

Aug. 1, 1939.

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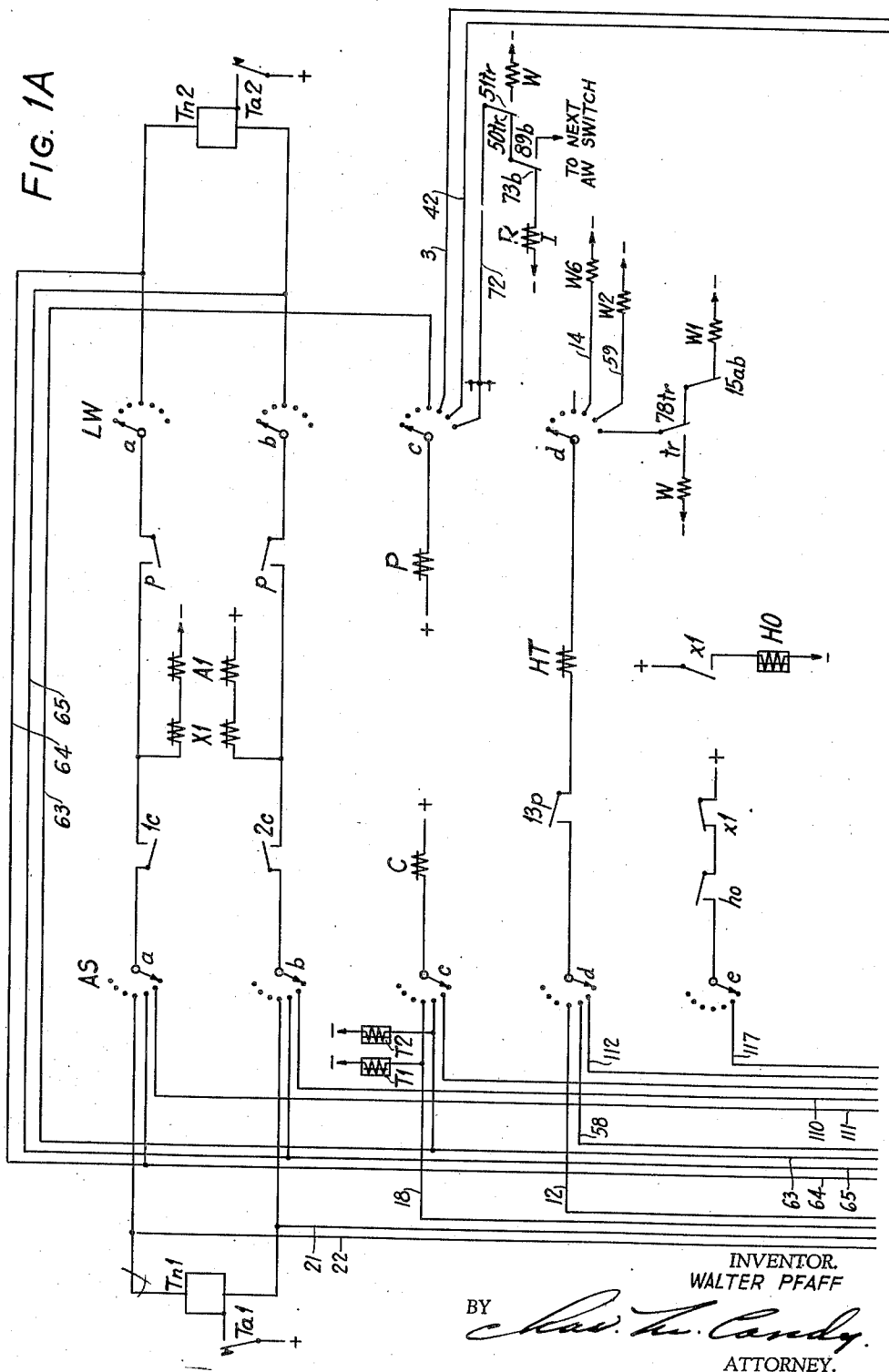
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TELEPHONE SYSTEM

