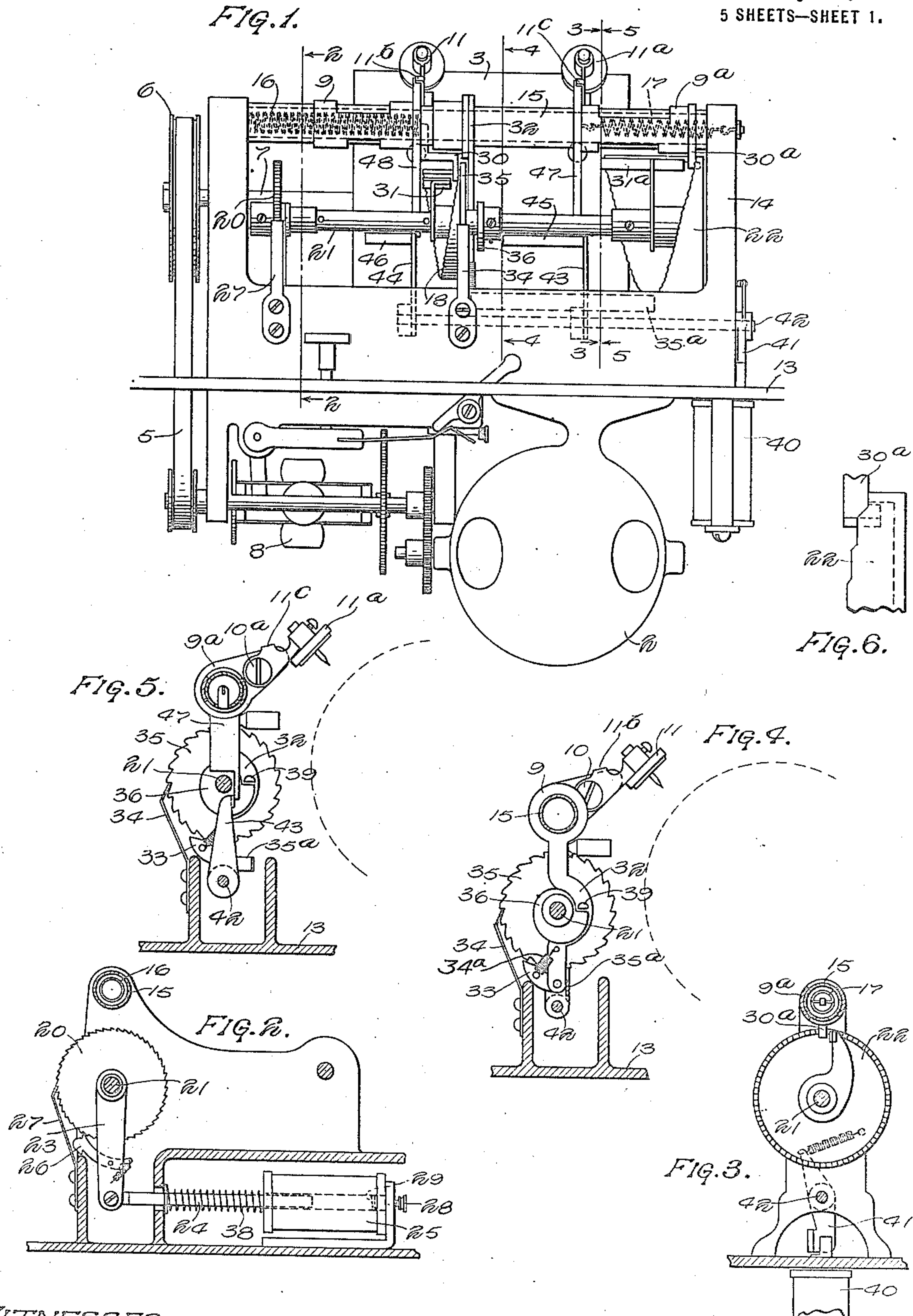


J. G. BLESSING.
 PHONOGRAPHIC TIME ANNOUNCER.
 APPLICATION FILED JULY 7, 1913.

1,227,523.

Patented May 22, 1917.

