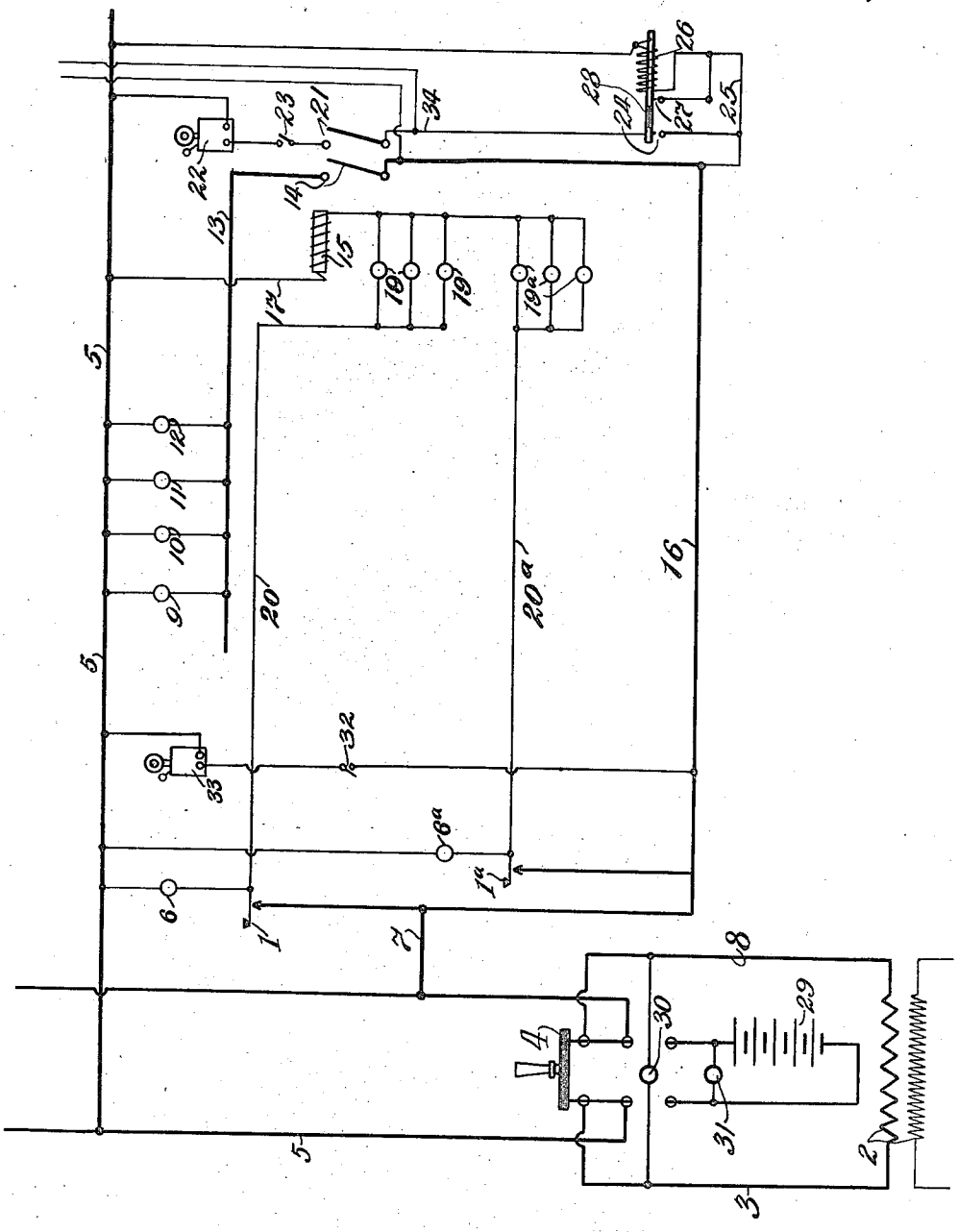
W. M. PERRY & A. E. BOOZER.

SIGNALING CIRCUITS.

