C. A. SIMPSON.

DESPATCHER'S TELEPHONE SYSTEM.

APPLICATION FILED JULY 30, 1910.

1,193,835.

Patented Aug. 8, 1916.

2 SHEETS—SHEET 1.

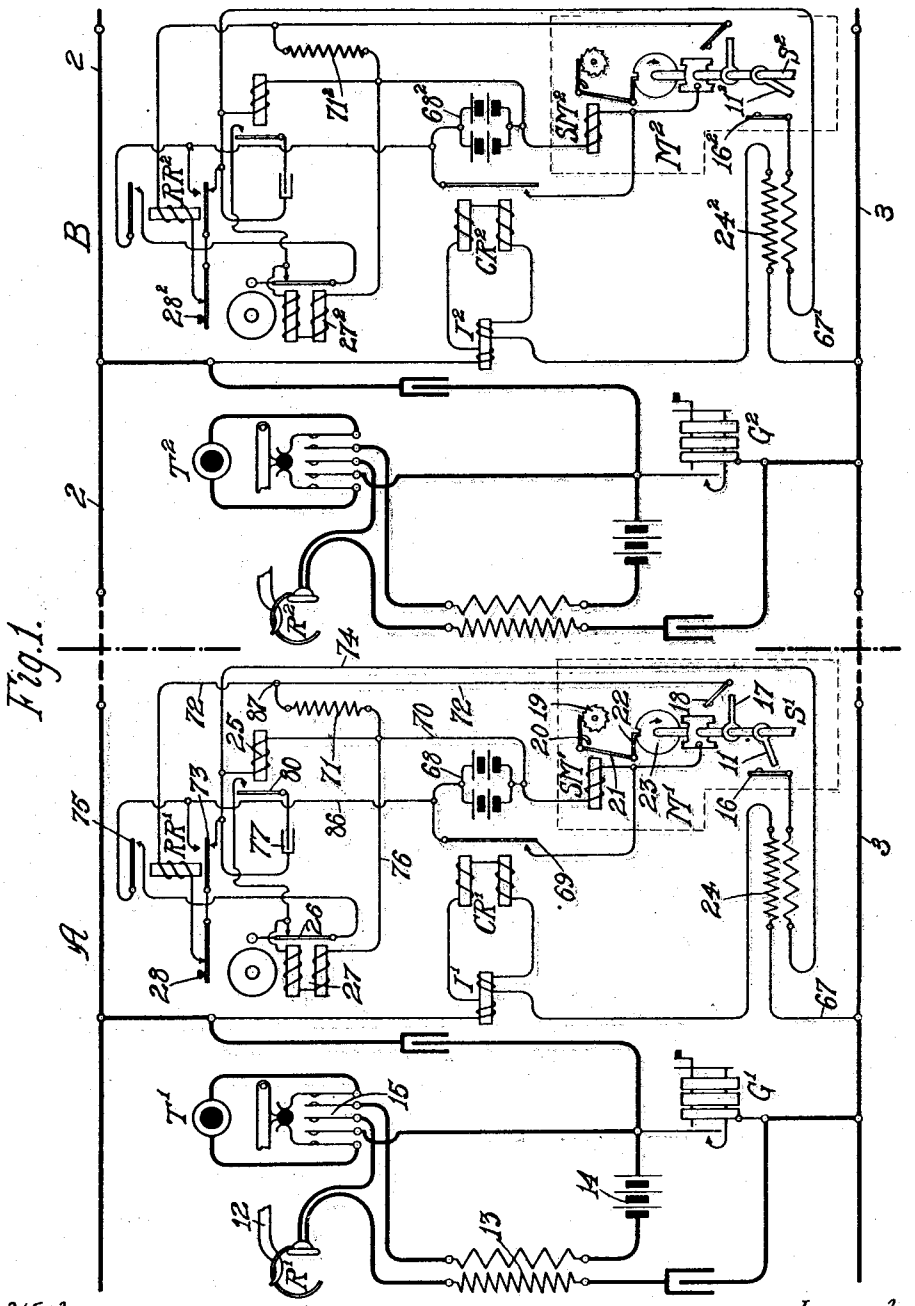

Fig. 1.

