

W. A. FRICKE.  
SIGNALING SYSTEM.  
APPLICATION FILED AUG. 25, 1914.

1,282,803.

Patented Oct. 29, 1918.  
2 SHEETS - SHEET 1.

FIG. 1.

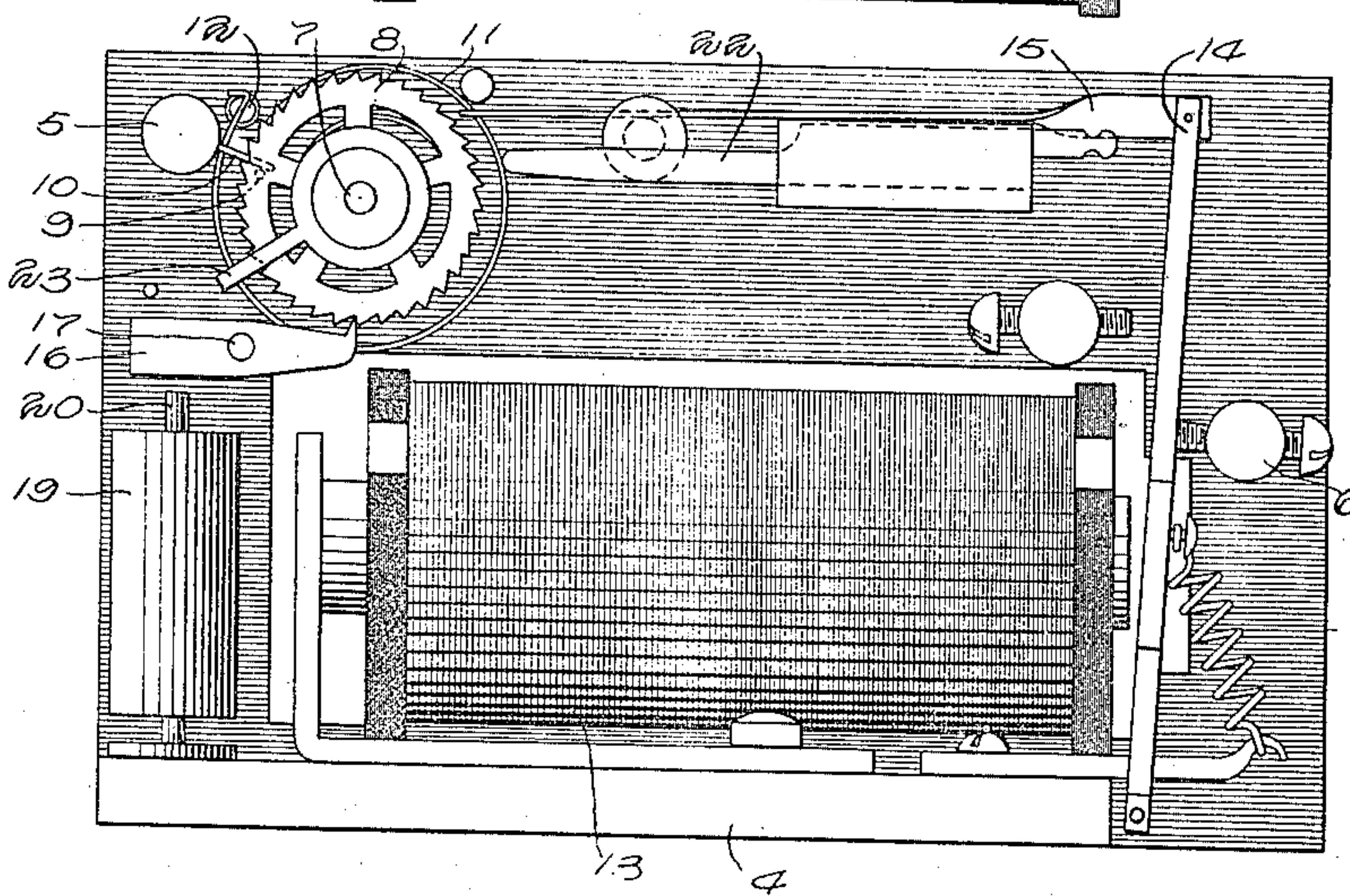
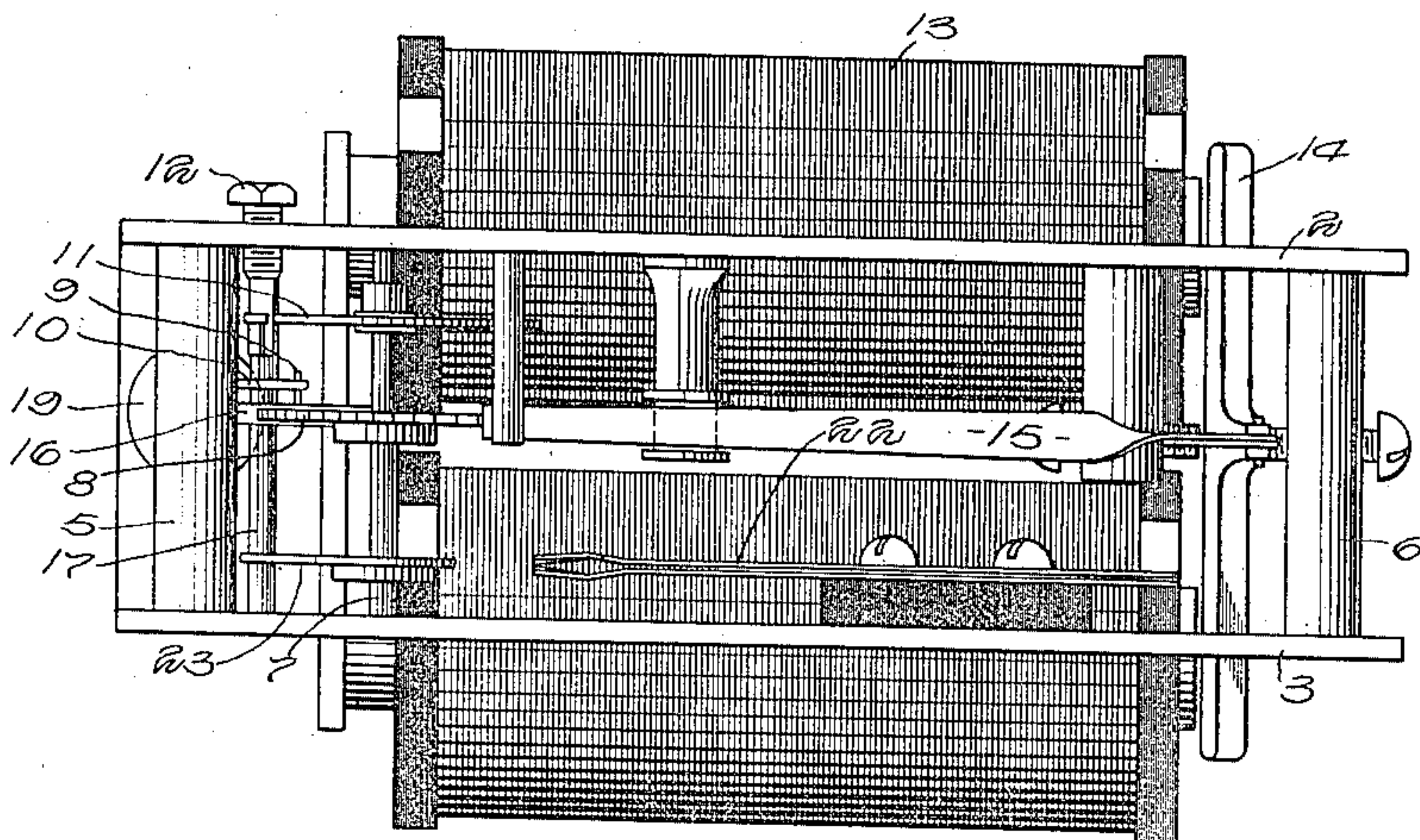


