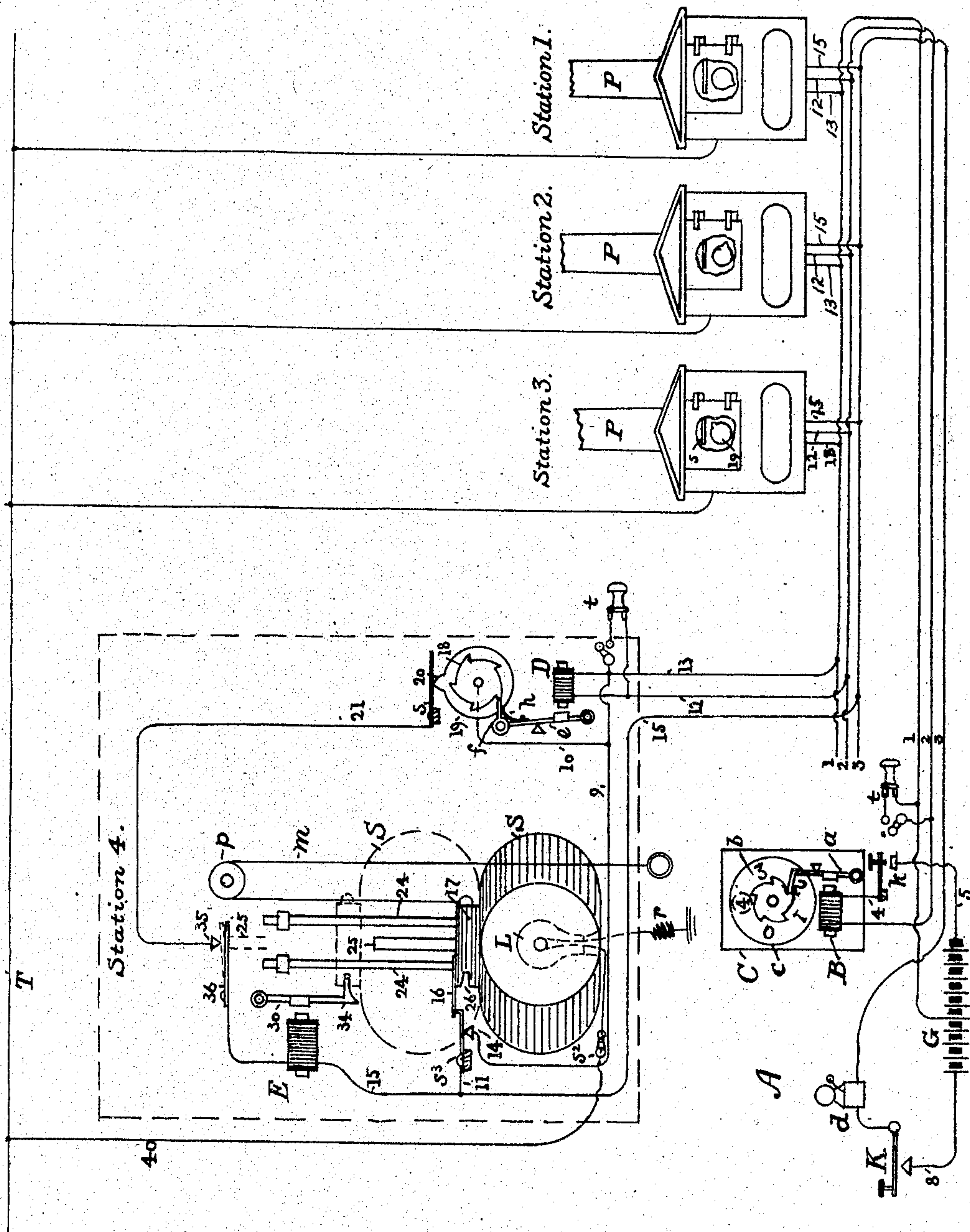


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O. W. HART.
RAILWAY SIGNAL.
APPLICATION FILED AUG. 14, 1901.



WITNESSES:

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ORLANDO W. HART, OF FALL RIVER, MASSACHUSETTS.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 786,894, dated April 11, 1905.

