June 23, 1936. H. T. JEANDRON ET AL 2,045,146

COMMUNICATION SYSTEM

Filed March 1, 1933 3 Sheets-Sheet 1

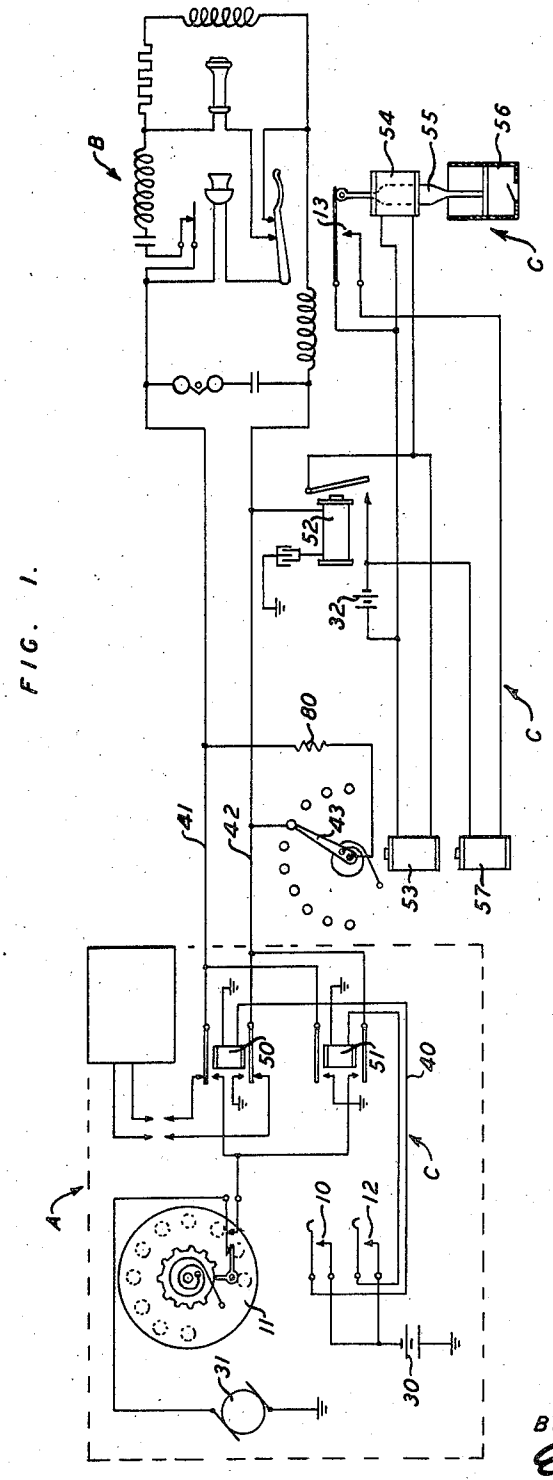


FIG. 1.

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Filed March 1, 1933 3 Sheets-Sheet 2