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Inventor:
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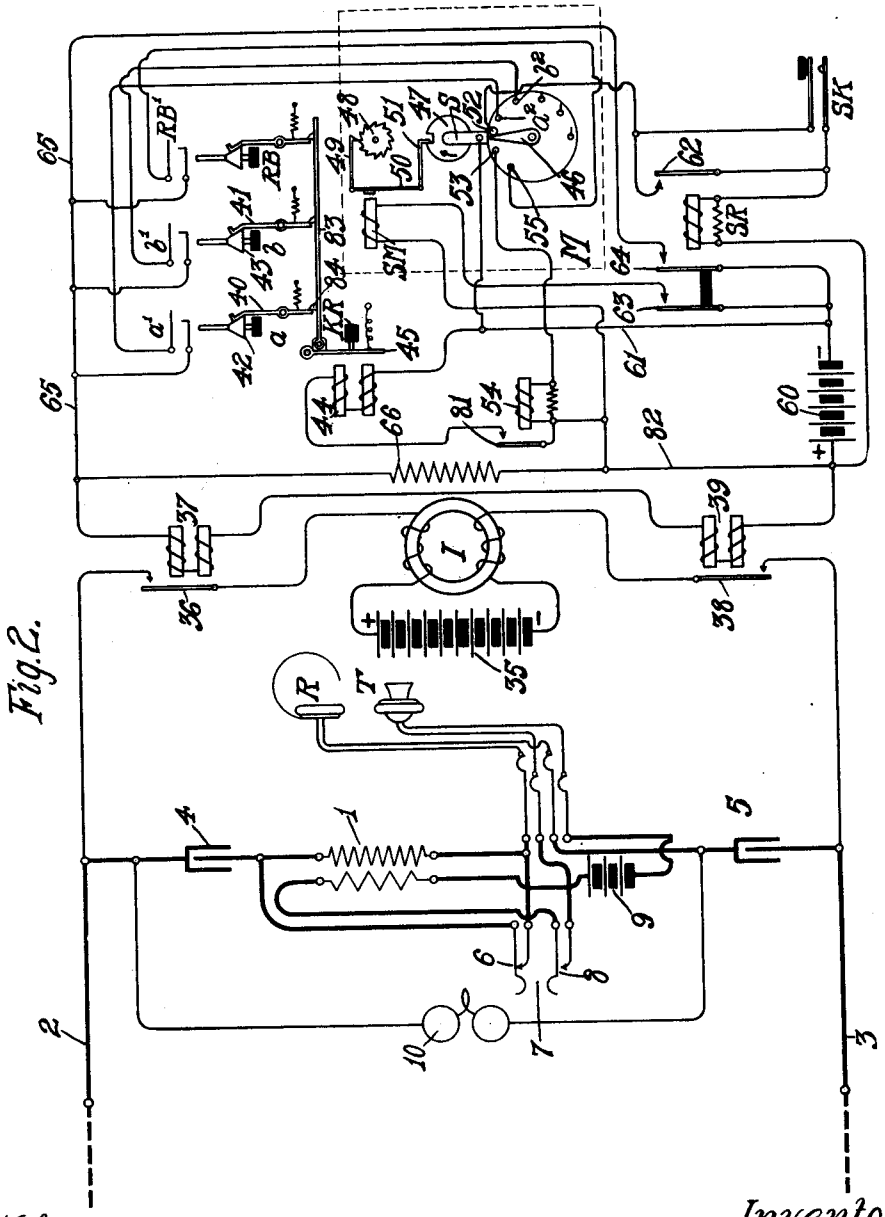

Fig. 2.

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UNITED STATES PATENT OFFICE.

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DESPATCHER'S TELEPHONE SYSTEM.

1,193,835. Specification of Letters Patent. Patented Aug. 8, 1916.

Application filed July 30, 1910. Serial No. 574,619.

To all whom it may concern:

Be it known that I, CHARLES A. SIMPSON, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Despatchers' Telephone Systems, of which the following is a specification.

My invention relates to despatchers' telephone systems in which a chief despatcher by means of controlling apparatus may selectively signal any one or more operators on a line at any one time. In former systems the chief despatcher calling any one or more of the operators on a line had control of the closing of a local ringing circuit at the called station for signaling the desired operator and then depended upon the response of the called operator to open this local ringing circuit to render said circuit ineffective. It sometimes happens that an operator may not be within hearing distance of his telephone and his signal bell would continue to ring until it was cut off by the operator or someone else responding to the call.

One of the features of my invention is to provide means controlled by the chief despatcher to again open this local ringing circuit to stop the ringing of the call bell if the operator fails to respond.

Another feature is to provide means whereby the despatcher is enabled to tell whether the call bell of the called operator is really being operated.

There are other features and advantages in a system embodying my invention, and the scope of my invention will be more particularly pointed out in the appended claims.

Referring now to the accompanying drawings, by placing the Figure 1 to the left of Fig. 2, the operation of the system as described will be readily understood. In Fig. 2 a chief-despatcher's telephone and signal controlling apparatus is shown connected to the operator's telephone shown on Fig. 1 by the line wires 2 and 3. The despatcher's station shown on Fig. 2 includes the receiver R and the transmitter T which are connected to the contacts of a spring jack, the operator's induction coil 1 being in bridge of the limbs 2 and 3 of the line between the condensers 4 and 5. The secondary winding of the induction coil 1 is normally short-circuited through the contacts 6 of key 7, while the lower contacts 8 of the said key 7 are adapted to cut in the despatcher's transmitter T and the talking battery 9. When the key 7 is actuated, the springs 6 remove the short circuit about the said secondary winding. The call bell 10 is permanently bridged across the limbs 2 and 3 and is adapted to be operated by any of the operators on the line by means of a hand generator. The chief-despatcher preferably has the head receiver R attached at all times so that it is not necessary for a calling operator to actuate the call bell 10 unless the despatcher has temporarily removed the said head receiver.

