J. C. FIELD.

SIGNALING CIRCUIT FOR TRAIN DESPATCHING.

APPLICATION FILED APR. 5, 1911.

1,045,271.

Patented Nov. 26, 1912.

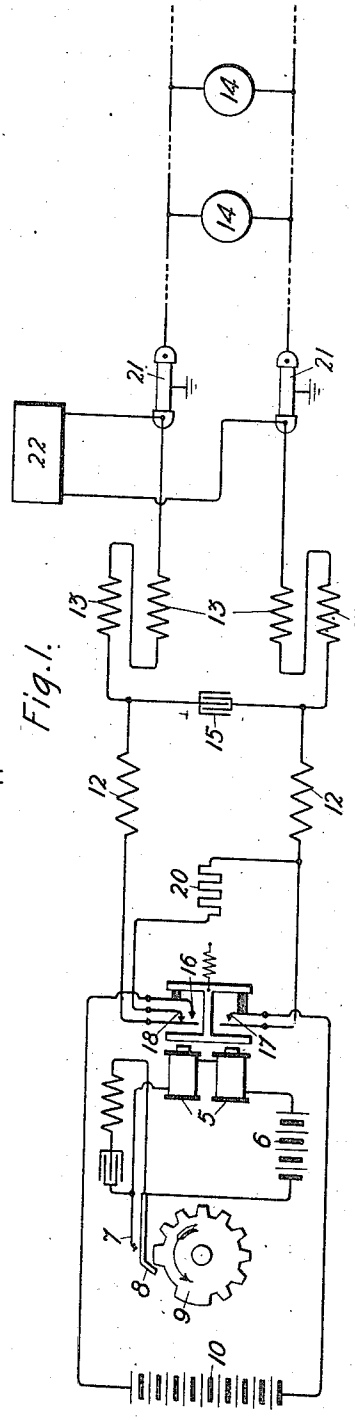

Fig. 1.

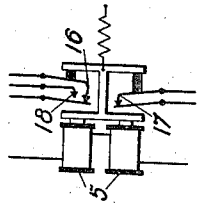

Fig. 2.

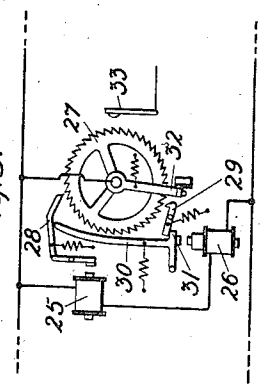

Fig. 3.

Witnesses:
A. M. Guthe
G. M. Campbell

Inventor:
Joseph C. Field.
by A. C. Tanner, Atty.

UNITED STATES PATENT OFFICE.

JOSEPH C. FIELD, OF ORANGE, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF NEW YORK, N. Y., A CORPORATION OF ILLINOIS.

SIGNALING-CIRCUIT FOR TRAIN-DESPATCHING.

1,045,271. Specification of Letters Patent. Patented Nov. 26, 1912.

Application filed April 5, 1911. Serial No. 619,162.

To all whom it may concern:

Be it known that I, JOSEPH C. FIELD, citizen of the United States, residing at Orange, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Signaling-Circuits for Train-Despatching, of which the following is a full, clear, concise, and exact description.

This invention relates to party line selective signaling systems wherein a plurality of step by step selective devices located at waystations upon a line are adapted in response to current impulses from a central or despatching station to close a signaling circuit at a selected waystation without signaling any other waystation on the line.

The object of this invention is to provide a circuit arrangement which will insure the proper functioning of the step by step selective devices under varying and unfavorable conditions of the line circuit.

In the class of systems to which this invention relates both the telephones and the selectors are bridged across the line and in order that there will be no disagreeable thump in the telephones produced by the current impulses which operate the selectors means are provided for causing gradual emission and extinction of these current impulses. In the circuit arrangement shown there is inserted in the line circuit between the calling and the waystations, graduating devices comprising retardation coils connected in the line wires and a condenser bridged between the two sides of the line. On ordinarily loaded lines or on lines free from trouble the prolongation of current impulses due to the discharge of the graduating devices over the line is not of sufficient duration to prevent the stepping devices functioning properly. Upon long and heavily loaded lines or upon lines which are broken or patched out, however, there is a tendency of the stepping magnet of the selective device to stick. This is due to the fact that on account of the high resistance of the line the discharge of the graduating devices out over the line is prolonged and this prolongs the sending impulse to such an extent that the stepping armature of the selector does not fall back far enough to make the succeeding step.

According to this invention there is provided a temporary discharge path for the graduating devices, which path comprises a non-inductive resistance adapted to be bridged across the line by the operation of the sending apparatus when the impulse circuit is interrupted at the sending station; this bridging period being so timed that it occurs substantially at the time of the opening of the impulse circuit.

The invention will be more particularly described with reference to the accompanying drawings in which—

Figure 1 is a diagram of the circuit and apparatus. Fig. 2 is a view of a portion of the apparatus in operated position. Fig. 3 is a schematic view of one of the selectors.

In the circuit arrangement illustrated in Fig. 1 an impulse relay 5 is shown as included in a local circuit with a battery 6 and contact springs 7 and 8 adapted to be closed by a toothed impulse wheel or circuit closer 9. Located at the despatcher's station is a source of electrical energy 10 in a normally open circuit which is closed onto the line by operation of the impulse relay 5, the current therefrom passing through retardation coils 12, 12 and 13, 13 in said line to selectors at way stations 14, 14. The said retardation coils 12, 12 and 13, 13 in the line wires together with a condenser 15 bridged across the line operate to cause a gradual emission and extinction of the current impulses from the battery 10 thus preventing an audible click in the telephonic instruments on the line during the signaling operation.