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To all whom it may concern:

Be it known that I, ORLANDO W. HART, of Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification.

This invention relates to certain new and useful improvements in signaling systems for electric railroads which extend across the country between small towns and which employ sidings or turnouts upon which one or more cars stop to permit other cars coming in the opposite direction to pass, said invention being particularly designed as an improvement upon the structure covered by Letters Patent No. 695,456, granted to me March 18, 1902.

In carrying out my invention the signaling apparatus is inclosed in suitable boxes which are attached to supports, preferably the poles which carry the brackets upon which are suspended the trolley-wire. The boxes are placed at proper intervals along the route of an electric railroad, especially at the turnouts and sidings. Each box constitutes a station, and associated therewith are signals consisting of electric lamps, which are lighted by current from the trolley-wire, a switch being located in each box for the purpose. Each box also contains a semaphore-signal, by means of which special day and night signals may be set from a distant central station in order to call attention of the motorman and conductor of a car. In practice there are also telephones at each station by which the conductor of a car can converse with the central station.

The invention indicates devices by means of which any desired number of signal-stations may be located on a line of railroad, and at any one of the stations signals may be sent from the central station to the exclusion of all the other stations, and also consists in the circuit arrangements by which the results are effected.

In the accompanying diagram, which forms part of the specification, A represents a central station, and 1, 2, 3, and 4 represent post-stations along the route of an electric railroad which are connected by the conductors 1, 2, and 3. The apparatus at station 4 is

shown in detail, while boxes are indicated at the other post-stations. At the central station A there is an automatic transmitter C, consisting of a metal box inclosing a relay B, whose helices are connected by the wire 4 to the key *k* on one side and with the conductor 2 on the other side. The armature *a* is provided with a detent which engages the ratchet-wheel *b*, which is upon a spindle to which is also secured the disk or indicator *c*, upon the outer face of which are numerals "0," "1," "2," "3," "4," which are adapted to be rotated past a window in the transmitter-case. A signal-bell *d* is connected on one side with the conductor 3 and on the other to the key K, whose anvil is connected by wire 8 to one pole of generator G, the opposite pole of which is in connection with the anvil of key *k*. The conductor 1 connects in between the cells of the generator to include a portion of them in circuit, as will be hereinafter described.

At each post-station branch wires 13, 12, and 15 extend, respectively, from the conductors 1, 2, and 3 into the boxes. The conductors 13 and 12 include the helices of a relay D, and the conductor 3 includes the helices of relay E and terminates with a flat spring 36. The armature *e* of relay D bears upon its end a pivoted detent *f*, held up to the ratchet-wheel 18 by the spring *h*. The wheel 18 is secured to and rotates with the same shaft upon which is fastened the cam-wheel 19, whose cam projection is shown as in contact with the flat spring *s*, which is connected by the wire 21 with the stop 35 above the spring 36.

9 is a wire extending from the wire 13 to stop 14 under the flat spring *s*, which is in electrical connection with the wire 15 by the wire 11, and 10 is a wire connecting the wire 9 with the shaft supporting the cam and ratchet wheels.

S is a semaphore, shown as of oval shape and represented as in a downward position in front of the lamp L, which is in circuit with conductor 40, extending from the trolley-wire T to ground through a suitable manual switch *s*² and resistance *r*. A number of lamps in series may be inserted, if desired. The semaphore S is provided with guide-rods 24 and a central striking-rod 25, integral with the

part 17, to which is attached a rope or chain *m*, extending over pulley *p* and terminating in a ring. When the semaphore is in its downward position, the extension 16 from the part 17 holds the spring *s*³ upon the stop 14; but when the semaphore is raised by the chain *m* to the position shown in dotted lines the spring *s*³ separates from the stop and the end of the armature 30 of relay E slips into the notch 26 in the part 17 and holds the semaphore up, and when in the downward position the lamp L shows or lights up the colored face of the semaphore to give a signal if the switch *s*² is closed.