5 SHEETS—SHEET 1.



WITNESSES

A. Andersen.

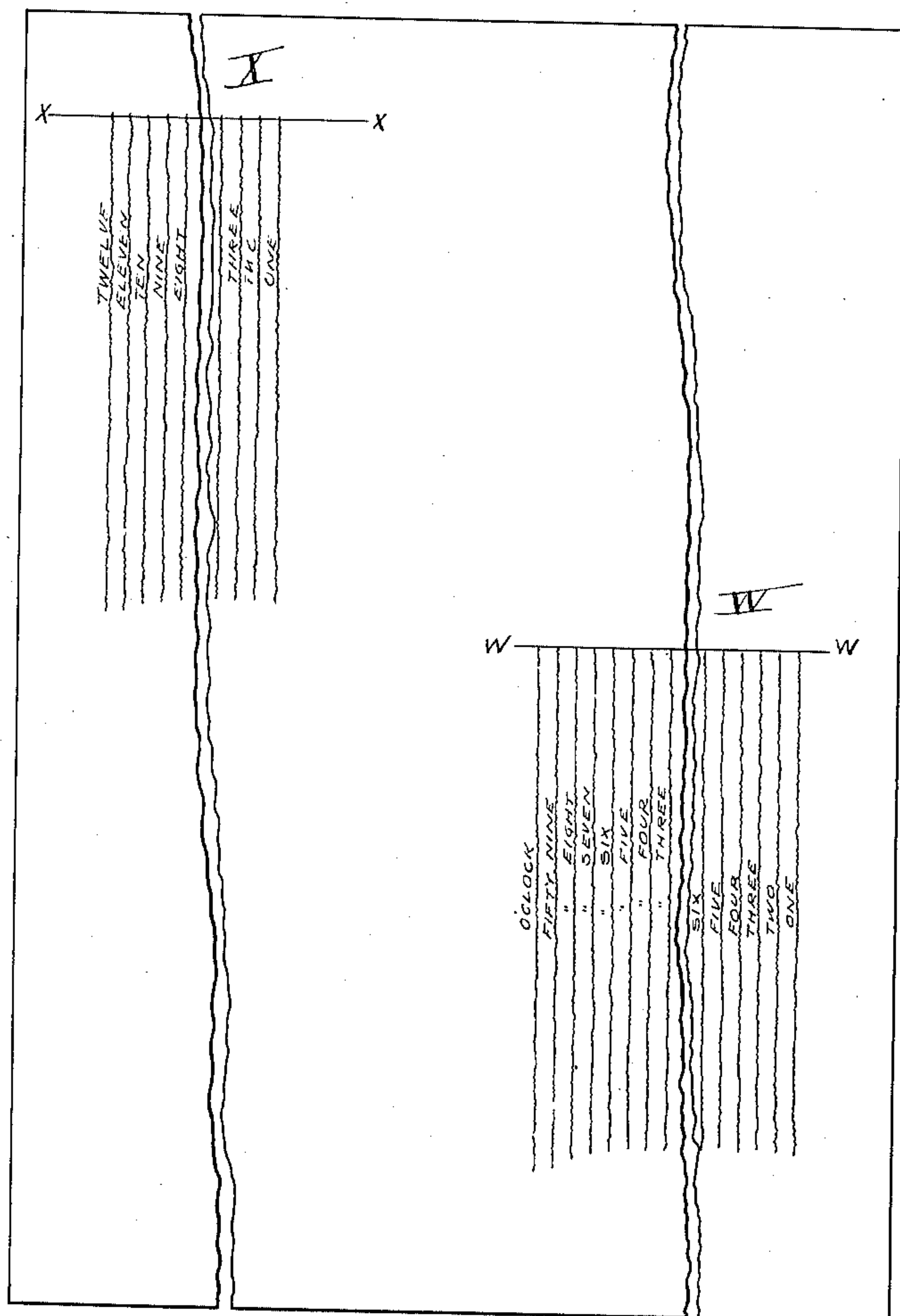
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1,227,523.

Fig. 7.



