

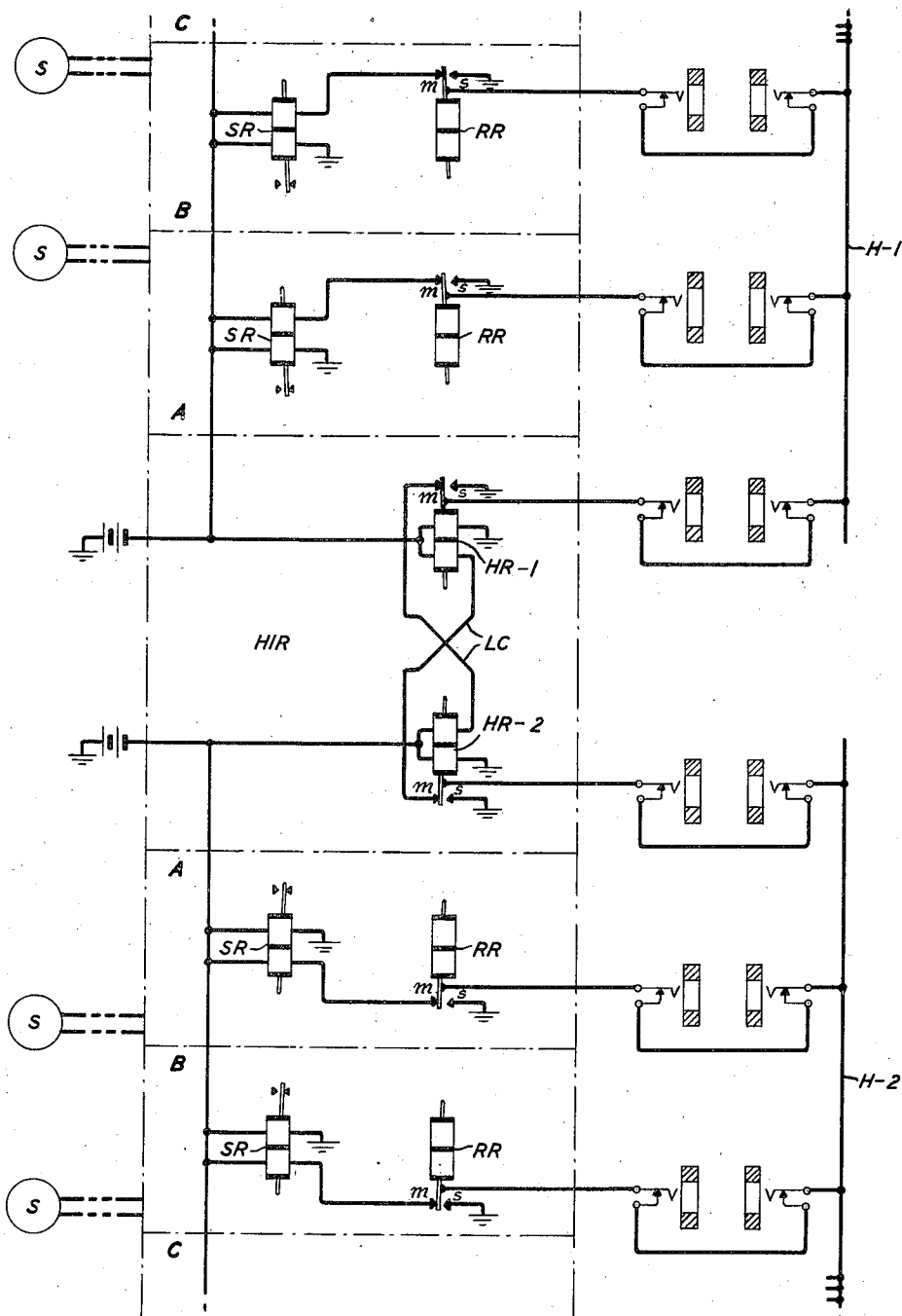
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TELEGRAPH REPEATER

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TELEGRAPH REPEATER

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6 Claims. (Cl. 178-74)

This invention relates to telegraph repeaters and particularly to so-called interconnecting telegraph repeaters by means of which a large plurality of line circuits or subscribers' loops may be placed in two-way communication with each other.

It has recently been suggested to permanently assign a two-way repeater to each outgoing line circuit at a repeater station and to interconnect these repeaters for two-way communication by means of a common circuit termed the "hub" circuit whereby the local side of all the repeaters intended for intercommunication are connected in multiple for direct operation by the local contacts of any one of the repeaters. The windings of the transmitting relays of the repeaters are, during marking, connected over the contacts of the receiving relay to the two-way common circuit and any one of the repeaters, by operation of its receiving relay contacts, will disconnect its own transmitting relay windings and apply spacing potential to the hub circuit, thereby operating all the other transmitting relays connected to the hub. It is evident that the contacts in spacing position must carry the total current through all the transmitting relays in multiple, which current thus may be very heavy. Arrangements have been suggested for connecting as many as sixteen repeaters to a single hub circuit.

It is an object of the invention to provide an arrangement whereby the number of line circuits to be placed in intercommunication may be greater than the number of line circuits which can be operated over a single relay contact under practical commercial conditions.

In accordance with a feature of the invention this object is attained by dividing a large plurality of line circuits into groups, interconnect each group by means of a hub circuit and interconnect the hub circuits through repeating means for two-way communication between them. More specifically the interconnecting repeating means comprises two polar relays each adapted to receive from one hub and send into the other.

