

H. P. CLAUSEN.
 ELECTRIC SIGNALING SYSTEM.
 APPLICATION FILED OCT. 25, 1916.

1,232,499.

Patented July 10, 1917.

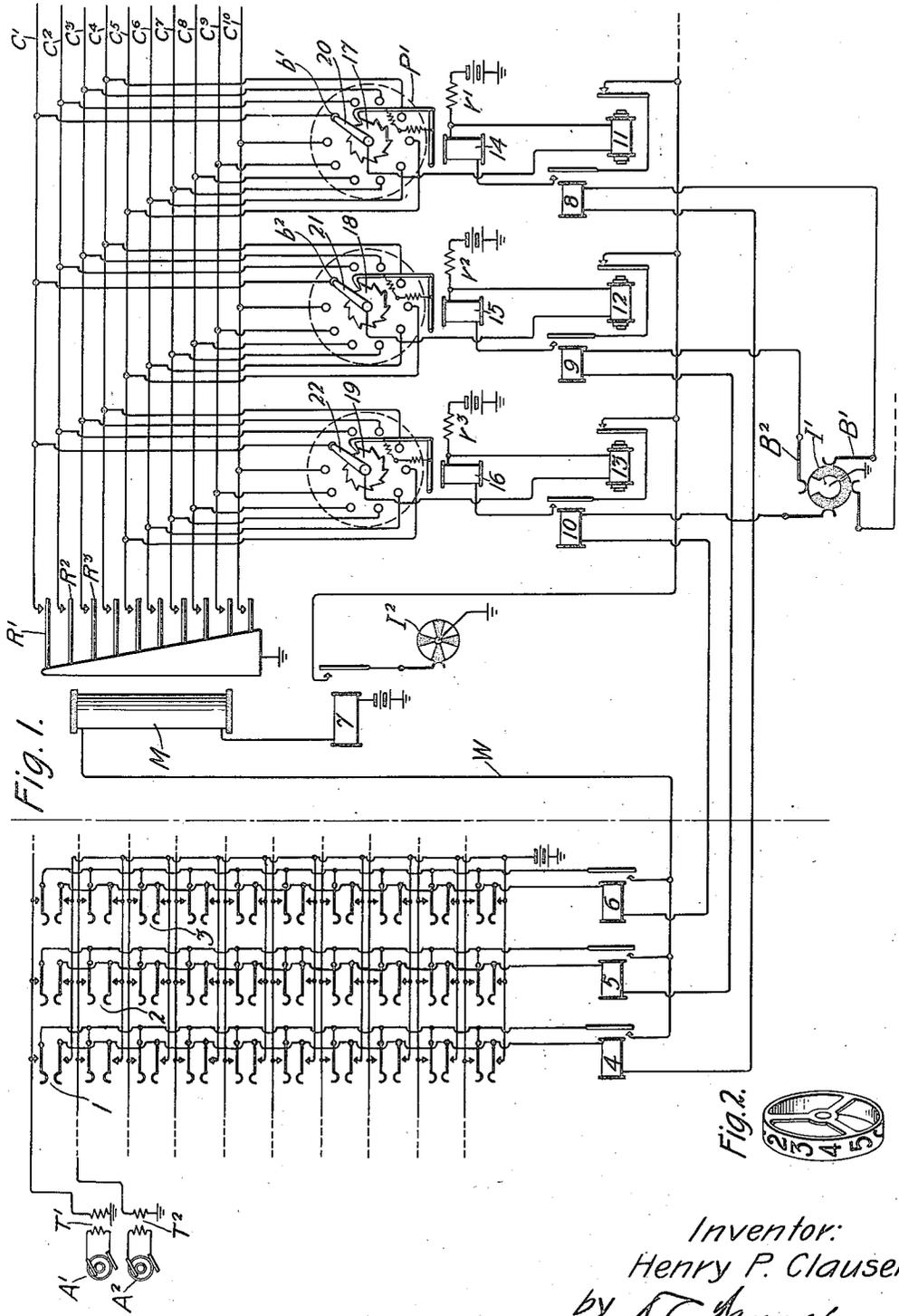


Fig. 1.

Fig. 2.

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UNITED STATES PATENT OFFICE.

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ELECTRIC SIGNALING SYSTEM.

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Specification of Letters Patent. Patented July 10, 1917.

Application filed October 25, 1916. Serial No. 127,648.

To all whom it may concern:

Be it known that I, HENRY P. CLAUSEN, a citizen of the United States, residing at Mount Vernon, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Electric Signaling Systems, of which the following is a full, clear, concise, and exact description.

This invention relates to signaling systems, and has particularly to do with the transmission of intelligence between telephone operators.