FIG. 2.

WITNESSES

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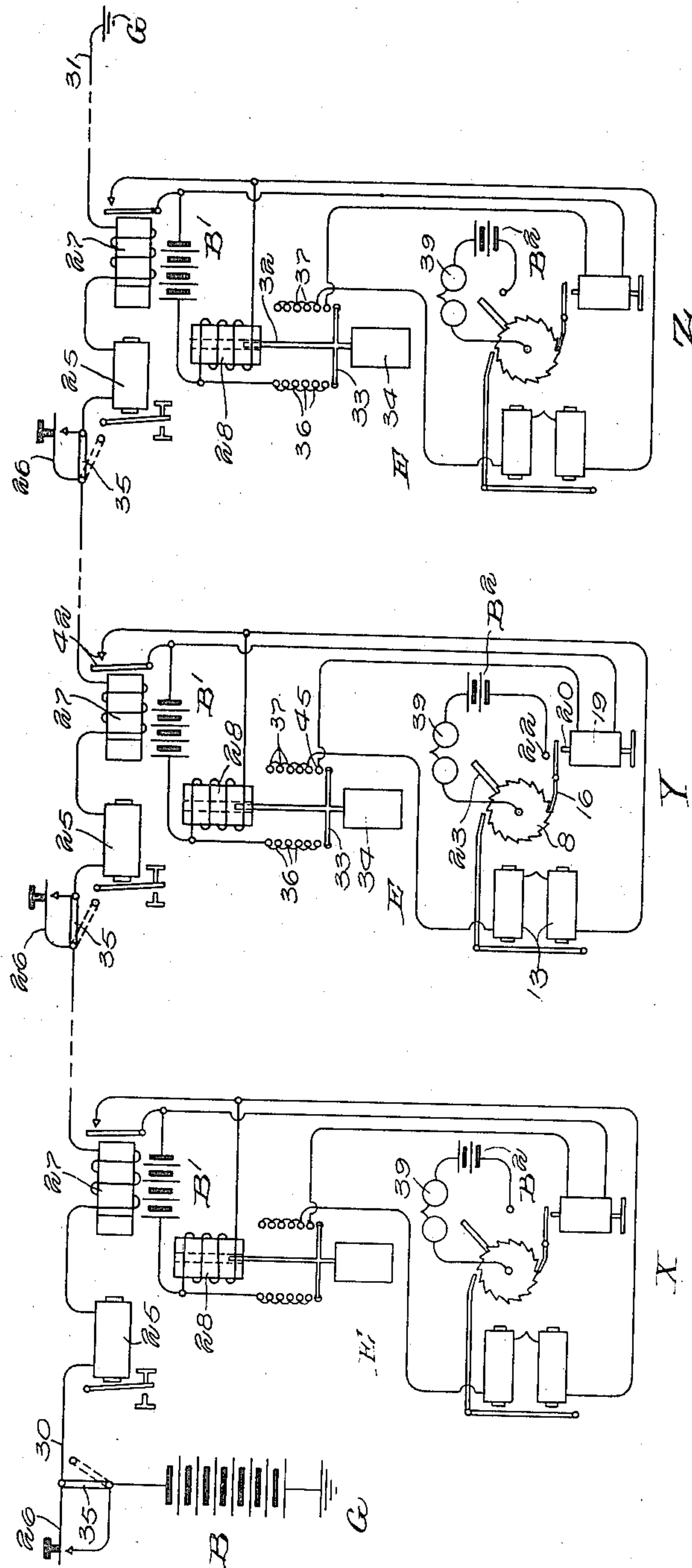


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FIG. 3.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## SIGNALING SYSTEM.

1,282,803.

Specification of Letters Patent.

Patented Oct. 29, 1918.

Application filed August 25, 1914. Serial No. 858,491.

*To all whom it may concern:*

Be it known that I, WILLIAM A. FRICKE, a citizen of the United States of America, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Signaling Systems, of which the following is a specification.

My invention relates to signaling systems and more particularly to systems adapted for use in railway despatching. In telegraph work it often happens that the operator is called away from the receiving instrument and thus a great deal of delay and inconvenience are caused, as the calling operator is unable to raise the station desired immediately.

The object of my invention is to enable this undesirable feature to be overcome by arranging a special signaling apparatus which is used in connection with the ordinary telegraph line circuit, so that if the station which is being signaled cannot be raised by the regular code call, the special signaling device will be operated to signal the desired station.

These and other objects and features of my invention will be more readily understood by reference to the accompanying drawings, in which I have illustrated one embodiment of my invention.

In the drawings Figure 1 is a plan view of a substation selector.

Fig. 2 is an elevation of the same with the side plate removed.

Fig. 3 diagrammatically represents a line circuit comprising a plurality of stations.