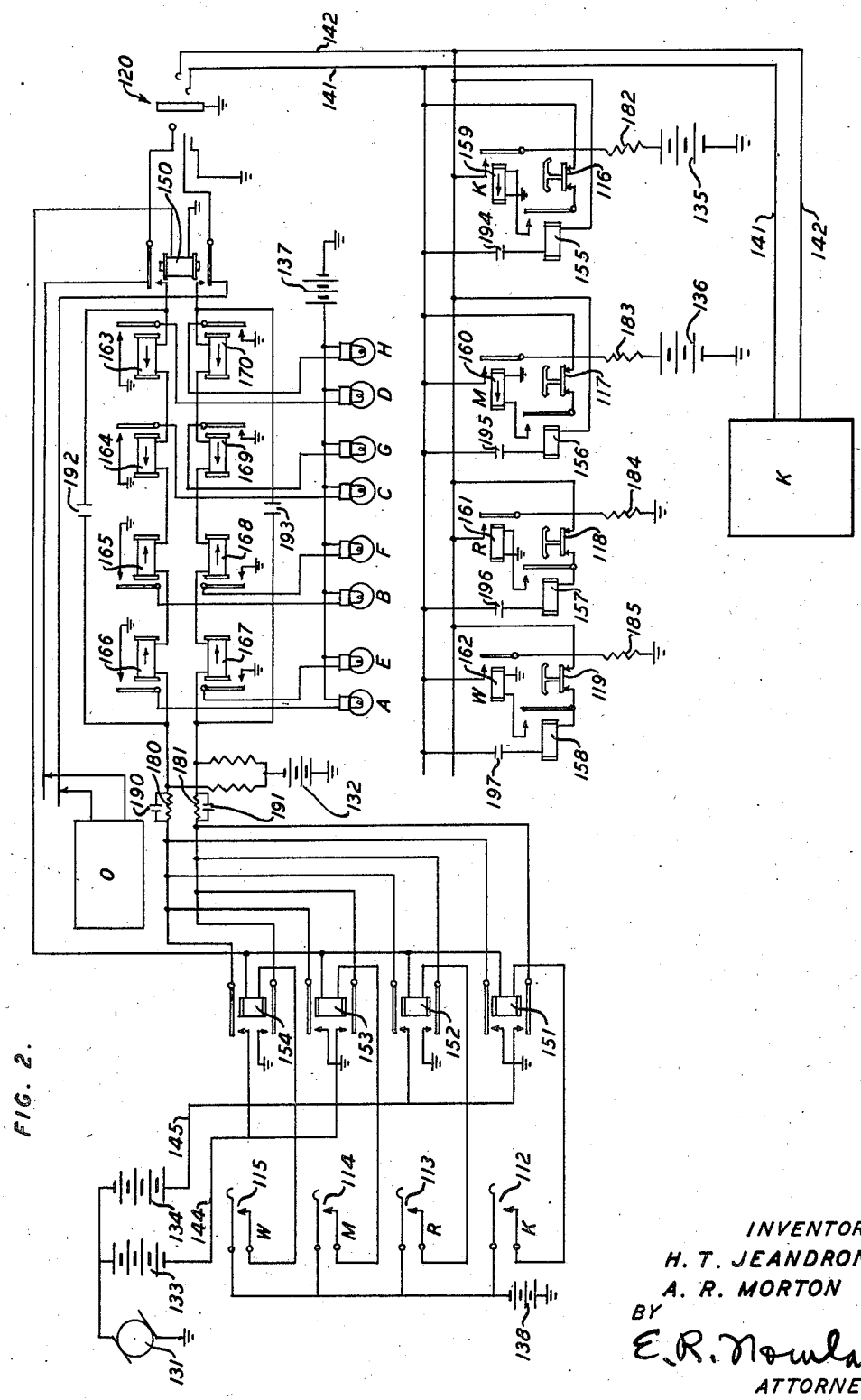


FIG. 2.

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Filed March 1, 1933 3 Sheets-Sheet 3

