Aug. 4, 1942. B. A. WALLACE 2,292,183

CODE CALL INTERRUPTER CIRCUIT

Filed Nov. 18, 1940 2 Sheets-Sheet 1

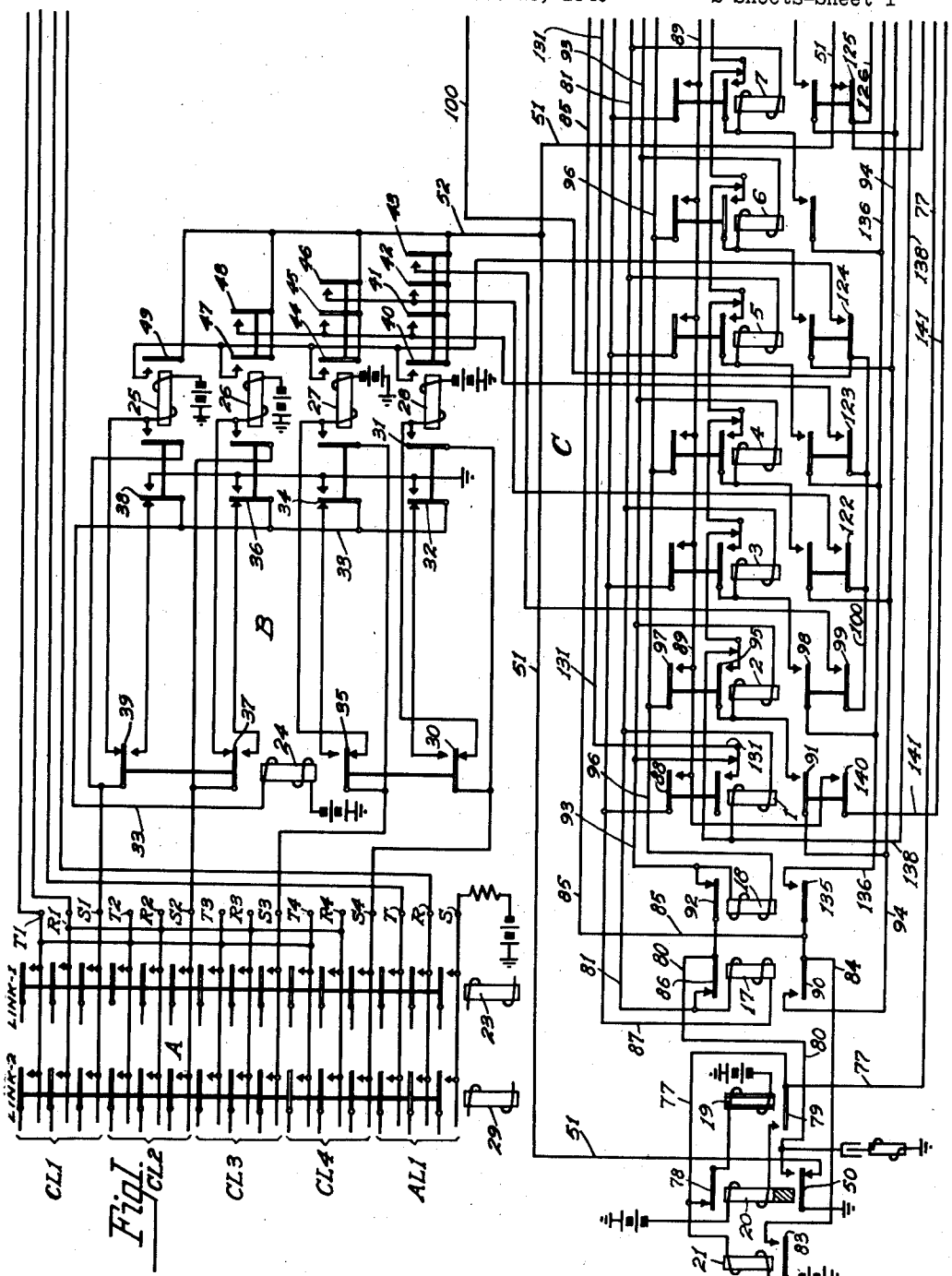


Fig. 1

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CODE CALL INTERRUPTER CIRCUIT

