H. O. RUGH.

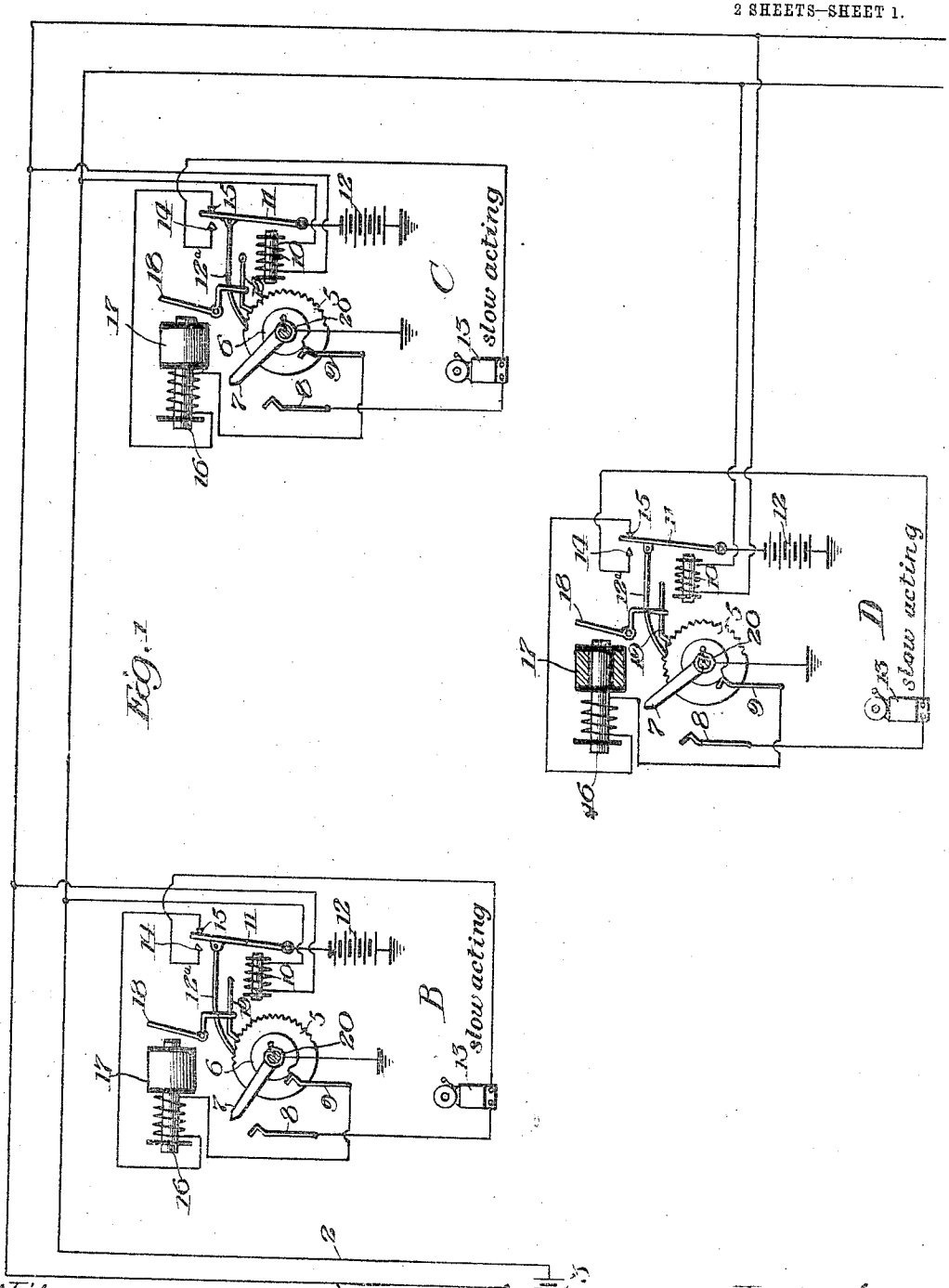
SELECTIVE SIGNALING SYSTEM.

APPLICATION FILED FEB. 15, 1910.

1,051,270.

Patented Jan. 21, 1913.

