

Nov. 17, 1931.

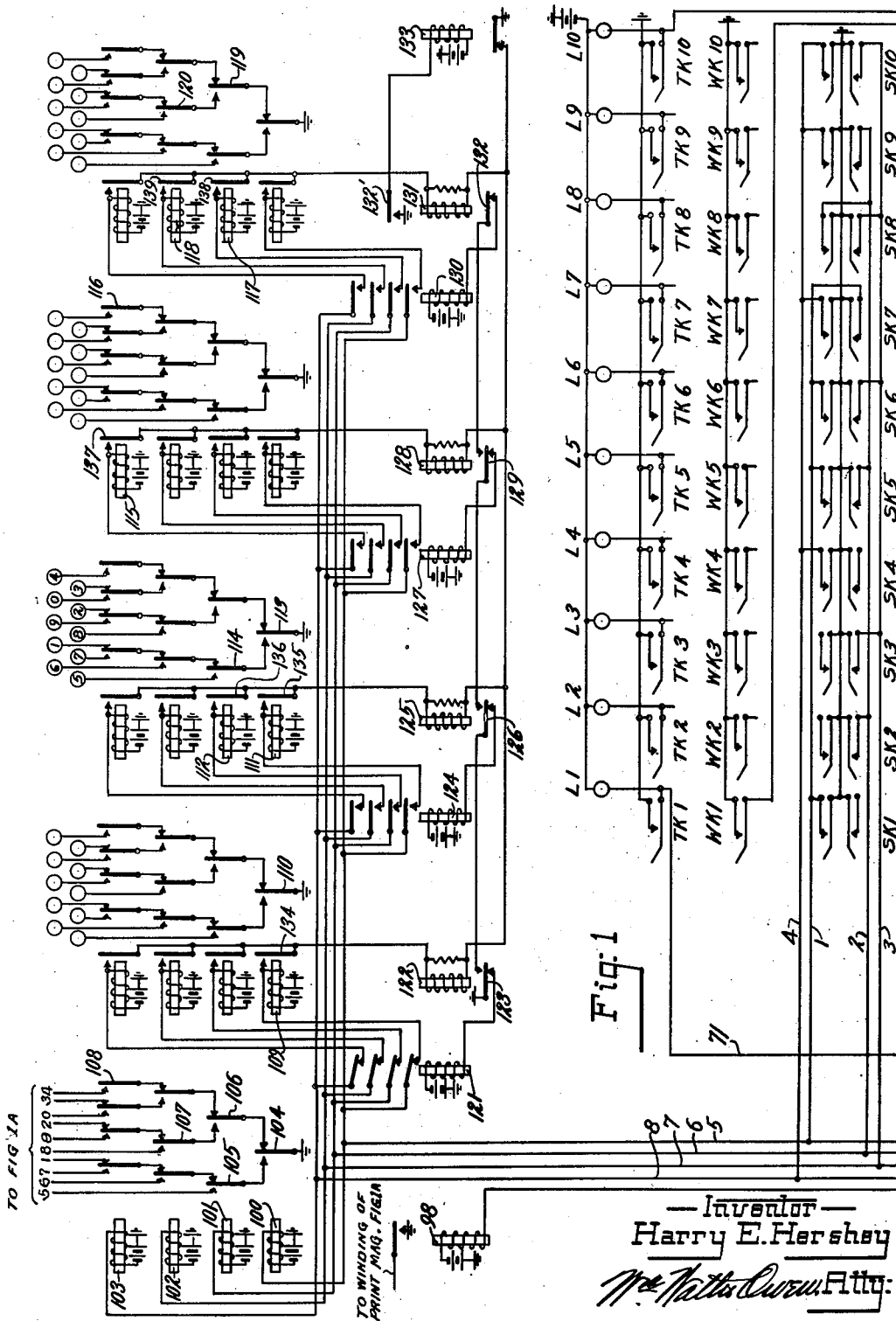
H. E. HERSHEY

1,832,118

SIGNALING SYSTEM

Filed May 3, 1928

4 Sheets-Sheet 1



Nov. 17, 1931.