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4 Sheets-Sheet 1

FIG. 1A



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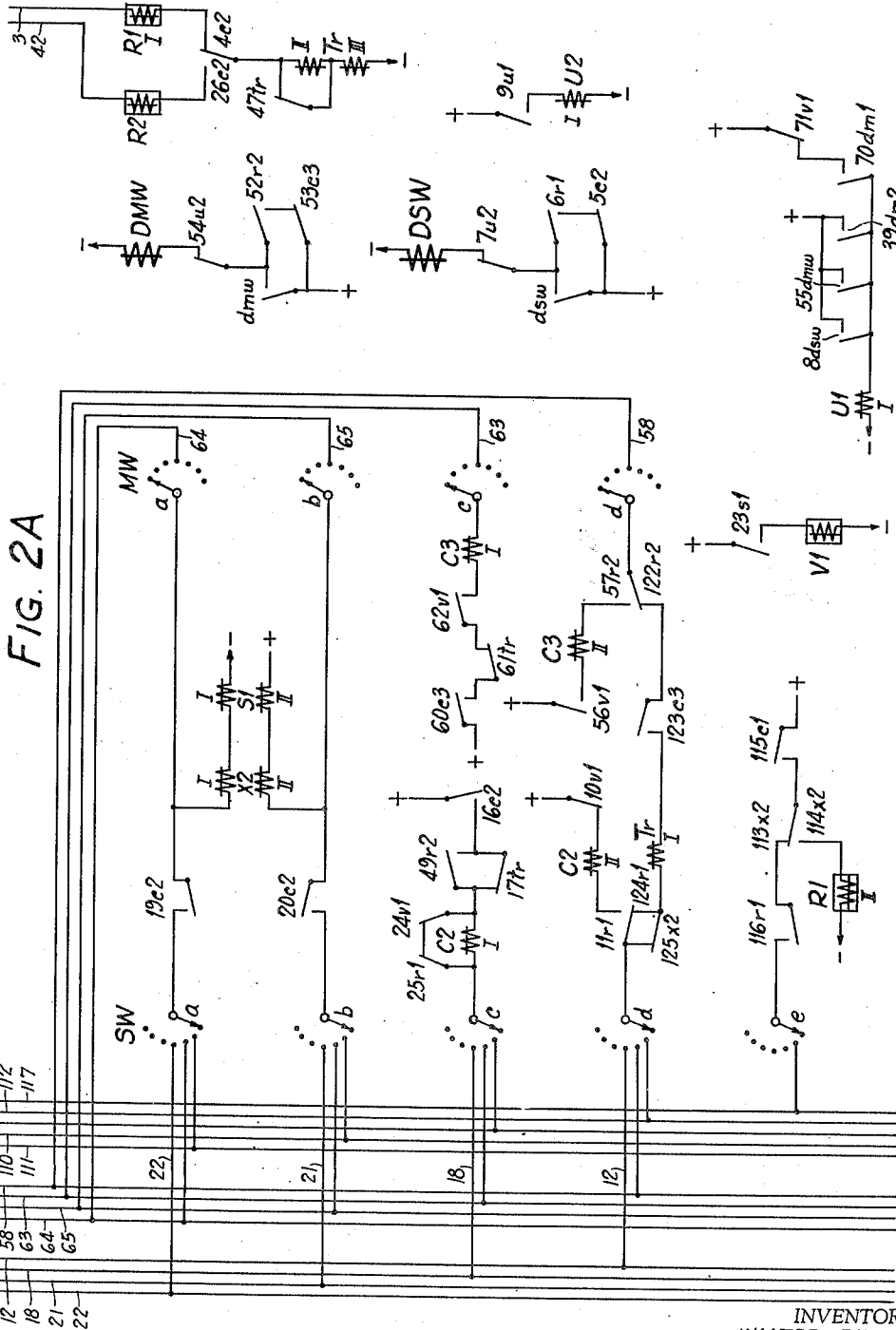
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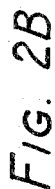
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TELEPHONE SYSTEM :

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TELEPHONE SYSTEM

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12 Claims. (Cl. 179—18)

The invention relates to a circuit arrangement for call indicating systems in association with telephone systems and aims at avoiding the withdrawal of the telephone system connecting path from the traffic when connection is established between the party who is sought and the call indicating system. This is achieved by the present invention in that the sought party causes a switch associated with the call indicating system to be set on the line of the station from which he replies while simultaneously releasing the switches of the telephone system after a reply signal has been given.

The drawings comprising Figs. 1A, 1B, 2A and 2B show an embodiment of the invention. They represent a private branch exchange system in association with a call indicating system. It may occur that a subscriber who is busy cannot answer a telephone call or that a visitor does not find the desired person at his desk. In either case the seeking party can cause a special call indicating signal to be operated at various points in the works. The desired party can then establish connection to the calling party over the reply line after giving a special signal from the nearest equipment.