Bridged across the limbs 2 and 3 of the line are a plurality of operators' telephones, two of which, the stations A and B only, are shown. Each station on the line is equipped similarly to that of A and B with the exception of the mechanism M′ of station A. While this mechanism at each station is similar in construction, the wiper 11 for each station has a different adjustment on the shaft S′ with respect to the coöperating contact 16.

The station A has the usual local battery telephone set, including the switch-hook 12, the operator's head receiver R′ and the transmitter T′. The induction coil 13, the local battery 14 and the receiver R′ are adapted to be cut in circuit by the operation of the switch-hook springs 15. The said springs 15 are moved to their alternate position, thereby cutting in the apparatus specified by the removal of the receiver R′ from the switch-hook 12, the said switch-hook 12 thereby moving upwardly and allowing the said springs 15 to move to their alternate position. The generator G′ is normally out of circuit of the limbs of the line but is automatically bridged across the said limbs of the line in a well-known manner when being operated to call the chief-despatcher.

Each substation and also the despatcher's station has mechanism M, the shaft S of which is connected preferably to a spring-driven clock movement. All of the clock movements would be adjusted to run in synchronism so that the shafts S would make one revolution in the same period of time. The said shafts S would preferably be connected to a shaft of the clock movement so that a

single revolution of the said shafts would be made in a period of about two minutes. Fastened to the shaft S′ is the wiper 11 which is adapted to make a passing connection with a contact spring 16. Each wiper 11 of the substations would be adjusted at a different point upon the said shaft S′ with respect to the contact spring 16. The wiper 17 of each substation mechanism M′, M², etc., is adjusted at the same point upon the shaft S′ of the different mechanisms with respect to the contact spring 18, so that when all of the mechanisms are operating all of the wipers 17 and contact springs 18 make contact at the same instant.

Each clock mechanism has a starting ratchet wheel 19 fastened to its balance wheel shaft, the said starting ratchet wheel 19 and its associated mechanism being normally held at rest due to the engagement of the starting pawl 20 which is pivoted to the armature 21 of the starting magnet SM′. When the starting magnet SM′ is energized to start the clock mechanism to operate, the armature 21 is attracted and by means of the starting pawl 20, rotates the ratchet wheel 19 and then disengages itself from the said wheel allowing the mechanism to run. At the same time the arm 22 of armature 21 is lifted out of the slot in the periphery of the disk 23. When the starting magnet SM′ which is only momentarily energized, again retracts its armature, the said arm 22 rests upon the periphery of the said disk 23 which has moved out of its normal position as soon as the mechanism has started to run. Thus, the said shaft S′ making one complete revolution, allows the arm 22 to again drop into the slot of the said disk 23 when it comes around, thereby allowing the pawl 20 to again engage the starting wheel 19 and prevent any further movement of the associated clock mechanism.

In bridge of the limbs 2 and 3 of the line at substation A is an impedance coil I′, the controlling relay CR′ and the secondary winding of an induction coil 24. It will be noted that the windings of the said coils and relay are permanently bridged across the said limbs 2 and 3. The purpose of the impedance coil I′ is to prevent shunting the alternating current of the generator G′ when it is operated to call the chief-despatcher.

The starting magnets SM′, SM², etc., of all the stations on the line are adapted to be energized at the same instant by means of their associated control relays CR′, CR², etc. The magnet relay RR′ controls the signal bell 27, the energization of the said relay RR′ being controlled by the chief-despatcher. When the despatcher desires to call the operator at substation A the relay RR′ is energized and locks a local circuit for the call bell 27. This local circuit remains locked until the operator responds and opens the said circuit by pressing the key 28, or if the operator fails to respond, the said circuit may be opened by means under the control of the chief despatcher.

The primary winding of the induction coil 24 is adapted to be connected by means of the relay 25 and the contacts 16 and 11 across the contacts 26 of the signal bell 27 to inductively transmit pulsations from the said signal bell 27 when operating, to the chief-despatcher, thereby notifying the chief-despatcher that the said bell 27 is operating, in a satisfactory manner.

The apparatus of all of the stations on the line is similar to that of station A and the station B has its parts designated with the same numerals and letters as the parts of the station A except that the exponent "2" has been added.