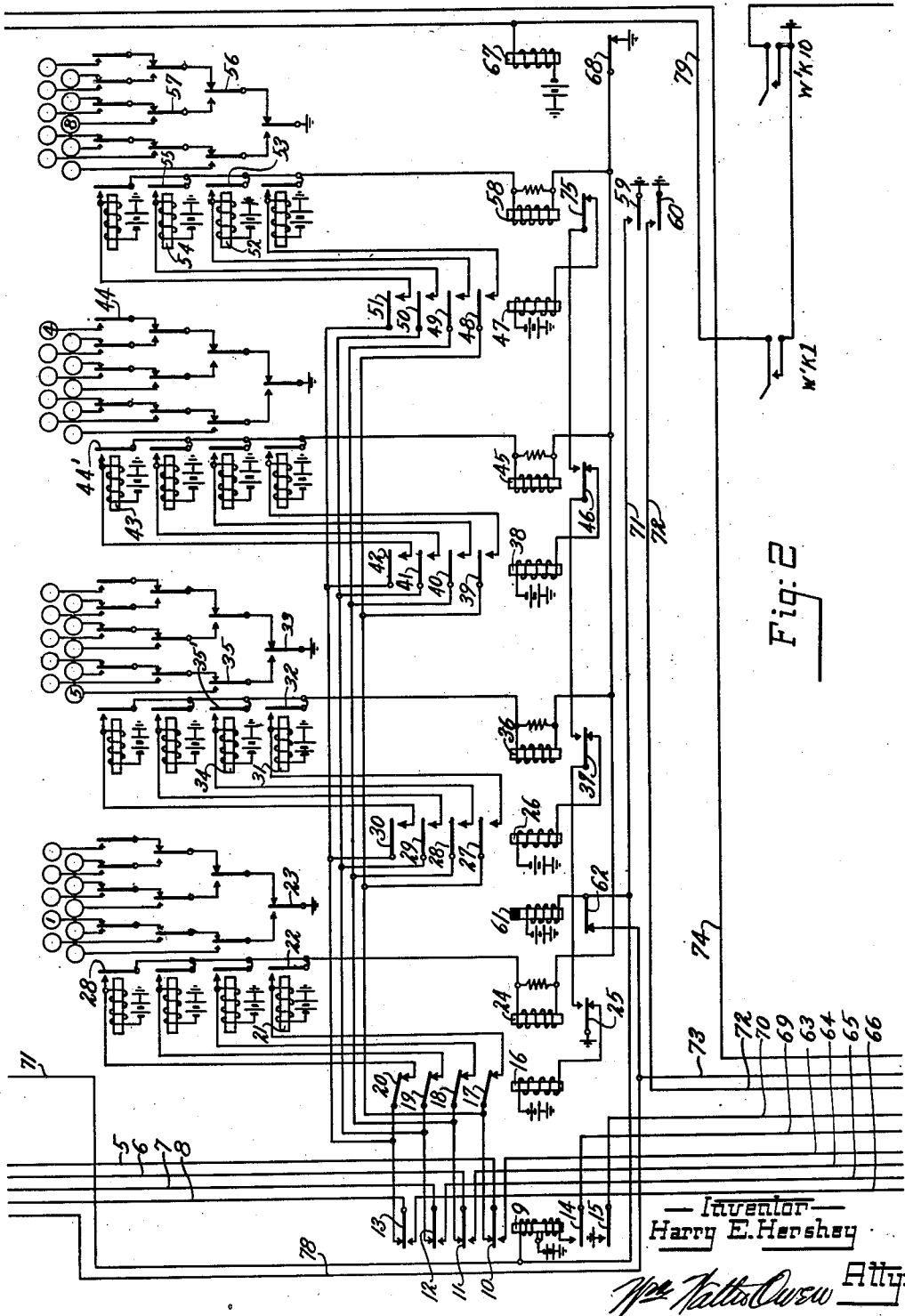
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SIGNALING SYSTEM

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4 Sheets-Sheet 2



Nov. 17, 1931.

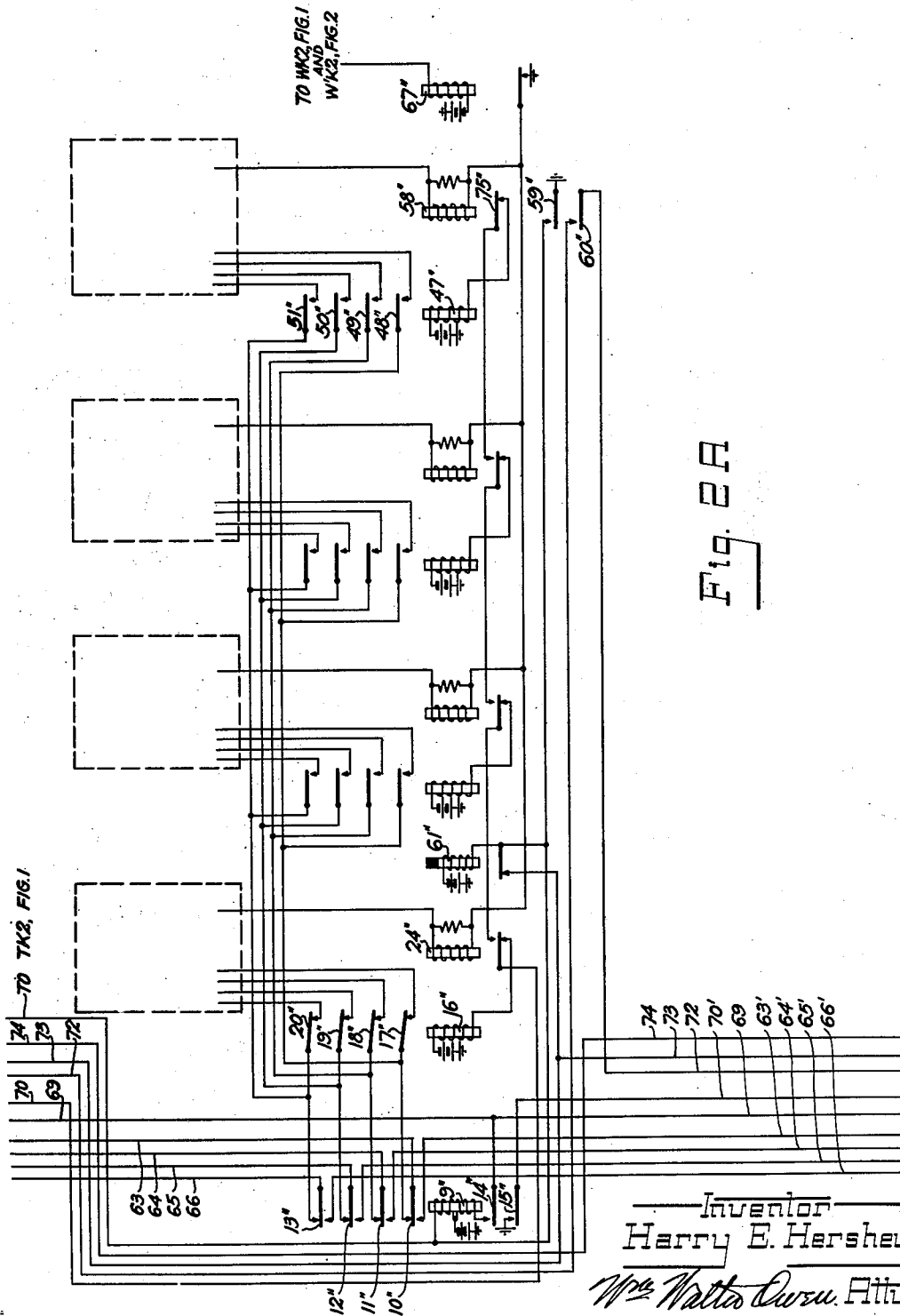
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SIGNALING SYSTEM

