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SIGNALING SYSTEM

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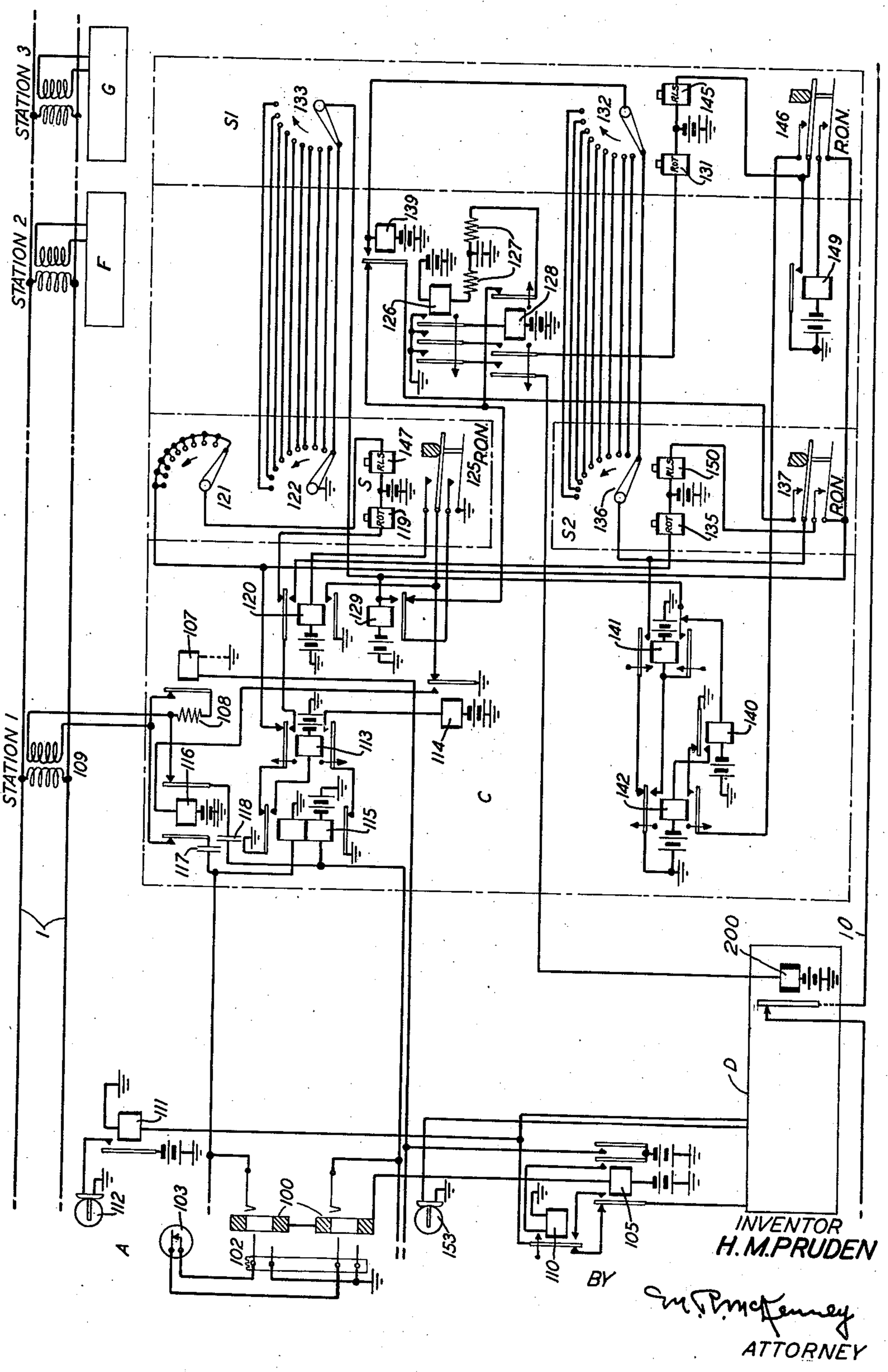

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SIGNALING SYSTEM

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2 Claims. (Cl. 177—380)

This invention relates to signaling systems and particularly to improvements in systems for selective signaling of stations.