The individual switching operations are as follows:

When the seeking party at the station Tn1 in Fig. 1A takes up the receiver the call finder AS is set on the calling party in the known way. After the call finder has been set the testing relay C energizes over wiper c of the call finder AS and switches through the speaking leads at contacts 1c and 2c. A feeding circuit is set up over relays A1 and X1. The differential relay X1 does not energize. When the calling party transmits a particular searching digit the final selector LW is set on a particular contact whereupon the following circuit is set up: positive, relay P, wiper c, lead 3 in Figs. 1A, 1B and 2A, winding I of relay R1, contacts 4c2 and 41tr, winding III of relay Tr and negative. In this circuit relays P, R1 and Tr energize. Relay R1 sets up the following circuit: positive, contacts 5c2, 6r1 and 7u2, rotary magnet DSW and negative. The rotary magnet DSW advances the switch SW. Over the following circuit: positive, contact 8dsw, winding I of relay U1 and negative, relay U1 is energized. Relay U1 at contact 9u1 completes a circuit for relay U2. Relay U2 opens contact 7u2 and thereby breaks the circuit for the magnet DSW. At contact 8dsw the circuit for relay U1 is opened and the latter releases and by opening contact 9u1 re-

leases relay U2. The circuit over the rotary magnet DSW is again set up over contact 7u2 so that the switch SW takes a further step forward. The rotary magnet DSW and the relays U1 and U2 operate together in the manner described until the following circuit becomes established over wiper d of the switch SW: positive, contact 10v1, winding II of relay C2, contact 11r1, wiper d of switch SW, lead 12 in Figs. 2A, 1B and 1A, wiper d of call finder AS, contact 13p, relay HT, wiper d of the final selector LW, lead 14, resistance W6 and negative. In this circuit relay C2 in Fig. 2A energizes and opens contact 5c2 in the circuit for rotary magnet DSW. The switch SW is accordingly brought to rest. The guarding 15 circuit is prepared over contact 16c2.

The relay HT energizes over the circuit over wiper d of switch SW and releases the final selector LW in the known manner (not shown) and also releases the call finder AS. The known guarding effect over wiper c of call finder AS is neutralized so that now the following guarding circuit over wiper c of switch SW in Fig. 2A can be set up: positive, contacts 16c2 and 17tr, winding I of relay C2, wiper c of switch SW, lead 18 in Figs. 2A, 1B and 1A, relay T1 and negative.

The energizing of relay C2 causes the line to be switched through at contacts 19c2 and 20c2. Thus the following circuit is established for the calling party: negative, winding I of relay S1, winding I of relay X2, contact 19c2, wiper a of switch SW, lead 22 in Figs. 2A, 1B and 1A, over the loop at station Tn1, lead 21 in Figs. 1A, 1B and 2A, wiper b of switch SW, contact 20c2, winding II of relay X2, winding II of relay S1, and positive. Only relay S1 energizes in the above circuit. Relay X2 is a differential relay. Over contact 23s1 relay V1 is energized and breaks the short-circuit for winding I of relay C2 at contacts 24v1 when contact 25r1 is closed after relay R1 is released. The release of relays R1 and Tr takes place when relay C2 energizes. Relay C2 opens contact 4c2 and closes contact 26c2. The following circuit is set up over relay V: positive, contact 31c2, winding II of relay V, wiper e of the switch D1 in position O, rotary magnet DM1, winding I of relay V and negative. In this circuit only relay V energizes; the rotary magnet DM1 is not operated.

The calling party now dials the digit for connecting up a particular calling signal.

It is assumed that the characterizing number for the desired party is the digit 6. In this case according to the embodiment the acoustic signal for the desired party consists of two short signals

followed by a long signal. Lamps L1 and L3 are operated to constitute a visible signal.

The impulse train of six impulses transmitted by the calling party is taken up by relay S1 in Fig. 2A and in Fig. 2B is repeated by contact 27s1 to the rotary magnet DM1 of switch D1. The circuit of the rotary magnet DM1 passes over positive, contacts 28v, 29r2, 30v1, and 27s1, rotary magnet DM1, winding I of relay V and negative. Relay V remains energized throughout the impulse train. When relay V falls back at the end of the train and the wipers of switch D1 are in position 6 the following circuit is established over wiper a of switch D1: negative, contact 32v, wiper a of switch D1 in position 6, lead 33, lamp L1 and positive. Over wiper b of the switch D1 the following circuit is established: negative, resistance W, contact 34v, wiper b, in position 6, lead 35, lamp L3 and positive. Thus the lamps L1 and L3 light up. Wiper c of switch D1 is also set in position 6 and is accordingly prepared for the connecting up of an acoustic signal.

