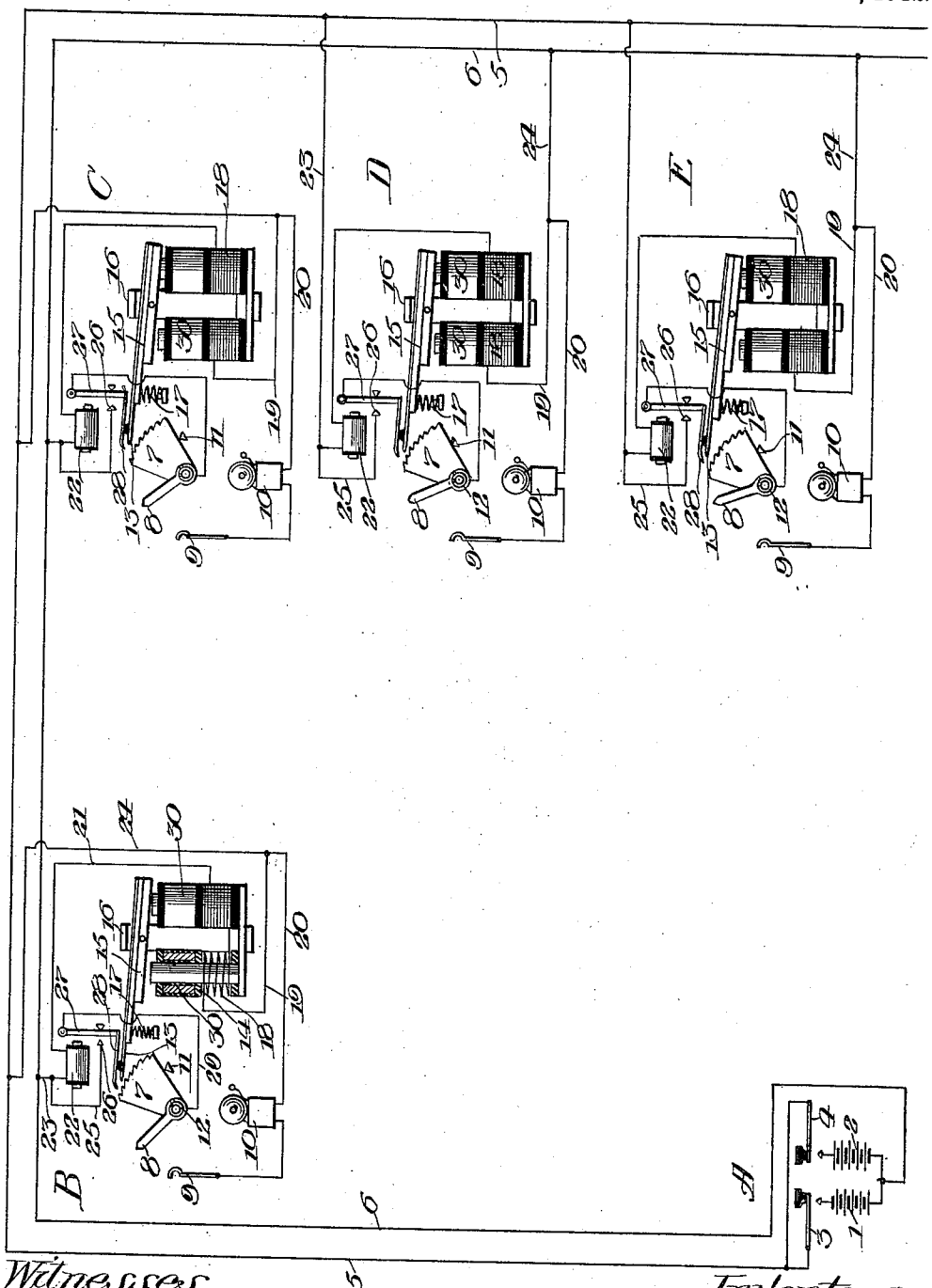
H. O. RUGH & C. S. RHOADS, Jr.

SELECTIVE SIGNALING.

APPLICATION FILED AUG. 18, 1910.

1,041,354.

Patented Oct. 15, 1912.



Witnesses
Chas. Wernicke
Hazel Jones.

Inventors
Harry O. Rugh
Charles Stanley Rhoads Jr.
by May W. Gabel Atty

UNITED STATES PATENT OFFICE.

HARRY O. RUGH AND CHARLES STANLEY RHOADS, JR., OF SANDWICH, ILLINOIS, ASSIGNORS TO SANDWICH ELECTRIC COMPANY, OF SANDWICH, ILLINOIS, A CORPORATION OF ILLINOIS.

SELECTIVE SIGNALING.