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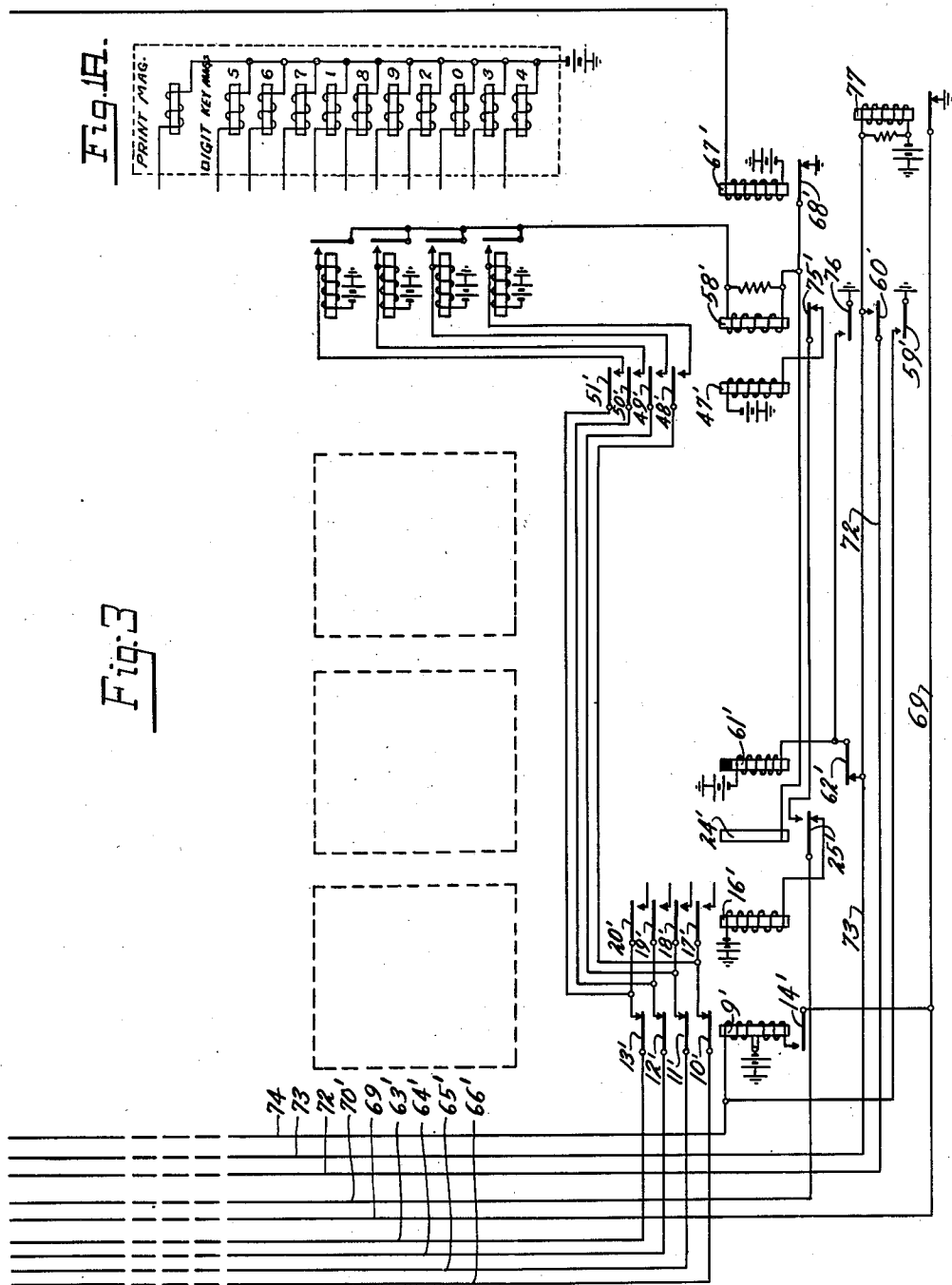
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SIGNALING SYSTEM

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4 Sheets-Sheet 4



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SIGNALING SYSTEM

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This invention relates in general to signaling systems, but more particularly to such systems in which key senders are employed for transmitting digits representing numbers to a remote station where the register panels are located, the panels being of the lamp type which, when lighted, exhibit numbers.

A system of this type is particularly advantageous in such places as department stores where a great deal of package "checking" is done by the patrons. In most cases, the stores provide "checking" service for their patrons. The "check-room" is usually located on the first floor where it will be most conveniently accessible. Because of space requirements, it is usually necessary that the "checked" parcels be transferred to one of the basements by elevator, where storage space is available. When a patron returns for his bundle or parcel, the "check-room" must signal the package number to the storage room, the attendant of which will send that package up to the "check-room."

