

Oct. 9, 1934.

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1,976,660

CODE CALLING SYSTEM

Filed June 16, 1928

2 Sheets-Sheet 1

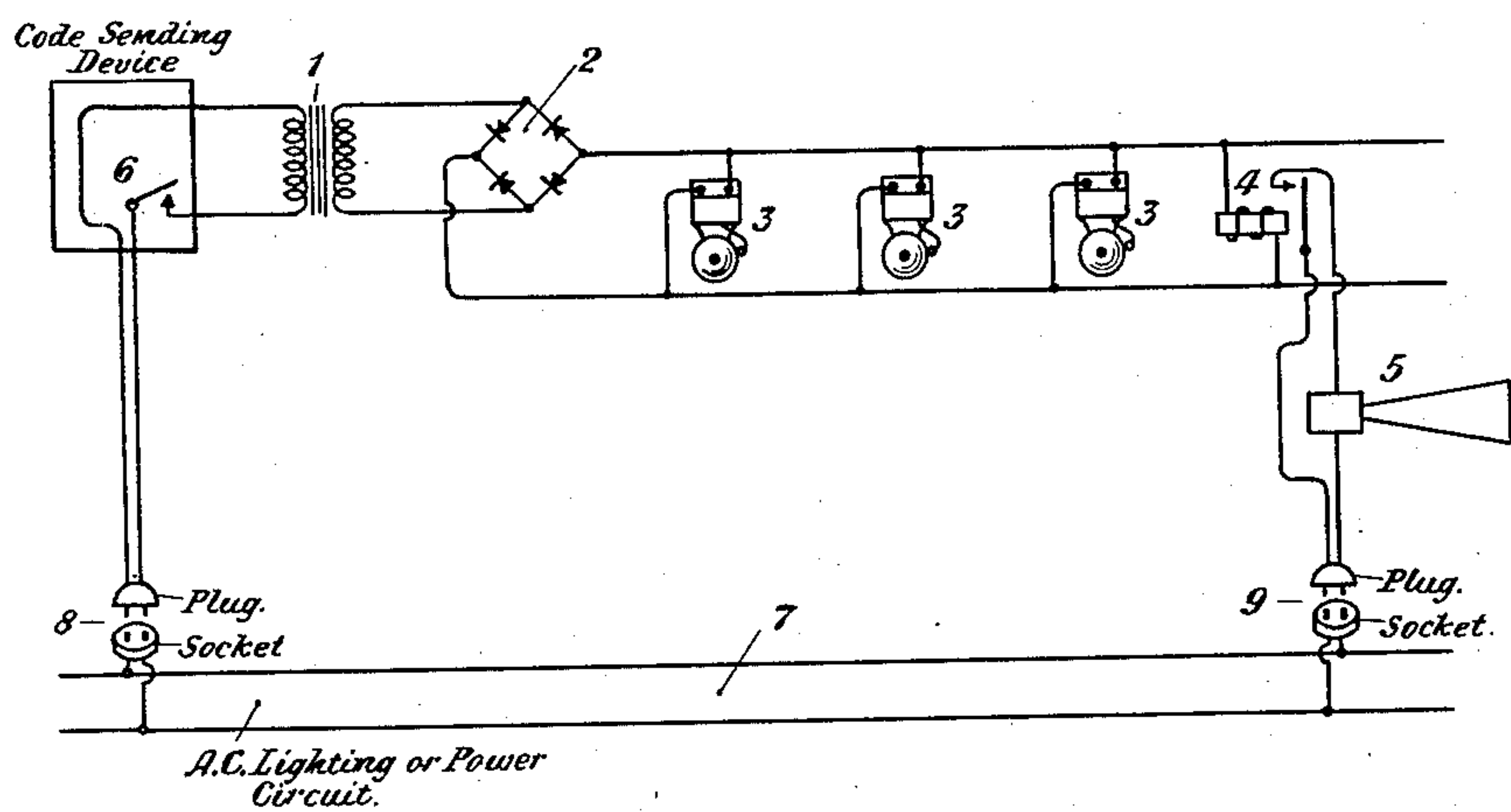


Fig. 1

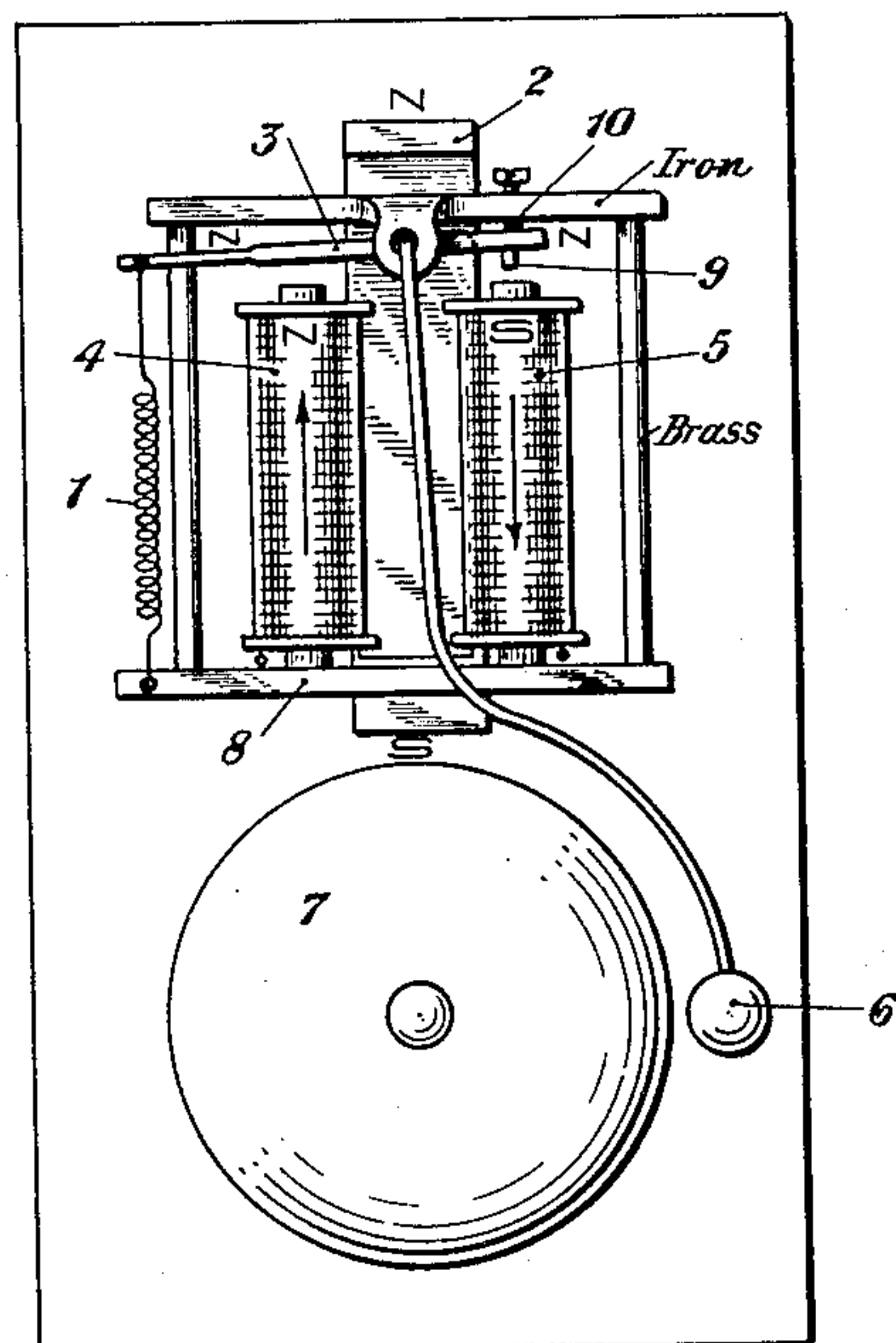