The objects of the invention are to increase the efficiency and utility of selective signaling systems by providing means for utilizing standard dialing equipments in connection with signaling in systems of this kind.

Heretofore, systems have been used in which step-by-step selectors, located at different stations and connected by a single wire, were selectively controlled by code impulses to cause a corresponding station to be signaled. A system of this kind is disclosed in the Patent 1,961,385 to Henry W. O'Neill of June 5, 1934. In this system the calling of the various stations was done by code signals produced by a manual key that opened and closed the single wire between the stations to operate the selectors at the various stations.

It is a feature of the present invention to provide means whereby an ordinary telephone dial may be used for the production of the code signals and to translate these dial pulses into equivalent series of impulses, produced at a lower speed and transmitted over the single wire to select a station. The arrangement is such that as soon as a digit or code number has begun to be transmitted, a corresponding translated series of impulses will immediately begin to be transmitted and the speed of transmission is adjusted to the electrical requirements of the single wire.

The invention has been disclosed in the accompanying drawing in which:

The drawing shows an order wire with equipment required for translating dial pulses at one station in detail with two other stations in diagrammatic form as well as a portion of the single wire for selecting of stations.

In general the arrangement of this system has been shown with an order wire 1 and a single wire 10 for the selection of stations. Equipment C at one station has been shown in detail and an operator's position for dialing series of impulses and translating them into an equivalent series at a speed independent of the speed at which the original impulses are dialed. The translated impulses are transmitted to the equipment indicated by the box D which may be identical to the equipment shown in detail at C in the above-mentioned patent to H. W. O'Neill for receiving such translated impulses and selecting a station by interruption of the circuit through the single wire 10 in accordance with a corresponding code comprising two series of such translated impulses. The speed of interruption of this circuit over wire 10 is adjusted to the electrical characteristics of this line. The selection of a station may be indicated by the lighting of a lamp at the selected station, as for example, if station 1 were selected, the lamp 4 would be lighted. In this case the operator at A would insert the plugs 102 of an answering cord into the jacks 100 and thus establish a talking connection over the order wire 1 to the called station. The called station would similarly insert the plugs of an answering cord into corresponding jacks to converse with the operator at the calling station.

A detailed description will now be made of a call from one operator to another employing order wire 1 for the talking connection. If it is assumed that the operator at A inserts the plugs 102 into jacks 100, a circuit will be completed for the operation of relay 105 from battery through the winding of this relay, the sleeves of the jacks 100 and plugs 102 to ground. This relay in operating closes a circuit for the operation of relay 107 from battery, contacts of relay 105, winding of relay 107 to ground. The operation of relay 107 opens the bridge circuit through a resistance 108 across the right-hand winding of the induction coil 109, the left-hand winding of which is connected across the two conductors of the order wire 1. This bridge is provided for normally short-circuiting the right-hand winding of the repeating coil 109 to maintain the normal transmission loss of the order wire 1. Relay 105 also closes an obvious circuit for relay 110 to open the circuit for relay 111. The circuit for relay 111 may be closed to operate this relay to light lamp 112 when this station is being called and is in that respect similar to the lamp 53, for example, in the above-mentioned H. W. O'Neill patent. The operator at position A may now actuate dial 103 to transmit the desired code which consists as hereinbefore stated of two digits and which will be assumed to be 5, 2. On the insertion of plugs 102 into jacks 100, a circuit is also completed for relay 115 from battery, lower winding of this relay, lower jack 100 and the lower plug 102, dial contacts of dial 103, the upper plug 102 and upper jack 100, upper winding of relay 112 to ground. Therefore on each interruption of the dial contacts relay 115 will be released. On the first operation of relay 115 relay 113 is operated over an obvious circuit so that on the release of relay 115 a circuit is completed for relay 114 and battery through the