When relay V releases after the impulse train the following circuit is set up for rotary magnet DM2: positive, contacts 36u2, 37v1, 66r2 and 38v, rotary magnet DM2 and negative. The rotary magnet DM2 advances the wipers of switch D2 one step and by closing contact 39dm2 in Fig. 2A causes relay U1 to be energized over positive, contact 39dm2, winding I of relay U1 and negative. Relay U2 is energized over contact 9u1. In Fig. 2B, over the windings II of relays U1 and U2 and contacts 43v, 44s1, 45r2 and 46u2 a damping circuit is established so that relays U1 and U2 operate and release slowly and thus cause the switch D2 to be stepped slowly by the rotary magnet DM2. At contact 36u2 relay U2 breaks a circuit for magnet DM2. Contact 39dm2 is opened and relay U1 releases. At contact 9u1 the circuit is broken for relay U2 so that the circuit for magnet DM2 is again established over contact 36u2. Magnet DM2 operates with relays U1 and U2 as an interrupter so that the switch D2 is advanced until the called subscriber replies. When wiper c of switch D2 reaches contacts 6, 8, 10, 11 and 12 the following circuit is established: positive, contact 40v, wiper c of switch D1 in position 6, contacts 6, 8, 10, 11 or 12, wiper c of switch D2 contact 48tr, and lead 41 over the bells at various positions in the works to negative. In rotating wiper c bridges adjacent contacts, so that ringing is not interrupted as the wiper passes over contacts 10, 11 and 12, and the bells are thus rung in two short pulses followed by one long pulse. When the wanted party becomes aware of the signal which is individual to him he proceeds to the nearest telephone set. It will be assumed that he replies from the station Tn2 shown in Fig. 1A. When the receiver has been removed the call finder AS is set on the calling line. After the call finder has been set the wanted party transmits a special relay digit whereby the final selector LW of the telephone system is set on a particular contact.

On account of this setting of the final selector LW the following circuit is set up over the test wiper c of the final selector LW: positive, test relay P, wiper c of the final selector LW, lead 42 in Figs. 1A, 1B and 2A, relay R2, contacts 26c2, 41tr, winding III of relay Tr and negative.

Relay Tr opens contacts 17tr and 41tr. Winding II of relay Tr was short-circuited so that relay Tr was made slow to operate. Shortly before relay Tr energizes relay R2 energizes. Contact 49r2 closes so that the guarding circuit passes

over winding I of relay C2 and contacts 49r2 and 16c2. Relay R2 opens contact 66r2 and prevents further operation of the rotary magnet DM2. On account of contact 45r2 being opened the damping circuit for windings II of relays U1 and U2 cannot be established when the switch MW is being set and consequently this switch is stepped rapidly. Relay Tr also opens contact 50tr in Fig. 1A and closes contact 51tr so that a calling subscriber cannot start up a public exchange switch by dialing the characterizing digit for outgoing calls. Moreover, the switch MW in Fig. 2A is prevented from testing on a calling subscriber who has dialled the public exchange characterizing digit.

Relay R2 in Fig. 2A also closes contact 52r2 so that the rotary magnet DMW is energized over the following path: positive, contacts 53c3, 52r2, 54u2, rotary magnet DMW and negative. Magnet DMW closes contact 55dmw so that relay U1 is energized. Relay U1 closes the circuit for relay U2 over contact 9u1. Relay U2 energizes and at contact 54u2 breaks the circuit for the rotary magnet DMW. Magnet DMW restores contact 55dmw to normal. Relay U1 releases so that contact 9u1 is opened and thus a circuit for relay U2 is broken. Relay U2 again completes the circuit for magnet DMW over contact 54u2. Magnet DMW is operated together with relays U1 and U2 until the following testing circuit is established: positive, contact 56v1, winding II of relay C3, contact 57r2, wiper d of switch MW, lead 58 in Figs. 2A, 1B and 1A, wiper d of call finder AS, contact 13p, relay HT wiper d of final selector LW, lead 59, resistance W2 and negative. In this circuit relay C3 in Fig. 2A energizes. By opening contact 53c3, relay C3 brings the switch MW to rest and at contact 60c3 prepares the guarding circuit over wiper c of the switch MW. Relay HT energizes in the testing circuit over lead 58 and wiper d of the call finder AS and promotes the release of the final selector and of the call finder AS in the known way. On account of the release of the final selector the circuit over wiper c of this switch and lead 42 in Figs. 1A, 1B and 2A is broken. Relays R2 and Tr release. Relay Tr closes its contacts first. The guarding circuit over which c of switch SW now passes independently of contact 49r2 over contact 17tr. After the release of relay Tr the following guarding circuit is established over wiper c of switch MW: positive, contacts 60c3, 61tr and 62v1, winding I of relay C3, wiper c of switch MW, lead 63 in Figs. 2A, 1B and 1A, relay T2 and negative. The following feeding circuit is now established for the wanted party: negative, winding I of relay S1 in Fig. 2A, winding I of relay X2, wiper a of switch MW, lead 64 in Figs. 2A, 1B and 1A over the loop at station Tn2, lead 65 in Figs. 1A, 1B and 2A, wiper b of switch MW, winding II of relay X2 winding II of relay S1 and positive.

The calling party at station Tn1 and the wanted party who has replied from station Tn2 are now connected together over the switches SW and MW in Fig. 2A.

