

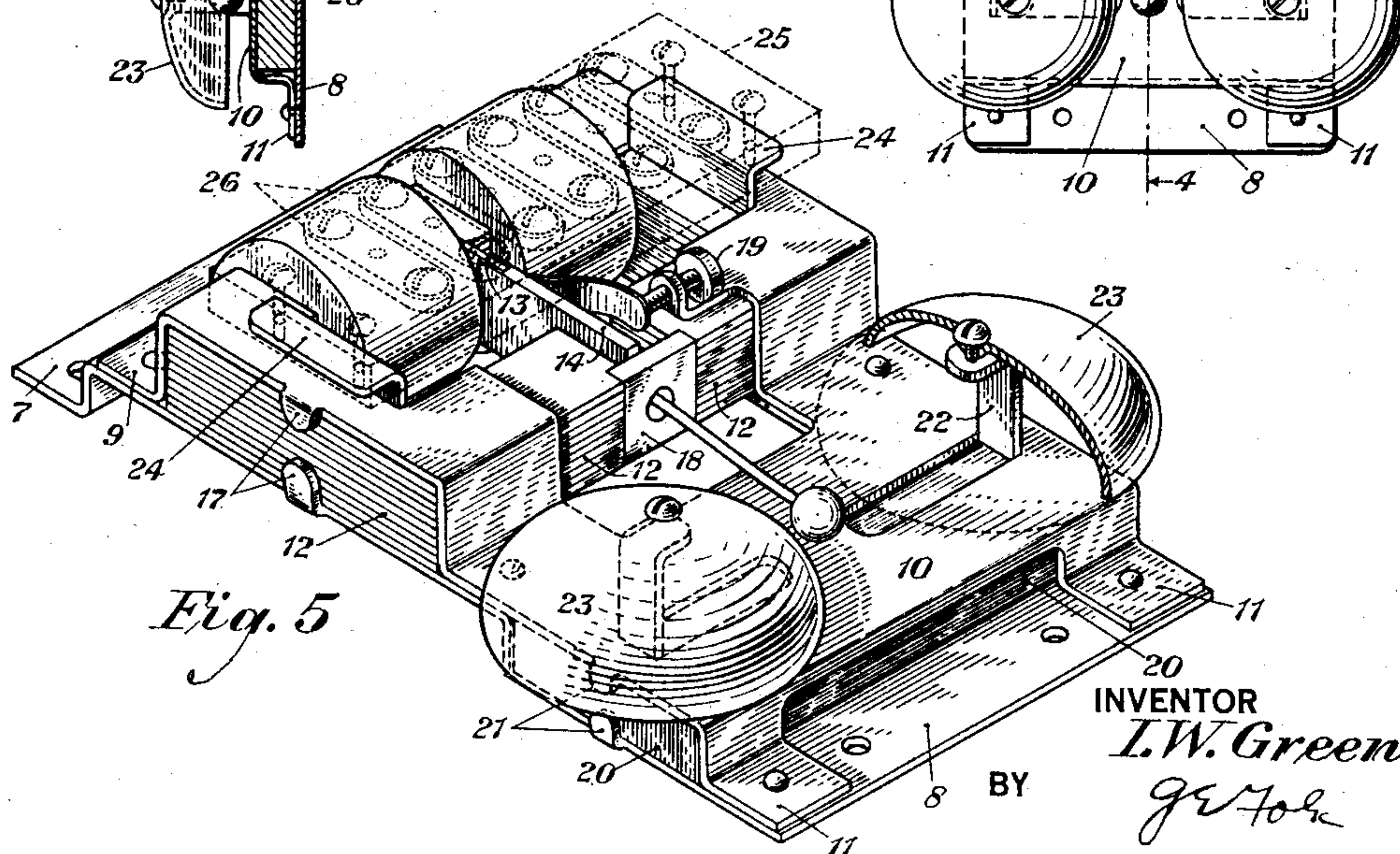