Returning now to the controlling mechanism of the chief-despatcher, the battery 35 thereof is connected to the two windings of the impedance coil I, the said windings then being connected to the armature 36 of relay 37 and armature 38 of relay 39. The purpose of impedance coil I is to prevent too quick a building up of the operating impulses sent out on the line so as to have less interference with the talking circuit, should the despatcher be calling one operator while talking to another. The controlling apparatus of the chief-despatcher also includes a plurality of push buttons *a*, *b*, there being one such push button for each station on the line. Associated with the push button *a* are the contact springs *a*′, the said springs being adapted to be closed when the said button *a* is actuated. The spring 40 is adapted to hold its associated push button in its depressed position due to the hook end of the said spring 40 engaging the surface 42 of the associated push button. When any of the said push buttons are depressed they remain in their depressed position until the release key KR is operated to move the spring 40 out of engagement with the associated push button or until the magnet 44 is energized to attract its armature 45.

The mechanism M of the chief-despatcher's station includes the shaft S having the wiper 46 mounted thereon at one end and the slotted disk 47 at the other end. The shaft S with its attached wiper and disk is adapted to be rotated in a direction indicated by the arrow thereon, by a spring driven clock mechanism similar to that described in connection with the mechanism M′, of the other stations. Attached to the balance wheel shaft of the clock mechanism associated with M is the starting ratchet wheel 48. The said clock mechanism is normally held at rest due to the engagement of the wheel 48 by the starting pawl 49. The said starting pawl 49 is pivoted to the arma-

ture 50 of the starting magnet SM in a manner similar to that of the mechanisms at the other substations. The extension 51 of the armature 50 is adapted to be raised out of engagement wth the slot of the disk 47 when the armature 50 is attracted to start the clock mechanism in its movement. As the starting magnet SM is only momentarily energized, the arm 51 rests upon the periphery of the disk 47 when the armature 50 is retracted. The starting pawl 49 is thereby held out of engagement with the starting ratchet wheel 48 until the shaft S has made one complete revolution and the extension 51 has again dropped into the said slot.

Each set of contacts a^2, b^2, etc., are connected to a corresponding contact set a', b' etc., the said contacts a^2, b^2, etc., being adapted to be engaged by the wiper 46 in its travel. The said wiper 46 normally rests in engagement with the contact 52, the said wiper passing out of engagement with the contact 52 in its travel before it engages with the contact a^2. The starting magnet SM which upon its energization starts its associated clock mechanism to operate, is controlled by contacts on the starting relay SR. The said starting relay SR is energized when the starting key SK is actuated by the chief despatcher.

In making a call the chief despatcher first operates the push button a of the desired operator and then presses the starting key SK. In former systems the starting key SK was connected directly to the starting magnet SM and it was found that if the despatcher held the contacts of the starting key SK closed for too long a period the wiper 46 would engage the first contact a^2 and ring the bell of the telephone associated therewith. On the other hand, if the starting key SK was not held closed long enough all of the starting magnets on the line would not be operated and therefore the system would fail. To prevent this failure of the system I have provided the starting relay SR and the locking contact 52 so that the starting impulse in each instance is of the same period, namely, while the wiper 46 is in engagement with the contact 52 in its travel.

The release contact 53 is adapted to be engaged by the wiper 46 after it has been passed over all of the contacts a^2, b^2, etc., for the purpose of closing an energizing circuit through the release relay 54. The energization of the said relay 54 in turn closes a circuit through the release magnet 44, thereby releasing the push buttons that have been actuated for a call.

As previously stated, should the called operator fail to respond, the signal bell at his station would continue to ring. To enable the despatcher to stop the ringing of the called operator's bell, the contact 55 on the switch of M and the associated release button RB are provided, the operation of which will be more fully explained.

Operation: Having now fully described the detailed apparatus of the system, a full description of the operation will now be entered into. Assuming that the chief despatcher desires to talk to the operator at telephone A, he would first depress the plunger a and thereby close the associated springs a'. The plunger a is held in its depressed position due to the shoulder 42 being engaged by the respective spring 40. The despatcher now presses the starting key SK, thereby closing an energizing circuit through the starting relay SR traced from the positive pole of the battery 60 through the winding of the said relay SR, contact of key SK, contact 52, wiper 46, shaft S, conductor 61 to the negative pole of battery 60. The starting relay SR is now energized and a locking circuit is established through the contacts 62 and over the before-traced path so that the key SK may be released and the relay SR maintained energized. The closing of alternate contact 63 of relay SR establishes an energizing circuit through the starting magnet SM traced from the negative pole of battery 60, alternate contact 63, the winding of starting magnet SM to the positive pole of battery 60. The closing of the contact 64 of the relay SR establishes an energizing circuit for the relays 37 and 39 traced from the negative pole of battery 60, alternate contact 64, conductor 65, the windings of the said relays 37 and 39 to the positive pole of battery 60. It will be noted that the non-inductive winding 66 is connected in multiple with the relays 37 and 39, this being to prevent excessive sparking of the contacts of the despatcher's controlling apparatus. The energization of the relays 37 and 39 establishes an energizing circuit for the control relays CR′ and CR², etc., of the substations A and B and of all stations on the line, the said circuit being traced from negative pole of battery 35 through the lower winding of impedance coil I, alternate contact 38 of relay 39, limb 3 of the line, conductor 67 of station A, the secondary winding of induction coil 24, the windings of impedance coil I′, and control relay CR′, limb 2 of the line, alternate contact 36 of relay 37, the upper winding of impedance coil I to the positive side of battery 35. The control relay CR² of station B and all other control relays on the line being connected between the limbs 2 and 3 of the said line in a manner similar to that of the control relay CR′ of station A, the said relays CR², etc., will also be energized. The energization of the relay CR′ of station A closes an energizing circuit through the starting magnet SM′ traced from the negative pole of battery 68 through the winding of the said magnet

