

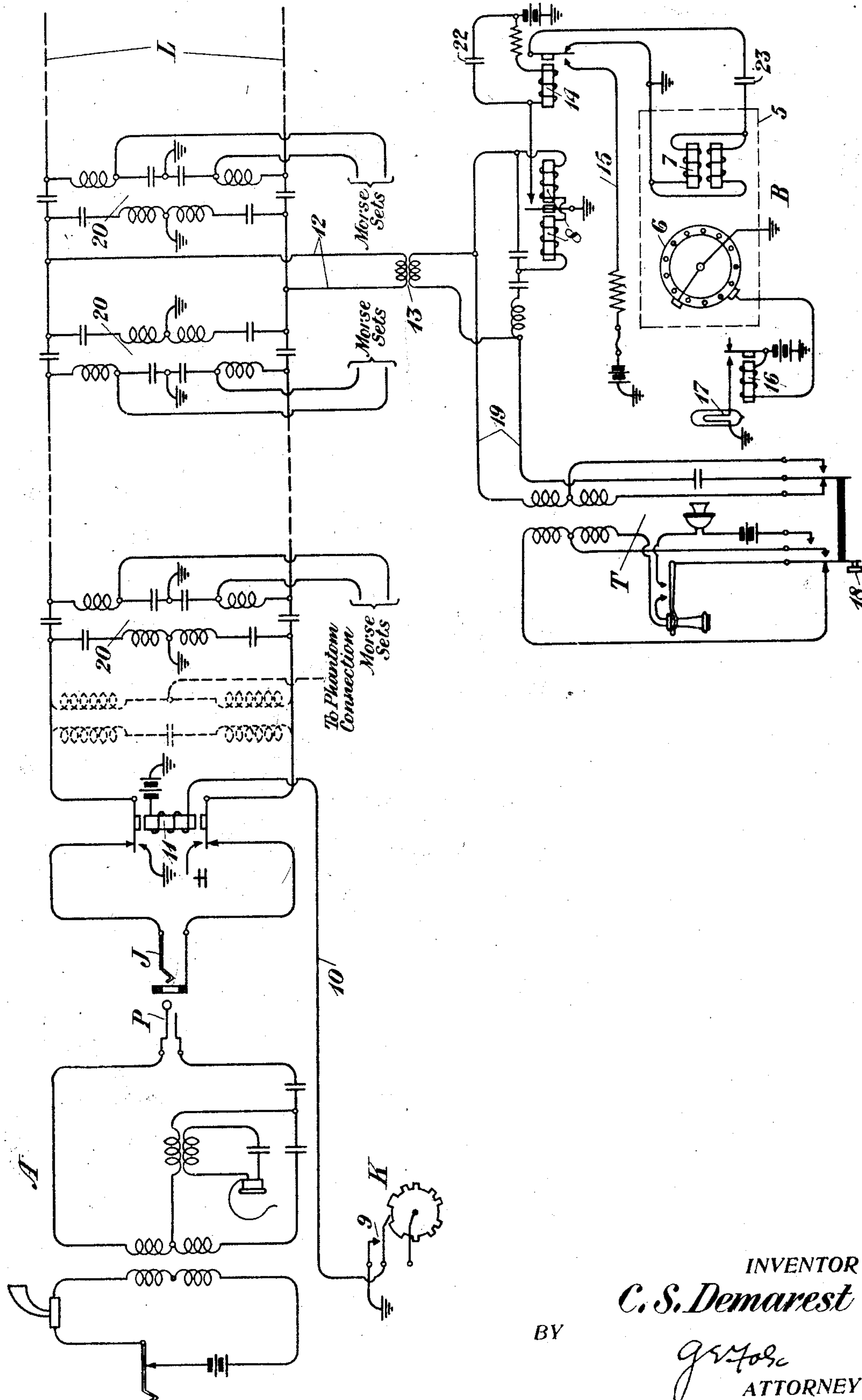
Nov. 20, 1928.