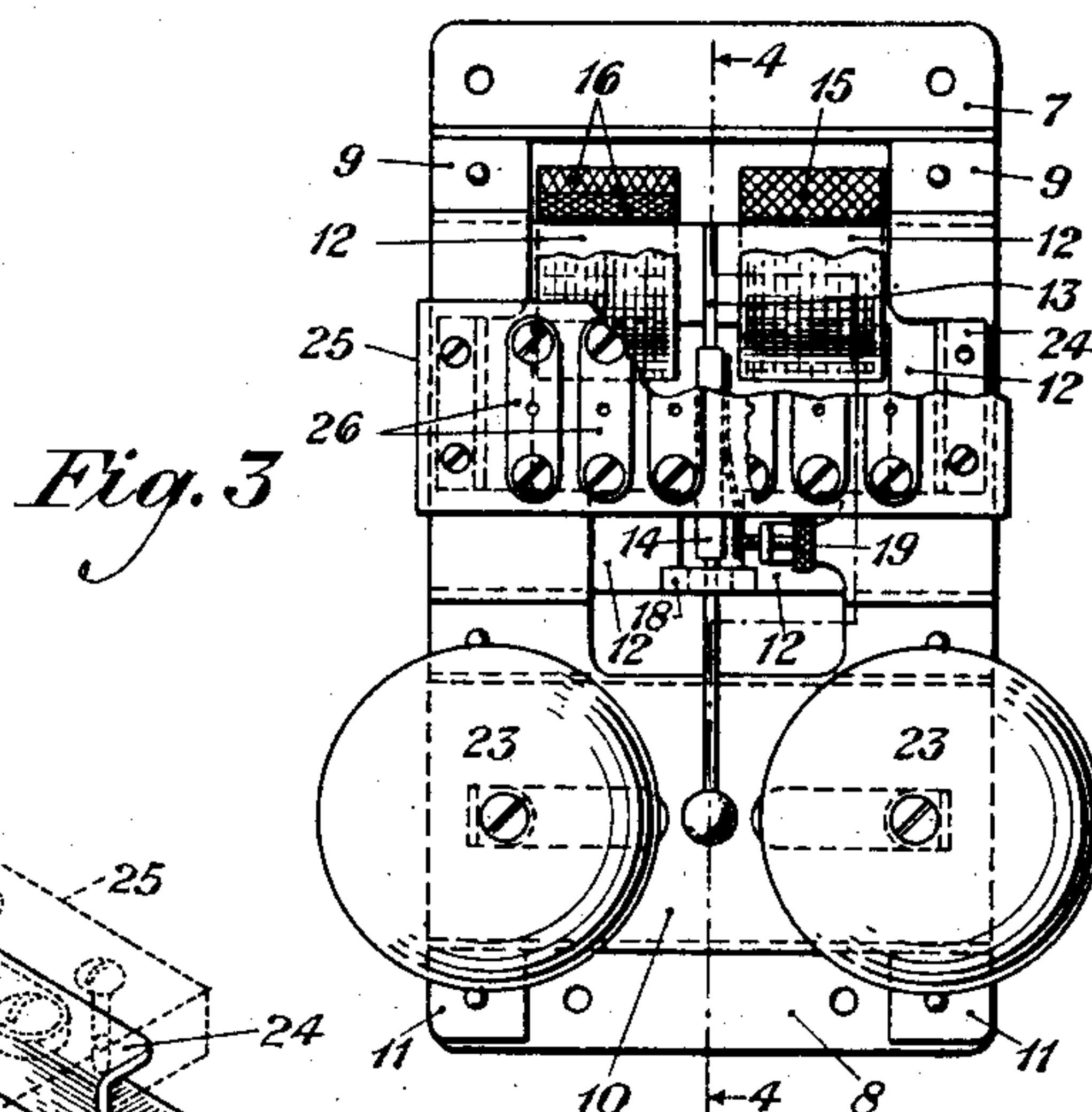
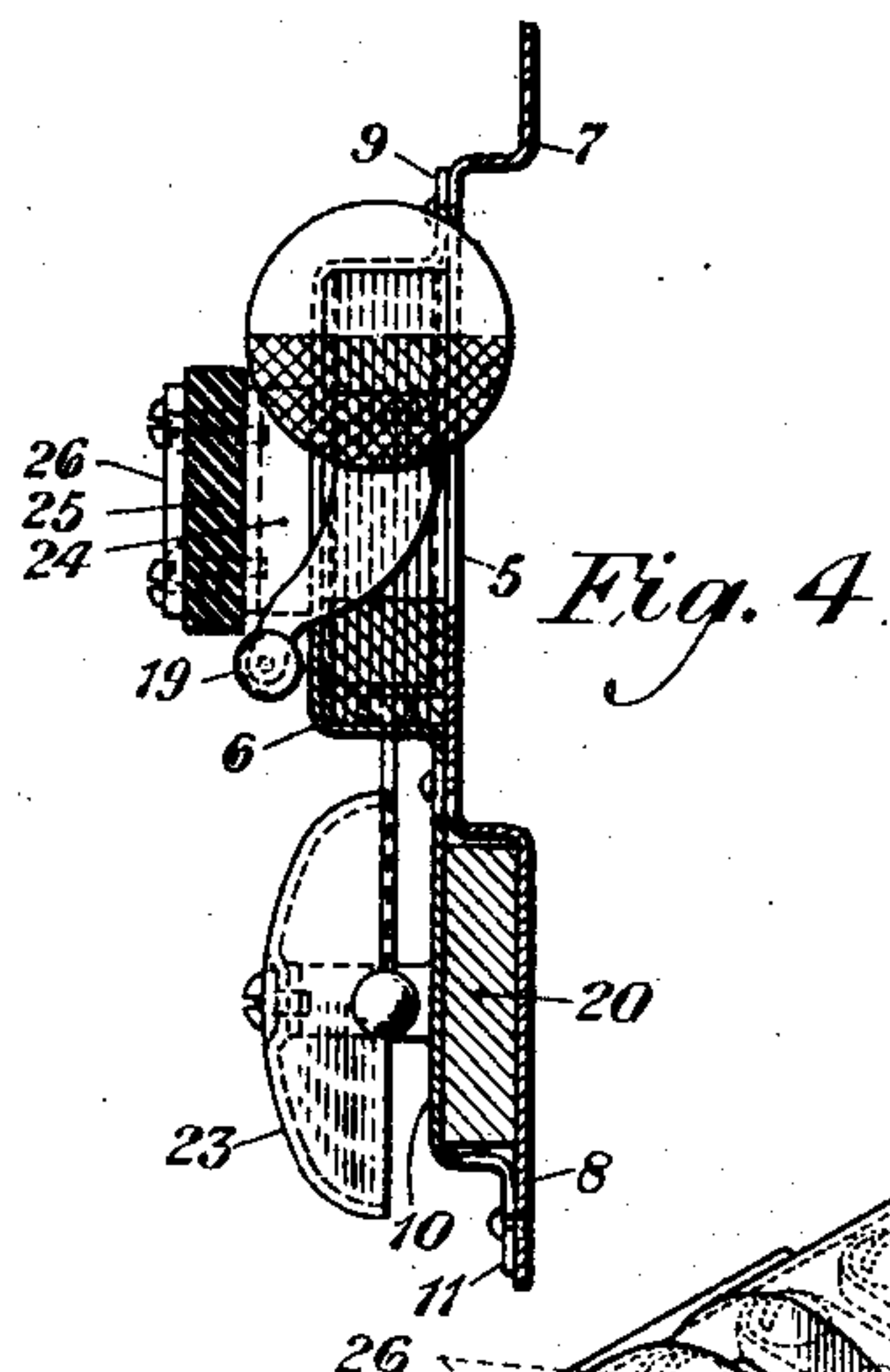