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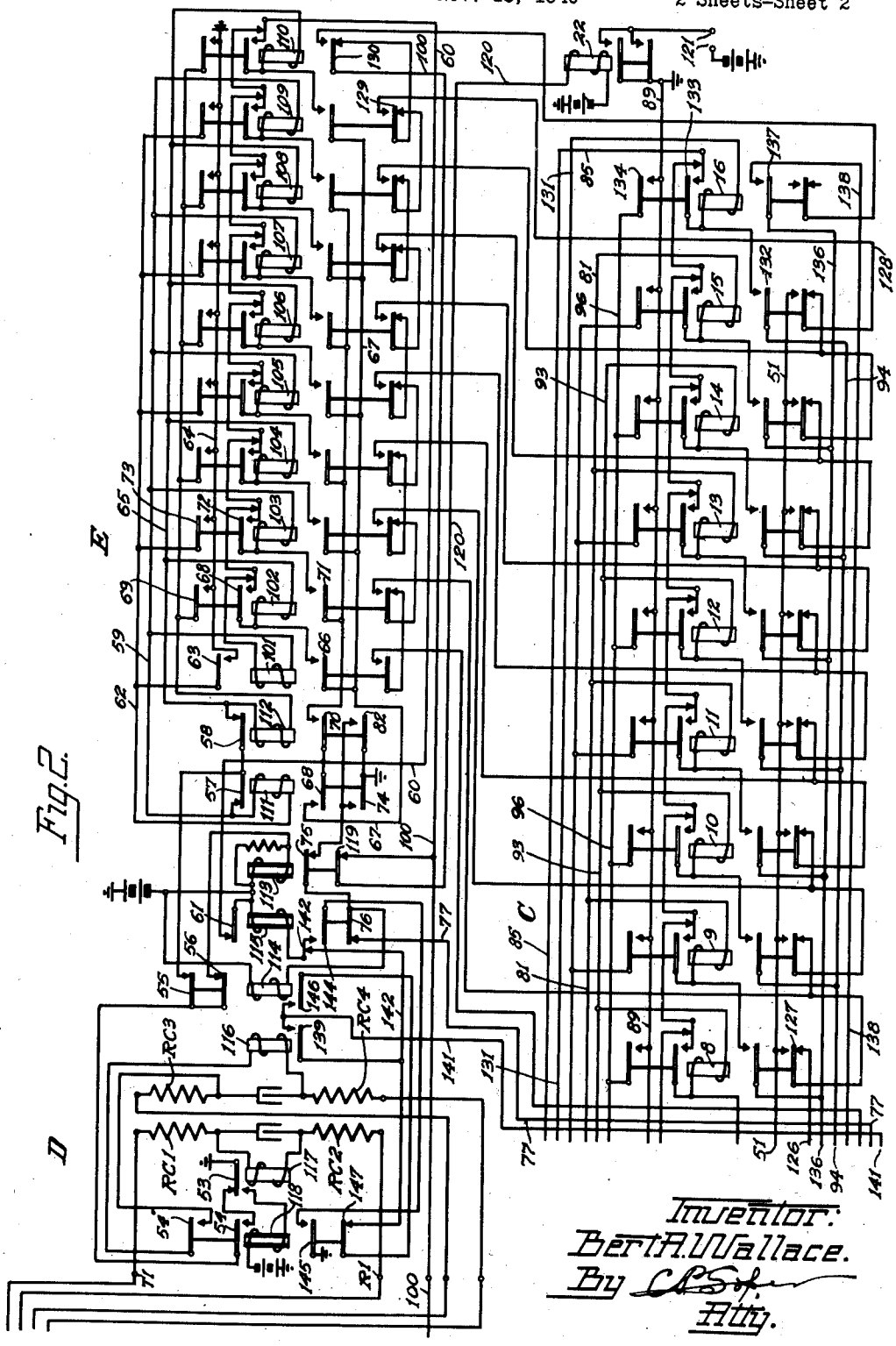


Fig. 2.

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2,292,183

CODE CALL INTERRUPTER CIRCUIT

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5 Claims. (Cl. 179—18)

This invention relates to telephone systems, and more particularly to a system employing machine switching apparatus, wherein any subscriber may set up a code call, wait for an answer from the called party, and hold a conversation.

One object of this invention is to provide a code call system whereby any subscriber can initiate a code call signal. Another object is to provide means whereby a code call signal can be selectively initiated. A further object is to provide a code call system wherein each code call sequence is always completed.

One feature of this invention allows a subscriber to set up a code call line connection by dialing an assigned number. Another feature permits code call selection by the dialing of an additional digit. Another feature precludes interference with the original code call by the accidental or subsequent dialing of other digits.