1,691,962

C. S. DEMAREST

SELECTIVE SIGNALING SYSTEM

Filed May 25, 1923



INVENTOR

C. S. Demarest

BY

gr. 408

ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES S. DEMAREST, OF RIDGEWOOD, NEW JERSEY, ASSIGNOR TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK.

SELECTIVE SIGNALING SYSTEM.

Application filed May 25, 1923. Serial No. 641,473.

This invention relates to selective signaling systems, and more particularly to the application of such systems to railroad train dispatching circuits.

One of the objects of the invention consists in the provision of circuits and apparatus for increasing the available transmission facilities capable of being obtained over a pair of line conductors.

Another object consists in utilizing alternating current for signaling over the line conductors, thus eliminating high line voltages previously required by the use of direct current for this purpose.

These objects and further objects of the invention will be apparent from the following detailed description of the circuit and accompanying drawing which illustrates one embodiment of the invention.

There is shown in the drawing a main or dispatcher's station A from which the line conductors L extend to substations or way stations, one of which is indicated at B. The dispatcher's station A is provided with the ordinary substation telephone set comprising a transmitter and a receiver by which conversation may be carried on over conductors L with operators at the connected way stations which are provided with like instruments. A selector key K at the dispatcher's station A is of the well-known type and is adapted to be adjusted to operate selector apparatus at any desired station, such selector apparatus being indicated at station B by the numeral 5. The selector apparatus 5 which is well-known in the art, is shown as comprising a mechanical selector 6 operated by a relay 7. Associated with each way station is a relay corresponding to that illustrated by the reference numeral 8. This relay is of the vibrating make contact type and responds readily to signaling impulses of short duration, such as those which occur, for example, when pulses of 135 cycle current are sent out on the line by the operation of relay 11 by the selector key K. The relay 8 is sensitive to one frequency, for example 135 cycles, and relatively insensitive to other frequencies, and is therefore relatively free from the ordinary sources of interference, such as those caused by mechanical vibration, Morse

thump, switching impulses and voice currents. The line L, in addition to being used for selective signaling, is also adapted to have the usual phantom and composite circuits connected therewith.

The details of this circuit may be now sufficiently understood from a description of its operation.

Assuming a dispatcher at A wishes to communicate with one of the way stations connected with the line L, the selector key K will be set for the code combination of the particular station desired, in a well-understood manner. For the purpose of illustration, it will be assumed that station B is the station wanted. When key K is operated, it turns and its contact spring passes over the unmasked teeth on the impulse wheel, closing contact 9 intermittently and completing a circuit from ground, conductor 10, winding of pulsing or line relay 11 to battery. The closure of this circuit causes the energization of relay 11, which connects alternating current through its upper and lower make contacts to the tip and ring conductors of the line L. Relay 8 is bridged across the line L by means of conductors 12, through repeating coil 13. When alternating current of suitable frequency is sent over the line L, relay 8 is energized and when the reed of this relay vibrates it intermittently closes a circuit through its armature from ground, winding of relay 14 to battery. The intermittent closing of this circuit causes the operation of relay 14. A condenser 22 is bridged across relay 14 to make it release slowly so that as long as the reed of relay 8 is vibrating, relay 14 remains operated. When relay 14 operates, it completes a circuit through its front contact from battery, conductor 15, condenser 23, windings of relay 7 to ground and charges condenser 23. When relay 14 releases condenser 23 discharges. Relay 7 is operated by the charge and discharge current of this condenser and causes the operation of selector 6 in a well-known manner. The selector 6 is stepped around by each signaling pulse until it responds to its code combination, at which time a circuit is closed through the contacts of the selector from ground, winding of relay 16 to battery. Relay 16 is energized by the closure of this circuit and causes a suitable

signal to be operated. In this instance the signal is shown in the form of a lamp 17. The lighting of the lamp 17 serves to inform the operator at station B that the dispatcher at A wishes to communicate with that station