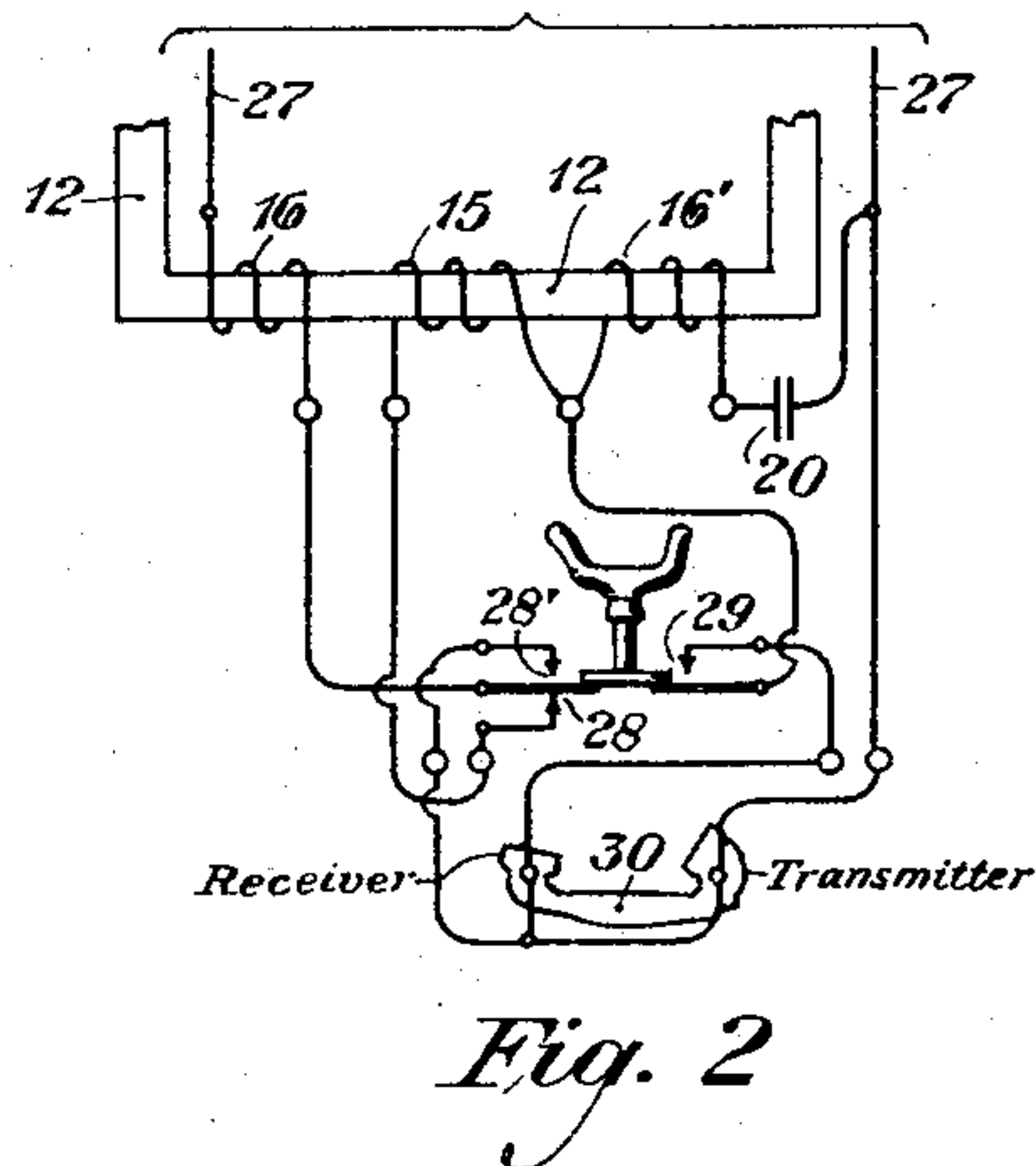