Another feature of this system provides for the complete sounding of a code call, one or more times, even though the originating party has abandoned the call, or the called party has answered in the middle of the call. Another feature permits any telephone in the exchange to be used by dialing the number assigned for the code call purpose. Another feature permits stopping the code call signal after the called party has answered, but only after completion of a code call sequence. Another feature sets up a conversational circuit between a code call line and a code answer line.

A further feature starts the code interrupter after completion of the code selecting digit. A further feature of the device resides in the provision of a power contactor to close battery to multiple code signal apparatus.

Other objects, features, and advantages of this invention will appear from the following description, taken in connection with the accompanying drawings.

In the drawings, Figs. 1 and 2 are to be taken together to show a circuit diagram of a system having features of the present invention. Fig. 1 is to be placed on the left of Fig. 2. The various circuits in each figure are correspondingly marked and completed in the adjacent figure.

Considering the drawings in greater detail, at the upper left hand portion of Fig. 1 is shown a series of multipled connector switches A for connecting together the link used by a calling subscriber station and the code call system or circuit. The multiple at A is connected to code call line circuits T1, R1, S1; T2, R2, S2; etc.; and also to the preliminary pulse selector relays B. The code call interrupter circuit C (on both Figs. 1 and 2) includes the chain of relays 1 to 21, inclusive, and 22 the call signal power contactor. Each set of tip and ring conductors T1 and R1, etc., go to the conference line circuit D, while the lines T and R provide for the answering circuit. The chain of relays E provide for the final pulses of the code call actually selected.

The transmitter "hundreds" and "tens" impulses from a calling subscriber station selects one of the circuits CL1, CL2, CL3 and CL4 depending upon the number dialed and then operates and locks up the respective preliminary pulse selector 25, 26, 27 or 28 of the selected circuit. The operation of any one of these pulse selectors in turn locks up relay 24 and places ground upon the sleeve circuit of all of the non-selected lines. The further dialing of the last or units digit sets up the code selector relays 101 to 112. Upon completion of the dialed digit, the chain C is then placed in operation thereby ringing the code call until the called party answers or the calling party abandons the call. When the call is answered from any one of the subscriber stations, the conversational circuit is completed by relay 116. This in turn will prepare a circuit for relay 115, which latter only operates upon the operation of relay 1, and locks through relay 3. This operation of relay 115 removes battery from the chain E and releases any of the relays of that group which were locked up. It also trips relay 114; relays 19, 20 and 21; 17 or 18; and 1. The foregoing is a very brief description of the operation.

The circuits herein described can, for example, be used for any one of the forty different code calls, using different arrangements or combinations of four preliminary pulses and ten selector or final pulses in setting up the actual code call signal. For example, code call line one (CL1) is used for all calls using a single preliminary pulse and either none or any combination of nine final pulses to make a complete code call

signal. For example, if the dialing numbers 910 to 919, inclusive, are assigned to circuit CL1, the following would illustrate one arrangement or series of ten code calls.

Sixteen relay step chain

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
910					–											
911					–		–									
912					–		–	–								
913					–		–	–	–							
914					–		–	–	–	–						
915					–		–	–	–	–	–					
916					–		–	–	–	–	–	–				
917					–		–	–	–	–	–	–	–			
918					–		–	–	–	–	–	–	–	–		
919					–		–	–	–	–	–	–	–	–	–	

Assigning other groups of ten codes for each line CL2, CL3 and CL4, etc., completes the arrangement. These latter lines would then provide for two, three and four preliminary pulses with the additional final pulses.

A more detailed description of the operation will now be given for setting up a particular code call, answering it, and terminating the connections. For the purpose of this description, let us assume that the dial number assigned for this particular code call is 949 to obtain the following code call signal pulses:

– – – – – – – – – – – – –

The calling party dials the number 949. The first two "hundreds" and "tens" digits 94— determine which one of the code call line circuits will be used. As assumed, it will select CL4 through the customary automatic relays, finders, selectors, links 1 or 2, and connectors 23 or 29 of the automatic telephone exchange. On the further assumption that this line circuit is idle, the hereinafter described operations will take place.