The impulse relay 5 in its operation controls the operation of contacts 16, 17 and 18. The contacts 16 and 17 are adapted to complete the circuit of the source of energy 10 and the line while the contact 18 is adapted to close a bridge of the line in which is included a non-inductive resistance 20. This bridge is located between the impulse relay 5 and the bridged condenser 15. The contact 18 is so arranged with respect to the contacts 16 and 17 that it will be opened substantially at the time said contacts 16 and 17 are closed and closed substantially at the time that they are opened. Protective devices 21, 21 are inserted in the line wires at the sending or despatcher's station, and a despatcher's telephone set 22 is bridged across the line between said protectors and the retardation coils 13, 13.

As shown in Fig. 3 the selector comprises

two electromagnets 25 and 26, a ratchet wheel 27 and stepping and holding pawls 28 and 29. The stepping pawl 28 is connected with the armature of the stepping magnet 25 and is normally retained out of engagement with the ratchet wheel 27 by means of an arm 30 connected with the armature of the holding magnet 26. The holding pawl 29 is normally retained out of engagement with the ratchet wheel 27 by means of an extension 31 on the armature of said holding magnet. A contact arm 32 carried by the ratchet wheel 27 is adapted in the rotation of said ratchet wheel to register with a contact 33 to close a signaling circuit (not shown). The stepping magnet 25 is a quick acting magnet, while the holding magnet 26 is a slow acting one, and these two magnets are connected in series across the line wires.

In the operation of the selector a current impulse is put upon the line of sufficient duration to cause the operation of the holding magnet 26 which attracts its armature and permits the engagement with the ratchet wheel 27 of the stepping and holding pawls 28 and 29. The succeeding impulses will be of shorter duration and will operate the stepping magnet 25 although not permitting the release of the holding magnet 26. When the contacts 32 and 33 are brought into register there will be put upon the line a current impulse of sufficient length to hold the contacts 32 and 33 closed to cause the operation of a signal, (not shown).

The operation of the selective signaling system as a whole is as follows: The despatcher desiring to call a party at one of the waystations operates the impulse wheel 9 to send out the number of impulses necessary to operate the selective device to close the signaling circuit at the particular waystation desired. The rotation of the impulse wheel 9 intermittently closes the contact springs 7 and 8 thus closing the local circuit through the impulse relay 5. The operation of the impulse relay 5 first closes the contacts 16 and 17 and immediately thereafter opens the contact 18 sending an impulse of current from the source 10 through the graduating devices and out over the line. After the first current impulse the circuit through the impulse relay 5 is momentarily opened at the springs 7 and 8. The opening of this circuit permits the relay 5 to fall back to its normal position closing the contact 18 and opening the contacts 16 and 17. The closing of the contact 18 closes the bridge, containing the non-inductive resistance 20, across the line and provides a path through which any remaining charge in the condenser 15 may be dissipated. The above operation will be repeated for each tooth of the impulse wheel 9 which passes beneath the contact springs 7 and 8. The non-inductive resistance 20 in the circuit has the effect of making the extinction of the current impulses more abrupt when the resistance of the line is very high but has but little effect upon the current graduations with a normally loaded line.

I claim:

1. In a selective signaling system the combination with line wires, of a selector connected with said line wires, impulse sending mechanism for operating said selector, means connected with the line for graduating the current impulses, and a temporary discharge path for said graduating means intermittently connected with the line wires for preventing a prolongation of current impulses through the selector.

2. In a selective signaling system the combination with line wires, of a selector bridged across said line wires, impulse sending mechanism for operating said selector, means connected with the line for graduating the current impulses, and a temporary discharge path for said graduating means in a circuit controlled by the operation of said impulse sending mechanism adapted to prevent a prolongation of current impulses through the selector.

3. In a selective signaling system the combination with line wires, of a selector bridged across said line, impulse sending mechanism for operating said selectors, graduating devices connected with said line wires between said impulse sending mechanism and said selector, and a non-inductive resistance intermittently bridged across the line between said graduating devices and said impulse sending mechanism for preventing a prolongation of current impulses through the selector.

4. In a selective signaling system the combination with line wires, of a selector bridged across said line wires, impulse sending mechanism for operating said selector, graduating means comprising retardation coils in said line wires and a capacity bridged across said line wires, and a non-inductive resistance in a bridge of said line between said graduating means and said impulse sending mechanism controlled by the operation of said impulse sending mechanism.

5. In a selective signaling system the combination with line wires, of a selector connected with said line wires, a source of calling current, means for intermittently connecting said source of calling current to said line, graduating devices in said line between said selector and said source of calling current, and a non-inductive resistance in bridge of said line between said graduating devices and said source of calling current, said bridge being opened when said source of calling current is connected with the line and closed when said source of calling current is disconnected from the line to prevent

a prolongation of current impulses through said selector.

6. In a selective signaling system the combination with line wires, of a selector connected therewith, a source of calling current, an impulse relay for intermittently connecting said source of current with the line, impulse graduating means in said line between said impulse relay and said selector, and a non-inductive resistance in bridge of said line between said impulse relay and said graduating devices, said non-inductive bridge being opened by said impulse relay when the source of calling current is connected with the line and closed by said impulse relay when said source of calling current is disconnected from the line to prevent a prolongation of current impulses through said selector.

In witness whereof, I hereunto subscribe my name this 4th day of April, A. D. 1911.

JOSEPH C. FIELD.

Witnesses:
IRVING MACDONALD,
MORGAN WASHBURN, Jr.