1,041,354. Specification of Letters Patent. Patented Oct. 15, 1912.

Application filed August 18, 1910. Serial No. 577,754.

To all whom it may concern:

Be it known that we, HARRY O. RUGH and CHARLES STANLEY RHOADS, JR., citizens 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, 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.

Our invention relates to signaling systems, and is more particularly applicable to such systems when used to call a plurality of stations selectively from a given central station, all of which stations are united by a suitable line circuit.

Our invention contemplates a plurality of substations having impulse elements and provided with means for stepping said elements to a given desired position to thereby selectively call any desired station. At each impulse mechanism likewise means are provided which are slow acting in their nature and which control locking means for the impulse mechanism. The slow acting means desirably maintain the locking devices normally out of engagement with the impulse mechanism and associate said locking means with the impulse mechanism only when a station is being called. Upon completion of the signal sending current the slow acting means again resume their former position, in which case, the locking devices are disengaged from the impulse mechanism and permit restoration of said impulse mechanisms to their normal or zero position.

The slow acting means which we use in accordance with our invention are electromagnetic in character and are selectively responsive to currents of different electrical character, whereas all of the stepping up means are operated with all of the different characters of current which are used to selectively operate the slow acting means. Under these conditions a given character of current will operate a given group of impulse mechanisms, and a different character of current will operate a further group of impulse mechanisms, thus serving to control a plurality of groups of impulse mechanisms. By reason of this the number of stepping operations necessary to call one of a plurality of substations is reduced in proportion to the number of groups into which a system is divided. The slow acting means which we prefer to employ are provided with closed circuited secondaries. In the form illustrated herein we use polarized electromagnetic means of slow acting character so that positive impulses will operate one group of stations and negative impulses will operate the next group all as will more clearly appear from the description which follows in connection with the accompanying drawing illustrating one embodiment of our invention.

In a divisional application filed Jan. 20, 1911, Serial No. 603,699 we have set forth and broadly claimed the electromagnetic device herein.

We here illustrate a central station A, substations B and C forming one group, and substations D and E forming another group. At the central station we have two sets of batteries 1 and 2 which in connection with push buttons 3 and 4 are designed to furnish as desired positive or negative current in bridge of the line conductors 5 and 6 which in this instance unite all of the stations together. At all of the substations the equipment is similar excepting that the connections are reversed in one group from those in the other group as will be explained hereinafter. At each of the substations, we show a step-up wheel 7 carrying a pointer 8 arranged to contact with a spring 9. The arms 8 at the various stations are displaced angularly so that different numbers of impulses will call different stations. A bell 10, or other suitable signal controlling means, is arranged in circuit with the spring 9 and this bell is of a slow acting character so that the rapid passing contact established when the arm 8 passes the spring 9 without stopping there as it does when that particular station is called, will not operate said bell. A stop 11 determines the zero position of the element 7, and a spiral spring 12 tends to rotate the elements clockwise to their limiting positions. The element 7, as will be seen, is normally under no influence except that of the spring 12. A locking pawl 13 however, is designed to enter the teeth of the element 7 upon proper energization of the magnet 14. This magnet has a centrally pivoted armature 15 under the influence of a permanent polarized magnet 16 and is normally pushed upwardly at its left hand

extremity 17, thus to maintain the locking pawl 13 out of engagement with the teeth of the element 7. This magnet 14 has a winding 18 preferably consisting of two coils, which is connected by means of the conductor 19 to the conductor 20, and whose other terminal is connected by means of the conductor 21 to a terminal of the step-up magnet 22. The other terminal of the step-up magnet 22 is connected directly with the line conductor 6 in the stations B and C by means of the conductor 23. The conductors 19 and 20 preferably unite in a conductor 24, which at stations B and C is connected to the line conductor 5. A conductor 25 unites the conductor 23 with a front contact 26 adapted for engagement with armature 27 of the magnet 22. The armature 27 carries a step-up pawl 28 which normally tends to push downwardly but is held away from the teeth of the element 7 by a small button interposed between the said step-up pawl 28 and the locking pawl 13, thus when there is no current in the winding of the magnet 14, the spring 17 pushes the left hand extremity upwardly thereby removing the locking pawl 13 from the teeth of the impulse element 7 and also moves away therefrom the stepping-up pawl 28. The stepping-up pawl 28, of course, is of a springy nature so that when the proper current in the winding of the magnet 14 permits the attraction of its armature so as to move it in a contra-clockwise direction, whereby its locking pawl 13 engages the teeth of the element 7, then the stepping-up pawl 28 follows and also engages these teeth.