Referring to Fig. 3, the telegraph line 30—31 comprises a plurality of stations, only three of which are shown. Each station comprises the usual well-known sounding relay 25 for controlling the sounder, and the sending key 26. To each station requiring the special signaling apparatus is added a relay 27, a solenoid 28 and a selector switch E. The relay 27 is preferably slow acting and does not respond to the ordinary dots and dashes used in the Morse telegraph code, but if the line circuit is held open for a longer period of time, or if the impulses transmitted are longer than the ordinary dash, the said relay will readily respond. The solenoid 28 is provided with a plunger shaft 32 to which is attached a

wiper 33 for wiping over the contacts 36 and 37. The downward movement of the shaft is retarded and controlled by a delaying device 34. The switch 35 is the ordinary key switch used in telegraph work.

The mechanism of the substation selector shown in Figs. 1 and 2 is mounted between two side plates 2 and 3, which are secured to the base block 4 and the spacing posts 5 and 6. Journaled between the plates 2 and 3 there is a shaft 7 carrying a ratchet wheel 8 rigidly secured thereto. The shaft 7 is maintained in its normal position with the pin 9 in the wheel 8 resting against the stationary stop post 10 by means of a small spiral spring 11, one end of which is secured to the shaft 7 and the other end to the pin 12. The ratchet wheel 8 may be rotated forward by means of an electromagnet 13, which controls the armature 14 and the pawl 15, which latter is secured to the upper end of the said armature. For maintaining the ratchet wheel in any advanced position against the tension of the spring 11 there is provided a holding pawl 16 which is rigidly secured to the shaft 17, which shaft is pivoted between the plates 2 and 3. This pawl is held in engagement with the ratchet wheel by the preponderance of weight at its rear end. A throw-off is provided for the holding pawl 16, said throw-off comprising a solenoid 19 which, when energized through the medium of its plunger 20, removes the said holding pawl from engagement with the ratchet wheel 8 for a period of time long enough to allow the spring 11 to return the shaft 7 to normal position. Secured to the side of the plate 3, but insulated therefrom, is a pair of electrical contacts 22 which are adapted to be contacted by an arm 23 on the shaft 7 after the wheel 8 has been advanced a certain number of steps. When the magnet 13 is energized, the armature 14 is drawn forward and the pawl 15 operates to rotate the wheel 8 forward one step. The retaining pawl 16 then holds it in its advanced position after the relay 13 deenergizes. The relay 13 operates in this manner to advance the ratchet wheel 8 and the arm 23 to a position where the arm 23 contacts the wiper 22 and closes a local signaling circuit. To release the selector E a circuit is closed through the solenoid 19. Its plunger 20, upon being attracted, removes the retaining



pawl 16 from engagement with the ratchet wheel 8 and the spiral spring 11 returns the shaft 7 to normal position.

The battery B is the main or line battery. Associated with each station is a battery B' and a battery B<sup>2</sup>. The battery B' is for operating the relays and the selector E associated with the said station, while the battery B<sup>2</sup> is used for signaling purposes—that is, for ringing the bells 39, or for operating whatever other signaling device may be used in connection with the selector E.

Having given a general description of the apparatus, it will now be explained how the operator at station X may signal the operator at station Y by means of the selector E, the operator at station Y having failed to respond to the ordinary Morse code signal. It will be assumed that the numbers of the stations Z, X and Y are 7, 8 and 9, respectively—that is, the line relay 27 associated with the substation Z must be operated seven times to close its local signaling circuit; the line relay 27 associated with the substation X must be operated eight times to close its local circuit, etc.

The operator at substation X, after having failed to attract the attention of the operator at station Y by operating his sounder according to the code signal, opens and closes his sending key 26 nine times, allowing the key to remain open each time for a period of time longer than would be the case if dashes of the Morse code were sent. This opening and closing of the sending key 26 causes the line relays 27 at the different stations to respond a corresponding number of times. Each time the line relay at station Y deenergizes, a circuit is closed through the solenoid 28. This circuit extends from the negative pole of battery B' through the contact of springs 42 and the solenoid 28 to the opposite terminal of battery B. The solenoid 28, upon energizing, raises its wiper 33 to effect contact between the bank contacts 36 and 37. The delaying device 34 is so arranged as not to allow the wiper 33 to pass off the contacts 36 and 37 during the time that impulses are being transmitted through the line relay 27 by the operator at station X. One method of delaying the return of the wiper 33 to normal is the use of the well-known dash-pot on the lower end of said wiper. The opening in the piston of this dash-pot may be varied in size to increase or decrease the speed of the wiper in returning to normal. Also the number of contacts 36 and 37 may be increased or they may be spaced further apart making it very simple to lengthen or shorten the time taken by the wiper to reach its lowest point. A further result of the operation of the line relay 27 is to close a circuit through the operating magnets 13 of station Y each time the said relay deenergizes. This circuit ex-

tends from the negative terminal of battery B' through the said springs 42, operating magnets 13, bank contacts 37, wiper 33, bank contacts 36 to the opposite pole of battery B'. The operating magnet 13 operates to rotate the arm 23 around nine steps and into engagement with the wiper 22.