Fig. 2

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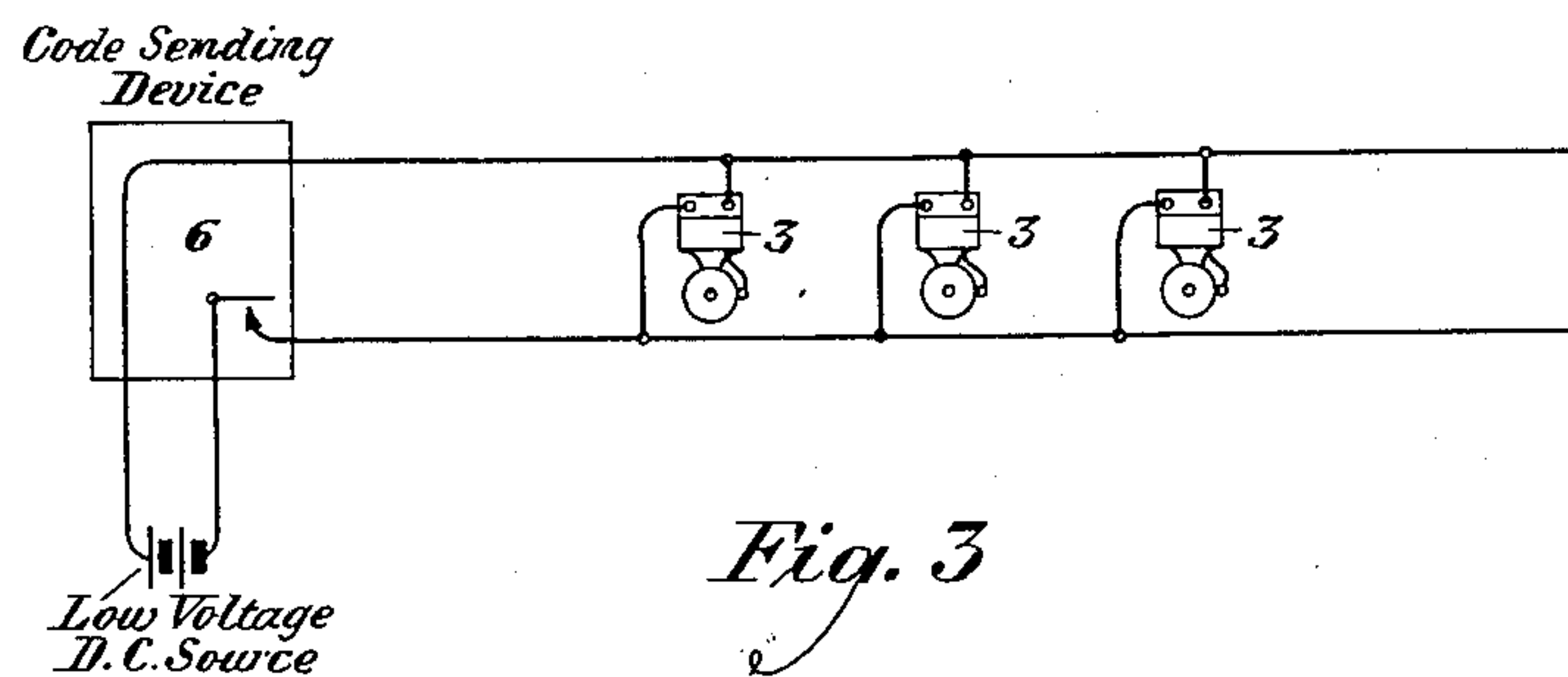