The system of my invention is one which will enable the "check-room" attendant to quickly and reliably signal the storage room, transmitting to the storage room the number, or numbers, of the package, or packages, desired. It provides the attendant with a key set of ten keys numbered from 1 to 0, which are depressed to transmit the package number to the storage room. It provides the attendant a panel which will indicate all numbers which he writes upon the keys, so that he may determine whether or not he has transmitted the correct number. It provides an electrical printing recorder, so that a permanent record may be made of all the numbers transmitted. It provides at the storage room several register panels in order that more than one number may be transmitted, so that there will be as little delay as possible in returning the packages to their owners. It provides both the attendant at the "check-room", hereinafter called the sending station, and the attendant at the storage room, hereinafter called the receiving station, means by which either may erase the numbers registered on the panels.

A complete understanding of the invention may be had by reference to the description which is to follow, in conjunction with the accompanying drawings comprising Figs. 1 to 3, inclusive.

Fig. 1 shows a diagrammatic representation of the equipment located at the sending station. That equipment is comprised of a bank of lamps divided into groups of ten lamps each. Associated with each group of ten lamps is a group of four relays, which, by means of their armatures, control spring contacts for completing the circuits of the lamps. The number of lamp groups and associated relay groups depends upon the number of digits in the signals to be transmitted. In the present case, it is assumed to be a four-digit system. At the sending station there are also three strips of ten keys each. These strips of keys are the non-locking set-up keys SK1 to SK10, inclusive, the non-locking wipe-out keys WK1 to WK10, inclusive, and the locking transfer keys TK1 to TK10, inclusive. The set-up keys are used to transmit the signals desired. Upon the first depression of one of those keys, a relay, or a combination of two of the relays of the group associated with the first group of lamps, operates, to complete a circuit for one of the lamps to exhibit a letter or numeral corresponding to the key pressed, in the well-known manner. The second depression of any one of the keys will cause the lighting of the corresponding lamp in the second group, and so on until all the digits of the signal have been transmitted, which in this case is assumed to be four.

At the very left of Fig. 1 is shown another group of four relays which control circuits for an electrically operated adding-machine which will make a permanent record of the number written upon the lamps. Such an adding machine is represented by the rectangle, Fig. 1A, within which are shown the electro-magnets which operate the ten digit keys and the print bar of any well known electrically operated adding machine of the ten-digit key type, which, for sake of simplicity of the drawings and since it in itself does not comprise a part of this invention,

has not been shown in the drawings. These electromagnets are preferably of the solenoid type and are so positioned with respect to the digit keys and the print bar of the adding machine that the energization of one of the digit key magnets will cause its armature to depress the associated digit key as if it had been manually depressed, while the energization of magnet associated with the print bar, depresses the print bar to cause the electrical operation of the adding machine to print on the record roll the numerals stored in the machine by the depressions of the digit keys and to advance the record roll after the printing operation in the well known manner.

Figs. 2, 2A and 3 show the diagrammatic representation of the equipment at the remote receiving station. This equipment is comprised of several lamp and relay equipments which are similar to that shown in Fig. 1. The first set of equipment corresponding to the first register panel has been shown in detail in Fig. 2. The second set corresponding to one of the panels, intermediate the first and last panels, has been shown in Fig. 2A. The lamps and their associated relays have been represented by rectangles, since they are identical with those of Fig. 2. Only a part of the last set has been shown since the remainder of it is identical with that of the first set. The number of these sets to be installed depends upon the traffic requirements. It is not thought necessary to show all of these sets on the drawings, as it is believed a complete understanding of the invention may be had from the description of the equipment shown.

The depressions of the set-up keys at the sending station will operate the relays at the receiving station simultaneously with those at the sending station, and when the last digit of the signal has been sent, the conductors from the set-up keys will be transferred from the first register set at the receiving station to the second set.

A set of wipe-out keys is also provided at the receiving station so that the signals registered on the equipment sets at the receiving station may be wiped out from either station.

A general description of the system having been given, a detailed description will now be given.

It will be assumed that the operator at the sending station desires to write up the number 1548 on the lamps at the receiving station. As the set-up keys are numbered from 1 to 0, inclusive, the operator, in accordance with the first digit of the assumed, momentarily presses the key SK1. The pressing of that key completes a circuit for relay 21 of the first relay group of the first equipment set at the receiving station, the circuit being traceable from ground, spring contacts of

key SK1, conductor 1, conductor 5, spring 10 of relay 9 and its back contact, spring 17 of normally energized relay 16, winding of relay 21 to battery. Relay 21 operates in this circuit, moving springs 22 and 23 into engagement with their make contacts. The engagement of spring 23 and its make contact completes a circuit for one of the associated lamps, which lamp lights and exhibits the numeral "1" in the lamp panel. It might be well to state here that all of the lamps shown on the drawings are connected to battery although those connections have not been shown. The engagement of spring 22 with its make contact completes a locking circuit for relay 21 in series with relay 24, but relay 24 does not operate until after key SK1 has been released since it is short-circuited by direct ground on conductor 5.

When the operator releases key SK1, relay 24 energizes in series with relay 21. In energizing, relay 24, by moving its spring 25 out of engagement with its back contact and into engagement with its make contact, opens the circuit of relay 16 and closes the circuit of relay 26. Relay 16 deenergizes when its circuit is opened and moves springs 17, 18, 19 and 20 out of engagement with their make contacts, thereby disconnecting conductors 5 to 8, inclusive, from the first group of relays. Relay 26 operates when its circuit is closed and moves springs 27 to 30, inclusive, into engagement with their make contacts, thereby connecting conductors 5 to 8, inclusive, to the second group of relays preparatory to the registering of the second digit.