SM′, alternate contact 69 of relay CR′ to the positive pole of battery 68 energizing the said starting magnet SM′. The energization of the control relays of the other stations closes a similar path through their associated starting magnets. The starting magnets SM of all the stations including the despatcher's station are now all energized having attracted their respective armatures at practically the same instant. The attraction of the armature 50 of the starting magnet SM of the despatcher's station by means of the pawl 49, starts the associated mechanism to rotate the shaft S as previously described. The energization of the starting magnet SM′ of station A by means of the pawl 20 starts its associated clock mechanism to rotate the shaft S′, the same operation occurring at all other stations on the line. The mechanisms M and M′ being adjusted to run in synchronism, the shafts S and S′ will make one complete revolution within the same period of time.

Returning now to the operation of the despatcher's controlling mechanism, the shaft S now being rotated by its associated motor mechanism, the wiper 46 passes over the contact 52. After the wiper is passed beyond and out of connection of the said contact 52, the circuit for the starting relay SR is interrupted and the said relay SR deënergizes, retracting its armatures. The opening of the contact 63 deënergizes the starting magnet SM, but the pawl 49 does not again engage the ratchet wheel 48 until the shaft S has made one complete revolution when the arm 51 again drops into the slot of the disk 47. The opening of the contact 64 of the relay SR opens the energizing circuit for the relays 37 and 39 allowing them to retract their armatures, thereby opening the circuit for the control relay CR′ at station A and all control relays on the line. The deënergization of the said relay CR′ in turn opens the circuit for the starting magnet SM′, the armature of which cooperates with its associated mechanism similar to that of the armature of the starting magnet SM of the despatcher's control mechanism as previously described. The shafts S and S′, etc., now continue in their rotation, the shaft S carrying the wiper 46 into engagement with the contact a^2. The wiper 11 of the shaft S′ at station A is so adjusted that it engages the contact spring 16 during the period that the wiper 46 and contact a^2 are in engagement. The closing of the contact between wiper 46 and contact a^2 establishes an energizing circuit through the relays 37 and 39 traced from the negative pole of battery 60, conductor 61 to shaft S, wiper 46, contact a^2, closed contact a', conductor 65, the windings of the said relays 37 and 39 to the positive pole of battery 60. The energization of the said relays 37 and 39 establishes a circuit for the control relay CR′ at station A over a path traced from the negative pole of battery 35, the lower winding of impedance coil I, alternate contact 38, limb 3 of the line, conductor 67, station A, induction coil 24, the winding of impedance coil I′ and control relay CR′ to the limb 2 of the line, back to alternate contact 36 of relay 37, the upper winding of impedance coil I to the positive pole of battery 35. The control relay CR′ is thereupon energized closing a circuit through the ringing relay RR′ and the relay 25 over the following traced paths. The ringing relay RR′ is energized over a path traced from the negative pole of battery 68, conductor 70, resistance 71, conductor 72, winding of the relay RR′, contacts of key 28, normal contact 73, conductor 74, primary winding of induction coil 24, contacts 16—11, the frame of mechanism M′, alternate contact 69, of relay CR′ to the positive pole of battery 68. Although the other control relays are also energized the contacts 11—16 of the other stations are not closed. The relay RR′ now being energized and the contact 73 being a make before break, a locking circuit for the said relay RR′ is established by the closing of alternate contact 73 direct to the positive pole of battery 68. The energization of the relay RR′ also closes the alternate contact 75, establishing a circuit for the call bell 27 from the negative pole of battery 68, conductor 70, conductor 76, the winding of the said signal bell 27, normal contact 26, alternate contact 75 of relay RR′ to the positive pole of battery 68. The signal bell 27 being an ordinary vibrating armature bell vibrates its armature and actuates the bell to call the operator. It will be observed that the ringing circuit is entirely local to the substation at A being conductively disconnected from the limbs 2 and 3 of the line. In previous systems where a local ringing circuit has been used there was nothing to indicate to the despatcher whether the call bell was really being actuated. For this purpose I have provided the relay 25, the induction coil 24 and the condenser 77. As previously stated the relay 25 is also energized responsive to the actuation of the control relay CR′, the energizing circuit being traced from the negative pole of battery 68, conductor 70, the winding of relay 25, conductor 74, primary winding of the induction coil 24, contacts 16—11, the frame of mechanism M′, alternate contact 69 of relay CR′ to the positive pole of battery 68. The relay 25 thereupon is energized, closing the contact 80 and placing the condenser 77 and the primary winding of the induction coil 24 in multiple with the contact 26 of the signal bell 27. Thus, it will be seen that when the armature of the signal bell 27 is vibrated opening and closing contact 26, the con-