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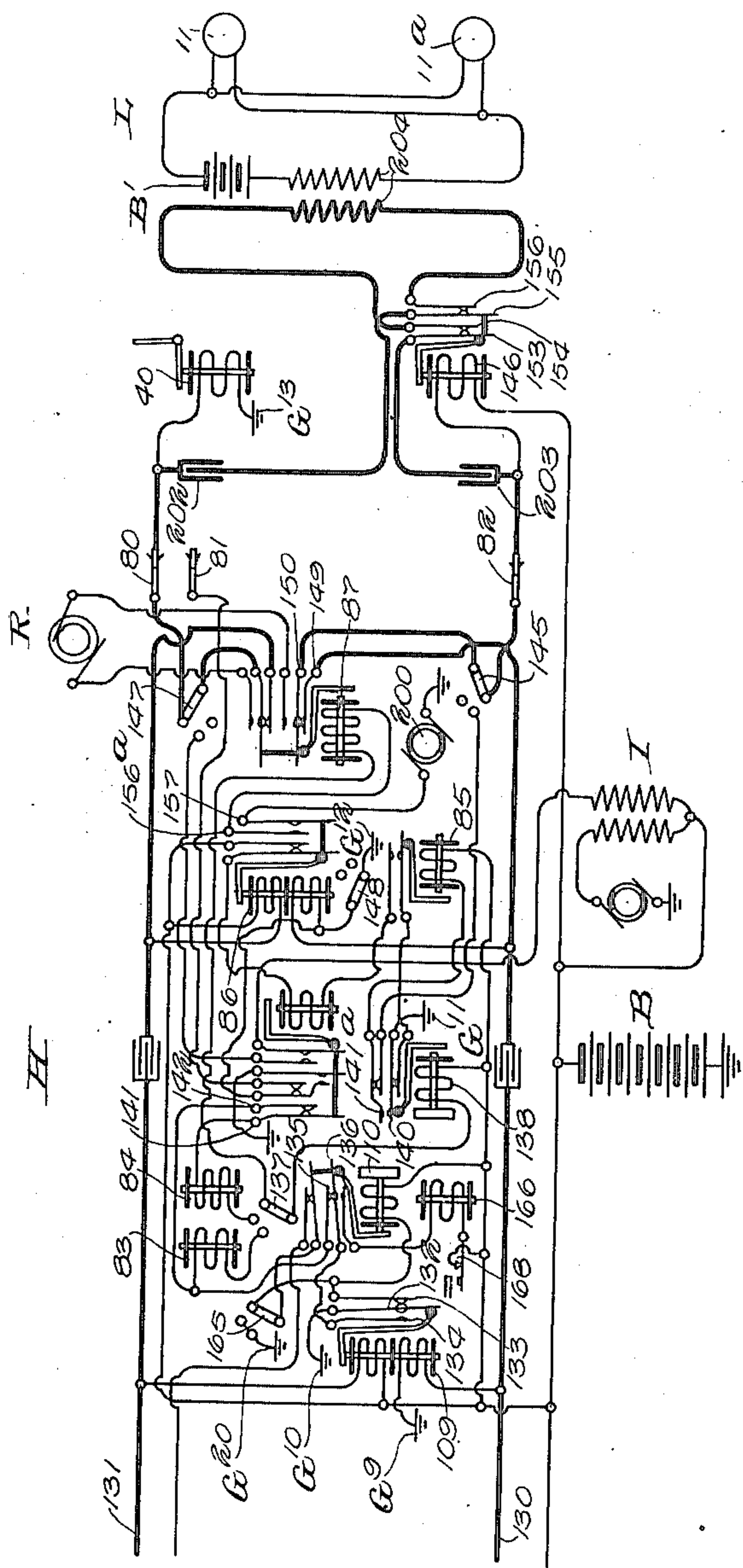
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5 SHEETS—SHEET 4.

Fig. 9.



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 5 SHEETS—SHEET 5.