The connection will place ground on the sleeve circuit S4 to operate relay 28 by a circuit: grounded battery, winding 28, normal contact and armature 30 of relay 24, to ground on S4. Relay 28 operates and locks through its front contact and armature 31, to ground on sleeve S4. The operation of relay 28 in turn energizes relay 24 from ground; through contact and armature 32 of relay 28, conductor 33, winding 24, grounded battery. Armature 32 of relay 28 also places artificial ground busy test upon each of the non-selected sleeves S1, S2 and S3 of the remaining code call circuits CL1, CL2 and CL3. This ground is from grounded conductor 33, to armature 34 and normal contact of 27, front contact and armature 35 of relay 24, to sleeve S3. Ground on S2 is from 33 to armature 36 and normal contact of 26, front contact and armature 37 of 24 to S2. The ground on S1 is from grounded conductor 33 to armature 38 and normal contact of 25, front contact and armature of 39 of 24 to sleeve. Every time a subscriber puts the code call into operation, the unused circuits are given a busy test ground in the same manner. The operation of relay 24 also opens the circuits of relays 25, 26 and 27 at armatures 39, 37 and 35, respectively. The armatures 40 to 49, inclusive, are connected to ground at armature 50 and normal contact of relay 29 (which latter is slow to pick-up and slow to release), over conductors 51 and 52. The operation of relay 28 at its armatures 40 to 43, therefore, places a ground upon the lowermost front contact of each of relays 2, 3, 4 and 5 of chain C.

The seizing of CL4 also operates relay 117 from the battery on the tip and ring conductors T4 and R4 as follows: T4, T1, repeating coil RC1, winding 117, repeating coil RC2, R1, to R4. Relay 118 (which latter is very slow to release) is in turn connected to ground and operated by relay 117 at the latter's front contact and armature 53.

The subscriber now dials the next code selecting digit 1, 2, 3, 4, 5, 6, 7, 8, 9 or 0, causing the release of relay 117 a number of times equal to the digit dialed. In this case, the digit is 9 and relay 117 is released nine times. Relay 118 is slow in releasing and holds over during the release of relay 117. A ground pulse is connected at armature 53 and normal contact of relay 117, through armature 54 and front contact of relay 118, to armatures 55 and 56 of relay 114 at each release of relay 117.

The first ground pulse through armature 56 and normal contact of relay 114 operates slow relay 113 which holds over for all succeeding impulses of the digit dialed and then releases. The first ground pulse through armature 55 and normal contact of relay 114 is carried to the armatures 57 and 58, respectively, of relays 111 and 112 and operates relay 101. The latter is energized by a circuit through armature 57 and front contact of relay 111, conductor 59, winding of relay 101, through the series of upper, inner normal contacts of relays 102 to 109, the corresponding contact of relay 110, conductor 60 to grounded battery on armature 61 and normal contact of relay 115. Relay 101 operates and locks, from this grounded battery through the armature 61 and normal contact of relay 115, conductor 60, the series of upper inner normal contacts on relays 102 to 110, winding of relay 101, conductor 59, winding of 111, conductor 62, armature 63 and front contact of 101, ground conductor 64. Relay 111 does not operate because its winding was shunted by the first ground pulse, but it does operate at the end of this ground pulse when relay 117 reoperates and removes the shunt ground off of armature 57.

The second ground pulse, assuming that a higher digit than 1, viz., 9, is dialed, operates relay 102. The circuit is now from the new ground on armature 55, through armature 58 and normal contact of relay 112, conductor 65, winding of relay 102, front contact and armature 66 of relay 101, conductor 67, front contact and armature 68 of relay 111, conductor 69, normal contact and armature 61 of relay 115 to grounded battery. Relay 102 operates and locks through the coil of relay 112, but relay 112 does not operate at this time because it was shunted by the operating ground pulse from armature 58. The locking circuit of relay 102 is from grounded battery to armature 61 and normal contact of relay 115, conductor 60, the upper inner series of normal contacts of relays 103 to 110, front contact and armature 68 of relay 102, winding of relay 102, conductor 65, winding 112, armature 69 and front contact of relay 102, to grounded conductor 64. This operation of relay 102 in turn releases relays 101 and 111 by removing battery as a result of the opening of the upper inner normal contact of relay 102 by the operation of its armature 68. The reoperation of relay 117 ends the second ground pulse and removes the shunt ground from relay 112, allowing the latter to operate and prepare a circuit for relay 103 by placing battery on armature 71 and front contact of relay 102, through the engagement of armature 70 and front contact of relay 112.