denser 27 is charged and discharged and by means of coil 24 inductively transmits pulsations over the limbs 2 and 3 of the line, through the condensers 4 and 5 of the despatcher's telephone and through the receiver R and induction coil 1. By this signal the despatcher is enabled to tell whether the call bell of the called operator is operating.

Now returning to the mechanisms M and M′ which have continued to run, the shaft S of the despatcher's station continues in its travel until it has made one complete revolution. Upon passing off of contact a^2 the cirtuit for the relays 37 and 39 is interrupted thereby retracting their armatures 36 and 38 and disconnecting the battery 35 from the limbs 2 and 3 of the line. The wiper 46 continuing in its movement passes over contact b^3 and the other signaling contacts of the switch, but none of the other keys b', etc., having been depressed, nothing occurs. The wiper 46 continuing in its travel engages the contact 53 to close a circuit through the key restoring relay 54, the said circuit being established from the negative pole of battery 60, conductor 61, shaft S, wiper 46, contact 53, winding of relay 54 to the positive pole of battery 60. The relay 54 now attracts its armature closing the alternate contact 81, thereby closing an energizing circuit through the release magnet 44 traced over a path from the negative pole of battery 60, conductor 61, winding of magnet 44, alternate contact 81, conductor 82 to positive pole of battery 60.

The energization of the magnet 44 attracts the armature 45, which draws the bar 83 toward the left. The said bar 83 by means of the small lug 84 thereon, moves the spring 40 out of engagement with the shoulder 42, the button a then restoring to normal and opening the contacts a'. The wiper 46 continuing in its travel passes off the contact 53, opening the circuit for the relay 54 which is thereby deënergized and opens the circuit for the magnet 44. The magnet 44 retracts its armature 45 restoring the spring 40 to normal. The mechanism M continues in its movement until the shaft S reaches its normal position, when the arm 51 drops into the slot of the disk 47 and the pawl 49 once more engages the wheel 48. The controlling apparatus of the despatcher is now at normal.

Returning now to the substation A, the operator thereat in response to the ringing of the call bell 27, removes the receiver R′ from the switch hook 12, thereby cutting in the telephone apparatus of the said substation A. The operator now also presses the key 28, thereby opening the locking circuit for the ringing relay RR′ which deënergizes and by means of the contact 75, opens the energizing circuit for the call bell 27. The mechanism M′ meanwhile having continued in its operation, rotates the shaft S′ until it reaches its normal position, when the arm 22 again drops into the slot of the disk 23. This allows the armature 21 to retract, whereby the pawl 22 again engages the wheel 19, stopping the movement of the clock mechanism. All of the other mechanisms M^2, etc., on the line simply make one complete revolution of the shafts S^2, etc., when they are stopped from further action in a manner similar to that described in connection with the mechanism of the substation A. The chief-despatcher having operated the key 7, the receiver R and transmitter T are cut into circuit and the shunt is removed from about the secondary winding of the induction coil 1. The despatcher's station and the operator's telephone at A are now connected in a conversational circuit traced over the heavily marked conductors.

Upon finishing the conversation, the operator at A places the receiver R′ upon its switch hook if desired, thereby again cutting out the telephone apparatus of the said station A. The chief despatcher simply restores the key 7 to its normal position, thereby again placing a shunt about the secondary winding of the induction coil 1 and opening the circuit of the transmitter T and the local battery 9.

Assuming now that the despatcher desires to call several operators on the line at one time, he would simply depress the buttons a, b, etc., of the telephones wanted and thereafter press the starting key SK. The mechanism M of the despatcher's station and all of the substations on the line would be started as previously described and upon the wiper 46 connecting with the contact a^2, the bell of the telephone at A would be rung. Continuing in its movement, the wiper 46 would then engage the contact b^2 and at this time the wiper 11^2 of the station B would be connected to the contact 16^2, thereby closing a circuit for relay RR^2 and ringing the call bell of the operator at B. Continuing in its movement the wiper 46 would pass over the different contacts ringing the call bell of each operator whose ringing buttons a, b, etc., had been depressed. The different operators would respond to their calls in a manner similar to that described in connection with the operator of telephone A and the different mechanisms would restore as previously described. Thus, it will be seen that the chief despatcher may call any one or more operators on the line at any one time and converse with one or more of them.