Further results of the depression of key SK1 are the closures of circuits for relays 100 and 109. The circuit for relay 109 is traceable through one of the springs and its make contact of normally energized relay 121. Relays 100 and 109 operate when their circuits are closed. Relay 100 in operating moves spring 104 into engagement with its make contact, thereby completing the first operating circuit for the adding-machine. This circuit includes the winding of the #1 digit key magnet of the adding machine, Fig. 1A, which magnet thereupon energizes and depresses the #1 digit key. Relay 109 in operating moves its springs 110 and 134 into engagement with their make contacts. The movement of spring 110 completes a circuit for one of the lamps in the associated group which lamp lights and exhibits the numeral "1" on the panel in accordance with the first digit of the signal. The movement of spring 134 completes a locking circuit for relay 109 in series with relay 122, but this locking circuit is not effective as long as key SK1 is depressed.

When key SK1 is released, the circuit for relay 100 is opened and that relay releases, opening the circuit of the #1 digit key magnet. Also when key SK1 is released, relay

109 remains energized through the locking circuit which was previously ineffective. Since relay 122 is no longer short-circuited, it will energize in series with relay 109. In energizing, relay 122 moves its spring 123, thereby opening the circuit of normally energized relay 121, and completing the circuit of relay 124. Relay 121 releases when its circuit is opened and disconnects conductors 5 to 8, inclusive, from the first group of relays of which relay 109 is one. Relay 124 operates when its circuit is completed and moves its springs into engagement with their make contacts to connect conductor 5 to 8, inclusive, to the second group of relays preparatory to the registering of the second digit of the signal at the sending station.

The results of the transmission of a signal from the sending station to the receiving station, which were obtained by the depression and release of key SK1 in accordance with the first digit of the assumed number, are the lighting of a lamp at the receiving station to exhibit the numeral "1", the lighted lamp being one of the first lamp group of the first equipment set, and the similar lighting of a lamp at the sending station, and the setting of the first digit in the adding-machine.

As the second digit of the assumed number is "5", the operator next depresses key SK5. It will be noted that the contacts of this key are connected to two conductors, namely 1 and 2. Therefore, the depression of key SK5 completes circuits for relays 31 and 34 in the second group of relays of the first equipment set at the receiving station, relays 111 and 112 of the second group of relays at the sending station, and relays 100 and 101 of the relay group at the sending station associated with the adding-machine. The relays 31 and 34 by moving springs 33 and 35 into engagement with their make contacts complete a circuit for one of the lamps of the second lamp groups, which lamp will light and exhibit the numeral "5". Relays 31 and 34, by the operation of springs 32 and 35' prepare locking circuits for themselves through the winding of relay 35. Thus, when key SK5 is released, relays 31 and 34 will remain energized and relay 36 will energize in series with each of them. The operation of relay 36 breaks the circuit of relay 26 which deenergizes to disconnect conductors 5 to 8, inclusive, from the second group of relays, and completes the circuit of relay 38, which operates to move its contacts 39 to 42, inclusive, into engagement with their make contacts to connect conductors 5 to 8, inclusive, to the third group of relays preparatory to the registering of the third digit.

The operation of relays 100 and 101 moves springs 104 and 105 to complete a circuit for the #5 digit key magnet of the adding-machine to set up the second digit.

The operation of relays 111 and 112 moves

springs 113 and 114 to light a lamp to exhibit the numeral "5" at the sending station, and moves springs 135 and 136 to complete locking circuits through relay 125 which will be effective upon the release of key SK5.

The release of SK5 opens the circuits for relays 100 and 101 which deenergize and open the circuit of the #5 digit key magnet, and removes the short circuit about relay 125, which relay energizes in the locking circuits of relays 111 and 112. Relay 125, in energizing, opens the circuit of relay 124 and completes the circuit of 127. Relay 124 deenergizes to disconnect conductors 5 to 8, inclusive, from the second group of relays, and relay 127 operates to connect those conductors to the third group of relays.

Thus, by the depression of key SK5, the number "15" representing the first two digits of the assumed number are exhibited at both the receiving and the sending stations. Also that same number has been set up in the adding-machine.

As the third digit of the assumed number is "4", the operator next depresses key SK4, thereby completing a circuit for relay 43 of the third group of relays of the first equipment set at the receiving station and completing circuits for relays 103 and 115 at the sending station, the circuits for relays 43, 103, and 115 being completed over conductors 4 and 8.

Relay 43 operates when its circuit is completed and moves its springs 44 and 44' to complete a circuit for one of the lamps of the third group to exhibit the numeral "4" and to complete a locking circuit for itself through relay 45, which circuit will be effective when key SK5 is released. Upon the release of SK5, relay 45 energizes in series with relay 43, thereupon moving its spring 46 to open the circuit of relay 38 and to complete the circuit of relay 47. Relay 38 deenergizes to disconnect the conductors 5 to 8, inclusive, from the third group of relays and relay 37 operates to connect those conductors to the last group of relays of the first equipment set.

At the receiving station, relays 103 and 115 operate when their circuits are closed. Relay 103 by moving spring 108 upon operating, completes a circuit for setting up the third digit in the adding-machine, which circuit includes the winding of the #4 digit key magnet. Relay 115 by moving its springs 116 and 137 upon operating, completes a circuit for a lamp in the associated group, which lamp lights and exhibits the numeral "4", and completes a locking circuit for itself through relay 128, opening the circuit of the #4 digit key magnet.