The third ground pulse, due to the release of relay 117, operates relay 103 thereby releasing relays 102 and 112 by the removal of battery by the operation of armature 72 of relay 103. Relay 103 in turn locks by circuit over its armature 73 and the winding of relay 111. This circuit is as follows: grounded conductor 64, front contact and armature 73 of relay 103, conductor 62, winding 111, conductor 59, winding 103, armature 72 and front contact of 103, the inner upper normal contacts of relays 104 to 110, conductor 60, normal contact and armature 61 of relay 115, grounded battery. The reoperation of relay 117 again removes the shunting ground from armature 57 of relay 111 and permits the latter relay to operate from the locking circuit of relay 103.

The fourth ground pulse operates relay 104 and locks through relay 112 which latter subsequently reoperates. Relay 104 releases relays 103 and 111. The circuits and mode of operation are similar to that described in connection with relay 102.

The fifth ground pulse operates relay 105, in turn releasing relays 104 and 112. After the removal of the ground pulse, relay 111 then operates.

The sixth ground pulse operates relay 106 which in turn locks through the winding of relay 112 which latter is reoperated upon the removal of the ground pulse at relay 117. The operation of relay 106 in turn releases relays 105 and 111.

The seventh ground pulse operates relay 107 which in turn locks through the winding of relay 111 which does not operate. The operation of relay 107 in turn releases relays 106 and 112. Relay 111 subsequently operates.

The eighth ground pulse operates relay 108 which locks through the circuit of relay 112. The operation of relay 108 in turn releases relays 107 and 111. The reoperation of relay 117 removes shunting ground and allows relay 112 to operate through locking circuit of relay 108.

The ninth ground pulse operates relay 109, which latter locks through the winding of relay 111. The operation of relay 109 releases relays 108 and 112. The reoperation of relay 117 again removes the shunting ground and permits relay 111 to operate over the locking circuit of relay 109. The code call selector circuit E now has its relays 113, 111 and 109 in actuated position.

The selection circuit B now has preliminary pulse relays 24 and 28 in actuated position with all of its other relays locked out of their normal circuits. The conversational line circuit D now has its relays 117 and 118 in actuated position. One or the other of the link relays 23 and 29 will be in operated position depending upon the switchboard circuits. In the description thus far, the operation of the code call apparatus has been setting up the particular code call desired. The code call signal itself has not been given.

The means for actuating the signal will now be described. The completion of the last ground pulse of the digit dialed, removes the ground from armature 56 of relay 114 and in turn removes ground off of relay 113. Although this relay is a slow relay, the continued absence of ground permits it to release. Relay 111 at its armature 74 and front contact, places ground upon the inner lower contact of relay 113 so that the release of the latter's armature 75 in turn places ground upon relay 114. The latter operates its armatures 55 and 56, thereby precluding any further stepping of the relay chain 101 to 112, inclusive.

If the relay chain E had locked upon an even numbered relay with the consequent operation of relay 112, the ground for relay 114 would then have been provided by the armature 82 and front contact of relay 112.

The release of relay 113, at its armature 75, provides a ground through armature 76 and normal contact of relay 115, and conductor 77, for relays 19 and 21. This ground starts into operation, the code call interrupter starting relays to initiate relay chain I to 18, inclusive. Relay 19 is slow to release and relay 20 is slow both on pick-up and release. The operation of these two relays, together, assures a slow sequential movement of the relay chain C and the consequent slow code call.

The ground on conductor 77 completes a circuit for relay 21 to grounded battery. The relay operates and locks through the armatures of relays 111, 113 and 115. This ground also completes a circuit for relay 19 through armature 78 and normal contact of relay 20. Relay 19, at its armature 79 and front contact, placed ground upon the winding of relay 20 causing the latter to operate. The operation of relay 20 at armature 50 removed the ground from conductor 51 and from armatures 40 to 49, inclusive, of the preliminary pulse relays, and more particularly 40 to 43, inclusive, of relay 28; and placed ground upon the conductors 80 and 81.

Relay 20 in operating breaks the circuit for relay 19, at its armature 78 and normal contact. The release of relay 19 at its armature 79 and front contact, in turn removed ground from relay 20 to release the latter. The release of relay 20 in turn restores ground to conductor 51, and also at its armature 78 to relay 19. Relay 19 in turn reoperates and completes a circuit for the reoperation of relay 20.

Every time that relay 20 is energized, it will place ground upon conductors 80 and 81. Relay 21 at its armature 83 and front contact places battery on conductors 84 and 85. Upon each actuation of relay 20, while relay 21 is energized, battery and ground, respectively, will be placed upon one of the chain of relays 1 to 16 by conductors 85 and 81.