2 SHEETS—SHEET 1.



Witnesses
Chas. Wenmich
L. Fitzgerald

Inventor
Harry O. Rugh
by Mayo W. Zahl
Atty

H. O. RUGH.

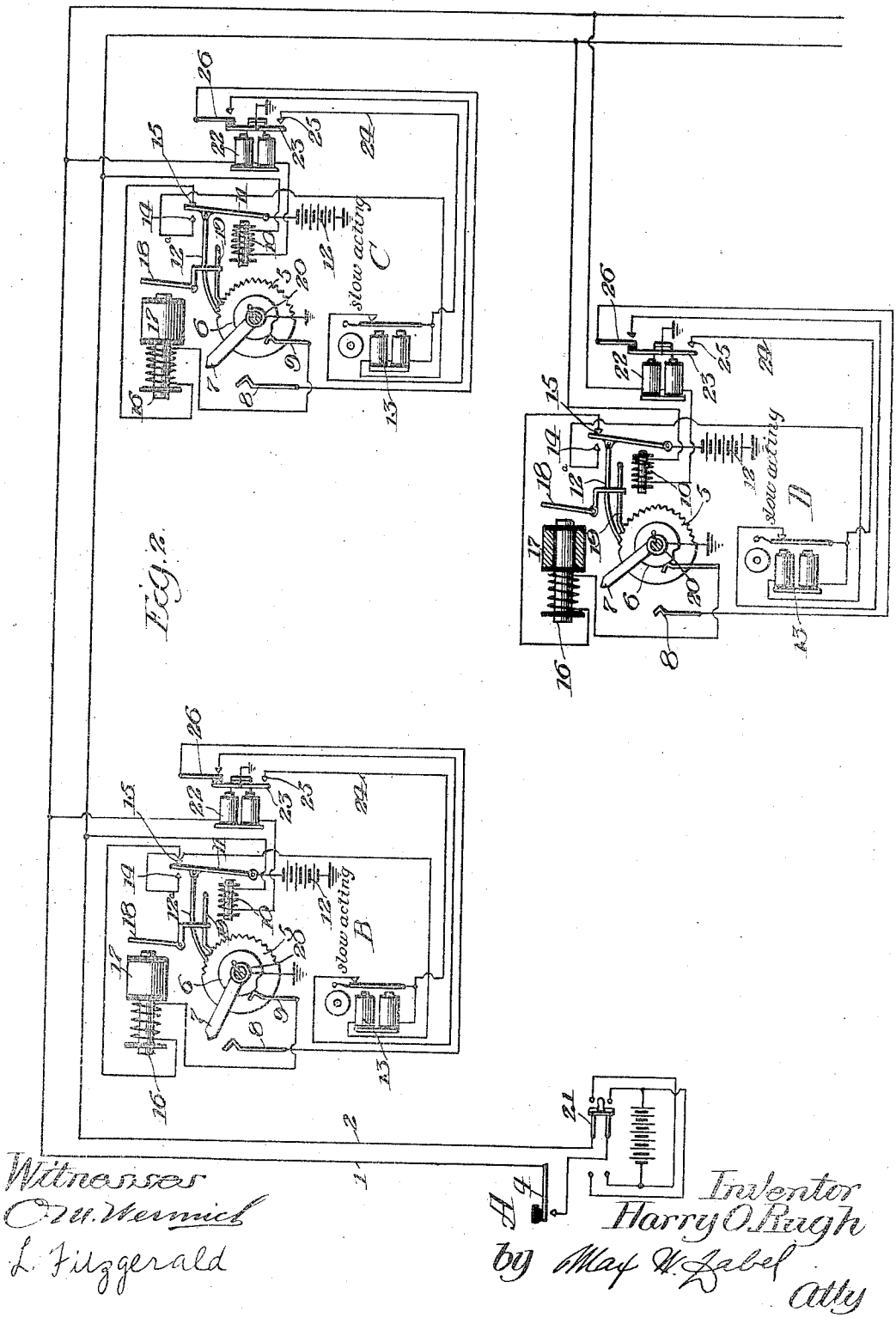
SELECTIVE SIGNALING SYSTEM.

APPLICATION FILED FEB. 15, 1910.

1,051,270.

Patented Jan. 21, 1913.

2 SHEETS—SHEET 2.



Witnesses
Chas. Wernicke
L. Fitzgerald

Inventor
Harry O. Rugh
by May W. Label
Atty

UNITED STATES PATENT OFFICE.

HARRY O. RUGH, OF SANDWICH, ILLINOIS, ASSIGNOR TO SANDWICH ELECTRIC COMPANY, OF SANDWICH, ILLINOIS, A CORPORATION OF ILLINOIS.