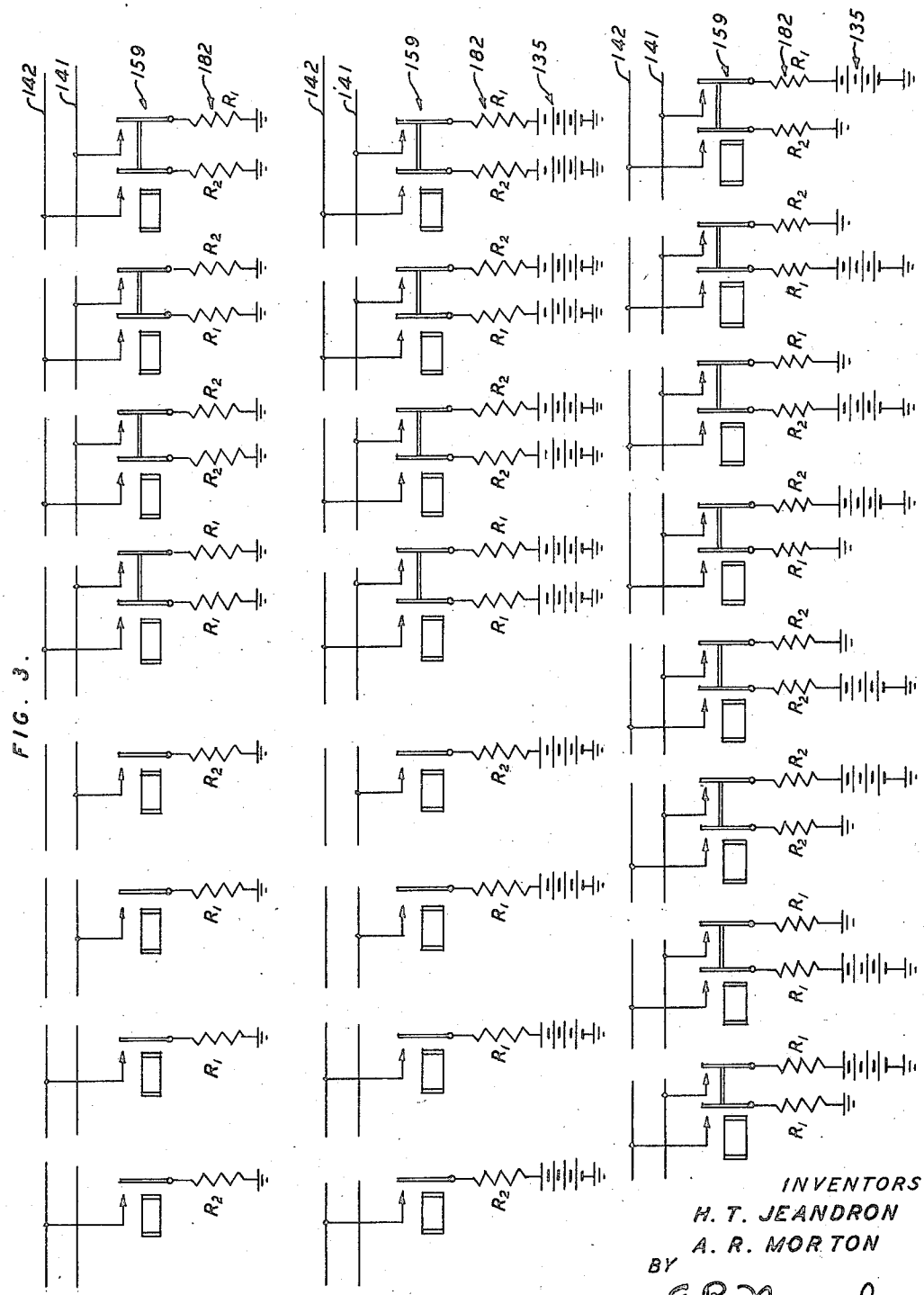


FIG. 3.

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UNITED STATES PATENT OFFICE

2,045,146

COMMUNICATION SYSTEM

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Application March 1, 1933, Serial No. 659,032

8 Claims. (Cl. 179—5.5)

This invention relates to communication systems and more particularly to a system in which a central office is enabled to secure an identificatory response from an idle or unattended subscriber's telephone by the use of a predetermined code signal.

It may happen that a telephone subscriber away from his own telephone and using, perhaps, a pay station instrument may wish to charge a toll call to his own home account. In such cases it is customary in some instances for the central office to make an independent call to the subscriber's private number and thus obtain verification before completing the call desired by the subscriber at the public telephone. If no answer is obtained from the subscriber's private telephone the verification cannot be made.

A characterizing object of the invention is the provision of means whereby a predetermined signal sent from one station to another will automatically evoke a responsive signal in return which uniquely and predeterminedly identifies or is characteristic of the second station.