The arm 23 contacting with wiper 22 closes a signaling circuit through the bells 39 of the station Y. This circuit extends from one pole of battery B<sup>2</sup> through the said bells 39, ratchet wheel 8, arm 23 and the wiper 22 to the opposite terminal of battery B<sup>2</sup>. This circuit remains closed as long as the arm 23 remains in contact with the wiper 22, which depends upon the length of time that the operator at the station X allows the main circuit to be open and also upon the length of time that it takes for the solenoid wiper 33 to descend (after the main line circuit is closed) and close the circuit of the release solenoid 19.

As soon as the wiper 33 attached to the plunger 32 of the solenoid 28 has descended to a point where the said wiper contacts the bank contacts 36 and 45, a circuit is closed through the release solenoid 19. This circuit extends from the negative side of battery B' through the contact points 36, wiper 33, contact point 45 and the solenoid 19 to the opposite pole of battery B'. The solenoid 19, upon energizing, attracts its plunger 20, which operates to remove the holding pawl 16 from engagement with the ratchet wheel 8, which immediately returns to normal by the tension of the spring 11, and the circuit of the solenoid 19 is broken an instant later when the wiper 33 passes off the bank contact 45. As soon as the bells at the station Y cease ringing, the operator at said station comes in upon the line in the usual manner, signaling the operator at the station X and thus indicating to him that he is ready to receive the message.

From the foregoing it will be seen that at the time when the seventh impulse is being transmitted, a circuit is closed through the bells 39 at the substation Z, but this is for a short period of time only and the operator at substation Z (as well as at all other stations) is instructed not to respond to short rings. Therefore, the only operator who will answer is the operator at station Y when his bells are given a long ring.

The lowest number assigned to a station will be six. The reason for this is that, should the operator at any station be particularly slow in sending a message, and the selector E be falsely operated, the selector will never be advanced more than five steps before the release circuit of said selector will be closed and the apparatus released, as the most dots and dashes used in any letter in the Morse code is five. It will therefore be readily seen that the station selector E will



always return to normal no matter if the line relay should be falsely operated.

It will thus be seen that I have devised a very efficient system in which, if the operator does not respond to the regular code call, the sending operator can cause the special signaling apparatus to operate, thus operating the special signal to call the desired operator to the receiver.

While I have illustrated one specific embodiment of my invention, it will, of course, be understood that I do not wish to be limited to the exact construction shown and described, but that various changes and modifications can be readily made without departing from the spirit of my invention.

What I claim as my invention is:—

1. In a signaling system, a line circuit, a plurality of receiving magnets connected in said circuit, a slow acting relay associated with one or more of said magnets, other magnets, said slow acting relay being non-responsive to telegraphic impulses transmitted over said line, means for transmitting impulses over said line slower than telegraphic impulses to control said relay to operate said other magnets, a signaling circuit and a signal associated with said slow acting relay and means controlled by said other magnets for closing said signaling circuit to operate said signal.

2. In a signaling system, a line circuit, a plurality of slow acting relays connected in said line circuit, said relays being non-responsive to telegraphic impulses, a plurality of receiving magnets in said circuit responsive to telegraphic impulses, a signal for each of said slow acting relays, a circuit for each signal, and means controlled by one of said slow acting relays to close its signaling circuit to operate the associated signal.

3. In a signaling system, a line circuit, a plurality of slow acting relays connected in said line circuit, said relays being non-responsive to telegraphic impulses, a plurality of receiving magnets in said circuit responsive to telegraphic impulses, a signal associated with each of said slow acting relays, a circuit for each signal, and a selective device controlled by each of said slow acting relays to close one of said signaling circuits to operate its associated signal.

