O. T. LADEMAN.

SIGNALING SYSTEM.

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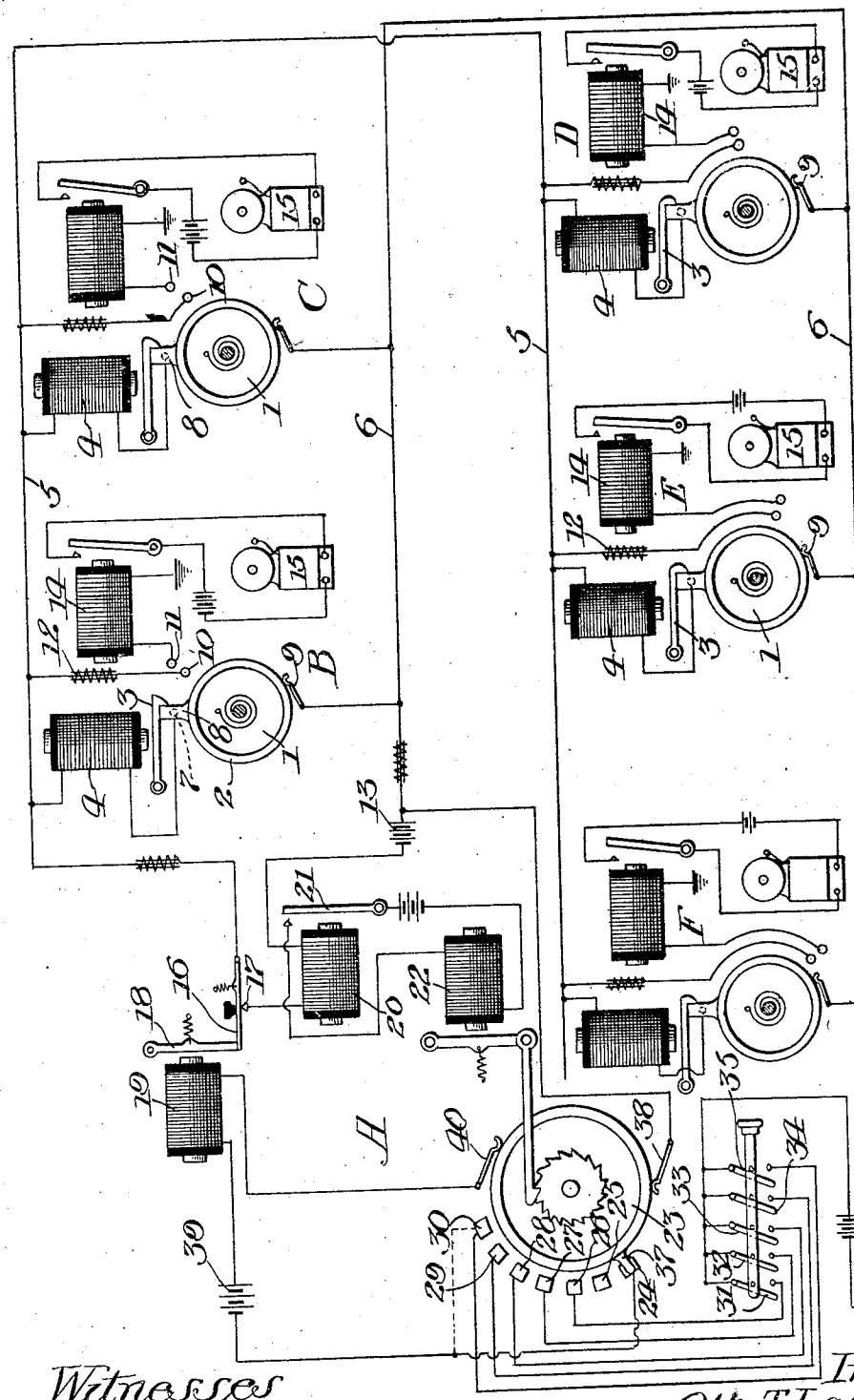
944,563. Patented Dec. 28, 1909.



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SIGNALING SYSTEM.

944,563. Specification of Letters Patent. Patented Dec. 28, 1909.

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To all whom it may concern:

Be it known that I, OTTO T. LADEMAN, citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Signaling Systems, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to signaling systems, and is designed to accomplish the selective calling of any given one of a plurality of stations connected to the same line, and to accomplish this end by the agency of simple mechanisms, it being a prime object of my invention to overcome the necessity of step-by-step appliances at the sub-stations.

In the general form of my invention I place the step-by-step device at the central station, and provide instrumentalities at the sub-stations for permitting impulses to pass through this device, one impulse preferably for each station, and I further provide means at the central station and the sub-station, whereby, if it is desired to call any given station, such calling is effected at the time said station is sending in its impulses.

I will describe my invention more in detail by reference to the accompanying drawing, illustrating the preferred embodiment thereof.