The operation of each of the chain of relays 1 to 16 will prepare a circuit for the next relay in sequence and trip the locking circuit of the last relay of the sequence. The odd numbered relays will lock up through the relay 17 and the even numbered relays will lock up through the winding of relay 18. A more detailed explanation of this operation follows.

The operation of relay 20 at its front contact and armature 50, places ground on conductor 80 to armature 86 and normal contact of relay 17, conductor 81, winding of relay 1, through the upper inner normal series of contacts of relays 2 to 16, inclusive, to conductor 85, conductor 84, front contact and armature 83 of relay 21 to grounded battery. Relay 1 operates and locks through the winding of relay 17 over the following circuit: grounded battery, armature 83 and front contact of relay 21, conductor 84, conductor 85, series of upper inner normal contacts of relays 2 to 16, winding of relay 1, conductor 81, winding of 17, conductor 87, armature 88 and front contact of relay 1 to grounded conductor 89. Relay 17 was shunted by the initial operating ground pulse and did not operate. The release of relay 20 removes the shunting ground from relay 17 permitting the same to subsequently operate with the consequent opening at its

armature 86 of the initial operating circuit for relay 1. The operation of relay 17 at its armature 90 and front contact connects the grounded battery to armature 91 and front contact of relay 1 to preset the circuit for the operation of relay 2.

The release of relays 19 and 20 and the subsequent reoperation of relay 20 again places ground on conductor 80 to operate relay 2 by means of the following circuit: ground, armature 50 and front contact of relay 20, conductor 80, armature 92 and normal contact of relay 18, conductor 93, winding of relay 2, front contact and armature 91 of relay 1, conductor 94, front contact and armature 90 of relay 17, conductor 84, front contact and armature 83 of relay 21, to grounded battery. Relay 2 operates and locks through winding of relay 18, which latter does not operate due to a shunting ground. Relay 2 locks over the following circuit: grounded battery, armature 83 and front contact of relay 21, conductor 84, conductor 85, upper inner normal series of contacts, relays 3 to 16, front contact and armature 95 of relay 2, winding of relay 2, conductor 93, winding of relay 18, conductor 96, armature 97 and front contact of relay 2 to grounded conductor 89. The operation of relay 2 releases 1 and 17 by the opening of the battery circuit by the operation of armature 95 at break-after-make contact of relay 2. Armature 98 of relay 2 prepares a circuit for relay 3. The release of armature 20 removes the shunting ground from relay 18 and permits the latter to operate.

The circuit is now set for the first preliminary pulse of the code call signal which will be sounded upon the release of relay 20. The release of relay 20 at its armature 50 and normal contact, restores ground to the preliminary pulse relay armatures over conductors 51 and 52. It also provides a ground from armature 43 and front contact of relay 28, front contact and armature 99 of relay 2, conductor 100, normal contact and armature 119 of relay 113, conductor 120, to the winding of the code signal relay, to grounded battery. The code call signal relay 22 is energized, operating its armatures to complete a local circuit for the multipled code call signals throughout the particular store, factory, office or other installation. The operation of relay 20 will again remove the ground from conductor 51 thereby deenergizing relay 22. The next pulses to operate relay 22 will come from armature 42 of relay 28, and armature 122 of relay 3; or armature 41 of relay 28 and armature 123 of relay 4 and finally from armature 40 of relay 28 and armature 124 of relay 5.

Relays 2, 3, 4 and 5 of the code call interrupter circuit C thereby provide for the preliminary pulses of the code call interrupter. Relay 6 does not have an armature controlling the code call interrupter. It therefore merely provides a means for continuing a sequence of relay operation.

The operation of relay 3 in turn releases relays 2 and 18, and then locks up through the winding of relay 17 which latter operates upon the release of relay 20. The operation of relay 3 prepares a circuit for relay 4. Relay 3 at its armature 122 completes a second preliminary pulse of the code call signal over the following circuit: ground to armature 50 and normal contact of relay 20, conductor 51, conductor 52, armature 42 and front contact of relay 28, front contact and armature 122 of relay 3, conductor 100, normal contact and armature 119 of relay 113, conductor 120, winding of code call signal relay 22 to grounded battery.

The next ground pulse set up by relay 20 at its armature 50 and front contact, operates relay 4 thereby releasing relays 3 and 17, and locking up through relay 18. The release of relay 20 again places ground upon conductor 52 through armature 41 and front contact of relay 28 from front contact and armature 23 of relay 4, conductor 100, normal contact and armature 119 of relay 113, conductor 120, winding of relay 22 to grounded battery setting up the third preliminary pulse of the code call. The reoperation of relay 20 operates relay 5 releasing relays 4 and 18 and locking up through relay 17 which latter operates upon the release of relay 20. The release of relay 20 sets up the fourth and last preliminary pulse of the code call from conductor 52, armature 40 and front contact of relay 28, front contact and armature 124 of relay 5, conductor 100, etc. This terminates the preliminary series of pulses or signals on the code call.