It will be evident that although the invention is herein disclosed as pertaining to and embodied in a wire telephone system it is characteristically capable of being employed with and embodied in any system of communications, wherein electrical means are used to transmit messages and wherein it is desired to evoke from a distant station an automatic response which will identify the automatically responding station.

Other objects and characteristic features of the invention will appear from the detailed description below taken together with the appended drawings in which

Fig. 1 is a diagram of a manual telephone circuit showing one embodiment of the invention for the use of a one subscriber private telephone connected to a manual central office;

Fig. 2 is a similar diagram of another embodiment of the same, and

Fig. 3 is a variated diagram of a part of the arrangement shown in Fig. 2 to illustrate the scope of variability of the latter.

In carrying out the invention as herein shown and referring now to Fig. 1, there is employed the customary manual central office apparatus generally indicated by the letter A, the usual subscriber's telephone set generally indicated by the letter B, and the novel auxiliary apparatus generally indicated by the letter C.

The parts of the apparatus A and B are old and well known and will not be further described or particularized than necessary to show the application and connection thereto of apparatus C.

In the embodiment shown in Fig. 1 the customary central office ringing contacts are shown at 10. When contact is made at 10 current from the battery 30 passes through the wire 40 to ground and operates the relay 50 permitting ringing pulses from the generator 31 and interrupter 11 to pass as usual over the line wires 41 and 42 to the subscriber's set B and back to ground. If there is no personal response from the subscriber's set, the operator closes the contacts at 12 thus operating the relay 51. The operator then actuates the dial interrupter 11 which may be of any suitable type, at the code number given by the subscriber. The resulting current pulses are carried through the line wire 42 to the relay 52. This relay is thus energized the predetermined number of times. At each pulse from 11 a pulse of current flows from the battery 32 through the operating magnet 53 of the rotary selector 43. The selector 43 having been set to close the circuit at, for example, the fourth pulse will then bridge the resistance 80 across the line wires 41 and 42. This resistance is designed to produce the same effect on the line circuit as though the latter were closed through the subscriber's set B by someone lifting the receiver from the hook and thus the operator receives a characteristic response by use of the code number on the interrupter 11. This response is taken as identifying the person making the original request which may then be complied with.

The actuation of the relay 52 also permits current from the battery 32 to flow through the solenoid 54 and lift the plunger 55 breaking the contact at 13 and lifting the dasher of the dash pot 56. The dash pot and the successive pulses of current keep the contact at 13 broken until after the predetermined number of pulses has operated the selector 43 and sufficient time has elapsed to allow the operator to note the bridging of the line wires 41 and 42 by the resistance 80. When the pulses cease, the stem 55 sinks gradually into the dash pot until the contact at 13 is re-made, whereupon the current from the battery 32 flows to operate the resetting magnet 57 of the selector 43. The selector is standard apparatus and well known in the art and so is not here described in further detail.

In operation the subscriber whose private home or office telephone is B may be thought of as at a public telephone elsewhere and desirous of making a pay call to some third number and of charging the cost of the call to his own number

at B. He calls the operator at A in the usual manner and states his desire and gives his secret code number, in this case the number "four". The operator closes the contact at 10 and waits for a response and an authorization to make the charge from B. Receiving no answer, the operator opens the contact at 10 and closes that at 12 and operates the interrupter 11 to send four pulses. The above described process takes place and the operator receives the same signal from the line as though the receiver at B had been lifted. This response to the code number is taken as authority to make the charge.

The above embodiment and description are applied to the case of a single party private line. Fig. 2 illustrates another embodiment of the invention as applied to a four party line with the customary selective ringing installation. The customary apparatus for one of the four subscribers is indicated generally by the letter K from which the party line wires 141 and 142 lead to a central station jack indicated generally by the number 120. The usual A. C. ringing generator 131 working through the biasing batteries 133 and 134 supplies combined alternating and direct current to the wires 144 and 145 and thence through apparatus to be described to the jack 120 and so to the line wires 141 and 142.