Assuming now that the despatcher had called the operator at A and the said operator failed to respond to the call. In this instance it will be remembered that the ringing relay RR′ would remain locked in its

energized condition should the operator at A fail to respond. To release the said relay RR′ the despatcher, after the mechanism M has restored to normal, presses the release button RB, thereby closing the associated contact springs RB′. The starting key SK is now depressed closing an energizing circuit through the starting relay SR which in turn operates the starting magnet SM and the relays 37 and 39. Upon the energization of the relays 37 and 39 an impulse of current is sent over the line from the battery 35 as previously described, operating all of the control relays on the line. The actuation of the said control relays in turn operates the starting magnets of all the telephones on the line, thereby starting all of the clock mechanisms to operate. The operation of the starting magnet SM at the despatcher's station starts the mechanism M and the shaft S now starts in its travel moving the wiper 46 to connect with all the coöperating contacts. As the said wiper 46 disconnects from the contact 52, the starting relay SR is deënergized as previously described, opening the circuits for magnet SM and relays 37 and 39. Now continuing in its travel, the wiper 46 passes over the rest of the coöperating contacts, but as none of the buttons *a*, *b*, etc. have been depressed, nothing happens until the wiper reaches the contact 55. At this time all of the wipers 17 at the substations are in connection with their coöperating spring contacts 18. Upon the closing of the contact between wiper 46 and contact 55 an energizing circuit is established for the relays 37 and 39 traced from the negative pole of battery 60, conductor 61, shaft S, wiper 46, contact 55, spring contact RB′, conductor 65, the windings of relays 37 and 39 to the positive pole of battery 60. The said relays 37 and 39 are now energized and transmit an impulse of current from battery 35 out over the line and through the windings of all of the control relays.

Referring now more particularly to the substation A, at which no response has been secured, the energization of the said control relay CR′ attracts its armature 69, thereby placing a shunt about the winding of the release relay RR′ traced as follows: contact 69, the frame of mechanism M′, wiper 17, contact 18, conductor 72 to terminal 87 of the resistance 71. The closing of this circuit shunts all of the current around the winding of the ringing relay RR′ and it retracts its armatures and opens the locking circuit at alternate contact 73. The opening of the contact 75 of relay RR′ opens the energizing circuit for the call bell 27 and thereby stops the ringing of said bell.

Although all of the control relays of the other stations on the line are energized nothing occurs at these stations, as it has been assumed that none of the other ringing relays have been locked in their energized position. Thereafter all of the clock mechanisms of the different substations and of the despatcher's station return to normal and are stopped from further movement as previously described.

Should an operator fail to respond, as previously stated, the despatcher may ascertain whether the bell 27 of the called substation is really operating by simply pressing his starting key SK, thus starting all the substation mechanisms as before. Upon closure of contacts 11—16 of substation A, which will be indicated to the despatcher when his wiper 46 is on contact a^2, the primary of induction coil 24 is connected across the contacts 26 of the bell 27. If the bell is operating, the despatcher receives a signal in his receiver as previously described, and thus he will know that if the operator has not responded to the call, it is not due to the failure of the signal bell 27, and he may then stop the operation of the bell in a manner as previously described. If he does not receive such an audible signal in his receiver he will know that the bell 27 at the called substation is not operating.

While I have described spring driven motor mechanism to operate the different shafts S, I do not wish to be unduly limited to such driving means as it is obvious that many other forms of driving means may be used to rotate the shafts S with their associated wipers.

I claim:

1. In a signaling system the combination with a despatcher's telephone and a plurality of substations, conductors uniting said telephone and said stations, signal relays for said stations, selective mechanism for each of said stations, an active and a passive contact for each of said mechanisms, means controlled by said despatcher to set said selective apparatus in operation, means controlled by said despatcher to energize one of said relays at the time that an active contact engages a passive contact at one of said stations, a local locking circuit effective upon energization of said relay, and means under control of the despatcher for deënergizing said relay.

2. In a telephone system, the combination with a telephone line, of a substation and despatcher's telephone connected thereto, a relay for said station provided with only one winding, means controlled by the despatcher for energizing said relay, a locking circuit local to said station for holding said relay energized, a call bell for said station actuated responsive to energization of said relay, and means under control of the despatcher for deënergizing said relay to render said call bell ineffective.

3. In a signaling system the combination

with a despatcher's telephone and a plurality of substations, conductors uniting said telephone and said stations, a control relay and a signal relay for each of said stations, means under control of the despatcher for momentarily actuating one of said control relays, a circuit including contacts controlled by said control relay and one of said signal relays closed responsive to the energization of said control relay, a locking circuit for said signal relay effective upon its energization, and means for deënergizing said signal relay rendered effective upon another actuation of said control relay.

