

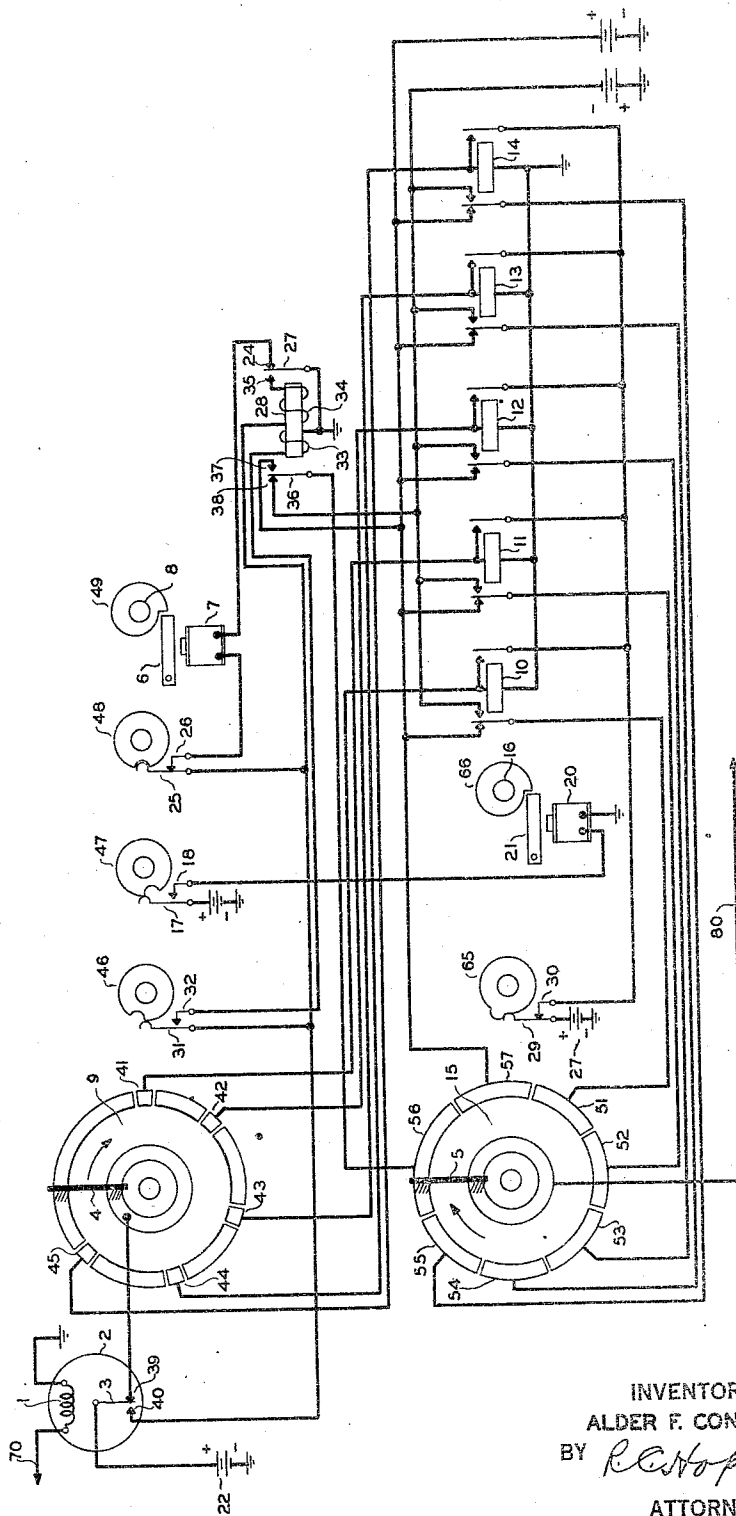
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PRINTING TELEGRAPHY

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PRINTING TELEGRAPHY

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My invention relates to improvements in printing telegraphy.

The object of my invention is the provision of means at a point intermediate the ends of a signalling conductor for repeating or regenerating the spacing and marking signalling current impulses.

In carrying out my invention I use a start-stop regenerative repeater at the intermediate point provided with equipment for producing special signals.

In order to produce these special signals I utilize a long spacing signal, that is, a signal of one or more seconds duration. When this signal is applied, the special equipment associated with the repeater is automatically operated to prevent signals of any character excepting the special or spacing signal to be transmitted.