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Witnesses

E. M. Connor.

H. H. Connor.

Inventors

W. M. Perry and A. E. Boozer.

By

H. R. Van Deventer

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM MAYRANT PERRY AND ALBERT EARLE BOOZER, OF COLUMBIA, SOUTH CAROLINA.

SIGNALING-CIRCUIT.

1,143,312. Specification of Letters Patent. Patented June 15, 1915.

Application filed March 25, 1912. Serial No. 685,978.

To all whom it may concern:

Be it known that we, WILLIAM MAYRANT PERRY and ALBERT EARLE BOOZER, citizens of the United States, residing at Columbia, in the county of Richland and State of South Carolina, have invented certain new and useful Improvements in Signaling-Circuits, of which the following is a specification, reference being had to the accompanying drawing.

Our invention relates to signaling systems, and has for its object the elimination of a great deal of equipment heretofore necessary such as push buttons with several contacts, the employment of simple circuits easily installed and understood by the average wireman, the elimination of local relays and the reduction of the total number of same necessary, and the employment of an intermittent audible signaling device in combination with the visual signaling system, thereby eliminating the constant ringing bells heretofore employed.

There are other advantages which are hereinafter described and claimed.

It is obvious that our system may be employed wherever a signaling system is desired. We describe same herein as employed for calling nurses or other attendants to the room or wards of a hospital.

The accompanying drawing illustrates the features of our invention when applied to the beforementioned use.

In the accompanying diagram 1 and 1ª denote circuit closing devices, which, when operated, closes a circuit, which remains closed until the device is manually restored to the open position. Such an arrangement as the ordinary pendant switch with "off" and "on" buttons is suitable, and any one of the well known types may be employed. One of these devices is located at each bed or in each room or ward, and when operated, current flows from the transformer 2 through conductor 3, switch 4, conductor 5, lamp 6, push 1, conductor 7, switch 4, conductor 8, and back to the transformer 2. Lamp 6 is preferably positioned over the door of the room in which push 1 is located, and serves as a local signal to the nurse or attendant who is usually stationed in the corridor. As an additional signal, we provide at suitable points the pilot lamps 9, 10, 11, 12 located at various points along the passageways or corridors. If necessary, these pilots may be located on another floor or in another part of the building from the wards or beds having local lamps indicated at 6 and 6ª, thereby notifying the nurse when any one is calling. Any suitable number of pilot lamps are operated by reason of current flowing when button 1 is pushed, as follows: from conductor 5 through lamps 9, 10, 11, 12 to conductor 13, through the contacts 14 of relay 15, conductor 16, conductors 7 and 8 back to the transformer 2. Relay 15 closes because of the circuit established through it as follows: conductor 5 to conductor 17, conductor 18 through lamps 19, private wire 20 through push 1, conductors 7 and 8 to transformer 2. There is also a circuit established through the lamps 19ª, private wire 20ª and lamp 6ª. The lamps in this circuit, however, are not lighted because of the high resistance of the lamp 6ª.

Bearing in mind that when button 1 is operated it remains locked, it will be obvious that the local lamp 6, and the pilots 9, 10, 11, 12 will remain lighted until the nurse enters the room and restores the button to normal. If any button remains pushed the pilots remain lighted; that is, as long as any button remains "on" and when more than one button is "on," restoring the first button pushed will not extinguish the pilots. It will also be observed that the annunciator lamps 19 and 19ª are operated when the corresponding button is pushed. Any desired number of annunciator lamps may be used in multiple, and any desired number of rooms connected to any one annunciator and only one relay 15 used, provided the winding of same is properly positioned to pass the maximum current. This is particularly important when alternating current is used, in which case the impedance of the relay must be reduced to a minimum. In large instal-

lations it is only necessary to divide the lamps on the annunciators into groups, using one relay for each group. Heretofore it has been necessary to use a relay for each room or bed to accomplish the results we obtain, and we consider this elimination of relays one of the important features of our invention.