winding of this relay, contact of relays 113 and 115 to ground. Relays 113 and 114 are slow in releasing so remain operated during the pulsing of the digit. On the operation of relay 114, relay 116 is operated over an obvious circuit to open at its armatures and back contacts a talking connection from the order wire 1 through the condensers 117 and 118 to the calling operator over jacks 100. On each release of relay 115, a circuit is therefore completed for the rotary magnet 119 from battery, the winding of this magnet, contacts of relays 120, 113 and 115 to ground. Magnet 119 in operating operates the brushes 121 and 122 of the step-by-step switch S, which now is set in accordance with impulses of the first digit to register it. On the first rotary step of the switch S, the rotary off-normal contacts 125 are operated and a circuit is completed from battery through the winding of relay 126, resistances 127, contacts of relays 128 and 129 to ground at rotary off-normal contacts 125. Relay 126 in operating closes an obvious circuit for the operation of relay 128. Relay 128 in operating opens the circuit for relay 126 which is slow in releasing and when it releases relay 128 also releases and this relay in turn is slow in releasing. This cycle of operation of relays 126 and 128 is repeated at a definite speed depending on the slow release characteristics of relays 126 and 128. The operation and release of these relays provides a pulsing circuit for the rotary magnet 131 from battery through the winding of this magnet, contact of relays 128 and 126 to ground. Rotary magnet 131 steps the brushes 132 and 133 of the step-by-step switch S_1, and the brushes are stepped as many steps as there are pulses in the first digit registered on switch S but at a lower speed. Another pulsing circuit is also prepared by the operation and release of these relays 126, 128 from battery through the winding of relay 200, contacts of relays 128 and 126 to ground and relay 200 is therefore stepped at the required speed, one for each impulse transmitted by the dial 103 during the first digit. Relay 200 will interrupt the single line 10 in accordance with the speed of operation and release of relays 126 and 128 which is the required speed for transmitting impulses over line 10. This relay 200 corresponds to relay 35 in the above-mentioned patent to H. W. O'Neill. At the end of the first digit when relay 115 is held operated, relay 114 will release and this relay in turn closes a circuit for the operation of relay 120 from battery, winding of relay 120, rotary off-normal contacts 125 to ground at contacts of relay 114. Relay 120 in operating closes a locking circuit for itself through its lower armature and front contact to ground and the rotary off-normal contacts 125. Now on the reception of the impulses of the second digit, each time relay 115 is released a circuit will be completed for the stepping magnet 135 from battery through the winding of this magnet, contact of relays 120, 113 and 115 causing the brush 136 of the switch S_2 to step the number of steps as controlled by the second digit to record it.

When the rotary magnet 131 has operated, a number of times corresponding to the first digit, a circuit will be completed by the operation of relays 129 and 140, the circuit for relay 129 extending from battery through the winding of this relay, brush 133, the desired terminals as determined by the position of the brushes 132 and 122 to ground. Relay 129 in operating closes a locking circuit for itself through its armature and front contact to ground at the rotary off-normal contacts 125 and opens the circuit for operating and releasing relays 126 and 128 causing these relays to cease producing additional impulses for operating magnet 131 and relay 200. Relay 140 operates from battery, winding of this relay, contacts of relay 141, brushes 133 and 122 to ground. Relay 140 in operating closes an obvious circuit for the winding of relay 142 which in turn closes an obvious circuit for the operation of relay 141. Relay 141 in operating closes a locking circuit for itself from battery through its lower armature and front contacts of relay 129 to ground at rotary off-normal contacts 125. Relay 141 is slow in operating. When it does operate it opens the circuit for relay 140 which is slow in releasing and this relay in turn releases relay 142 which is also slow in releasing. This is to provide an interval between the impulses of the first digit and the second digit. When relay 140 releases and before relay 142 is released, a circuit is completed for release magnet 145 from battery, winding of this magnet, off-normal contacts 146 of the switch S_1, contacts of relays 142 and 140 to ground. This causes the release of switch S_1. When relay 142 releases it closes a circuit for the reoperation of relay 126 from battery through the winding of this relay, resistances 127, contact of relays 128 and 139, rotary off-normal contacts 137 of the rotary switch S_2, contacts of relays 141 and 142 to ground. This causes the operation of relay 128 and this relay in turn releases relay 126. These relays are then operated and released to transmit impulses of the second digit for the operation of relay 200 over a circuit as hereinbefore described and also causes the rotary magnet 131 to again step in response to these impulses as hereinbefore described. When the brush 132 of switch S_1 arrives to the position occupied by the brush 136 of the rotary switch S_2 a circuit will be completed for the operation of relay 139 from battery, winding of this relay, brushes 132 and 136, contact of relays 141 and 142 to ground. Relay 139 in operating opens the circuit for relays 126 and 128 which now cease sending impulses representing the second digit to the relay 200 and provides a locking circuit for itself from battery through its winding and armature and front contact, rotary off-normal contact 137, contact of relays 141 and 143 to ground. The relays and switches of the dialing and control circuits C, now remain in the position in which they have been set. That is, relays 115, 113, 120, 129, 139, 141, remain operated and switches S, S_1 and S_2 remain in the position in which they were set until the connection at the operator's position A is released by the removal of the plugs 102 from the jacks 100 when relay 115 releases, causing the release of relay 113. Relay 113 in releasing closes circuits for the release magnets of these switches as follows: For the switch S a circuit is completed from battery through the release magnet 147, brush 121, contacts of relays 113 and 115 to ground; for the switch S_1 from battery through the release relay 149, rotary off-normal contact 146 to ground through contacts of relays 113 and 115, relay 149 in operating closing a circuit for the release magnet 145 which causes the release of switch S_1. The circuit for release magnet 150 for switch S_2 extends from battery, winding of release magnet 150, off-normal contacts 137 to ground through contacts of relays 113 and 115. On the return of these switches to normal, the circuits for the release magnets are opened at