4. A telephone system comprising a pair of conductors, a plurality of operators' telephones or stations connected thereto, a despatcher's station connected to said conductors, a normally open local signal circuit for each telephone, selective mechanism including an active and a passive contact for each of said operator's stations, means controlled by said despatcher for operating said selective mechanisms to cause said active contacts to wipe over their passive contacts thereby closing said signal circuits to call said operators, means at each telephone for rendering its associated circuit effective until a complete response of the operator is secured, and means controlled by the despatcher for again rendering any of said circuits ineffective to which no complete response has been secured.

5. A telephone system comprising a despatcher's telephone and an operator's substation conductively united, a local signaling circuit for said station, means including a selector switch having a driving electromagnet controlled by the despatcher for rendering said circuit effective to call the operator, an induction coil for said station having one winding conductively united with said telephone, and means controlled subsequently by the despatcher for connecting the other winding of said coil with said circuit to inductively connect said circuit with said telephone.

6. A telephone system including line conductors, a plurality of substations and a despatcher's telephone connected thereto, a signal for each station, advancing switch mechanism including a signal contact for each station and a wiper for coöperation therewith, a manually operated key, a relay for starting said mechanism, energized responsive to actuation of said key, a locking circuit for said relay closed upon energization of said relay, and means for deënergizing said relay before said wiper cooperates with said ringing contacts.

7. A telephone system comprising a despatcher's telephone and an operator's substation conductively united, a local signaling circuit for said station, means controlled by the despatcher for rendering said circuit effective to call the operator, means for inductively associating said signaling circuit with said telephone to indicate to the despatcher that the signaling circuit is effective, means located at said substation for automatically disassociating said signaling circuit from said telephone before the said signaling circuit is rendered ineffective, and means for interrupting said signal circuit.

8. A telephone system comprising a despatcher's telephone and a plurality of substations conductively united, a call signal at each substation, means controlled from the despatcher's station for operating the call signal at one of said substations, means controlled by the despatcher for subsequently operating apparatus at the substation for determining whether the signal at the called substation is operating effectively, and controlling means at the despatcher's station for discontinuing said call signal.

9. A telephone system comprising a despatcher's telephone and a substation conductively united, a local signaling circuit for said station including a direct current vibrating bell, means controlled from the despatcher's telephone to render said circuit effective when calling said station, an induction coil having one winding connected to a conductor uniting said telephone and station, and means for connecting another winding of said coil in bridge of the vibratory contacts of said bell for indicating to the despatcher that said circuit is operating effectively.

10. A telephone system comprising a despatcher's telephone and a substation conductively united, a local signaling circuit for said station, selective apparatus at said substation controlled from said telephone for rendering said signaling circuit effective, an induction winding included in circuit with said signaling circuit and a contact on said selective apparatus, and means whereby a subsequent operation of said selective apparatus by the control from the said telephone while said signaling circuit is operating will operate said contact to momentarily inductively relate said winding to said telephone to indicate to the despatcher that said circuit is operating effectively.

11. In a signaling system the combination with a despatcher's telephone and a substation, a signal relay for said substation, a selector for said substation adapted when set in operation to perform one complete cycle of operation before coming to rest, means, including the said selector, under the control of a despatcher for energizing said relay, a locking circuit effective upon energization of said relay, and means under control of the despatcher for deënergizing said relay.

12. In a signaling system the combination

with a despatcher's telephone and a substation, a signal relay for said substation, a signal controlling wiper for said substation adapted when set in motion to continue in motion until reaching its normal position, means, including the said controlling wiper, controlled by the despatcher for energizing said relay, a relay locking circuit effective upon energization of said relay, and means under control of the despatcher for deënergizing said relay.

13. A telephone system comprising a despatcher's telephone and an operator's substation conductively united, a local signaling circuit for said station, means controlled by the despatcher for rendering said circuit effective to call the operator, means for inductively associating said signaling circuit with said telephone to indicate to the despatcher that the signaling circuit is effective, means located at the said substation for automatically disassociating said signaling circuit from said telephone before said signaling circuit is rendered ineffective, and means controlled by the said despatcher for reoperating said second means for again inductively associating said signaling circuit with said telephone.

14. In a signaling system the combination with a despatcher's telephone and a substation, of conductors uniting said telephone with said station, a control relay and a signal relay for said station, means under control of the despatcher for momentarily actuating said control relay whereby a circuit including contacts of said control relay and said signal relay is closed, a locking circuit for said signal relay effective upon energization of said relay, and means for deenergizing said signal relay rendered effective upon another actuation of said control relay.

15. In a signaling system the combination with a despatcher's telephone and a substation, of conductors uniting said telephone with said station, a control relay and a signal relay for said station, means under control of the despatcher for momentarily actuating said control relay whereby a circuit including contacts of said control relay and said signal relay is closed, a locking circuit for said signal relay effective upon energization of said relay, and means under control of the despatcher for deënergizing said signal relay.

Signed by me at Chicago, county of Cook, and State of Illinois, in the presence of two witnesses.

CHARLES A. SIMPSON.

Witnesses:
MARJORIE E. GRIER,
GEORGE E. MUELLER.