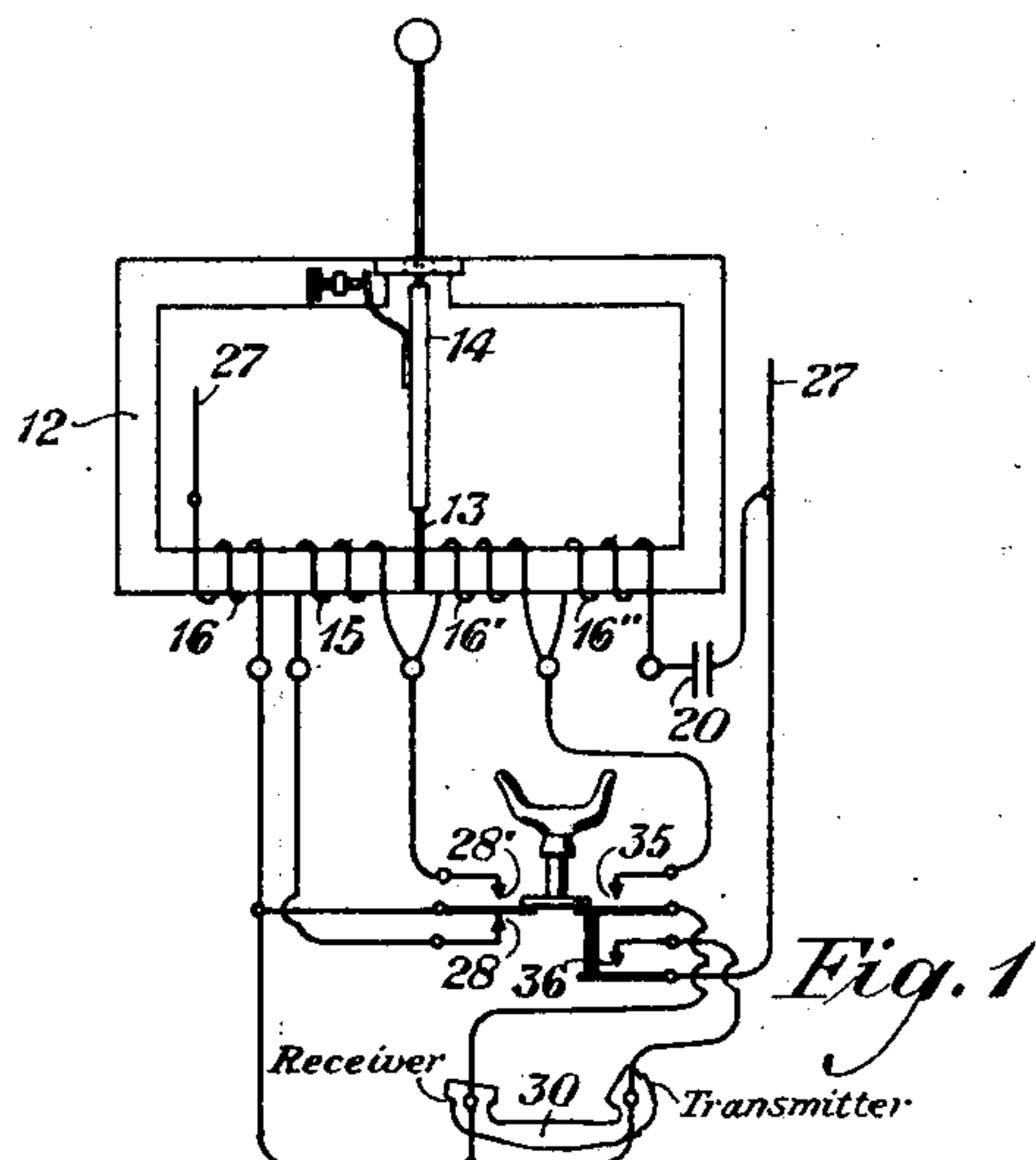
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TELEPHONE SUBSTATION APPARATUS