Fig. 3

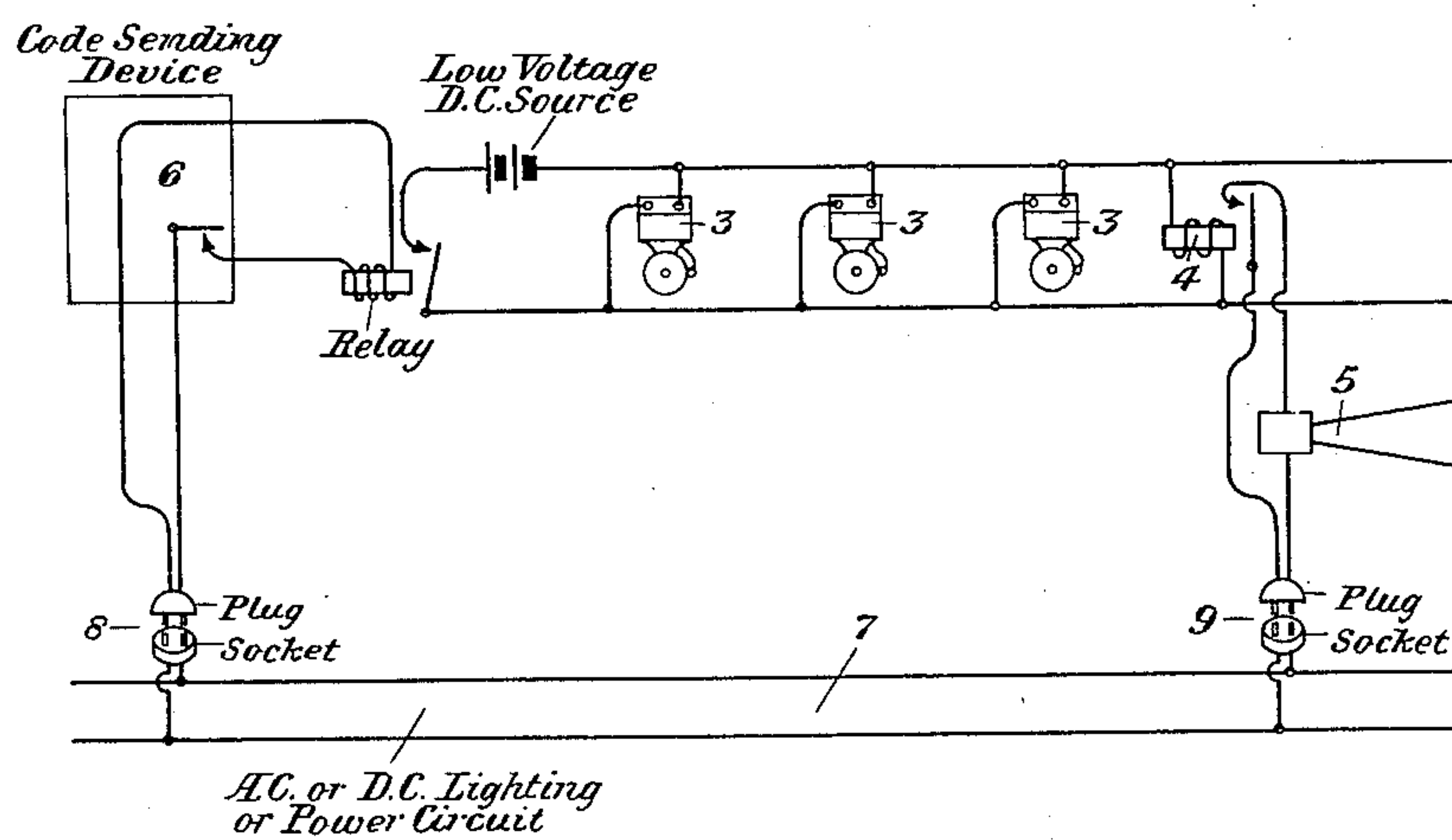


Fig. 4

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1,976,660

CODE CALLING SYSTEM

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6 Claims. (Cl. 177—7)

This invention discloses an improved low voltage operated code calling system of the type used for simultaneously operating signals at a plurality of locations in accordance with selected codes.

A code calling system of the type here intended finds application in large organizations where certain officials or employees whose business carries them to all parts of the plant are wanted from time to time at headquarters or on the telephone, and whose whereabouts in the plant at any particular instant is unknown. In such cases to make an individual search for the person wanted would involve much loss of time and otherwise react detrimentally upon the organization efficiency.

One method of locating an individual quickly consists in placing electrically operated gongs or other suitable signaling means at various points about the plant, and causing these signaling means to be operated in accordance with a predetermined code when a certain person is desired. A different code is of course assigned to each person thus likely to be wanted. As a general thing it is most convenient to have the control apparatus for ringing the gongs located convenient to the local switchboard which serves the organization. The local switchboard operator is informed as to the person desired, whereupon she causes the proper code to be rung. The individual wanted upon hearing his signal, merely steps to the nearest phone and informs the operator as to his whereabouts, and is thereupon placed in touch with the party desiring him.

Electrically operated code sending devices are well known to the art, which upon depression of a selected one of a plurality of keys, or the insertion of a plug in a certain jack will cause the signaling means to be operated in accordance with a desired code. The code calling systems known to the art in general require considerable power for operation of the signals and hence the signaling means as well as the code sending devices are operated from the usual 110 volt lighting and power supply where this is available. Such a system, of course, has the disadvantage that it requires a considerable amount of power wiring, which to be satisfactory from the standpoint of fire protection is generally run in flexible armored cable or conduit. Signaling means could of course be designed for operation from a low voltage supply which utilized the same amount of power for operation as the higher voltage operated signals. The use of such signals would not reduce the wiring cost since the

proportionally greater increase in current would continue the fire hazard and require an expensive wiring installation.