the respective rotary off-normal contacts of the switches. Relays 141 and 129 are then released due to the opening of the rotary off-normal contacts 125.

It will therefore be seen that relay 200 of the equipment D at this station will receive impulses representing the two digits dialed and that these impulses are received at a rate suitable for interrupting the line 10 and setting the switches of equipments such as are disclosed in the above-mentioned patent to H. W. O'Neill in accordance with these digits to select a called station. This rate is slower than the rate at which impulses are transmitted by the dial 103. When these equipments have operated to select the called station lamps corresponding to lamps 4 and 112 will be lighted at the called station. The operator at this station will then insert the plugs of an answering cord into the associated jacks corresponding to jacks 100 and conversation may then take place between the calling operator and the called operator over the order wire 1 through condensers 117 and 118 and induction coil 119 and corresponding apparatus at the called station for the transaction of whatever business is required in connection with this kind of service.

What is claimed is:

1. In an impulse translating device, a dial, means responsive to the operation of said dial for transmitting series of impulses at a speed determined by the speed of operation of said dial and of a number depending on the setting of said dial, a step-by-step switch controlled by said first series of impulses from said dial, an impulse operating device for producing two other series of impulses at a speed slower than the speed of a first series of impulses produced by the dial, means for starting said impulse operating device operative when said switch has taken one step, a second step-by-step switch controlled by one of said two series of impulses, means for stopping said impulse operating device operative when said second switch has operated the same number of times as the first switch, a delay device then operative for releasing the second switch a certain interval after it has been stopped, a third step-by-step switch controlled by a second series of impulses produced by the dial, a circuit means controlled jointly by said delay device and by said third switch when it has taken one step for again starting the impulse operating device to again operate said second switch, a circuit controlled jointly by said delay device and by said second and third switches when the second switch has operated the same number of times as the third switch for stopping said impulse operating device, and means for thereafter restoring all three switches to normal.

2. In an impulse translating device, a dial, means responsive to the operation of said dial for producing two succeeding series of impulses, means for translating said series of impulses into equivalent series of impulses at a slower speed, and means for starting the first series of translated impulses as soon as the first impulse of the first series of original impulses is produced by the dial and for starting the second series of translated impulses a fixed interval after the first series of translated impulses has been transmitted if the production of the second series of original impulses has started prior to the elapse of said interval, or for starting the second series of translated impulses as soon as the first impulse of the second series of original impulses has been produced if the production of the second series of original impulses is started after said interval has elapsed.

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