The usual operator's set connected to the jack 120 is generally indicated at 0.

Assuming that subscriber has the party letter K and the secret code signal CDF and that he is at a public telephone away from home and has asked the operator to make a pay call elsewhere for him and has given the operator his home number to which to charge the pay call and his code signal by which to identify himself, the operator will call the subscriber's private home telephone to receive confirmatory authority to make the charge. If no reply is received, the operator closes the contacts 112 closing a circuit from the battery 138 to actuate the relays 151 and 150. Alternating current from the generator 131 and direct current from the battery 134 then flow through the wire 145 and the lower contacts of relay 151. The alternating current passes thence via condensers 191 and 193, lower contacts of relay 150, jack 120, line wire 141, condenser 194, relay winding 155, line wire 142, tip side of jack 120, upper contacts of relay 150, condensers 192 and 190, and upper contacts of relay 151 to ground. This current operates relay 155 closing a circuit for the direct current. The direct current passes from the lower contacts of relay 151 through inductive resistance 181, relay windings 167, 168, 169, and 170, lower contacts of relay 150, jack 120, line wire 141, button switch 116, contacts of relay 155 (closed now by the alternating current), and winding of relay 159 to ground. This current operates relay 159 and tends to operate polarized relays 167 and 168 but not polarized relays 169 and 170. This actuation of relay 159 allows current from battery 135 to pass via relay 159, line 142, jack 120, upper contacts of relay 150, windings of relays 163, 164, 165 and 166, inductive resistance 180, and upper contacts of relay 151 to ground, thus tending to actuate polarized relays 163 and 164 but not polarized relays 165 and 166. Battery 132 is connected at one side to ground and at its other side to the leads of the windings of the two sets of relays 163, 164, 165, 166 and 167, 168, 169, 170. Batteries 134 and 132 and windings 167, 168, and 159 are so balanced against each other that in the case now being considered the combined effect of the two batteries is sufficient to operate relay 168 but not relay 167. Also batteries 134, 132, and 135, resistance 182, and windings of relays 163 and 164 are so chosen that their combined effect will operate both relays 163 and 164. Closing of relays 163, 164, and 168 closes a three branched circuit from battery 137, through lamps D, C, and F in parallel, and the contacts of relays 163, 164, and 168 in parallel to ground, thus lighting lamps CDF and confirming the code identification given by the subscriber.

The alternating current first traced out above will also pass via the windings of relays 156, 157 and 158 as well as relay 155 from line wire 141 to line wire 142 and will operate these relays, but relay 160 is polarized against direct current from line wire 141 and so will not operate, while the windings of relays 161 and 162 are connected to line wire 142 and together with relays 159 and 160 are wound not to be operated by battery 132 alone. Hence in the instant case only relay 159 of this group will be actuated and only subscriber's set K to which relay 159 is assumed to belong will respond with its characteristic identificatory signal.

The button switches 116, 117, 118, and 119 are included merely for convenience to enable the subscriber to dispense with this service if he so wishes.

In analogous fashion the operation of key 112, 113 or 114 will bring a unique response from the bank of signal lamps in each case.

A code sign and its corresponding signal may be changed for any one subscriber by changing the resistance 182, 183, 184 or 185 as the case may be, by adding or removing a battery 135 or 136, by changing the relay 159, 160, 161 or 162 respectively, by inverting the connections to the line wires 141 and 142, etc. In particular, Fig. 3 illustrates twenty-four different arrangements of the signal circuit closing relay with resistances of only two different sizes available and with or without a battery. Thus a great variety of possible code signals is available for assignment to any one subscriber.

Although the invention as herein shown is illustrated as combined for use with a hand operated central station, it may obviously also be combined with the supervising operator's position of an automatically operating central station since in no case is the construction or mode of operation of the central station involved. Furthermore, the invention is not limited to application to telephone systems but by suitable modification in detail may be applied to any communication systems in which messages are transmitted electrically between two or more stations.