I have here shown a central station A, together with sub-stations B, C, D, E and F. It will be seen that the instrumentalities at the substations B, C, D, E and F are similar, with the exception of the different angular positions occupied by various contact elements, as will be described more in detail hereinafter.

The apparatus at each sub-station consists of clock-work mechanism 1, which I have indicated merely by a disk and spring, but whose features are sufficiently well understood to need no further illustration, which clock-work mechanism, when released, serves to rotate the annular disk 2 continually, until it is stopped by the armature 3. In order to start the clock-mechanism, which is kept continuously wound, I employ a relay 4, which, as shown, is bridged across the line conductors 5 and 6, this bridge connection extending through a contact point 7, shown in dotted lines in the illustrations, which contact point is fixed, and through which contact is broken when the annular member 2 and its arm 8 are moved angularly. Thus, the bridging circuit of the relay 4 is closed through this contact member 7, arm 8, ring 2, and contact spring 9. When all of the relays 4 are energized, therefore, the clock-mechanism 1 is released, and it begins to travel in a clockwise direction. When it has reached the contact elements 10 and 11, a bridging connection is established between the line conductors 5 and 6, which includes the impedance coil 12, which sends an impulse to the central station by closing the circuit through the line wires 5 and 6, which include the battery 13. At the same time, the local relay 14 is placed in a circuit between the line conductor 6 and the ground, so that if the instrumentalities at the central station have properly established a ground battery connection using said line wire 6, then the relay 14 will be drawn up at the same time the arm closes circuit through the contact 10, and the local signal 15 will be operated. The same is true of the remaining sub-stations, except that certain time intervals must elapse before the various contact members 11, 11 are brought into circuit.

It will be seen that upon the instant the clock members A are released, successive impulses are received at the central station 1 from each sub-station, and the only instrumentalities at the sub-stations necessary to perform this result are the contact springs 9, the contacts 10 and 11, and the clock mechanism. I will now set forth how these various impulses are received at the central station and the local stations called as desired.

In order to operate the relays 4, I provide a lever 16, which I bring into association with its contact 17, whereupon said lever is held into its closed position by an armature 18 under the control of the relay 19, to be thereafter released, as will appear later. By closing the key 16, the battery 13 is closed over the line wires 5 and 6, through the interposition of the actuating relay 20, which actuating relay 20 is thus in a position to have its armature 21 drawn up whenever the line wires 5 and 6 are closed at a sub-station, and these closures of the line circuits at the sub-stations occur successively, as the various clock mechanisms contact with the members 10 in the regular order. Thus, after the clock mechanisms are started, relay 20 actuates its armature once for each station; the actuation of the armature 21

causes the relay 22 to step up the step-up mechanism 23, an equal number of times, depending upon the number of stations. Thus, when the key 16 is first closed, the arm 8 at the sub-stations, being in association with the contact element 7, one impulse is received by the relay 20, which moves the step-up mechanism 7 from the segment 24 to the segment 25. Now, when the first station closes circuit through its contact 10, the step-up mechanism is moved to segment 26, which corresponds to station B, the segment 27 corresponding to station C, segment 28 to station D, segment 29 to station E, and segment 30 to station F. Now, I provide levers 31, 32, 33, 34 and 35, corresponding respectively to stations B, C, D, E and F, which levers, when closing circuits with their associated contacts, connects the battery 36 to the respective segments 26, 27, 28, 29 and 30, the other terminal of the battery being grounded. It will thus be seen that battery current is on those circuits corresponding to the stations which it is desired to call. Now, when the step-up element 23 engages say the contact segment 26 through the agency of its arm 37, the line wire 6 is grounded through the battery 36, by virtue of the spring 38, and thus, when the clock mechanism at station B is sending its impulses through the central station A, there is at the same time established a grounded circuit over the line wire 6, including the battery 36, and including the relay 14 of said station B, which thereby calls the signal 15. Similarly, the other stations are called. Now, to release the lever 16 I provide a battery 39, which is connected to the segment 24, and likewise a spring 40, so that when the last station on the line has sent in its impulse, the step-by-step element 23 will have its arm 37 in association with the segment 24 to close circuit through the relay 19, and permit the release of the key 16.

While I have herein shown and particularly described the preferred embodiment of my invention, I do not limit myself to the precise construction and arrangement herein set forth, but

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing a selective operation of the sub-station signal-controlling devices.

2. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing the operation of any desired sub-station signal-controlling device.

3. A signaling system comprising a central station and substations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing the operation of a plurality of desired or selected sub-station controlling devices during one complete cycle of the said step-by-step device.

4. A signaling system comprising a central station and substations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, each sub-station operating device in its turn serving to effect an operative movement of step-by-step device, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing a selective operation of the sub-station signal-controlling devices.

5. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, each sub-station operating device in its turn serving to effect an operative movement of said step-by-step device, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing the operation of any desired sub-station signal-controlling device.

6. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the substations for automatically operating said step-by-step device, each sub-station operating device in its turn serving to effect an operative movement of said step-by-step device, means at the central station for causing said operating devices to

start in motion, and switching devices at the central station associated with said step-by-step device for causing the operation of a plurality of desired or selected substation controlling devices during one complete cycle of the said step-by-step device.

7. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, each sub-station operating device in its turn serving to effect an operative movement of said step-by-step device, means at the central station for causing said operating devices to start in motion, means for holding said operating devices in normal position after completion of a cycle, and switching devices at the central station associated with said step-by-step device for causing a selective operation of the sub-station signal-controlling devices.

8. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, each substation operating device in its turn serving to effect an operative movement of said step-by-step device, means at the central station for causing said operating devices to start in motion, means for holding said operating devices in normal position after completion of a cycle, and switching devices at the central station associated with said step-by-step device for causing the operation of any desired sub-station signal-controlling device.

9. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, each substation operating device in its turn serving to effect an operative movement of said step-by-step device, means at the central station for causing said operating devices to start in motion, means for holding said operating devices in normal position after completion of a cycle, and switching devices at the central station associated with said step-by-step device for causing the operation of a plurality of desired or selected sub-station controlling devices during one complete cycle of the step-by-step device.

10. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, each sub-station operating device in its turn serving to effect an operative movement of said step-by-step device, means whereby the operating impulses from said sub-station operating devices are transmitted consecutively from the various said devices, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing a selective operation of the substation signal-controlling device.

11. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, each sub-station operating device in its turn serving to effect an operative movement of said step-by-step device, means whereby the operating impulses from said substation operating devices are transmitted consecutively from the various said devices, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing the operation of any desired sub-station signal-controlling device.

12. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, each sub-station operating device in its turn serving to effect an operative movement of said step-by-step device, means whereby the operating impulses from said sub-station operating devices are transmitted consecutively from the various said devices, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing the operation of a plurality of desired or selected sub-station controlling devices during one complete cycle of the step-by-step device.

13. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-station for automatically operating said step-by-step device, each substation operating device in its turn serving to effect an operative movement of said step-by-step device, angularly displaced circuit controlling elements whereby the operating impulses from said sub-station operating devices are transmitted consecutively from the various said devices, means at the central station associated with said step-by-step device for causing the operation of a plurality of desired or selected

sub-station controlling devices during one complete cycle of the said step-by-step device.

14. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, each sub-station operating device in its turn serving to effect an operative movement of said step-by-step device, means at the central station for causing said operating devices to start in motion, a relay-controlled stop for holding said operating devices in normal position after completion of a cycle, and switching devices at the central station associated with said step-by-step devices for causing the operation of a plurality of desired or selected sub-station controlling devices during one complete cycle of the step-by-step device.

15. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, switching means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing a selective operation of the sub-station signal controlling devices.

16. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step devices for causing a selective operation of the sub-station signal-controlling devices, said switching devices operating in conjunction with circuit changing elements at the sub-stations under the control of said operating devices.

17. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing the operation of any desired sub-station signal-controlling device, said switching devices operating in conjunction with circuit-changing elements at the substations under the control of said operating devices.

18. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing the operation of a plurality of desired or selected sub-station controlling devices during one complete cycle of the said step-by-step device, said switching devices operating in conjunction with circuit changing elements at the sub-stations under the control of said operating devices.

19. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, means at the central station for causing said operating devices to start in motion, and switching devices at the central station associated with said step-by-step device for causing the operation of a plurality of desired or selected substation controlling devices during one complete cycle of the said step-by-step device, said switching devices operating in conjunction with angularly displaced circuit changing elements at the sub-stations under the control of said operating devices.

20. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, each substation operating device in its turn serving to effect an operative movement of said step-by-step device, means adapted to continuously operate said operating devices, means at the central station for causing said operating devices to start in motion, means for holding said operating devices in normal position after completion of a cycle, and switching devices at the central station for causing the operation of a plurality of desired or selected sub-station controlling devices during one complete cycle of the said step-by-step device.

21. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, means at the central station for causing said operating devices to start in motion, contact elements associated with said step-by-step device, one for each sub-station, and switching means for changing the circuit conditions of the contact elements corresponding to the

sub-stations desired for call, thereby to cause an operation of the desired sub-station signal-controlling devices.

22. A signaling system comprising a central station and sub-stations, a signal-controlling device at each sub-station, a step-by-step device at the central station, operating devices at the sub-stations for automatically operating said step-by-step device, means at the central station for causing said operating devices to start in motion, switching means associated with said step-by-step device whereby to change the line circuit conditions when said step-by-step device has reached a position corresponding to the sub-station desired thereby to selectively call any desired sub-station.

In witness whereof, I hereunto subscribe my name this 26th day of January A. D., 1909.

OTTO T. LADEMAN.

Witnesses:

MAX W. ZABEL,

O. M. WERMICH.