When the subscribers have conversed together and have both replaced their receivers the feeding bridge relay S1 falls back. Relay S1 breaks the circuit for relay V1 at contact 23s1. The rotary magnet DM2 is subjected to current over: positive, contacts 36u2 and 67v1, wiper e of switch D2 in the working position, rotary magnet DM2 and negative. The rotary magnet DM2 operates with relays U1 and U2 in the manner already described until the switch D2 has reached the rest position and the circuit for the rotary magnet

DM2 over wiper *e* of switch D2 can no longer be set up. When the switch D2 is in the normal position switch D1 is restored to normal in that the following circuit is set up for magnet DM1: positive, contacts 68c2, wiper *d* of switch D2 in the rest position, contact 69u2, wiper *e* of switch D1 in the working position, rotary magnet DM1, winding I of relay V and negative. Magnet DM1 closes contact 70dm1 so that relay U1 is energized over: positive, contacts 71v1 and 70dm1, winding I of relay U1 and negative. Relays U1 and U2 now operate together with magnet DM1 until wiper *e* of switch D1 has reached the normal position. When this has occurred the circuit for magnet DM1 over wiper *e* is no longer established. Thus all the devices which have been taken into use are once more in the normal position.

It is possible also for a subscriber connected to the exchange line AL to seize the devices of the call indicating system over the enquiry path if the party called in an enquiry call is absent from his position and accordingly does not reply.

An outgoing public exchange call is set up in the following way. After the receiver has been removed and the call finder AS has been set on the calling line the subscriber has to dial the digit characterizing outgoing public exchange calls. The following circuit is then set up over wiper *c*: positive, testing relay P, wiper *c* of the final selector LW, lead 72, contacts 50tr and 73b, winding I of relay R and negative. It should be noted that when there is a free public exchange line relay B is energized over: positive, contact 84cl or 85s, contacts 86b, winding of relay B, contact 88h and negative, and its contacts assume the position shown in the drawing. Relay R closes contacts 74r and 75r. Contact 74r closes the circuit for the rotary magnet DAW. The circuit passes over positive, relay interrupter RU, contacts 76cl and 74r, rotary magnet DAW and negative. The public exchange switch AW is stepped by the rotary magnet DAW until the following testing circuit is established: positive, contacts 77ab abd 75r, winding II of relay C1, wiper *d* of the public exchange switch AW, lead 12, wiper *d* of call finder AS, contact 13p, relay HT, wiper *d* of the final selector LW, contacts 78tr and 15ab, resistance W1 and negative. In this circuit relay C1 energizes and brings the switch to rest by opening contact 76cl. Relay HT brings about the release of the final selector LW and of the call finder AS in the known manner (not shown). The following guarding circuit is now established: positive, contacts 79u, 80v2, and 81cl winding I of relay C1, wiper *c* of the public exchange switch AW lead 18, relay T1 and negative. Relay C1 switches through at contacts 82cl and 83cl. The feed bridge relay S is energized and opens contact 85s. The circuit for relay B is broken by the opening of contact 85s. Relay B opens contact 86b and closes contact 87b. At the same time contact 73b has opened and contact 89b closed. Relay R falls back and a further impulse for setting a public exchange switch is transmitted over contact 89b to a second public exchange switch.

Relay S switches through at contact 90s. The calling subscriber is thus connected with the public exchange line AL.

An incoming public exchange call is established in the following way. Relay A is energized by the ringing current flowing over the exchange line. Relay A establishes a circuit for relay H over: positive, contact 91r, winding I of relay H,

contacts 92a and 93b and negative. Relay H locks up over contact 84cl or 85s, contact 94v3, winding II of relay H, contact 95h and negative. Relay H establishes the following circuit: positive, contact 96h, windings II and I of relay C1, wiper *c* of the public exchange switch AW in the normal position, lead 97, lead 18, relay T1 and negative. Switching through is effected at contacts 82cl and 83cl by relay C1 while winding II of relay C1 is short-circuited by contact 81cl and thus the line of subscriber Tn1 is guarded in the known way. The following ringing circuit is set up: from the source RQ of ringing current over contact 98h, winding I of relay S, winding I of relay X, winding I of repeater Ue, contact 82cl, wiper *a* of the public exchange switch AW, lead 99, lead 22, to bell at station Tn1, lead 21, lead 100, wiper *b* of the exchange switch AW in the normal position, contact 83cl, winding II of repeater Ue, winding II of relay X, winding II of relay S and positive.

When the subscriber at station Tn1 takes up the receiver relay S energizes. Relay S breaks the locking circuit for relay H and the circuit for relay B at contact 85s. Relay B releases and at contact 93b breaks the circuit for winding I of relay H. Relay H restores its contacts to normal. Current is fed to the called subscriber over contact 101h.