SELECTIVE SIGNALING SYSTEM.

1,051,270. Specification of Letters Patent. Patented Jan. 21, 1913.

Application filed February 15, 1910. Serial No. 543,972.

To all whom it may concern:

Be it known that I, HARRY O. RUGH, citizen of the United States, residing at Sandwich, in the county of Dekalb and State of Illinois, have invented a certain new and useful Improvement in Selective 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 selective signaling systems, and has for its object the provision of an improved system of this kind, in which a central station is adapted to call selectively a plurality of substations.

In the preferred form of the invention, I employ means for stepping up an impulse mechanism at each substation, which, when in its proper position, operates a local signal-controlling device, or signal in conjunction with automatic means for restoring said device to normal position when the signaling operation is complete, one of the prime objects herein being the provision of a substation selector, which, in its preferred form is not dependent upon differences of polarity of the operating current for its operation, so that transpositions of the line circuit or changes of the connections of the devices to the line circuit do not influence its operations, because it is only required, in order to call any given station, to send impulses of a certain character, and in the preferred form, all of the same nature corresponding to that station, and when the impulses cease and the signaling operation is complete, the apparatus, through the agency of the very simplified means shown, restores itself to normal. To accomplish this result, I have shown an impulse mechanism and a step-up magnet for same, in conjunction with a slow-acting magnet, which controls a locking pawl for impulse mechanism.

My invention, of course, is susceptible of many modifications, and I do not limit myself to the specific form which the carrying out of my invention takes in this particular description and illustration.

I will describe my invention more in detail by reference to the accompanying drawings, in which—

Figure 1 shows my improved signaling system, and Fig. 2 shows the addition to my improved system of means for providing a special signaling condition to which my invention is adaptable.

Referring more particularly to Fig. 1, I show a central station A, and substations B, C and D, as united by a line circuit consisting of the line wires 1 and 2. At the central station, there is a battery 3, and a key 4, which is utilized to send the necessary number of impulses over the line circuit 1 and 2, to properly call the substations. The apparatus at the substations being similar with the exception of the different angular positions occupied by the circuit-closing arms, I will describe simply the apparatus at substation B. This consists of an impulse wheel 5, having integral therewith a notched wheel 6, and a circuit-closing arm 7, which is adapted to contact with a spring 8. A spring 9 contacts with the wheel 6, whenever the impulse mechanism 5 is moved from its zero position, but does not contact therewith when the impulse mechanism is in its zero position. The stepping-up impulses actuate a magnet 10, bridged across line conductors, which magnet, by means of the armature 11, and step-up arm 12^a, successively engages the different teeth of the mechanism 5 to step up to the circuit-making connection with the spring 8. For instance, assuming that it takes five impulses to actuate station B, five impulses are sent by means of the key 4, and the key is held closed at the last impulse, which thereupon allows the bell 13, through the agency of the contact 14, armature 11, battery 12, elements 7 and 8 and the ground, to ring. In stepping past the station B, the impulses are of such short duration that the slow-acting bell 13 has not time to operate, but if circuit closure is effected of the elements 7 and 8, and a certain time interval elapses, the bell 13 will operate. After the key 4 is released, after having called the station B by maintaining the last impulse, the armature 11 falls back to contact with the back contact 15, and thereby establishes a circuit from the ground through the battery 12, armature 11, back contact 15, winding of the magnet 16, spring 9, wheel 6 and the ground. This circuit is established in the course of the stepping up operations only momentarily, and the momentary establishment of this circuit does not give sufficient time to actuate the

magnet 16 on account of the heavy current conducting shell 17, preferably of copper, which is placed thereon, thus making it a very slow-acting magnet or time element. When, however, the armature 11 permanently falls back to seat against the contact 15, this circuit remains closed long enough to permit energization of the magnet 16, thereby to attract its armature 18, which armature permanently controls a locking pawl 19, and to withdraw said locking pawl together with the operating arm 12 out of engagement with the mechanism 5, thus allowing same to return to normal position, at which time, the spring 9 no longer contacts with the notched wheel 6, as it is opposite the notch, and the circuit through the magnet is again opened. A spring 20, shown in dotted lines, restores the impulse mechanism 5 to normal. It will thus be seen that any station can be called by merely sending a given number of impulses, and an automatically controlling locking pawl restores the mechanism to normal when the signaling operation has ceased.