If the dialed code call circuit number is such as to seize the line CL1 instead of CL4, only one preliminary pulse would have been sounded and this by armature 124 of relay 5. In such a case, relays 2, 3 and 4 would have operated as part of the chain of relays C, but they would not complete a circuit for the code call signal. In this instance, relay 25 would have locked up instead of relay 28 and the circuit to the code call device would have been through armature 124 of relay 5 and armature 49 of relay 25.

Relay 6 operates and the code call skips one pulse due to the absence of the code call armature on relay 6.

The operation of relays 7 to 15 in step by step sequence will follow in the same manner as described in connection with relays 1 to 6, each even numbered relay locking through relay 18 and each odd numbered relay locking through relay 17.

The operation of relay 7 at its armature 125 and front contact sets up the first impulse of the final portion of the selected code call signal. Relay 109 was locked up as a result of the selection so that nine code pulses will be given by the relays 7 to 15, inclusive. The first pulse will be given after relay 7 has operated upon the release of relay 20. This circuit is as follows: ground, armature 50 and normal contact of relay 20, conductor 51, front contact and armature 125 of relay 7, conductor 126, normal contact and outer lower armature 127 of relay 8 and series relays 9 to 15, inclusive, conductor 128 to front contact and armature 129 of relay 109 to normal contact and armature 130 of relay 110, conductor 100, normal contact and armature 119 of relay 113, conductor 120, winding 22 to grounded battery. The operation of relays 8 to 15, inclusive, set up the additional pulses through the armature 129 of relay 109.

After the operation of relay 15 and the completion of the last code call pulse, the chain of relays 1 to 16 continues its sequential operation until stopped. Each time a sequence is completed, another code call is sounded. This continues until the code call is terminated by either an answer, or abandonment by the calling party.

The change-over from sounding of one sequence to another will be described. The operation of relay 20 places ground on relay 16 by the following circuit: ground, armature 50 and front contact of relay 20, conductor 80, armature

92 and normal contact of relay 18, conductor 93, the normal upper inner contact of relay 1, conductor 131, to winding of relay 16. Battery is supplied from grounded battery through armature 83 and front contact of relay 21, to conductor 84, armature 90 and front contact of relay 17, conductor 94, armature 132 and front contact of relay 15, to winding of relay 16. Relay 16 operates and locks through its upper inner armature and the winding of relay 18 which latter does not operate until the release of relay 20. Relay 16 locks over the following circuit: grounded battery, armature 83 and front contact of relay 21, conductor 84, conductor 85, front contact and armature 133 of relay 16, winding of relay 16, conductor 131, normal contact of relay 1, conductor 93, winding of relay 18, conductor 96, armature 134 and front contact of 16, to grounded conductor 89. Relay 16, in operation, releases relays 15 and 17. The lowermost armature of relay 16 is not connected to the code call device so it does not set up a code pulse.

The reoperation of relay 20 operates relay 1 by the following circuit: grounded battery, armature 83 and front contact of relay 21, conductor 84, armature 135 and front contact of relay 18, conductor 136, armature 137 and front contact of relay 16, armature 138, winding of relay 1, conductor 81, armature 86 and normal contact of relay 17, conductor 80, front contact and armature 50 of relay 20, to ground. Relay 1 in operating trips 13 and 16, and locks through winding of relay 17 over the circuit: grounded conductor 89, front contact and armature 88 of relay 1, conductor 87, winding of relay 17, conductor 81, winding of relay 1, series of normal contacts of relays 2 to 16, conductor 85, conductor 84, armature 83 of 21, to grounded battery. The sequence and code call will now be repeated.

Had the calling party dialed an assigned number 940 instead of 949, relays 110 and 112 would have locked up for the code selection in chain E. Since the pulse armature of relay 16 is not connected to the code call circuit, the call then sounded would only contain the four preliminary pulses:

— — — —

When the called party hears the code call signal and dials the code call answering number from any telephone, to seize answering line AL1, relay 116 will be operated from tip and ring battery of the link used through repeating coils RC3 and RC4. This completes the conversational circuit. The code call signals can only be influenced when relay 1 operates. This feature of the system provides for the complete sounding of a code call, to preclude the sounding of partial signals resulting in improper code calls.