The invention will now be described more in detail in connection with the accompanying drawing which shows a circuit arrangement whereby two groups of repeaters of the hub type may be interconnected for two-way communication.

For a detailed description of the hub type repeater reference should be had to application Serial No. 32,866, filed on July 24, 1935 by F. S. Kinkead and G. A. Locke.

Two groups of repeaters A, B, C, etc. are shown in the drawing as each comprising a sending relay SR and a receiving relay RR. Only the local side of these repeaters is shown completely connected whereas the connections for the line side are omitted since they form no part of this invention and may be arranged in any desirable manner for the requirements of the individual line circuits. Thus, each of the repeaters A, B, and C is arranged to receive signals over a line circuit from a subscriber's station S or from any other type of station, such as a repeater station. The signals are received by the receiving relay RR which operates its armature to marking or spacing position accordingly. In spacing position the receiving relay applies ground to the hub conductor H-1 or H-2, whereas in marking position it connects the sending relay to the hub conductor.

Thus, the sending relays SR have their windings connected in multiple from battery over the respective marking contacts of the receiving relays to the hub conductor. When all receiving relays are in marking condition no current flows in these parts of the system. However, when a spacing signal arrives from one of the line circuits the corresponding receiving relay will apply ground to the hub and operate to spacing all the other sending relays connected to the hub. The sending relays SR in operating repeat the spacing signal into their corresponding line circuits and at the same time control the receiving relay in a well-known manner to prevent the signals from being repeated back into the hub circuit.

From the description given above it will be apparent that the spacing contact of each receiving relay must carry the current for the sending relays of all the repeaters connected to a hub. Arrangement has been provided whereby sixteen repeaters of this type may be interconnected for two-way communication on a commercial basis.

If it should be desirable to operate a still greater number of repeaters for two-way communication between them, they will, in accordance with the invention, be divided into groups, each including a number of repeaters which can be practically operated over a single relay contact. The groups are then interconnected by means of hub interconnecting repeaters, such as the repeater HIR shown in the drawing. By means of the repeater HIR signals impressed upon the hub H-1 will be repeated into the hub H-2 and vice versa. Thus, any one of the stations S in any group of repeaters may transmit to all of the

other stations in the same group and in any other group connected thereto by means of a repeater such as the repeater HIR.

The repeater HIR comprises two relays which
5 are interconnected in such a manner as to form two operating circuits each of which conforms closely to the local side of the other repeaters. Assuming that, in response to a spacing signal, ground is applied to the hub H—1 by the re-
10 peater A associated therewith, the ground will extend over the marking contact of relay HR—1 of repeater HIR to operate relay HR—2 which, in operating, disconnects the operating winding of relay HR—1 and in turn places a ground on the
15 hub H—2 thereby operating all the repeaters A, B, C, etc. associated with the hub H—2 to send a spacing signal into their respective lines. A spacing signal will be repeated in a similar manner from the hub H—2 through the repeater HIR to
20 the hub H—1.

What is claimed is:

1. A group of signal repeaters each adapted for two-way operation over an associated line circuit, a one-wire signaling connection between said re-
25 peaters, another group of repeaters each adapted for two-way operation over an associated line circuit and another one-wire signaling connection between the repeaters of said other group, and repeating means interconnecting said signaling
30 connections for two-way communication between said groups of repeaters.

2. A telegraph repeating station for two-way intercommunication between a plurality of line circuits comprising a plurality of repeating means
35 each connected to an associated line circuit and being interconnected by a local one-wire signaling circuit, a plurality of other repeating means each connected to an associated line circuit and being interconnected by another local one-wire
40 signaling circuit, and a common signal repeating circuit connected between said local signaling circuits for two-way communication between any two of said line circuits.

3. A group of two-way repeaters each con-
45 nected to a line circuit, a local one-wire signaling

circuit interconnecting said repeaters, another group of two-way repeaters each connected to a line circuit, another local one-wire signaling circuit interconnecting the repeaters of said other
5 group, a link circuit, a one-way repeater for connecting one end of said link circuit to said first local circuit, and another one-way repeater for connecting the other end of said link circuit to said other local circuit for two-way intercom-
10 munication between all line circuits connected to said two groups of repeaters.

4. A group of signal repeaters each having a local side, a one-wire signaling circuit interconnecting in multiple said local sides for two-way
15 operation, another group of signal repeaters each having a local side, a second one-wire signaling circuit interconnecting in multiple the local sides of said other group, one of said first local sides and one of said second local sides being arranged to mutually control each other for repeating sig-
20 nals in both directions from one of said signaling circuits to the other of said signaling circuits.

5. A group of signal repeaters each connected to a line circuit and a one-wire multiple circuit
25 interconnecting the local side of said repeaters for two-way signaling between them, a second group of signal repeaters each connected to a line circuit and a second one-wire multiple circuit interconnecting the local side of said second group of
30 repeaters for two-way signaling between them, a pair of interconnected relays connected between said two multiple circuits for repeating signals between said groups of repeaters in one direction at a time.

6. A telegraph repeating system comprising a
35 plurality of repeating means having their local sides interconnected for operation of any one of said repeating means by all the other of said repeating means in multiple characterized in this, that said local sides are directly interconnected in
40 groups by multiple circuit means and said groups are indirectly interconnected through two-way repeating means to reduce the current load in said multiple circuit means.

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