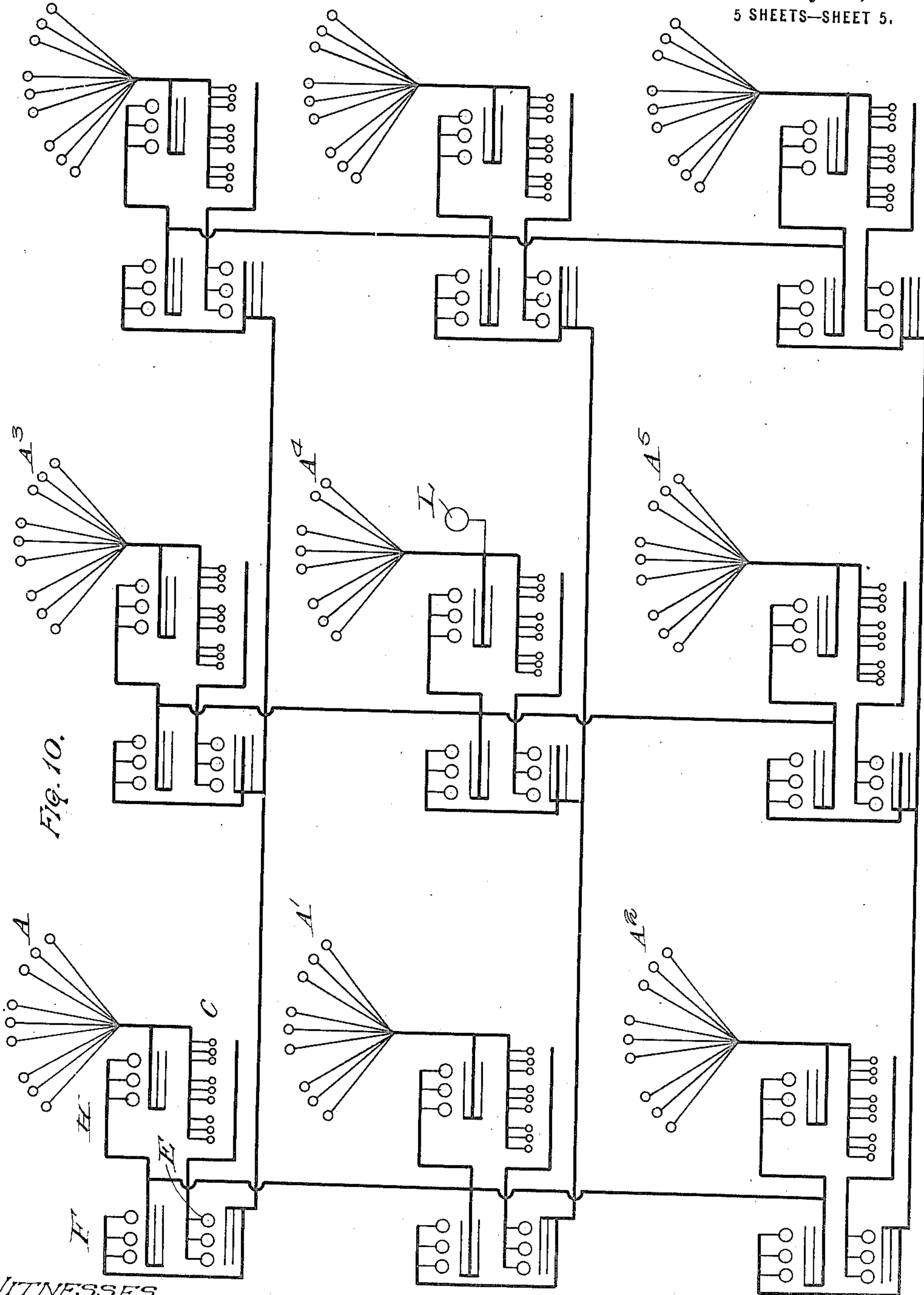


Fig. 10.

WITNESSES

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UNITED STATES PATENT OFFICE

JOHN G. BLESSING, OF CHICAGO, ILLINOIS, ASSIGNOR TO AUTOMATIC ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPHIC TIME-ANNOUNCER.

1,227,523.

Specification of Letters Patent.

Patented May 22, 1917.

Application filed July 7, 1913. Serial No. 777,677.

To all whom it may concern:

Be it known that I, JOHN G. BLESSING, a citizen of the United States of America, and resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Phonographic Time-Announcers, of which the following is a specification.