It will be seen from the above explanation as to the purpose of the type of code calling system intended, that it is utilized as an adjunct to the local telephone system. For this reason it would be desirable from the standpoints of installation and maintenance to have a code calling system which would operate satisfactorily as far as the signals are concerned, which require greatest amount of wiring, on a power supply comparable with that utilized by telephone equipment. With such a system available there would be a considerable saving in installation cost due to the fact that the circuits could be run in the usual type of telephone or annunciator wiring.

The present invention discloses such a code calling system the essential feature of which is the use, in combination with a relatively high power source of operating energy such as an electric light circuit, of telephone wiring for the signaling or interconnecting circuits and of sensitive low voltage signaling means which operate on a relatively small amount of power but furnish signals sufficiently loud for the purpose intended.

The system may be more easily understood by reference to the drawings, of which Figure 1 shows in schematic form the wiring of the proposed system. Fig. 2 shows an efficient and sensitive type of gong for use in connection with such a system. Figs. 3 and 4 show in schematic form modifications of the proposed system.

Referring to Fig. 2 the clapper 6 adapted to strike gong 7 is affixed to a centrally pivoted armature 3. The armature 3 is polarized by means of the permanent magnet 2. The helically coiled spring 1 normally holds the armature against the brass stop 10. The armature is actuated by the electromagnet consisting of coils 4 and 5 wound about iron cores, the latter being affixed to the iron base 8. One pole of the permanent magnet 2 is also affixed to this base, as shown. The coils 4 and 5 are wound oppositely to furnish a north and a south pole, as indicated.

The bell is intended to be operated by direct current, which current is supplied to the coils in such manner that the armature will be rotated against the spring tension and cause the clapper 6 to strike gong 7 once for each application of current to the coil. After the stroke, stop 9 holds the clapper slightly away from the gong to prevent damping of the vibrations.

Referring now to Fig. 1, a code sending device 6 is connected to the usual alternating current power and lighting system wiring 7 by means of plug and socket 8, as indicated. The output of the code sending device is connected to the primary winding of a bell ringing transformer 1. Bell ringing transformers, as is well known in the art, step down the voltage impressed on the primary winding thereof and also limit the current in the secondary circuit. Transformer 1 is adapted to step down the voltage of power circuit 7 approximately one-half, i. e., to between 35 and 55 volts, and to limit the secondary current under short circuit conditions to a maximum value of 280 milliamperes. Bell ringing transformers also give a relatively large voltage regulation between the maximum voltage obtained on an open circuit and the minimum voltage obtained under maximum power output conditions. Transformer 1 is adapted to cause a rapid falling off of the secondary voltage and a consequent limiting of the secondary current to 280 milliamperes as the impedance of the secondary circuit decreases, as might occur during short circuit conditions. The secondary of transformer 1 is connected to a rectifier indicated by 2. This rectifier may be of any type but it is suggested that a full wave rectifier of the recently developed copper oxide type is best adapted to the purpose. A plurality of sensitive gongs 3 such as is shown in Fig. 2, are connected to the output of the rectifier 2, as shown. These gongs, of course, are placed at suitable locations throughout the plant or building.

When a suitable key of the code sending device 6 is operated, pulses of alternating current are applied to the rectifier 2 in accordance with the code desired. This alternating current is converted by 2 into pulses of fluctuating direct current which operate the gongs once for each pulse.

In case it is desired to operate very loud gongs, horns or other signaling devices which require more energy than can be supplied from the transformer 1 and rectifier 2, the scheme shown at the right of Fig. 1 is suitable. In this case 4 is a sensitive relay operated by the rectified current, 5 is a horn or other power operated signaling device connected to the lighting system by means of plug and socket 9. Each time relay 4 operates, it closes the circuit to supply power to operate horn 5, as shown. No power wiring is required in this case as the plug may be connected to any available lighting socket. The relay 4 and signaling device could, of course, be built as one unit.