The special means for accomplishing this result does not involve the use of slow-acting relays which would delay the operation of the system in case there were two or more repeaters in the circuit. Assuming that a slow-acting relay of each repeater is adjusted to require a spacing signal of two seconds duration before responding, then the duration of time required would be increased two seconds for each station. With my invention this delay is avoided and positive results are obtained.

My invention consists of a new regenerative repeater circuit which dispenses with the use of slow-acting relays at the regenerative repeater station.

The repeater illustrated and to be described is designed to be used in connection with the conventional start-stop transmitters and repeaters which send out signals of the following type:

The initial signal transmitted consists of one unit of spacing current, followed by five more units of time during each of which units of positive or negative current may be transmitted, thus giving a total of thirty-two different signal combinations.

Following the letter combination there is a marking signal of one or more units in length.

When the transmission is from a direct

keyboard type of transmitter which does not utilize perforated tape, this marking interval will vary in length depending upon how fast the operator manipulates the keyboard but will always be at least one unit in length.

Various features of my invention will be pointed out in the description to follow.

Referring to the drawings, the signals coming over the line 70 pass through winding 1 of relay 2 to ground. Relay 2 is a polarized relay and is wound in such a direction that a positive current from the line will move the tongue 3 to the 40 or spacing contact, and a negative current from the line will move the tongue to the right-hand or marking contact 39.

The receiving brush is shown at 4 and the sending brush at 5. Brush 4 together with cams 46, 47, 48 and 49 are all fastened to the same shaft and connected to a motor, which is not shown, through a friction clutch. In a similar manner, brush 5 together with cams 65 and 66 are all connected to the same shaft and connected to the same motor through a friction clutch.

When the start-stop magnet 7 is not energized, armature 6 will engage with cam 49 and prevent the rotation of shaft 8, thereby stopping brush 4 and cams 46, 47, 48 and 49 in the position shown. When, however, magnet 7 is energized, armature 6 will be disengaged from the cam 49 and the shaft 8 will revolve.

The friction clutch which is connected to shaft 8 is geared to the driving motor in such a way that shaft 8 will tend to make more revolutions per minute than the shaft of the distant transmitter. In actual practice, the speed difference amounts to approximately 14%. Armature 6, however, engages with cam 49 once at each revolution and is so arranged that the shaft 8 will always start out each revolution in synchronism with the distant transmitter.

The distributor 9 is known as the receiving distributor and the signals picked up by brush 4 are stored up in relays 10 to 14. The left-hand tongues of relays 10 to 14 are connected to transmitting segments of the sending distributor 15 and the brush 5 of sending dis-

tributor 15 is arranged so that it will transmit to the line 80 the signals stored up in relays 10 to 14.

It is necessary that brush 5 lag behind brush 4. This is accomplished by having shaft 8 start the rotation of shaft 16 whenever shaft 8 has reached a suitable position. This is done as follows: when shaft 8 has rotated a small amount, cam 47 will permit the closure of contacts 17 and 18, thereby momentarily completing the circuit from battery 19 through sending shaft start magnet 20. The energization of magnet 20 will attract armature 21, thereby permitting shaft 16 to revolve for one revolution. The friction clutch to which shaft 16 is connected is geared to the driving motor in such a way that shaft 16 will tend to revolve at the same speed as the distant transmitter. Since, however, there will be a stop or marking impulse sent out from the distant transmitter between each letter and this marking impulse will usually be longer than one unit in length, it will be apparent that shaft 16 will be stopped once during each revolution and that this will insure that shaft 16 will always start out each revolution in proper phase relation with shaft 8.

Let us assume that the start signal, which consists of one unit of spacing or positive current, is received from line 70. This spacing signal will move the tongue 3 over to the spacing contact 40 for one unit of time. A circuit will be completed as follows: from battery 22, tongue 3, the spacing contact 40 of relay 2, contacts 25 and 26, start-stop magnet 7, contact 24, tongue 27 and thence to ground. The energization of magnet 7 will withdraw armature 6 out of engagement cam 49, thereby permitting shaft 8 to revolve for one revolution. When shaft 8 has revolved a short distance, contacts 17 and 18 will close and thereby energize magnet 20 which will withdraw armature 21 out of engagement with cam 66, thus permitting shaft 16 to revolve. Brush 4 will now pass over segments 41, 42, 43, 44 and 45 in succession and, depending upon whether or not tongue 3 is on the marking contact while the brush 4 is passing over the receiving segments, relays 10 to 14 may or may not be energized. In other words, if relay 3 is on the marking contact when brush 4 is passing over segment 41, relay 10 will be energized.