My invention relates to improvements in phonographic time announcers and one of the features of my invention is the application of this time announcer to an automatic telephone system whereby a subscriber, by operating his calling dial, may ascertain the time of day or obtain other information contained on the phonograph record. My device is arranged so as to announce the minute and the hour and to repeat this announcement every few seconds for one minute and then shift to the next succeeding minute. In order to reduce the size or number of the records required to announce the time for twelve or twenty-four hours, I divide the record into two parts or two sets of grooves. These grooves, instead of being spiral grooves, as in the ordinary construction, are circular. One set of grooves, of which there are sixty, corresponds to the minutes and contains impressions corresponding to the numbers 1, 2, 3, etc., up to 59, the last groove containing the impression for the word "o'clock." The other set, of which there are twelve, corresponds to the hours and contains the impressions for the figures 1 to 12. A separate reproducer is provided for each set of grooves and the two sets of impressions are so arranged that they do not overlap each other, so that by placing one reproducer in engagement with the proper groove of one group and the other reproducer in the proper groove of the other group, their combined announcement may be made to correspond to the hour and minute of the day. Means are provided for moving the reproducer corresponding to the minute group from one groove to the next each minute and for moving the reproducer the hour group from one groove to the next each hour. When the reproducers have reached the last groove, they are automatically returned to a position to engage the first groove of the corresponding group and thus seventy-two grooves, sixty in one group and twelve in the other, are sufficient to announce any time of day, and each announcement will be

repeated as many times as the cylinder makes revolutions in a minute.

A further feature of my invention is the adaptation of this time announcer to an automatic telephone system, whereby any subscriber, by merely operating his calling dial to transmit the proper series of impulses, may establish connection with this time announcer and thus ascertain the time of day.

My invention will be more clearly understood by reference to the accompanying drawings, in which I have illustrated one embodiment of my invention and have illustrated the same in connection with an automatic telephone system of a well-known type.

Figure 1 is a front elevation of a phonographic time announcer embodying the principles of my invention.

Fig. 2 is a section taken on line 2—2 in Fig. 1.

Fig. 3 is a section taken on line 3—3 in Fig. 1.

Fig. 4 is a section taken on line 4—4 in Fig. 1.

Fig. 5 is a section taken on line 5—5 in Fig. 1.

Fig. 6 is a fragmentary view of the cams 18 and 22 (Fig. 1) on an enlarged scale, so as to show more clearly the conformation of their edges.

Fig. 7 is a diagram of the phonographic record.

Figs. 8 and 9 show a complete connection between a calling subscriber's telephone and the time announcer in a telephone system in connection with which I have chosen to illustrate my invention.

Fig. 10 represents diagrammatically the trunking arrangement of a telephone system embodying the principles of my invention.

Before describing the telephone system shown herein, a detailed description of the construction of the time announcer will be given. Referring to Fig. 1, there is mounted on the top of a suitable plate 13 a modified phonograph machine consisting of a frame 14 and cylinder 3, on which cylinder is a record with two sets of impressions, one set comprising a separate impression for each of the sixty minutes in an hour and the other set comprising a separate impression for each of the hours in a day. These impressions form complete rings around the record, unlike the usual impressions, which

are helical. The cylinder 3 is fastened to a shaft 7 which is in turn secured to the pulley 6. For the purpose of revolving the cylinder 3, there is mounted on the under side of the plate 13 a small motor 2 connected by means of a belt 5. The speed of the motor is governed by a suitable governor 8. Upon a shaft 15 there are mounted two carriages 9 and 9^a for the purpose of carrying two microphone reproducers 11 and 11^a back and forth, there being one set of reproducers for each set of impressions on the record, namely, the hour impressions and the minute impressions. The reproducers are pivotally mounted on carriages by means of the screws 10 and 10^a (Figs. 4 and 5) in such a manner as to allow the reproducers to rest lightly on the record. These reproducers are provided with lugs 11^b and 11^c which extend over a portion of the edge of the carriages 9 and 9^a so that they may be lifted from the record by tipping the carriages backward. The carriages 9 and 9^a are arranged to slide back and forth independently of each other on the shaft 15, which is preferably hollow, and located inside of same are two helical springs 16 and 17. The purpose of these springs is to return the reproducers to their normal positions. For instance, the hour reproducer 11 is returned at the end of twenty-four hours and the minute reproducer is returned at the end of sixty minutes. The reproducer 11 is moved along the shaft 15 by means of the helical cam 18 against the compression of the spring 16, while the reproducer 11^a is moved along against the pulling tension of the spring 17 by means of the helical cam 22, as will hereinafter be more fully described.