The system is of course not restricted to be operated from an alternating power source, but may be operated from direct current provided a low voltage source is available. As shown in Fig. 3, when direct current is used, transformer 1 and rectifier 2 of Fig. 1 are of course omitted, and the gongs 3 are connected directly to the output of code sending device 6, the input of which is connected to a low voltage source of direct current. As shown in Fig. 4, an alternative scheme is to have the code sending device 6, operated from the usual power supply either a. c. or d. c., and have connected to the output thereof relay means for controlling the application of a low voltage source of direct current to the gongs 3 and relays 4. The horn 5 is connected to the power supply in the same manner as shown in Fig. 1, although of course, it must be of a type suitable for operation therefrom.

For the sake of clearness, the following expression used in the claims have the following

meanings: "high voltage" means a voltage of the order of 110 volts; "sensitive low voltage * * * devices", "sensitive low voltage * * * means", and "sensitive low voltage relays" means devices, means or relays, as the case may be, which are capable of operating on a current of the order of four milliamperes at from 35 to 55 volts; and "low maximum power" means power of a maximum of 280 milliamperes at from 35 to 55 volts.

What is claimed is:

1. A code calling system for incorporation with a telephone system without interference therewith, comprising in combination, a source of high voltage alternating current, a circuit normally used for telephone purposes connected thereto, a plurality of sensitive low voltage operated signaling devices associated with said circuit and operable by energy from said source, means interposed between said energy source and said signaling devices for obtaining electrical energy of low maximum power from said source for transmission over said circuit and for operation of said signaling devices, and means interposed between said source and said signaling devices to interrupt the current to said signaling devices in accordance with predetermined codes.

2. A code calling system for incorporation with a telephone system without interference therewith, comprising in combination, a source of high voltage alternating current, a circuit connected thereto consisting of one of the circuits normally used for telephone purposes, a plurality of sensitive low voltage operated signaling devices associated with said circuit, means interposed between said source and said signaling devices to interrupt current to the signaling devices in accordance with predetermined codes, voltage reducing means interposed in said circuit to obtain electrical energy of low maximum power from said source for transmission over said circuit and for operation of said signaling devices, and a full wave rectifier interposed in said circuit to rectify the current delivered to said signaling devices.

3. A code calling system for incorporation with a telephone system without interference therewith, comprising in combination, a device for applying electrical pulses to an output circuit in accordance with selected codes, a source of high voltage alternating current connected to the input of said device, a current limiting step down transformer having its primary winding connected to the output of said device, rectifying means connected to the secondary of said transformer, a signaling circuit connected to the output of said rectifying means and consisting of one of the circuits normally used for telephone purposes, and a plurality of sensitive low voltage sound producing means connected in said signaling circuit.

4. A code calling system for incorporation with a telephone system without interference therewith, comprising in combination, a device for interrupting a flow of current in accordance with selected codes, a source of high voltage alternating current power connected to the input of said device, a current limiting step down transformer having its primary winding connected to the output of said device, rectifying means connected to the secondary of said transformer, a circuit connected to the output of said rectifying means and consisting of one of the circuits normally used for telephone purposes, one or more sensitive low voltage relays connected in said circuit and operable by current therein, and signaling means associated with each such relay, operable

by said alternating current power supply and connected thereto during the operated intervals of said relays.

5 A code calling system for incorporation with a telephone system without interference there-with, comprising in combination, a source of high voltage alternating current power, a device connected thereto and adapted to interrupt the flow of current in its output circuit in accordance with
10 selected codes, signaling circuits associated with said output circuit and consisting of circuits normally used for telephone purposes, means interposed between said source and said signaling circuits for obtaining electrical energy of low maximum power from said source, one or more sensitive low voltage relays connected in said signaling circuits and operable by current therein, and
15 signaling means associated with each said relay, operable from said source of high voltage alternating current power and connected thereto during the operated intervals of said relays.

6. A code calling system for incorporation with

a telephone system without interference therewith, comprising in combination, a commercial lighting or power circuit of the order of 110 volts, a signaling circuit connected thereto and consisting of one of the circuits normally used for
80 telephone purposes, impulse sending mechanism interposed between said power circuit and said signaling circuit, means interposed between said impulse sending device and said signaling circuit for supplying electrical energy of low maximum
85 power from said commercial lighting or power circuit for transmission over said signaling circuit, sensitive low voltage code signaling devices and sensitive low voltage relays operated by the current in said signaling circuit, and signaling
90 means associated with each of said relays and operable by the current in said commercial lighting or power circuit, said relays being adapted during the operated intervals thereof to connect
95 said signaling means directly to said commercial lighting or power circuit.

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