The answering party can only control the code call signals to stop them by operating relay 116 just prior to the operation of relay 1. Relay 116 will remain energized and as soon as relay 1 operates, a circuit will be completed for relay 115 as follows: grounded common 89, front contact and armature 140 of relay 1, conductor 141, front contact and armature 139 of relay 115, conductor 142, normal contact 143 of relay 115, winding of relay 115 to grounded battery. Relay 115 operates and locks over its make-before-break contact and armature 144, to ground through armature 145 and front contact of relay 118. It releases relays of the interrupter chain by removing ground at its armature 76, thereby releasing relays 21, and 19 or 20 whichever is in at the moment. The release of relay 21 in turn releases relays 17 and 1 by removing battery.

Relay 115 in turn also releases relays 111 and 109 by removing battery at its armature 61. Relay 111 in turn removes ground at armature 74 and releases relay 114.

A conversational circuit is available with relays 24, 28, 115 to 118, inclusive, energized. The code call device cannot be initiated during the conversation because of the artificial busy test on lines CL1, CL2 and CL3, as well as the lack of battery in chain 101 to 112 due to relay 115.

At the end of the conversation, the called party controls only relay 116, irrespective of whether he hangs up first or last.

The calling party in hanging up, releases relays 28 and 24, also 117, 118 and 115. The release of relay 28 removes the busy test from the code call lines and also releases relay 24. Relay 117 removes ground from relay 118; which latter in turn opens the circuit of relay 115 at armature 145, and relay 116 at armature 54'.

Should the calling party abandon the call before the called party answers, thereby releasing relays 117 and 118, relay 114 will be operated from grounded armatures 74 or 82 of relays 111 or 112, to armature 75 of relay 113, to winding of relay 114 to grounded battery. This will complete a circuit for relay 115, at armature 146 and front contact of relay 114, through armature 147 and normal contact of relay 118, which will operate on the cutoff ground from relay 1 at the end of a complete code, and release the selected chain relays 101 to 112 of the group E, which in turn release relays 114 and 115 to restore the circuit to normal. The circuit is: grounded battery to winding of relay 115, contact 143, conductor 142, armature 147 and normal contact of relay 118, armature 146 and front contact of relay 114, conductor 141, armature 140 and front contact of relay 1, conductor 89 to ground.

Although a preferred embodiment of this invention is illustrated, and the preferred method of operation described, variations within the true spirit and scope of the same are to be determined by the appended claims.

Having thus described my invention, what I claim is new and desire to secure by United States Letters Patent is:

1. In an automatic telephone system, a code-call sending device, paths incoming thereto corresponding respectively to different telephone numbers, at least one of said telephone numbers having a plurality of suffixes, automatic switching equipment for extending connection to any one of said paths responsive to the dialing of the telephone number corresponding thereto, said code-call sending device being thereafter responsive to a dialed suffix of the telephone number, and means in said sending device for transmitting a code call of an identity depending both upon the path over which connection was made therewith and the suffix thereafter dialed.

2. In combination, a code-call sending device, paths incoming thereto, means for making connection therewith over any one of said paths, means subsequently controlled over any said path by which connection is made for imparting any one of a plurality of settings to the device, and means included in said device for sending out a code call of an identity depending both upon

the path over which connection was made therewith and the said setting imparted to the device.

3. In combination, a code-call sending device, means for effecting connection with said device responsive to the calling of any one of a group of call numbers, means for directively setting said device over the effected connection, and means for thereafter operating said device to transmit a two-digit code call of which one of the digits is of a value depending upon the number called to effect connection with the device, the other digit being of a value depending upon the setting subsequently imparted to the device.

4. In combination, a code-call sending device, paths incoming to said device, means for effecting connection with said device over any one of said paths, means for directively setting said device over the effected connection, and means for thereafter operating said device to transmit a two-digit code call of which one of the digits is of a value depending upon the path used to effect connection with the device, the other digit being of a value depending upon the setting subsequently imparted to the device.

5. In combination, a code-call line, a code-call sending device, paths over which connection may be extended to said device, setting relays associated respectively with said paths, each of said relays adapted to be operated responsive to the making of connection with said device over the associated path, a recording device common to all said paths and arranged to be variably set over any path, and sending means controlled in accordance with which of said setting relays is operated and in accordance with the setting of said recording device for sending out a code-call over said line.

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