On the shaft 21 there is mounted a ratchet wheel 20 (Fig. 2) and adjacent thereto is an arm 23 which swings loosely on the shaft 21 and carries near its lower end a driving pawl 26 which engages with the teeth of the ratchet wheel 20. The lower end of the arm 23 is connected with the plunger 24 of a solenoid 25. Secured to the plunger 24 is a helical spring 38, so that when said plunger is drawn into the solenoid the spring 38 is compressed. Upon the deenergization of said solenoid, the power stored up in the spring 38 returns the plunger 24 to its normal position. In this way the arm 23 may be moved back and forth to rotate the ratchet wheel 20 and shaft 21 with a step-by-step movement. A holding pawl 27 is provided for the purpose of preventing all backward movement of the wheel 20 when the pawl is being moved back by the plunger 24 to engage with a new tooth. The plunger is regulated and allowed to be drawn back just so far by means of a metal disk 29 on the inside of the solenoid and a thumb screw 28, thus allowing the desired amount of clearance at the pawl 26. The helical cam 22 is mounted on

and firmly secured to the shaft 21. This cam increases in height or width around its circumference by regular series of rather abrupt steps, as indicated more clearly in Fig. 6. On the right-hand end of the carriage 9^a is a projection 30^a which is, at the beginning of an hour, at the extreme right of the shaft 15 and in contact with the narrow portion of the cam 22. Upon the ratchet wheel 20 being rotated step by step in a manner already described, the cam 22 is also turned a corresponding distance, and as each of the steps in the cam passes the projection 30^a of the carriage 9^a, said carriage is moved a slight distance to the right, sufficient to move the reproducer 11^a to the next impression on the record. During the beginning of each advancement of the cam 22, the projection 30^a of the cam 9^a moves forward a short distance with the step in the face of the cam before riding up over it. This forward movement of the projection 30^a rocks the carriage 30^a slightly on the shaft 15, whereby the reproducer is lifted off the record before it is moved laterally. Before the cam completes its movement, it passes the projection 30^a, so that when the cam comes to rest, the reproducer drops back onto the record. This lifting of the reproducer while it is being moved laterally is to prevent the scratching of the record. The cam 22 is provided with fifty-nine steps on its surface, so that during one complete revolution of the cam, the reproducer is moved fifty-nine spaces to the left. On the sixtieth advancement the projection 30^a slips off the high part of the cam and the spring 17 returns the carriage and reproducer to their normal positions. During this return of the carriage, the projection 30^a bears on the guide 31^a which is secured to and revolves with the cam 22 and serves to hold the reproducer off the record until it gets back to its normal position.

The reproducer 11 is moved along the record by the cam 18 in substantially the same manner in which the reproducer 11^a is moved by the cam 22, as hereinabove explained. The cam 18, however, has only twenty-three steps on its surface and is adapted to make a complete revolution in twenty-four steps. The cam 18 is advanced one step on each complete revolution of the shaft 21 in the following manner: At 32 (Figs. 1 and 4) there is seen an arm loosely mounted on the shaft 15 and attached to the bottom of said arm is a pawl 33, together with the spring 34^a, for the purpose of holding said pawl 33 constantly in contact with the ratchet wheel 35. The center of the arm 32 is arranged to fit around the shaft 21, as clearly shown in Fig. 4. The cam 18 is securely attached to the ratchet wheel 35 and both are mounted loosely on the shaft 21 and therefore do not revolve with the

