members, the said armature acting upon one of said separated members to move said contact bar into the circuit closing position when the magnetic influence of said electro-magnet is relieved from said armature, and said armature acting upon the other separated member to move said contact bar into the circuit breaking position when the magnetic influence of said electro-magnet is applied to said armature.

In testimony whereof we affix our signatures in the presence of two witnesses.

WILLIAM J. COOK.
MARTIN W. BREUER.

Witnesses:
JNO. G. POWELL,
FELIX THIES.