When SK5 is released, relay 128 operates in series with relay 115, and relay 103 deenergizes. Relay 128 upon operating moves its spring 129 to open the circuit of relay 127 to disconnect conductors 5 to 8, inclusive,

from the third group of relays, and to complete the circuit for relay 130 to connect those conductors to the last group of relays.

Since the third key has been depressed, the number "154" representing the first three digits of the assumed number, is exhibited on the first lamp panel at the receiving station and upon the lamp panel at the sending station. Also, the number "154" has been set up in the adding-machine at the sending station.

In accordance with the last digit of the assumed number, the operator depresses key SK8, thereby completing circuits over conductors 2 and 3 for relays 52 and 54 of the last group of relays of the first equipment set at the receiving station, and relays 117 and 118 of the last relay group of the equipment set at the sending station. Circuits are also completed for relays 101 and 102 of the relay group at the sending station associated with the adding-machine. Relays 101 and 102 operate when their circuits are completed to complete a circuit for setting up the last digit in the adding-machine, which circuit includes the winding of the #8 digit key magnet.

When the circuits of relays 117 and 118 are completed, those relays operate to move their springs 119, 120, 138 and 139. The movement of springs 119 and 120 completes a circuit for one of the lamps in the last lamp group, which lamp will light to exhibit the numeral "8" in the lamp panel. The movement of springs 138 and 139 completes locking circuits for relays 117 and 118 through the winding of relay 131. Relay 131 does not energize at this time because it is short-circuited by the ground on conductors 2 and 3.

When the circuits of relays 52 and 54 are completed, those relays operate and move their springs 53, 56, 55 and 57 into engagement with their make contacts. The movement of springs 56 and 57 completes a circuit for one of the lamps in the last lamp group, which lamp lights and exhibits the numeral "8" in the lamp panel. The movement of springs 53 and 55 completes locking circuits for relays 52 and 54 through the winding of relay 58, which relay will not energize as long as the key SK8 is depressed.

The lamp panel at the sending station has been furnished merely to allow the operator to check the number which he has written upon the set-up keys and on one of the lamp panels at the receiving station. The number remains exhibited at the receiving station until one of the wipe-out keys is depressed. As there are several lamp panels at the receiving station and only one panel at the sending station, it can readily be seen that in order that the operator might check every number which he writes on the set-up keys, it will be necessary to wipe out the number on the panel at the sending station as soon

as the number has been completely transmitted. This feature is accomplished automatically when the operator releases the last set-up key, in this case, key SK8. Therefore, when the operator depresses the last key, he must check the number exhibited on the lamp panel at the sending station before that set-up key is released.

When the number has been checked and the key SK8 released, relay 131 operates in series individually with the relays 117 and 118. Upon operating, relay 131 moves its spring 132 out of engagement with its back contact, thereby opening the circuit of relay 130, which relay then deenergizes and disconnects the conductors 5 to 8, inclusive, from the last relay group. Relay 131 also moves its spring 132' into engagement with its make contact, completing a circuit for relay 133. Relay 133 operates when its circuit is completed and moves its spring out of engagement with its back contact, thereby opening the circuits of relays 122, 125, 128, and 131, and the relays of each group whose locking circuits included the windings of any of those relays. All of those relays will then deenergize, breaking the circuits of the lighted lamps and restoring the equipment to normal. Relay 122 in deenergizing completes the circuit of relay 121 which operates to connect the conductors 5 to 8, inclusive, to the first relay group preparatory to the operator's sending another number. Relay 131 in deenergizing opens the circuit of relay 133 which relay will then restore to normal.

Likewise, when the key SK8 is released, the circuits of relays 101 and 102 are opened, and these relays deenergize, opening the circuit of the #8 digit key magnet. The number is now completely set up in the adding machine ready to be stamped on the usual roll of paper.

It is desired that the numbers exhibited on the panels at the receiving station remain exhibited until such a time when they are no longer needed. In order to allow the operator to send more than one signal, it is necessary to provide more than one lamp panel. As said before, the number of panels required depends upon the traffic requirements. Since the sending equipment is connected to a lamp and relay set when a signal is transmitted, means are provided to connect the sending equipment to an idle lamp and relay group immediately after the completion of the sending operation. How this is accomplished will now be described.

When the operator releases key SK8, relay 58 will energize in series individually with relays 52 and 54. In so doing, relay 58 moves its spring 75 out of engagement with its back contact, thereby opening the circuit of relay 47, which relay deenergizes and disconnects conductors 5 to 8, inclusive, from the last relay group, moves spring 59 into en-

gagement with its front contact, completing a circuit for the upper winding of relay 9 by way of conductor 71, and moves its spring 60 into engagement with its front contact to connect ground to conductor 72 for a purpose which will be described later.

Relay 9 operates when its circuit is completed and moves its springs 10 to 15, inclusive. The movement of spring 14 completes a locking circuit for relay 9 by connecting the lower winding to grounded conductor 69. The movement of springs 10 to 13, inclusive, disconnects conductors 5' to 8, inclusive, from the first equipment set and connects them to conductors 63 to 66, inclusive, which lead to the next equipment set.

Since the second, third, etc., and last equipment sets are all similar, all of them except one intermediate set and the last have been omitted, and only enough of the last has been shown to give a complete understanding of the invention. The registering relay and lamp groups of the intermediate and last equipment sets operate in the same manner as those which have just been described. In order that the depressions of the set-up keys may have effect on the last equipment set, all relays corresponding to relay 9 of the first set must be in their operated positions to connect the conductors joining the sending and receiving stations together, to the last equipment set.