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TELEPHONE SUBSTATION APPARATUS

Application filed February 5, 1931. Serial No. 513,712.

This invention relates to telephone circuits and apparatus which are more particularly adapted for use at telephone substations.

The present application is a continuation
5 in part of my application filed March 1, 1930, Serial No. 432,502.

An object of the invention consists in combining the various elements required at a telephone substation to form a compact and unitary structure.

Another object consists in the provision of a minimum number of parts so related that they require only a relatively small space.

These and further objects will be apparent
15 from the following description when considered in connection with the accompanying drawing in which one embodiment of the invention is illustrated.

Referring to the drawing, Figure 1 is a
20 diagrammatic representation of a circuit which may be used in connection with this invention; Fig. 2 is a modification of Fig. 1; Fig. 3 is a front elevation, partly in section, of the improved arrangement; Fig. 4 is a
25 side view, in section, taken on the line 4—4 of Fig. 3 and Fig. 5 is a perspective view of the device.

In the drawing, in which like elements are designated by like reference characters
30 throughout, 5 is applied to a supporting plate which, with an auxiliary plate 6, form a mounting for the various elements of this device. The punchings comprising the plates 5 and 6 may be made of some suitable material
35 such as brass or the like. The plate 5 has a portion bent into the form of a flat U, and mounting flanges 7 and 8 extend substantially at right angles from the legs of the U portion. The flange 8 is longer than its companion flange 7 for a reason which will presently appear, and each flange is provided
40 with perforations through which screws may be inserted to attach the device to a base. The auxiliary plate 6 also has a portion bent
45 into the form of a flat U which may be of less width than the similar portion of the plate 5. The plate 6 is also provided with right-angular extensions 9 and 10 from the legs of its U portion, and the longer portion
50 10 of said extensions terminates in angular

brackets 11. The auxiliary plate 6 may be riveted or otherwise secured to the supporting plate 5. The U portion of the auxiliary plate 6 which, as previously stated, is of less
55 width than the U portion of the supporting plate 5, is mounted on the flat part of the latter U portion, and forms therewith a chamber or compartment. The long right-angular portion 10 of the auxiliary plate 6 extends
60 partly over the longer flange 8 of the supporting plate 5 and with its brackets 11 cooperates with the flange 8 to form a second chamber or compartment.

A laminated core for a ringer comprising
65 two U portions so formed as to provide a substantially C-shaped assembly 12 is positioned within the first-mentioned chamber. The ends at one side of said portions abut
70 each other, while the ends at the other side are spaced from each other. A reed 13 is clamped between the abutting ends of the U-shaped portions, and a permanent magnet
75 armature 14 carried by said reed is adapted to vibrate in the gap between the spaced ends of said portions. An energizing coil 15 for the ringer is carried on the core portion on
80 one side of the reed, and an induction coil 16 comprising a plurality of windings is carried on the core portion on the other side of the reed. In Fig. 1, the induction coil is
85 shown as having a primary winding 16, a secondary winding 16' and a tertiary winding 16''. In Fig. 2, the induction coil is shown as having a primary winding 16 and secondary winding 16'. The windings of the
90 energizing coil and induction coil may be of the form wound type, and may be slipped over the portions of the laminated core during assembly. The supporting plate 5 and auxiliary plate 6 are cut away at necessary
95 points to accommodate the coils 15 and 16, and lugs 17 extending toward each other from the edges on each side of said plates engage the U-shaped portions 12 of the core to clamp them firmly in position in the chamber. A brass spacer 18 is inserted between the separated poles of the portions 12 of the core to maintain the proper gap, and a clapper rod affixed to the permanent magnet
100 armature 14 extends through a central orifice

provided in the spacer. An adjusting screw 19 for the armature is mounted on an integral tongue cut in the auxiliary plate 6 and bent to form a support for said screw.

5 A condenser 20 is carried in the second chamber, previously described, and lugs 21 extending toward each other from the edges on each side of the plates 5 and 6 so engage the condenser as to clamp it in rigid position.
 10 Tongues 22 are cut in the portion 10 of the auxiliary plate and are bent upwardly to form supporting posts for the gongs 23 of the ringer. Eccentric holes may be provided in the gongs to permit them to be adjustably
 15 mounted. The clapper is adapted to vibrate in accordance with the actuation of the armature between the gongs to cause them to be sounded in a manner which will be presently described. Parallel integral brackets 24 are
 20 formed from the U-shaped portion of the auxiliary plate 6 and support a mounting strip 25 which may be composed of hard rubber or the like. The strip 25 provides a mounting for a series of terminal plates 26
 25 to which conductors of a telephone line and the various elements of the improved device are connected.