In certain telephone systems, it is necessary for an A operator to cause the display of a telephone number before a B operator. Heretofore this has been accomplished through complicated circuits and much apparatus. The present invention provides a simple circuit arrangement, and a small amount of sturdy apparatus which is quick and sure in action.

The feature of this invention is the use of alternating currents of different frequencies for the transmission of impulses whereby an indicator is set at a distant operator's position. The impulses of alternating current are received over a common wire by an electromagnet which controls a set of tuned reeds, and which selectively sets these reeds in vibration. The vibration of a selected reed closes a circuit between ground and one of ten common conductors leading to the indicating device proper, so that when such devices are actuated, they will be controlled in their setting by such electrically distinguished common conductors.

In the drawings, Figure 1 diagrammatically represents the circuits and apparatus embodying this invention, the part of the disclosure to the left of the broken line representing a set of keys and sources of alternating currents of different frequencies located on the transmitting station, and the part of the disclosure to the right of the broken line representing a set of tuned reeds and the indicating devices controlled thereby. Fig. 2 represents a part of an indicating device, and consists of a wheel with numbers appearing on its periphery.

Referring now especially to Fig. 1, A¹ and A² are sources of alternating currents of different frequencies, one of which is provided for each of the digits 1 to 0. These

alternating currents are transformed by the transformers T¹ and T², and supply current to the keys 1, 2, 3, etc. When these keys are actuated, impulses of alternating current are transmitted over the common wire W to the magnet M in control of the set of ten tuned reed contactors R¹, R², etc. Each of such reeds is of a different length and is therefore tuned to respond to a different frequency of vibration. When they are thereby caused to selectively vibrate each is arranged to close a contact during its period of vibration.

Let us assume that the operator, whose position is equipped with the set of keys mentioned, wishes to cause the display of the number 1, 2, 3 before the operator whose position is equipped with the indicating devices. She will press key 1 and thereby establish a circuit from ground, battery, the lower contacts of key 1, the winding of relay 4, the winding of relay 8, the brush B¹, the interrupter I¹, and thence to ground, whereupon relay 4 attracts its armature. Another circuit is thereupon established from ground, the secondary of transformer T¹, upper contacts of key 1 to the armature and contact of relay 4, the wire W, the magnet M, the relay 7, battery and thence to ground.

Direct current from the battery included in the last circuit described, will cause the energization of relay 7 and the alternating current superposed upon this direct current will cause the selective vibration of reed R¹ tuned to respond to the frequency of alternator A¹. This will occur only during the time that the brush B¹ makes contact to ground at the interrupter I¹, hence at this time a circuit will be closed from ground, the interrupter I², the armature and contact of relay 7, armature and contact of relay 11, the armature and contact of relay 8, the winding of relay 14, resistance r¹ to battery and thence to ground. Under the influence of the interrupted current flowing through this circuit, the armature of relay 14 will so actuate the pawl P¹ that the ratchet wheel 17 and the arm 20 rigidly secured thereto, are rotated in a clock-wise direction. This rotation will continue until the arm 20 makes contact with the button b¹ connected to the common wire C¹, whereupon the circuit will be established from ground, to tuned reed R¹ and its contact, to the com-

mon wire C^1 , button b^1 , the arm 20, the winding of relay 11, resistance r^1 to battery, and thence to ground.

I will assume that arm 20 is resting on button b^1 and that the magnet 7 has closed its contact before the tuned reed R^1 has reached the full amplitude of vibration where its contact is closed. Therefore the rotation of the ratchet wheel 17 will begin slightly in advance of the grounding of common wire C^1 and button b^1 . Since the full rotation of the ratchet wheel 17 must take place before the button b^1 is again encountered, the maximum time for the movement of this indicating device will be required. If, however, the interrupter I^1 removes the ground from b^1 before such rotation has been completed, the proper indication has not been lost, for upon the next rotation of the interrupter I^1 the same action will be repeated and the arm 20 will finally reach its destination. When the circuit completed through arm 20 and button b^1 is established, relay 11 will attract its armature and open the energizing circuit for the magnet 14, thus leaving the arm 20 stationary on the button b^1 , and leaving the wheel, illustrated in Fig. 2, in the proper position for the display of the numeral 1.

These actions and interactions take but a very short interval of time, and may be accomplished by a brief depression of key 1.

It should be noted at this point that the keys 1, 2 and 3 may be arranged to be locked or they may be arranged to make their contacts only while pressure is exerted on their operating buttons.