The conductor 29 unites the armature 27 with the pointer 8. At stations B and C the conductor 24 is connected to the line wire 5 and conductor 23 is connected to line wire 6, whereas at stations D and E conductor 23 is connected to line wire 5, and conductor 24 to line wire 6. The windings of the magnets 14 are all in the same direction so that this diagrammatic arrangement will serve to illustrate that for instance, positive current will operatively attract the armature 15 against the tension of the spring 17 at the stations B and C, and negative current will operatively attract the armatures 15 against the spring 17 at stations D and E, whereas the opposite polarity in the above cases will leave the armatures respectively in the positions they normally occupy as shown. Therefore when battery 1 is used the group of stations of which B and C are symbolic operate, and battery 2 will operate stations D and E.

The magnets 14 have short circuited shells 30 on their cores so as to make them slow acting and this is for the following purpose. The first impulse of the desired polarity is sufficiently long to operatively attract the armatures 15 of that group of stations within which it is desired to effect a selective call. Thereafter rapid impulses are sent to step-up the element 7 to the particular position to call the desired station. The time interval between these impulses during which no current is on the line, is of such a short duration that the slow acting magnet 14 does not release its armature, and the locking pawl 13 thereby remains in the teeth of the element 7 throughout the stepping operation. The last impulse is maintained a given length of time so that elements 8 and 9 remain in contact, thereby to effectively call a signal 10. After the current is removed from the line the spring 17 restores the armature 15 to normal, thereby removes the pawl 28 from the teeth of the element 7, and the spring 12 restores the element to normal against its stop 11.

It will be seen that the winding of the magnet 22 is in series with the winding 18 of the magnet 14, thus that they receive the same impulses, although of course, equivalent arrangements such as putting the two in parallel across the line circuit would serve the same purpose. When the contact is established between the elements 8 and 9, circuit is maintained from conductor 6 through conductor 23, conductor 25, armature 27, conductor 29, elements 8 and 9, signal 10, conductor 20, and conductor 24 to the line wire 5, thus connecting the bell 10 in bridge of the line conductors to thereby receive current direct from the central station.

While we have herein shown and particularly described the preferred embodiment of our invention, we do not mean to limit ourselves to the precise construction and arrangement as herein set forth, but

Having thus described our invention, what we claim as new and desire to secure by United States Letters Patent is:

1. A selective signaling system having a central station and two groups of substations united by a common line circuit, means at the central station for impressing currents of different electrical character on said line circuit, a selective impulse mechanism at each substation, means at each mechanism for stepping up said mechanism, holding means for said mechanism, a polarized release magnet to control said holding means, the release magnets of one group operating with one character of current and the release magnets of the other group operating with a different character of current.

2. A selective signaling system having a central station and two groups of substations united by a common line circuit, means at the central station for impressing currents of different electrical character on said line circuit, a selective impulse mechanism at each substation, means at each mechanism for stepping up said mechanism,

holding means for said mechanism, a release magnet to control said holding means, the release magnets of one group operating with one character of current and the release magnets of the other group operating with a different character of current.

3. A selective signaling system having a central station and two groups of substations united by a common line circuit, means at the central station for impressing currents of different polarity on said line circuit, a selective impulse mechanism at each substation, means at each mechanism for stepping up said mechanism, holding means for said mechanism, a polarized release magnet to control said holding means, the release magnets of one group operating with one polarity of current and the release magnets of the other group operating with the other polarity of current.

4. A selective signaling system having a central station and two groups of substations united by a common line circuit, means at the central station for impressing currents of different polarity on said line circuit, a selective impulse mechanism at each substation, means at each mechanism for stepping up said mechanism, holding means for said mechanism, a release magnet to control said holding means, the release magnets of one group operating with one polarity of current and the release magnets of the other group operating with the other polarity of current.

5. A selective signaling system having a central station and two groups of substations united by a common line circuit, means at the central station for impressing currents of different electrical character on said line circuit, a selective impulse mechanism at each substation, means at each mechanism for stepping up said mechanism, holding means for said mechanism normally not in engagement therewith, a polarized release magnet to control said holding means, the release magnets of one group operating with one character of current and the release magnets of the other group operating with a different character of current.

6. A selective signaling system having a central station and two groups of substations united by a common line circuit, means at the central station for impressing currents of different electrical character on said line circuit, a selective impulse mechanism at each substation, means at each mechanism for stepping up said mechanism, holding means for said mechanism normally not in engagement therewith, a release magnet to control said holding means, the release magnets of one group operating with one character of current and the release magnets of the other group operating with a different character of current.

In witness whereof, we hereunto subscribe our names this 13th day of Aug., A. D., 1910.

HARRY O. RUGH.
CHARLES STANLEY RHOADS, JR.

Witnesses:
HAZEL JONES,
A. LYDA JONES.