The circuit shown in Fig. 1 is characterized by the absence of side tone. The con-
 30 tacts 28, 35 and 36 in this figure are used in connection with a mounting for a hand set 30, and said contacts are shown in their normal unoperated position. When the hand set is removed, the contact 28 will be opened and
 35 the contact 28' and contacts 35 and 36 closed. The winding of the energizing coil 15 under this condition will be disconnected from the conductors 27 and the transmitter circuit will be closed from one side of the line 27 through
 40 coil 16, transmitter, contact 36, to the other side of the line 27. The induction coil circuit will be closed from one side of the line 27 through primary coil 16, contact 28', sec-
 45 ondary winding of secondary coil 16' and winding of tertiary coil 16'', condenser 20 and over the other side of the line 27. The receiver circuit will be closed in bridged con-
 50 nection across part of the induction coil circuit from secondary winding 16', contact 35, receiver, contacts 28', back to the secondary winding 16'.

The contacts 28 and 29 in Fig. 2 are also used in connection with a mounting for a
 55 hand set 30, and are shown in their normal unoperated position. When the hand set is removed, the contact 28 will be opened and the contact 29 closed. The winding of the energizing coil 15 under this condition will be disconnected from the conductors 27 and
 60 a talking circuit for the hand set will be completed through the make contacts of the springs associated with the contacts 28 and 29 through the left-hand or primary winding of the induction coil 16 and over the con-
 65 ductors 27.

In Fig. 1, when ringing current is applied to the line conductors 27, it will pass in a series path through condenser 20, winding 16'', 16' and 15 of the combined induction coil
 70 and ringer, contact 28 and left-hand winding 16. In Fig. 2, the ringing current from the conductors 27 will pass in a series path through condenser 20, winding 16' and 15 of the combined coil and ringer, contact 28 and
 75 left-hand winding 16. When a pulse of ringing current of one polarity passes through the windings, the left-hand pole piece of the core 12 becomes a north magnetic pole and the right-hand pole piece becomes a south
 80 magnetic pole. Inasmuch as armature 14 is a permanent magnet, with one pole, for instance, the north pole, lying in the gap between the pole pieces and the other, or south pole, of the armature at the end which
 85 is supported by the reed 13, the outer end of the armature will be repulsed by the left-hand pole piece 12 of the core and attracted towards the right-hand pole piece. When a pulse of opposite polarity passes through
 90 the ringer windings, the left-hand pole piece becomes a south magnetic pole and the right-hand pole piece a north magnetic pole, and the armature tends to move in the opposite direction. Thus, as the armature 14 vibrates
 95 in accordance with the applied ringing current, the clapper will strike the gongs 23 and create the desired ringing signal. The adjustable screw 19 acts upon the spring attached to the armature 14 so that the arma-
 100 ture responds more readily to current of a certain polarity. This characteristic is essential in preventing false operation of the ringer, due to the interruption of current of a certain polarity through the winding 16
 105 when the switch hook is operated, or to other similar causes.

While the arrangements of this invention have been illustrated as embodied in certain specific forms which have been deemed desirable, it will be understood that they are ca-
 110 pable of embodiment in many and widely varied forms without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. A mounting for telephone substation apparatus comprising a supporting plate hav-
 115 ing a portion bent into the form of a flat U with mounting flanges extending substantially at right angles from the legs of the U, one of said flanges being longer than the other, an auxiliary plate having a portion bent into the form of a flat U of less width
 120 than the U of the supporting plate and having right-angular extensions from the legs of the U, one of which is longer than the other, the U-shaped member of the auxiliary plate being mounted upon the flat part of the U of the supporting plate to form a compart-
 125 ment, the long-right-angular extension of the

auxiliary plate being extended over the long flange of the supporting plate and then bent downward to meet the edges of the long flange of the supporting plate to form a second compartment, a condenser mounted in said second compartment, and a ringer having its core mounted in said first compartment.