It will be noted that when relay 15 is operated as just described, in addition to contacts 14, an additional pair of contacts 21 are closed. This closes a circuit from conductor 5 through bell 22, switch 23, intermittent contact 24, conductor 25, and conductors 16, 7 and 8 to transformer 2. As the contact 24 is operated, the bell or other audible singaling device 22 is operated. We find a suitable adjustment is two seconds on, three to seven seconds off. This audible signal is of great value—especially at night when often only one attendant is on duty, as it allows the attendant to be engaged in any work without the necessity of watching the pilots for fear a call will be neglected. Heretofore a steady ringing bell has been employed, but this is very objectionable, and does not attract attention like the intermittent ringing.

The contacts 24 are controlled in any suitable manner. We find it is possible to employ a thermo device usually termed a "flasher" such as commonly used in connection with electric signs, etc.; this often consists of the arm 26 composed of two dissimilar metals and wound with a wire heating element. When this becomes heated, due to the passage of current, the contact 27 is closed, thereby short circuiting the wire on 26. The metals in contracting open circuit 27, and this process is repeated as long as the current continues to flow. While we describe a thermo device, it will be understood that a motor driven interrupter or any suitable device may be employed. The circuit for operating the circuit closing device is kept separate from the bell circuit by reason of the insulation 28, as often the circuit closing device may be operated by a higher voltage than that employed for the operation of the signaling system proper.

As alternating current is now in general commercial use, our system is designed and here shown to operate therewith, the usual commercial voltage of 110 or thereabout being reduced to about 10 by means of the transformer 2. But it is obvious that should the regular service fail for any reason, some auxiliary source of current should be available. Therefore, we provide the switch 4 and battery 29, and in case the alternating current should fail, the switch may be thrown and the system operated on direct current without further delay. Signal lamps 30 and 31 may be located at any suitable point so as to indicate at all times the condition of their respective sources of current supply. It will be noted that no changes or adjustments of any character are necessary when changing from alternating to direct current.

Sometimes it is desirable to have a special signal in addition to the regular nurse's call. In such cases we provide an additional push 32 and one or more bells 33 connected across conductors 5 and 7 as shown, whereby the same source of current may be employed for these special signals which are employed in combination with a code of signals on the regular lamps. Such modifications and additions we deem to be within the scope of our invention.

We have shown only one local light, four pilots and one intermittent bell in our drawings for the sake of simplicity, but it will be apparent that any number of bells or pilots may be used, and that only one intermittent circuit closing device is necessary for one system comprising any number of sections or rooms. This because the wire 34 may be common to one of the pair of contacts 21, on all of the relays employed. We also eliminate all mechanical parts such as found in the usual annunciator, by employing the lamps 19 for that purpose, each lamp being placed back of a ground or opalescent glass, on which is painted the number of the bed, ward, or room. While we refer to "lamps" as signals, it is obvious that any suitable visual indicating means may be employed, such for instance as the usual semaphore drops often employed. On account of their simplicity, lamps are the preferred signals.

We claim:

1. In a signaling system, a source of current, a circuit, a local lamp and circuit closing device in series in said circuit, a relay and a lamp in series with each other and in multiple with said local lamp and controlled by said circuit closing device, a lamp controlled by said relay and in multiple with said circuit closing device and local lamp, a constantly operated intermittent circuit closing device, and an audible signal controlled by said circuit closing device and said relay.

2. In a signaling system, a source of current, a main circuit, a plurality of lamps and circuit closing devices arranged in multiple-series with said main circuit, a relay controlled by said circuit closing devices, a plurality of lamps arranged in multiple, said lamps being connected in series with the winding of said relay, a plurality of wires from said lamps to the lamp side of said circuit closing devices, a plurality of lamps controlled by said relay, and an intermittent audible signal controlled by said relay.

3. In a signaling system, a source of current, a main circuit, a plurality of local

lamps and circuit closing devices in multiple-series with the main circuit, a relay adapted to be operated when any local lamp is displayed, a plurality of lamps individual to each circuit closing device and operated thereby, a plurality of pilot lamps operated by said relay, a bell circuit operated by said relay, and a circuit interrupting device in said bell circuit.

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

WILLIAM MAYRANT PERRY.
ALBERT EARLE BOOZER.

Witnesses:
W. R. CANTURIER,
JOS. L. NETTLES,
ROBT. MOORMAN.