Suppose, for example, armature 3 is resting on its spacing contact when brush 4 passes over segment 42, then relay 11 will not be energized. The right-hand tongues of relays 10 to 14 are connected to locking battery 27 through contacts 29 and 30, and when any of the storing relays 10 to 14 are energized they will lock up in an operated position. The left-hand tongues of relays 10 to 14 are connected to sending segments 51 to 55 respectively, and the polarity of the battery ap-

plied to these sending segments is determined by the position of relays 10 to 14. If a storing relay is energized, negative battery will be connected to the corresponding sending segment. If a storing relay is not energized, then positive battery will be connected to the corresponding sending segment. It should be noted that since brush 5 lags behind brush 4, the combination will be set up in storing relays in advance of the actual transmission by brush 5.

Referring now to brush 5, when brush 5 passes over segment 57, positive battery will invariably be transmitted to the line 80. When the sending brush 5 passes over segments 51 to 55, it will transmit to the line 80 the polarity combination set up in the storing relays. At the end of the revolution, the brush 5 will come to rest on segment 56 and since relay 28 is not energized, negative or marking current will be sent out to the line 80. Just before brush 5 came to rest, the cam 65 opened the contacts 29 and 30, thereby cutting off the locking battery of relays 10 to 14, which restore to normal.

Immediately before shaft 8 came to rest, contacts 31 and 32 closed momentarily. If the tongue 3 is on the spacing contact when contacts 31 and 32 close, then the following circuit will be completed: from battery 22, tongue 3, contact 40, contact 31, contact 32, winding 33 and thence to ground. Relay 28 will be energized and will lock up through the following circuit: battery 22, tongue 3, contact 40, winding 34, contact 35, tongue 27 and thence to ground. As long as relay 28 is locked up, magnet 7 will not be operated since the circuit between 24 and 27 is open. During the time that relay 28 is locked up, tongue 36 will touch contact 27, thereby applying positive polarity to segment 56. Since segment 56 is the segment that transmitting brush 5 comes to rest on, then positive or spacing signal will be transmitted to the line 80.

This positive signal will continue to be transmitted to the line 80 so long as the tongue 3 of relay 2 remains on the spacing contact 40. Immediately that the marking signal is received from the line 70, tongue 3 will move over to the marking contact, relay 28 will be unlocked and will restore to normal, thus putting negative or marking battery on segment 56 which is connected to the line 80.

Under normal conditions when printing combinations are being repeated through the regenerative repeater, it will be found that, when contacts 31 and 32 close momentarily, the tongue 3 will be lying against the marking contact 39. Under these conditions relay 28 will not be energized. When, however, a long spacing signal is received from the line 70, then tongue 3 will be on the left-hand or spacing contact when contacts

31 and 32 close and thereby cause relay 28 to lock up.

What is claimed is:

1. In a start-stop regenerative repeater,
5 the combination of a device for receiving marking and spacing signals, a second device for repeating the spacing and marking signals so received, and means for causing the second device to send a spacing signal alone
10 in case the spacing signal transmitted to the first device is prolonged.

2. In a start-stop regenerative repeater, the combination of a device for receiving marking and spacing signals, a second device for repeating the signals so received, and
15 means controlled by the first device for causing the second device to send spacing signals alone in case the spacing signals to said first device are prolonged.

3. In a start-stop regenerative repeater, the combination of a device for receiving marking and spacing signals, a second device for repeating the signals so received, a relay, and mechanically-operated means controlled by the first of said devices to cause
25 the operation of said relay, the operation of said relay causing spacing signals alone to be transmitted in case the spacing signals to said first device are prolonged.

4. In a start-stop regenerative repeater, the combination of a device for receiving marking and spacing signals, a rotating device provided with segments for repeating the signals so received, and means controlled
35 by the first device to change the condition of one of said segments to correspond to the condition of the other of said segments to cause the second device to send spacing signals alone in case the spacing signals to said first device are prolonged.
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5. In a start-stop regenerative repeater, the combination of a device for receiving marking and spacing signals, a second device for repeating the spacing and marking
45 signals so received, and means for sending spacing signals alone in case the spacing signals transmitted to the first device are prolonged.

In witness whereof, I hereunto subscribe
50 my name this 18th day of February, 1931.

ALDER F. CONNERY.

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