After the switching through at contact 90s the calling public exchange subscriber is connected to the subscriber at Tn1. If now the exchange call is to be extended to another subscriber the subscriber at station Tn1 promotes the establishment of an enquiry call. As a result of the transitory depression of key Ta1 the differential relay X disposed in the feeding circuit is energized and establishes the following circuit: positive, contacts 102cl and 103x, winding I of relay Z, contact 104y, resistance W4 and negative. Relay Z energizes and closes contact 105z. When the key is released relay X falls back and contact 103x is opened. The following circuit is established: positive, contact 102cl, winding II of relay Y, contact 105z, winding II of relay Z, winding I of relay Z, contact 104y, resistance W4 and negative. In this circuit relay Y is also energized and opens contact 104y and closes contact 125y. The following circuit now obtains for relays Y and Z: positive, contact 102cl; winding II of relay Y, contact 105z, winding II of relay Z, contact 125y, winding I of relay Y and negative. Relay Y establishes a holding bridge across the leads of the public exchange line over contact 105y and resistance W5. Relay Y by opening contacts 106y and 107y and closing contacts 108y and 109y causes the public exchange line AL to be switched over on to the enquiry line 110/111. The call finder AS is caused to be set on the enquiry line 110/111 by the loop over contacts 108y and 90s, windings IV and III of the repeater Ue and contact 109y. After the call finder AS has been set impulses are transmitted for setting the final selector LW. The impulses are received by relay S and are repeated over the enquiry line 110/111 by contact 90s to relay A1 in the final selector LW. If the final selector is set on the line of a subscriber who does not reply the enquiring party switches back on to the public exchange line. This is effected by again transitorily depressing the key. The differential relay X in the feeding circuit of subscriber Tn1 is energized and short-circuits winding II of relay Y and Z at contact 103x. Relay Z accordingly releases and opens contact 105z. When a sub-

scriber releases the key $Ta1$ relay X releases and contact $103x$ opens again. Relay Y releases and switches back from the enquiry line on to the exchange line by opening contacts $106y$ and $109y$ and closing contacts $106y$ and $107y$.

The subscriber at the calling station again causes the public exchange line to be switched over to the enquiry line in the manner already described. After this has been effected the characteristic digit for the call indicating device has to be dialled. The circuit for relays $R1$ and Tr is set up over wiper c of the final selector LW and lead 3 in Figs. 1A, 1B and 2A. Relay $R1$ causes the switch SW to be set in the manner already described. The switch SW is brought to rest when the following circuit is established: positive, contact $10v1$, winding II of relay $C2$, contact $11r1$, wiper d of switch SW , lead 112 in Figs. 2A, 1B and 1A, wiper d of the call finder AS , contact $13p$, relay HT , wiper d of the final selector LW , lead 14 , resistance $W6$ and negative. The switch SW is thus set on the enquiry line $110/111$. Relay $C1$ effects the switching operations already described such as guarding and switching through while relay HT releases the final selector LW and the call finder AS which has been set on the enquiry line. The subscriber at station $Tn1$ now transmits the digits for operating the call indicating signal. The impulse trains transmitted are received by relay S and are repeated by contact $90s$ to relay $S1$ in Fig. 2A. The setting of the devices (switches $D1$ and $D2$) for operating the call indicating signal takes place in the manner described.

When the wanted party perceives the signal he proceeds to the nearest telephone equipment and as already described causes the switch MW in Fig. 2A to be set on the line to the station from which he has replied by transmitting a characterizing digit. After this setting has been effected the following connection is established: from station $Tn1$ over the public exchange switch AW , enquiry line $110/111$ in Figs. 1A, 1B and 2A, over the switches SW and MW in Fig. 2A and line $64/65$ in Figs. 2A, 1B and 1A to the station $Tn2$ from which the wanted party has replied.

It is possible for the subscriber who has replied from station $Tn2$ to take over the exchange call. For this purpose he has to operate the key $Ta2$. This energizes the differential relay $X2$ in Fig. 2A which is disposed in the feeding circuit. The relay $X2$ opens contact $113x2$ and closes contact $114x2$. The following circuit is established for relay $R1$: positive, contacts $115c1$, $114x2$, winding II of relay $R1$ and negative. Relay $R1$ closes contact $116a1$. When the subscriber releases the key relay $X2$ falls back. Contact $114x2$ opens and contact $113x2$ closes. Relay $R1$ on account of its slow operating features holds contact $116r$ closed for a moment so that the following circuit obtains: positive, contacts $115c1$, $113x2$, $116r1$, wiper e of switch SW , lead 117 in Figs. 2A, 1B and 1A, contact $118z$, winding I of relay U and negative. Relay U is energized transitorily in the last mentioned circuit. Relay U opens contact $119u$ and closes contact $119u$. Relay $C1$ releases. Relay AB energizes. The release of relay $C1$ establishes the following locking circuit for relay U : positive, contacts $84c1$ and $87b$ winding II of relay U , contact $120u$ and negative. Relay U maintains the feeding bridge relay S energized over contact $121u$ so that this relay is not deenergized by the opening of contacts $82c1$ and $83c1$. The release of relay $C1$ breaks the circuit for relays Y and Z at contact $102c1$. Relays Y