The operator at station B upon noting the illumination of the signal 17 depresses key 18, thereby bridging the telephone set T across the line conductors L. As the selector key K returned to normal after sending the combination of pulses by which the selector 6 operated, the circuit by which relay 11 was energized is broken at contact 9 and said relay returns to normal. The return of relay 11 to normal disconnects alternating current from the line, whereupon relay 8 ceases operating and relays 14 and 7 release. The selector 6 will at this time be restored to normal causing the lamp to be extinguished. The dispatcher at station A who has inserted plug P in jack J is enabled to carry on conversation with the way station B by a talking circuit extending from station A over the tip and ring conductors of the line L, conductors 12 and repeating coil 13, conductors 19 to telephone set T at way station B in a well understood manner.

Composite sets equipped with the usual choke coils, condensers, etc. may be associated with the line conductors L as indicated at 20. These sets terminate in Morse legs and telegraph transmission may be carried on over the conductors L in the customary manner.

At 21 there is indicated in dotted lines the manner in which the line conductors L may be connected to form one side of a phantom circuit. The opposite side circuit may be similar to that illustrated and connected in like manner.

The circuit of this invention thus permits simultaneous or independent dispatching and message transmission over the same pair of wires for use in cases where one pair of wires only is available or where the two side circuits of the phantom group terminate at different points. It will be apparent that the transmission of Morse signals does not affect the operation of the selectively operated devices at the way stations. With this arrangement a talking circuit provided with selective signaling may be obtained over the same pair of wires as is used for telegraph transmission.

While this system has been described as having all signals originating at a master station, it is obvious that any of the way stations may function as a sending station by the addition of apparatus similar to that indicated at said master station.

What is claimed is:

1. In a selectively controlled signal system comprising a central station and a plurality of way stations, a line circuit connecting the central station and way stations, phantom circuits and Morse circuits associated with the line circuit at the central station and

way stations, telephone sets at the central station and way stations, a source of alternating current at the central station, a source of direct current at the way stations, switching means including a selector key and a relay serially associated therewith for controlling the application of alternating current to the line circuit, said relay also controlling the connection over the line circuit between the telephone sets at the central station and way stations, an alternating current relay at the way stations responsive to the application of alternating current to the line circuit, a direct current relay controlled by said alternating current relay, said direct current relay having a condenser bridged across its winding to maintain it operated during the vibration of the armature of said alternating current relay, and selectively operated devices at the way stations actuated by the direct current relay, said selectively operated devices being unaffected by the transmission of Morse signals over the line circuit.

2. In a railroad train dispatching system comprising a central station and a plurality of way stations, a line circuit connecting the central station and way stations, phantom and Morse circuits associated with the line circuit, a source of alternating current at the central station, switching means including a selector key and a relay serially connected therewith for controlling the application of alternating current to the line circuit, an alternating current relay bridged across the line circuit at the way stations mechanically and electrically tuned to be responsive to the application of ringing current, a direct current relay controlled by said alternating current relay having a condenser bridged across its winding of such capacity that said direct current relay is maintained energized during the operation of the alternating current relay, and selectively operated devices at the way stations actuated by the direct current relays, said selectively operated devices being unresponsive to the transmission of Morse signals over the line circuit and connections of the telephone sets at the central station and way stations over such line circuit.

3. In a railroad train dispatching system having a transmission line interconnecting a central station and a plurality of way stations, telephone sets, dispatching apparatus, phantom and Morse circuits connected with the line for independent and simultaneous transmission thereover between the central station and way stations, a source of alternating current at the central station, a source of direct current at the way stations, switching means including a relay and a selector key for controlling the application of alternating current to the transmission line, said relay also controlling the connection over the said line between the telephone sets at the

central station and way stations, an alternating current relay at the way stations responsive only to the application of alternating current to the transmission line, a direct current relay controlled by said alternating current relay, said direct current relay having a condenser bridged across its winding to maintain it operated during the vibration of the

armature of said alternating current relay, and selectively operated devices at the way stations actuated by the direct current relay. 10

In testimony whereof, I have signed my name to this specification this 24th day of May, 1923.

CHARLES S. DEMAREST.