2. A mounting for telephone substation apparatus comprising a supporting plate having a portion bent into the form of a flat U with mounting flanges extending substantially at right angles from the legs of the U, one of said flanges being longer than the other, an auxiliary plate having a portion bent into the form of a flat U of less width than the U of the supporting plate and having right-angular extensions from the legs of the U, one of which is longer than the other, the U-shaped member of the auxiliary plate being mounted upon the flat part of the U of the supporting plate to form a compartment, the long, angular extension of the auxiliary plate being extended over the long flange of the supporting plate and then bent downward to meet the edges of the long flange of the supporting plate to form a second compartment, a condenser mounted in said second compartment, a ringer having its core mounted in said first compartment, and coils mounted upon said core, said U-shaped members being cut away to accommodate said coils.

3. A mounting for telephone substation apparatus comprising a supporting plate having a portion bent into the form of a flat U with mounting flanges extending substantially at right angles from the legs of the U, one of said flanges being longer than the other, an auxiliary plate having a portion bent into the form of a flat U of less width than the U of the supporting plate and having right-angular extensions from the legs of the U, one of which is longer than the other, the U-shaped member of the auxiliary plate being mounted upon the flat part of the U of the supporting plate to form a compartment, the long, angular extension of the auxiliary plate being extended over the long flange of the supporting plate and then bent downward to meet the edges of the long flange of the supporting plate to form a second compartment, a condenser mounted in said compartment, a ringer having its core mounted in said first compartment, coils mounted upon said core, said U-shaped members being cut away to accommodate said coils, and the long right-angular extension of said auxiliary plate having tongues cut therefrom and bent to form integral supporting posts for the gongs of the ringer.

4. A mounting for telephone substation apparatus comprising a supporting plate having a portion bent into the form of a flat U with mounting flanges extending substantially at right angles from the legs of the U, one of said flanges being longer than the other, an

auxiliary plate having a portion bent into the form of a flat U of less width than the U of the supporting plate and having right-angular extensions from the legs of the U, one of which is longer than the other, the U-shaped member of the auxiliary plate being mounted upon the flat part of the U of the supporting plate to form a compartment, the long angular extension of the auxiliary plate being extended over the long flange of the supporting plate and then bent downward to meet the edges of the long flange of the supporting plate to form a second compartment, a condenser mounted in said second compartment, a ringer having its core mounted in said first compartment, coils mounted upon said core, said U-shaped members being cut away to accommodate said coils, the long right angular extension of said auxiliary plate having tongues cut therefrom and bent to form integral supporting posts for the gongs of the ringer, and tongues cut from the plate portion of the U of said auxiliary plate and bent to form brackets to support a terminal plate.

5. A mounting for telephone substation apparatus comprising a supporting plate having a portion bent into the form of a flat U with mounting flanges extending at right angles to the legs of the U, an auxiliary plate having a portion bent into the form of a flat U of less width than said first mentioned U with flanges extending at right angles from the legs of the U, said last mentioned flanges being mounted upon the flat part of the U of said supporting plate so that the two plates cooperate to form a compartment, and a ringer having a core mounted in said compartment.

6. A mounting for telephone substation apparatus comprising a supporting plate having a portion bent into the form of a flat U with mounting flanges extending at right angles to the legs of the U, an auxiliary plate having a portion bent into the form of a flat U of less width than said first mentioned U with flanges extending at right angles from the legs of the U, said last mentioned flanges being mounted upon the flat part of the U of said supporting plate so that the two plates cooperate to form a compartment, a ringer having a core mounted in said compartment, and coils mounted upon the core of said ringer, said plates being cut away to accommodate said coils.

In testimony whereof, I have signed my name to this specification this 4th day of February, 1931.

IRVING W. GREEN.