The operation of the invention is as follows: To display a signal at the post-station 4, for instance, the semaphore being in the raised position and the switch *s*² closed, the key *k* is pressed four times, and at each pressure a circuit is closed from the generator G via wire 5, key *k*, relay B, conductor 2, wire 12, relay D, wire 13, conductor 1 to the opposite pole of the generator, and the armature *a* forces the ratchet-wheel *b* around one tooth from unison at the same time the armature *c* of relay D operates the ratchet-wheel 18 one tooth until the figure "4" appears opposite the window of case C at central station A, and the cam-wheel 19 has its cam projection 20 brought into contact with the spring *s*. At all of the other stations the cam-wheels are operated by the depression of key *k*; but as the cam projections are all arranged differently they do not close a circuit with their springs *s*. When the fourth pulsation has been sent, the key K is then pressed upon its anvil, and a circuit is formed from the generator G via conductor 1, wires 13, 9, and 10, cam-wheel 19, spring *s*, wire 21, stop 35, and spring 36, relay E, wire 25, conductor 3, bell *d*, key K, and wire 8 to the generator, and the relay being energized attracts its armature, releasing the semaphore S, which falls into the position shown in full lines, and as the rod 25 leaves the spring 36 it separates from the stop 35 and opens the circuit there. At the same time the arm 16 depresses the spring *s*³ upon its stop 14 and closes the circuit at that point, and as long as the key K is kept closed the bell *d* will ring to indicate that the semaphore has fallen and that the signal is set at the selected post-station.

Telephones *t* are represented at the central station A and at the station 4 as adapted to be bridged in between the conductors 1 and 2 by switches, so that conversation may take place between the central station and the post-stations. As before stated, the apparatus is shown in detail only at post-station 4, and it will be understood that the same apparatus is to be located at each post-station.

I claim as my invention—

1. In a signaling system for electric railroads, a central station and a plurality of post or signal stations in series, the central station

being provided with a source of current, means for sending impulses to the signal-stations, a return-signal, and a switch therefor, each signal-station having a selective device, a sliding semaphore, apparatus for tripping the same whereby it will fall, and means carried by the semaphore for automatically closing a circuit to the said return-signal and its switch, as set forth.

2. In a signaling system for electric railroads, a central station and a plurality of post or signal-stations in series, a sliding semaphore for each of said signal-stations, three circuits between the central station and the signal-stations, one a selecting-circuit provided with means at the central station for sending impulses to any signal-station to operate means at the latter station to close the second circuit through an electromagnetic device thereat and trip the semaphore-signal whereby the latter will fall, and a device projecting from said semaphore-signal, whereby the latter in falling automatically closes the third circuit through a return-signal device at the central station, with a switch at the latter station for completely closing the third circuit and supplying current thereto, as set forth.

3. In a signaling system for electric railroads, a central station and a plurality of post or signal stations, at each of which is a signal-box inclosing illuminating means in circuit with the trolley-wire and adapted to be opened and closed by a manual switch, a sliding semaphore, a selective device and telephones, electric circuits extending to each station from the central station, with a return-signal and telephones at the central station, and a source of current with means for sending successive impulses to the signal-stations to operate the selective device at any station and close a circuit through an electromagnetic semaphore-tripping device, and devices carried by each semaphore for operating either one of two circuit-closing devices in another circuit to the central station, the second opening adapted to be manually closed through the said return-signal, as set forth.

4. The combination in an electric-railroad signaling system of a signal-sending station, and a series of signal-receiving stations united by three conductors adapted to constitute two independent circuits, each signal-station being provided with a relay-operated sliding semaphore illuminated by a lamp in a grounded branch from a trolley-wire, and with a relay-operated selective-circuit-closing device, with means at the signal-sending station as a key for sending current impulses over a selective circuit of two of said conductors to the signal-receiving stations to operate their selective relays and close a signaling-circuit at one of said stations only to the said battery, an indicator, as a bell, and a second key at the sending-station, whereby when said second

key is operated current from the battery energizes the semaphore-relay at the selected station and allows said semaphore to drop, and members carried by said semaphore
5 whereby the latter when falling opens the signaling-circuit at one point and closes it at a second point, as set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

ORLANDO W. HART.

Witnesses:

JOHN J. MANNING,
JAMES C. BRADY.