and Z restore their contacts to normal. The opening of contacts $106y$ and $109y$ and the closing of contacts $106y$ and $107y$ promotes the switching over from the enquiry line $110/111$ on to the public exchange line AL . Through the energizing of relay U relay R is operated over: positive, contacts $84c1$ and $87b$, windings II and III of relay R , contact $120u$ and negative. Relay R closes contact $121r$ so that its winding II is short-circuited and it is accordingly rendered slow-to-release. It also closes contact $74r$. The public exchange switch AW is advanced by the rotary magnet DAW . The stepping continues until the following circuit is established: positive, contact $127b$, contact $75r$, winding III of relay $C1$, wiper d , of the public exchange switch AW , lead 58 in Figs. 1A, 1B and 2A, wiper d of switch MW , contacts $122r2$ and $123c3$, winding I of relay Tr , contact $124r1$ and $125x2$, wiper d of switch SW , lead 112 in Figs. 2A, 1B and 1A, contacts $126r$ and $127ab$, resistance $W8$ and negative. By opening contact $76c1$ relay $C1$ brings the public exchange switch AW to rest. The exchange switch is thus set on the speaking leads 64 and 65 associated with station $Tn2$. Thus the subscriber who has replied from station $Tn2$ is connected to the public exchange line over the switch AW .

In the testing circuit for setting the public exchange switch AW on the line associated with station $Tn2$ relay Tr in Fig. 2A is also energized. At contact $17tr$ breaks the circuit over wiper c of switch SW . Relay $C2$ releases. It breaks the circuit for relay $S1$ at contacts $19c2$ and $20c2$. Relay $S1$ releases and causes relay $V1$ to release by opening contact $23s1$. Relays $C2$, $S1$ and $V1$ in their deenergized condition restore to normal the devices of the call indicating system which have been used in the manner already described.

As may be seen from the preceding description a subscriber who has been sought over the enquiry devices of the telephone system can cause a switch MW associated with the call indicating system to be set on the line of the station from which he replies by dialling a characteristic digit. After the switch has been set it is possible to take over the existing public exchange call in that switching means $X2$ of the call indicating system cause the public exchange switch AW in Fig. 1B to be switched over from the line of the calling party to the line of the station from which the called party replies.

What is claimed is:

1. In an automatic telephone system comprising a plurality of subscribers' stations, lines extending thereto, special control lines, and means for extending connections from calling or answering telephone lines to any one of said lines, a code calling system including first and second line finders, said finders having access to said telephone lines, signalling means located at points common to said stations, means operated when a connection is extended under control of a calling line to one of the special control lines for causing said first line finder to seize the calling line and extend a connection from said calling line to said second line finder, means for causing the extended connection to be released responsive to said seizure, means controlled by the calling line through said first line finder for operating said signalling means in accordance with a predetermined code to signal a particular party, means operated when a connection is extended under control of an answering line to another one of said special control lines for causing

said second line finder to seize the answering line, and means for causing said last extended connection to be released responsive to said last seizure.

2. In a signalling system, connector switches, a plurality of lines having access to said switches, special positions for said connector switches, means responsive to a call over any one of said lines for seizing one of said connectors, means responsive to impulses over said one line for operating said connector to a particular one of said special positions, a line finder having access to said lines, means responsive to said operation of the connector for causing said line finder to seize said one line, and means responsive to said last seizure for causing the operated connector switch to be released.

3. In a system as claimed in claim 2, means responsive to a call over any other of said lines for seizing one of said connectors, means responsive to impulses over said other line for operating said last connector to another one of said special positions, a second line finder having access to said line and associated with the said first line finder, means responsive to said operation of said last connector for causing the second line finder to seize said other line, and means responsive to said last seizure for causing said last operated connector switch to be released, whereby said one line and said other line are associated via said first line finder and said second line finder.

4. In an automatic telephone system comprising a series of switches including a connector switch, a plurality of lines having access to said connector switch, a special position for said connector switch, a line finder having access to said lines, a trunk line terminating in said line finder, means responsive to a call over any of said lines for seizing one of said connectors, means responsive to impulses over said one line for operating the connector to said special position, means responsive to the operation of the connector to said special position for causing said line finder to seize said one line and means responsive to said last seizure for causing said connector switch to be released.

5. In an automatic telephone system, a plurality of stations associated with a code calling system, signalling means common to said stations, means for extending a connection from a calling one of said stations to another station or to said signalling means, a trunk line, means for causing an incoming call over said trunk to be extended directly to a particular station, means controlled from said particular station for holding the trunk and for operating said signalling means to signal a particular called party, means whereby the called party may answer the signal from any one of said stations through the second-named means, and means controlled from the answering station for causing said last station to be connected with the trunk call independent of the second-named means.