Furthermore, when relay 9 operates, as said before, it moves its spring 15 into engagement with its make contact to place ground on conductor 70. The effect of connecting ground to conductor 70 in the present case is the completion of an energizing circuit for relay 16''. Relay 16'' immediately energizes and moves its springs 17'' to 20'', inclusive, to connect conductors 63 to 66, inclusive, to the first relay group of the intermediate set. From this point on until the last set-up key is released the operation is as explained for the first equipment set.

When the last set-up key is released, relay 58'' will energize in series with whichever relay, or relays, of the associated relay group is energized. Relay 58'' in energizing completes a multiple circuit for relays 9'' and 61'' at 59'': opens the circuit of relay 47'' at 75'': and at 60'' prepares a point in the chain circuit for relay 77, which circuit begins at grounded spring 60 and its make contact of relay 58, Fig. 2, and then proceeds by way of conductor 72 through the make contacts and springs, such as 60'' and its make contact, of all equipment sets, through the winding of relay 77 to battery. The purpose of this circuit will be explained subsequently.

Relay 9'' operates when the circuit for its upper winding is completed and at 14'' completes a locking circuit for itself through its lower winding to grounded conductor 69. At its springs 10'' to 13'', inclusive, relay 9''

disconnects conductors 63 to 66, inclusive, from the intermediate equipment set and connects them to conductors 63' to 66', inclusive, leading to the last equipment set.

Relay 47'' deenergizes when its circuit is opened and moves its springs 48'' to 51'', inclusive, out of engagement with back contacts to disconnect the signal conductors from the last relay group.

Furthermore, relay 9'' at its spring 15'', connects ground to conductor 70' to complete a circuit for relay 16' of the last equipment set. Relay 16' energizes to move its springs 17' to 20', inclusive, to connect conductors 63' to 66', inclusive, to the first relay group of the last equipment set. From this point on until the last set-up key is released, the operation is as explained for the first equipment set.

When the last set-up key is released, relay 58' will energize in series with whichever relay, or relays, of the associated relay group is energized. Relay 58' in energizing completes a circuit for relay 9' at 59'; opens the circuit of relay 47' at 75'; at 76' completes a circuit for relay 61'; and at 60' completes a circuit for common relay 77, which circuit is traceable over conductor 72 to ground by way of all springs 60 and their make contacts of the relays 58.

Relay 9' operates when the circuit for its upper winding is completed and at 14' completes a locking circuit for itself through its lower winding to grounded conductor 69.

Relay 47' deenergizes when its circuit is opened and moves its springs 48' to 51', inclusive, out of engagement with their back contacts to disconnect conductors 63' to 66', inclusive, from the last relay group.

A circuit is also completed for relay 77 by way of springs 76 and 62'. Relay 77 will energize as a result of the completion of its circuit and by moving its spring will remove ground from conductor 69 for a purpose which will be described later.

Relay 61', because of the slug on the armature end of its core, is slow to pull up when its circuit is completed. However, after an interval it energizes and by moving spring 62' opens one of the circuits for relay 77.

Returning now to the operation of the first set, when relay 58 operates to complete a circuit for relay 9 to switch the conductors 5 to 8, inclusive, to the next idle set, relay 58 at 59 also completes a circuit for relay 61 and a circuit for relay 77, Fig. 3, by way of spring 62 and its back contact. Because of the slug on the armature end of its core, relay 61 is slow to energize. However, relay 61 will energize after an interval and move its spring 62, thereby opening the circuit of relay 77. It can readily be seen that the slow action of relay 61 causes relay 77 to receive a ground impulse over conductor 73. Relay 77 energizes for an instant, removing ground from

conductor 69. The purpose of this will be described a little later.

The connection of ground to conductor 71 also lights the lamp L1 at the sending station to indicate to the operator that the signal has been written on the lamps of the first panel and advise him which wipe-out key to press in case an error has been made.

Relay 98, Fig. 1, also receives an impulse over conductor 78 as a result of the action of relay 61. The function of relay 98 is to complete the circuit of the print magnet of the adding-machine to print the number set up in the machine as a result of the action of relays 100 to 103, inclusive, and to prepare the machine for receiving another series of numerals.

When any number registered on any one of the lamp panels is no longer required, it may be erased by the operation of the wipe-out key corresponding to that panel. In the present case, since the number appears on the first panel, either wipe-out key WK1 or key W'K1 may be used. It will be assumed that the operator at the sending station wrote down the proper number on the set-up keys. Therefore, that operator would not care to erase the number at the receiving station until the attendant there was through with it. Naturally, it would then be the duty of the attendant at the receiving station to do the erasing, so he would depress key W'K1. The depression of key W'K1 places ground on conductor 79 to energize relay 67. When relay 67 energizes, it removes ground from the common conductor of relays 24, 36, 45, and 58 by moving spring 68 out of engagement with its back contact. Therefore, relays 24, 36, 45, and 58 will deenergize as will the relays of the relay groups whose circuits include the windings of relays 24, 36, 45, and 58. Accordingly, the lamps of the panel will be extinguished and relay 16 will again energize, moving its springs into engagement with their make contacts.

When relay 58 deenergizes, it opens the original energizing circuit of relay 9, but this relay remains energized since it is locked to grounded conductor 69. Relay 58 also opens the circuits of relay 61 and lamp L1. Relay 61 deenergizes and lamp L1 is extinguished.

When all equipment sets are in use, a chain circuit is completed for relay 77. This chain circuit starts at ground on spring 60 of relay 58 and proceeds by way of conductor 72 through a contact on each relay of each set similar to relay 58. Relay 77 energizes in this circuit to remove ground from conductor 69 so that when a wipe-out key is depressed, the relay similar to relay 9 of the corresponding set will deenergize to connect the equipment at the sending station with that set. The deenergization of the relay 58 of that set will break the chain circuit of relay 77

and that relay will deenergize to again place ground on conductor 69.