The embodiments of the invention herein disclosed are obviously merely illustrative and may be modified and departed from in many ways without departing from the spirit and scope of the invention as pointed out in and limited only by the appended claims.

What is claimed is:

1. In a communications system, a first station, a second station, electrical means to transmit a call signal from the first station to the second station, and electrical means for transmitting messages therebetween, in combination with means at the first station to transmit a predetermined signal distinct from the call signal to the second station, and means at the second station responsive only when the second station is idle to

the predetermined signal to return to the first station a predetermined signal.

2. In a communications system, a first station, a plurality of second stations, electrical means to transmit a call signal from the first station to any second station, and electrical means for transmitting messages therebetween, in combination with means at the first station to transmit a predetermined signal to any one of the second stations different from the call signal of that second station, and means at the particular second station responsive only when the second station is idle to the predetermined signal to return to the first station a predetermined signal.

3. In a communications system, a first station, a plurality of second stations, and electrical means for transmitting messages therebetween, in combination with means at the first station to transmit to the second stations any one of a set of predetermined signals each uniquely pertaining to one second station, means at each second station responsive only to the signal pertaining to that station to return to the first station a predetermined signal characteristic of the said particular second station, and means at the first station consisting of a plurality of lamps, operable by each predetermined return signal, to show a code characteristic of the said particular second station.

4. In a telephone system, a central station, a subscriber's station, electrical means at the central station to transmit a call signal to the subscriber's station, and electrical means for transmitting messages therebetween, in combination with means at the central station to transmit a predetermined signal different from the call signal to the subscriber's station, and means at the subscriber's station responsive only when the subscriber's station is idle to the predetermined signal to return to the central station a predetermined signal.

5. In a telephone system, a central station, a plurality of subscriber's stations, electrical means to transmit a call signal from the central station to anyone of the subscriber's stations, and electrical means for transmitting messages therebetween, in combination with means at the central station to transmit a predetermined signal different from the call signal to any one of the subscriber's stations, and means at the particular subscriber's station responsive only when the particular subscriber's station is idle to the predetermined signal to return to the central station a predetermined signal.

6. In a telephone system, a central station, a plurality of subscriber's stations electrically connected thereto, and electrical means for transmitting messages therebetween, in combination with means at the central station to send simultaneously to several of the subscriber's stations any one of a variety of electrical signals each of predetermined electrical characteristics, means at each of several of the subscriber's stations responsive to and actuable by one and only one such signal to automatically return to the central station a responsive signal characteristically identifactory of the responsive subscriber's station, and means at the central station consisting of a plurality of lamps, operable by each predetermined return signal, to show a code characteristic of the responsive subscriber's station, no two subscriber's stations being capable of responding simultaneously to the same such signal from the central station.

7. In a telephone system, a central station, a subscriber's station, and an electrical circuit connecting the same, in combination with means at the central station to send to the subscriber's station an electrical signal of predetermined sign and character and comprising a direct current component and an alternating current component, means at the subscriber's station responsive to and actuable only by the electrical signal of predetermined sign and character to return to the central office a responsive electrical signal of predetermined sign and character, and further means at the central station actuable only by the responsive signal to identify the subscriber's station responding.

8. In a telephone system, a central office and a plurality of subscriber's stations electrically connected thereto, in combination with means at the central station to send simultaneously to a group of the subscriber's stations any one of a variety of electrical signals each of predetermined sign and character and comprising a direct current component and an alternating current component, means at each of several of the group of subscriber's stations responsive to and actuable by one and only one of the variety of electrical signals to return to the central station a responsive electrical signal characteristic and identificatory of the responding subscriber's station, and further means at the central station actuable by the responsive signal to give an indication identifying the responding station, no two subscriber's stations in any one group having means responsive to the same signal.

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