6. In a telephone system, subscribers' stations and lines therefor, junction equipment having access to said lines, switching apparatus having access to said junction equipment, means at a plurality of stations controlled by subscribers thereat for seizing certain of said switching apparatus and for controlling said certain apparatus to cause said junction equipment to seize the lines of those stations, and means responsive to the seizure of each line for causing the certain apparatus seized and controlled thereover to be released, said junction equipment being thus associated with said plurality of stations concurrently

and effective to join in a connection the lines thereof.

7. In a telephone system, subscribers' stations and lines therefor, a link circuit including a plurality of line finder switches each having access to said lines, a plurality of seizing paths for said link, other links having access both to said lines and also to said first link, means responsive to a call over any of said lines for causing one of said other links to be associated with the calling line, and means for controlling said one link to seize said first link over one of said paths, one of the line finders effective responsive to said seizure to seize the calling line and to cause said one link to be disassociated therefrom, and means at another calling station for controlling one of said other links to seize said first link over another path, whereupon said first link is effective to seize the line of the other calling station, to cause said last-mentioned one link to be released, and to join the calling subscribers in a connection.

8. In a telephone system, subscribers' stations and lines therefor, switching equipment for extending calls of a particular character, other switching equipment for extending calls of a different character, means responsive to a call over any of said lines for associating said first switching equipment with the calling line, and means at the calling station for thereafter controlling said first switching equipment either to extend a call of said particular character or to seize said other switching equipment, said other switching equipment effective if so seized to associate itself with the calling line and thereby cause said first switching equipment to be released.

9. In a telephone system, subscribers' stations and lines therefor, switching equipment for extending a particular class of calls, switching equipment for extending each of a plurality of other classes of calls, means responsive to a calling condition on any of the lines for causing said first switching equipment to be associated with the calling line, and means at the calling station for thereafter controlling said first switching equipment either to extend a call of said particular class or to seize the proper switching equipment for extending another class of call, the other switching equipment effective if so seized to associate itself with the calling line and thereby cause said first switching equipment to be released.

10. In a telephone system, subscribers' stations and lines therefor, switching equipment for extending calls between said lines, a signalling means and other switching equipment associated therewith, means responsive to a calling condition on any of said lines for associating certain of said first switching equipment with the calling line, means at the calling station for thereafter controlling said certain switching equipment either to extend a call to another station or to seize said other switching equipment, said other switching equipment effective if so seized to associate itself with the calling line and to thereby cause certain switching equipment to be released, said other switching equipment then controllable by the subscriber at the calling station to actuate said signalling means, means for placing a calling condition on the line of any other station to respond to the signal and, when certain of said first switching equipment is associated with the responding line, for controlling said certain equipment to cause said other equipment to associate itself with the responding line, whereupon said certain equipment is released and said other

switching equipment is effective to complete a connection between the calling and responding lines.

11. In a telephone system, subscribers' stations and lines therefor, an inquiry line, switching equipment having access to said lines and effective to respond to a calling condition upon any of the lines, a signalling means and other switching equipment associated therewith, a trunk line, means for connecting a subscriber's line to said trunk line, said last means controllable by the subscriber to cause said trunk line to be held and to associate the subscriber's line with the inquiry line to establish a calling condition thereon for the initiation of a call to another subscriber, means responsive to the calling condition on the inquiry line for associating certain of said first switching equipment with the inquiry line, means at the calling station for thereafter controlling said certain switching equipment either to extend a call to another station or to seize said other switching equipment, said other switching equipment effective if so seized to associate itself with the inquiry line and thereby cause said certain switching equipment to be released, said other switching equipment then controllable by the subscriber at the said calling station to actuate said signalling means, means for placing a calling condition on the line of any other station to respond to the signal and, when certain of said first switching equipment is associated with the

responding line, for controlling said certain equipment to cause said other switching equipment to associate itself with the responding line, whereupon said certain equipment is released and said other switching equipment is effective to associate the inquiry line and the responding line, thus completing a connection between the calling and the desired subscribers.

12. In a telephone system, subscribers' stations and lines therefor, an inquiry line, a trunk line, a switch terminating said trunk line and having access over its wipers to said subscribers' lines, means including said switch for completing a connection between one of the subscribers' lines and the trunk line, means at the subscriber's station for controlling said switch to hold said trunk line and to seize said inquiry line, thereby to initiate an inquiry connection including said subscriber's line, said wipers and said inquiry line, switching means accessible to said inquiry line for completing the inquiry connection between said one subscriber's line and another of said subscribers' lines, and means at the other subscriber's station for causing said wipers to be moved from said one subscriber's line to said other subscriber's line and for causing said inquiry line and said switching means accessible thereto to be released, whereby said trunk connection is transferred to said other subscriber's line and said one subscriber's line is released.

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