In Fig. 2, I have shown mechanism similar to that shown in Fig. 1, with the exception of a circuit-changing switch 21 at the central station, so that positive or negative battery may be furnished, if desired, and I then include a polar relay 22 in series with a magnet 10, which is actuated either by positive or negative impulses, which relay has an armature 23, that remains in either one position or the other, depending upon the polarity of the current which last operated said armature. This armature is pivoted at the center so that when it is actuated by an impulse of one polarity it makes contact with the back contact 25 and remains in this position until an impulse of opposite polarity reverses the position of the armature in which case it makes contact with its alternative back contact and remains there until an impulse of the first polarity again actuates it. The bell 13, as shown, is of the ordinary vibrating type, but has an additional circuit established by means of the conductor 24, which eliminates the vibratory contact, and thus, when, say, negative current is used, armature 23 contacts with the contact 25, and the circuit through the spring 8 cannot be closed on account of the spring 26, as the armature 23 is in its opposite position, and every negative impulse through the magnet 10 and relay 22 closes circuit through the coils of the bell 13, and gives one impulse. The spring 26 serves merely to cut out contact making spring 8 when the armature 23 contacts with its back contact 25, in which case, the vibratory contact of the bell 13 is also out of circuit, and said bell responds by giving impulses of a single stroke or unitary character depending upon the impulses transmitted through its winding. Thus, the bell 13 gives one tap whenever the key 4 is depressed, provided negative battery is used, and the bell will not operate through the agency of the impulse mechanism 5, as the circuit through the spring 8 is opened in that condition. This is of particular utility in connection with sending the time impulses that are usually sent over a signaling circuit of this kind, when used along railroads.

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 as herein set forth, but

Having described the more salient features of this invention, what I claim as new and desire to secure by Letters Patent is:

1. A signaling system comprising a signal-sending station and signal-receiving stations united by a line circuit, a signal circuit-closing element at each receiving station, a signal under the control of each element, a controlling relay-magnet for each element, means at the sending station to control the magnets and thereby control the actuation of said elements, a slow-acting magnet at each receiving station to control the restoration of said elements to normal position, means whereby said relay-magnet controls the circuit through said signal, and means whereby said elements and said relay-magnets control the circuits through their associated slow-acting magnets.

2. A signaling system comprising a signal-sending station and signal-receiving stations, a signal-circuit-closing element at each receiving station, a signal under the control of each element, a relay magnet for operating each element and also independently controlling the circuit through its associated signal, means at the sending station including impulse sending means to control the magnets and thereby control the actuation of said elements, and a slow-acting magnet operatively responsive only after cessation of said impulses at each receiving station to control the restoration of said elements to normal position.

3. A signaling system comprising a signal-sending station and signal-receiving stations united by a line circuit, a step-by-step signal circuit-closing element at each receiving station, a signal under the control of each element, a controlling relay magnet for each element, means at the sending station to control the magnets and thereby control the actuation of said elements, a slow-acting magnet at each receiving station to control the restoration of said elements to normal position, means whereby said relay magnet controls the circuit through said signal, and means whereby said elements and said relay-magnets control the circuits through their associated slow-acting magnets.

4. A signaling system comprising a signal-sending station and signal-receiving stations, having at each receiving station a step-up-element, a step-up relay magnet for same, a slow-acting release magnet for same, whose circuit is momentarily closed during each stepping operation, but whose armature attracting energization does not become effective during the momentary circuit closures, and a signal whose circuit is controlled conjointly by said step-by-step element and said relay-magnet, and having means at the sending station for controlling said step-up relay-magnet.

5. A signaling system comprising a signal-sending station and signal-receiving stations, having at each receiving station a step-by-step element, a step-up relay-magnet for same, a slow-acting release magnet for same, whose circuit is momentarily closed during each stepping operation but whose armature attracting energization does not become effective during these momentary circuit closures, and a signal whose circuit is controlled conjointly by said step-by-step element and said relay-magnet, together with means whereby the step-by-step element controls the circuit through said release magnet, and having means at the sending station for controlling said step-up relay-magnet.

In witness whereof, I hereunto subscribe my name this 1st day of February A. D., 1910.

HARRY O. RUGH.

Witnesses:
MAX W. ZABEL,
J. ELLIOTT.