The operator now presses the key 2, whereupon alternating current of a frequency different from that first transmitted over the wire W is now transmitted from the generator A^2 , through key 2 over the wire W . Through the closure of the contacts of key 2, a circuit may be traced from ground, battery, the lower contacts of key 2, the winding of relay 5, the winding of relay 9, the brush B^2 , the interrupter I^1 to ground. The energization of relay 5 results in the establishment of a circuit which may be traced from the secondary of transformer T^2 , the upper contact of key 2, the armature and contact of relay 5, the wire W , the winding of magnet M , the winding of relay 7 from battery, and thence to ground. The action in this case is similar to that previously described, the only difference being that now the tuned reed R^2 vibrates and grounds the common conductor C^2 , and the arm 21 rotates until contact is made with the button b^2 .

When the indication set up by the second indicator is completed, the operator presses the button 3, whereupon a third indication is accomplished in a manner similar to the two previous.

It should be noted that there is no normal position for these indicating devices since their setting does not depend on the number of impulses received but rather on the changed electrical condition of one of their contact buttons, and that should locking keys be used, the three or more indicating devices that are used will be set in their selected positions, and will be maintained in such positions until the keys are reset, at which time they will immediately indicate the new number.

It should be noted that the interrupter I^2 may be so proportioned that the maximum number of impulses necessary for rotation of the ratchet wheels may be sent during the interval that the brush B^1 or B^2 is in communication with ground through the interrupter I^1 , or it may be so proportioned that a small number of impulses is sent when the action will be such as described in the first case.

What is claimed is:

1. In an electrical signaling system, means for transmitting impulses of varying characteristics, means variably responsive to said impulses, a traveling switch movable to a position determined by the operation of said responsive means, and an indicating device controlled by said traveling switch.
2. In an electrical signaling system, a transmitting station, a receiving station, a circuit therebetween, means at said transmitting station to control the application of sources of current of varying characteristics to said circuit, an electromagnet at said receiving station and included in said circuit, a set of tuned reed contactors controlled by said electromagnet, a controlling device, means to position said device, said positioning being controlled by the actuated condition of a desired one of said reeds, and an indicating device controlled by said controlling device.
3. In an electrical signaling system, a transmitting station, a receiving station, a circuit therebetween, a key set at said transmitting station, sources of current of varying characteristics, means including said key set to control the application of said current sources to said circuit, an electromagnet at said receiving station and included in said circuit, a set of tuned reed contactors controlled by said electromagnet, a step-by-step controlling device, means to advance said device to a desired position dependent upon the actuated condition of a desired one of said reeds, and an indicating device controlled by said step-by-step controlling device.
4. In an electrical signaling system, a transmitting station, a receiving station, means for transmitting intelligence between said stations consisting of a plurality of sources of current of differing characteris-

tics, a set of keys for selectively extending said sources of current to said receiving station, an electromagnet for receiving said current, a set of tuned reed contactors controlled by said electromagnet, a wheel bearing characters on its periphery for displaying messages in its selected positions, and means for actuating said wheel, said means being under control of said contactors and said keys.

5. In an electrical signaling system, a transmitting station, a receiving station, means for transmitting intelligence between said stations consisting of a plurality of sources of current of differing characteristics, sets of keys for selectively extending said sources of current to said receiving station, an electromagnet, a set of wheels bearing characters on their peripheries for displaying a message in their selected positions, and means for actuating said wheels, said means being under control of said contactors and said keys.

6. In an electrical signaling system, a transmitting station, a receiving station, circuits extending between said stations, a plurality of sources of alternating currents of different frequencies, and a set of keys for selectively connecting said sources of alternating currents to said circuits for transmission thereover, an electromagnet under control of said transmitted alternating current, a set of tuned reeds under control of said electromagnet and a plurality of indicating devices comprising motor magnets for actuating said devices, test relays for controlling the setting of said devices, and wheels bear-

ing characters on their peripheries for the display of messages, said test relays being under control of said tuned reeds.

7. In an electrical signaling system, a transmitting station, a receiving station, a common conductor extending between said stations, a plurality of individual conductors extending between said stations, means at said transmitting station for transmitting impulses of current over said common conductor, means including a set of tuned reeds at said receiving station for receiving said impulses of current, a plurality of indicating devices controlled by said tuned reeds, and means for selectively actuating said indicating devices including said individual conductors.

8. In an electrical signaling system, a transmitting station, a receiving station, a plurality of sources of alternating currents of different frequencies at said transmitting station, a plurality of sets of keys for selectively connecting said sources of current to a common conductor also at said transmitting station, an electromagnet at said receiving station, a common conductor extending between said sets of keys and said electromagnet, a set of tuned reeds under control of said electromagnet, a plurality of indicating devices under control of said tuned reeds at said receiving station, and a conductor extending between each set of keys and an indicating device.

In witness whereof, I hereunto subscribe my name this 24th day of October A. D., 1916.

HENRY P. CLAUSEN.