4. In a signaling system, a line circuit having a plurality of stations connected thereto, each of said stations including a transmitting key, a receiving sounder connected in series in said circuit, a slow acting relay connected in series in said circuit, a signal, and a selective device controlled by said slow acting relay for controlling the operation of said signal, whereby said signals can be selectively operated through the medium of said slow acting relays.

5. In a signaling system, a line circuit,

means for sending impulses of different character over said line circuit, a slow acting relay in said circuit, a selective device controlled by said relay, a signal, and a signaling circuit controlled by said selective device for controlling said signal; said relay controlled by impulses of only one character over said line circuit to operate said selective device to in turn operate said signal.

6. In a signaling system, a conductor and a source of current forming a circuit, station apparatus associated with said circuit, said apparatus comprising means for receiving telegraph impulses and means for receiving impulses other than telegraph impulses, a plurality of magnets and a signal for said station, a circuit for said signal, said last means controlling said magnets to close said signaling circuit to operate said signal.

7. In a signaling system, a conductor and a source of current forming a circuit, a plurality of stations for said circuit, equipment for each station, said equipment comprising means responsive to telegraph impulses of current, and means responsive to impulses of current other than telegraph impulses, magnets and a signal for each station, a circuit for each signal, said last means controlling said magnets to close one of said signaling circuits to operate the associated signal.

8. In a signaling system, a conductor and a source of current forming a circuit, a plurality of stations for said circuit, equipment for each station, said equipment comprising means responsive to telegraph impulses of current, and means responsive to impulses of current other than telegraph impulses, magnets and a signal for each station, a circuit for each signal, said magnets operating progressively movable mechanism, said last means controlling said magnets whereby said progressively movable mechanism may be operated to close one of said signaling circuits to operate the associated signal.

9. In a signaling system, a conductor and a source of current forming a circuit, a plurality of stations for said circuit, equipment for each station, said equipment comprising means responsive to telegraph impulses of current, and a relay responsive to impulses of current other than telegraph impulses, selective apparatus and a signal for each station, a circuit for each signal, said relay controlling said selective apparatus to close one of said signaling circuits to operate its signal.

10. In a signaling system, a conductor and a source of current forming a circuit, a plurality of stations for said circuit, equipment for each station, said equipment comprising means responsive to telegraph impulses of current, and means responsive to impulses of current other than telegraph impulses, magnets and a signal for each station, a circuit for each signal, said magnets



operating progressively movable mechanism, said last means controlling said magnets whereby said progressively movable mechanism may be operated to close one of  
5 said signaling circuits to operate its associated signal, and means for restoring said mechanism to normal.

11. In a signaling system, a conductor and a source of current forming a circuit, a  
10 plurality of stations for said circuit, equipment for each station, said equipment comprising means responsive to telegraph impulses of current, and a relay responsive to  
15 impulses of current other than telegraph impulses, selective apparatus and a signal for each station, a circuit for each signal, said relay controlling said selective apparatus to  
20 close one of said signaling circuits to operate its signal, and means for releasing said selective apparatus.

12. In a signaling system, a line, a relay having a coil in said line, a progressively  
25 movable switch, a signaling circuit controlled by said switch, a signal, an impulse sender for sending impulses over said line for operating said relay to control said  
30 switch, said relay provided with means for preventing the relay from deenergizing sufficiently between impulses while the impulse sender is sending impulses of one character to permit the relay armature to fall back,

but responsive to impulses of a different character for controlling said progressively movable switch to close said signaling circuit to control said signal. 35

13. In a signaling system, a line, a plurality of stations on said line, equipment for each station, said equipment comprising a progressively movable switch, a signaling  
40 circuit controlled by said switch, a signal, an impulse sender, a relay having a coil in said line, said sender sending impulses over said line for operating said relay to control said  
45 switch, said relay provided with means for preventing the relay from deenergizing sufficiently between impulses while the impulse sender is sending impulses of one character to permit the relay armature to fall back,  
50 but responsive to impulses of a different character for controlling its associated progressively movable switch, the said relays of said stations being operated together  
55 whereby said switches may be operated simultaneously to close one of said signaling circuits at a time.

Signed by me at Chicago, Cook county, Illinois, this 18th day of August 1914.

WILLIAM A. FRICKE.

Witnesses:

GEO. A. YANOCHOWSKI,  
HARRY E. HERSHEY.