The purpose of relay 61 and those similar to it can now be understood. As explained before, when the relays of one of the equipment sets have been released by the depression of the wipe-out key, the relay 9 remains energized, as it is locked to conductor 69 when all of the equipment sets are not in use. Therefore, upon the completion of the next transmission of a signal, the relay 58 and the relay 61 of the set that has just received the signal, cooperate to send an impulse to relay 77 as before explained. This relay energizes for a short interval to break the locking circuits of all the relays 9, to allow those whose original energizing circuits have been opened by the depression of a wipe-out key, to release and prepare its associated equipment set for another signal.

When all of the equipments sets are in use, all of the lamps L1, L2, etc., at the sending station are lighted. Then the operator seeing this condition, knows there is no use in sending another signal. Even if the operator does send another signal, it will have no effect since relay 9' has energized and disconnected the conductors 63 to 66, inclusive, from the last set of equipment.

Let it be assumed that the first equipment set is out of order. This would be a serious matter for it would prevent the operation of the other sets if it failed to transfer the conductors 5 to 8, inclusive, to the next set. To take care of such a situation, the transfer keys have been provided, one for each equipment set. The operator would depress the key TK1 to place ground on conductor 71 to energize relay 9 to transfer conductors 5 to 8, inclusive, to the next set. A circuit is also completed for lamp L1 to notify the operator that the set has been made busy. Since key TK1 is of the locking type, the only way the relay 9 may be released is by the release of that key.

Although I have chosen the foregoing example as an illustration of my invention, it is not my intention that the invention shall be limited to the exact disclosure, as there are modifications and adaptations that can be made by those skilled in the art.

Having thus described my invention, what I consider new and desire to have protected by Letters Patent will be pointed out in the appended claims.

What is claimed is:

1. In a signaling system, a sending station, a receiving station, a plurality of lamp panels at the receiving station, means at the sending station for lighting certain lamps on the first of said panels to register a signal, means for transferring subsequent signals to the other panels one at a time for registration, and means for automatically disconnecting said first means from said panels

when all of said panels have registered signals and for automatically reconnecting said first means when any one of said panels becomes idle.

2. In a signaling system, a sending station, a receiving station, a digit register at the sending station, a plurality of digit registers at the receiving station, a key-operated digit sender at the sending station for transmitting upon the depression of the keys, a series of signals corresponding to digits to the registers at the receiving station and simultaneously to the register at the sending station, means responsive to the registration of a series of signals on a panel at the receiving station for transferring succeeding series to the other registers, whereby each series is registered on a different register at the receiving station, means operated responsive to the release of the last key of a digit series for automatically erasing the digits on the register at the sending station, means for maintaining the digits on the registers at the receiving station, and means at both stations for thereafter releasing at will the digits maintained registered.

3. In a signaling system, a sending station, a receiving station, a digit register at the sending station, series of digit registers at the receiving station, a key-operated digit sender for transmitting signals corresponding to digits to the register at the sending station and one of the registers at the receiving station upon the depression of the keys, means operated responsive to the release of the last key of a digit series for automatically erasing the digits registered at the sending station, means for maintaining said digits registered at the receiving station, means also operated responsive to said release for routing a subsequent series of digits to another register of the series, and means for erasing at will the digits maintained registered.

4. In a signaling system, a sending station, a receiving station, a digit sender at the sending station for transmitting series of signals corresponding to digits to the receiving station, a plurality of registering devices at the receiving station for registering the series of digits, means responsive to the registration of a series of digits on one registering device for transferring succeeding series to the other registering devices, whereby each series is registered on a different registering device, a plurality of indicating devices at the sending station, one for each registering device at the receiving station, and means responsive to the registrations of series of digits on said registering devices for operating the associated indicating devices to indicate upon which devices at the receiving station the series of digits are registered.

5. In a signaling system, a sending station, a receiving station, a digit sender at the send-

ing station for transmitting series of signals corresponding to digits to the receiving station, a plurality of registering devices at the receiving station for registering the series of signals, means associated with each registering device and responsive to the registration of a series of signals in the associated registering device for transferring succeeding series to the other registers, whereby each series of signals is registered on a different register, a plurality of indicating devices at the sending station, one for each registering device, means associated with each registering device and operated responsive to the registration on the associated device of a series of signals corresponding to digits transmitted by the sender for operating the associated indicating device at the sending station to indicate that that registering device is busy, and means at the sending station for operating the transfer-means and the indicating-device-operating means associated with a particular registering device in case of trouble in that device to artificially busy that particular registering device.

6. In a signaling system, a sending device for transmitting a plurality of series of signals corresponding to digits, a series of devices for registering the series of digits, means responsive to the registration of a series of digits in the first idle registering device for routing a subsequent series of digits to the next idle registering device, means responsive to the registration of a digit series in all of the registering devices for rendering the sending device ineffective, and means for erasing any one of said registrations, said rendering means responsive to said erasure to render the sending device effective again.

7. In a signaling system, a digit sender, a plurality of registers for registering series of signals corresponding to digits transmitted by the sender, means for routing the first series of signals corresponding to digits to the first idle register, means for maintaining that series of signals registered, means for routing a subsequent series of signals to the next idle register, means for erasing the registration from any one of said registers, and means responsive to the registration of a series of signals in the next idle register for rendering the register which the registration has been erased available for another registration.

In witness whereof, I hereunto subscribe my name this 1st day of May, A. D. 1928.

HARRY E. HERSHEY.