ratchet wheel 20 and the minute cam 22, which are both secured to the shaft 21. There is fastened to the frame 14 a flat spring 35^a that bears on the arm 32, holding it normally against the shaft 21 and at the same time holding the pawl 33 rigidly against the ratchet wheel 35. A spiral cam is shown at 36 which is securely fastened to the shaft 21 and consequently turns with each step-by-step movement of the ratchet wheel 20, which latter, it will be remembered, is operated by means of the energization and deenergization of the solenoid 25. As the cam 36 turns it pushes against a projection 39 on the movable arm 32, which arm is thereby pressed back against the tension of the spring 35^a and draws the pawl 33 back a proportionate distance toward the next tooth on the ratchet wheel 35. When the highest part of the cam 36 reaches the projection 39, the arm 32 is forced back far enough to engage a new tooth of the wheel 35, and when the cam completes its revolution and the projection 39 slips off the high part of the cam, the arm 32 is returned to its original position by the spring 35^a, and the wheel 35 is thereby advanced one step. Both reproducers are normally held off the record by the engagement of the tail pieces 47 and 48 of the carriage 9^a and 9 with the bars 45 and 46, as indicated more clearly in Fig. 5. These bars are carried on the end of the arms 43 and 44 which are secured to a shaft 42, to which latter is also secured the armature 41 of an electromagnet 40 (Fig. 3). By the energization of the magnet 40, the shaft 42 is turned slightly to tip the bars 45 and 46 back far enough to permit the reproducers to drop down onto the record.

In Fig. 7 there is represented in a more or less diagrammatic form a cylindrical record for the time announcer described herein, said record being developed into a plain surface. At X are shown the record grooves corresponding to the hours. These grooves are twelve or twenty-four in number, each one comprising the proper impressions for reproducing some one of the words "one," "two," "three," etc., up to "twelve." If these grooves are twenty-four in number, the record impressions run from "one" to "twelve" and then repeat. This enables each groove to be used only during one hour of the twenty-four, while if only twelve grooves are used, each one would have to be used twice during the twenty-four hours, thereby decreasing the life of the record. The hour impressions on the record all begin approximately on a straight line $x-x$ across the record and extend only about one-third or less of the distance around the cylinder. The minute impressions W are sixty in number, running from "one" to "fifty-nine," the sixtieth

being for the word "o'clock." The minute impressions all begin approximately on the line $w-w$, which is beyond the end of the longest impression of the hour group. The record is placed on the constantly rotating cylinder 3 (Fig. 1), with the reproducer 11 in position to engage the hour group of impressions X and the reproducer 11^a in position to engage the minute group of impressions W. The reproducer 11 is set to engage the particular impression in the group X corresponding to the hour of the day and the reproducer 11^a is set to engage the impression of the group W corresponding to the minute of the hour. It is thus seen that when the reproducers are in contact with the record, the time will be announced once during each revolution of the record, the reproducer 11 first announcing the hour and the reproducer 11^a announcing the minute immediately thereafter. The cylinder is preferably revolved at the rate of fifteen or twenty revolutions per minute, so as to give an announcement every three or four seconds. The magnet 25 (Fig. 2) is connected with a suitable clock mechanism, which closes the circuit of the magnet once each minute to move the reproducer 11 to the next impression. At the beginning of each hour the reproducer 11^a is moved from the "fifty-nine" impression to the "o'clock" impression and the reproducer 11 is moved over one step to the impression corresponding to the new hour. Although the reproducers are constantly in position to give the correct announcement, they are not always in actual engagement with the record, for, as has been explained, means have been provided for holding the reproducers off the record at all times except when an announcement is desired.

Having given a general description of the construction and mode of operation of the time announcer, I will now describe the telephone system shown herein and indicate how a subscriber may obtain connection with the time announcer. In Fig. 10 there is shown diagrammatically the trunking system in connection with which I have chosen to illustrate my invention. This drawing is on the scale of three to ten—that is, three lines represent ten lines in practice and three groups represent three groups, etc. The system is an automatic system of a well-known type, comprising subscribers' individual or line switches C, selectors E, second selectors F and connectors H. In the drawing there are represented three thousands of an exchange of ten thousand line capacity. The substations A are divided into groups A, A', A², etc., usually of one hundred lines each. Therefore the groups A, A' and A² may represent one complete thousand and the groups A³, A⁴ and A⁵ another. With each group of subscribers' lines there is associ-

ated in the central office a group of line switches C, one switch for each line, a group of first selectors E, a group of second selectors F and a group of connectors H. The selector and connector switches represented herein comprise banks of contacts arranged in horizontal rows or levels shown diagrammatically by horizontal lines, indicating that corresponding contacts of all the line switches are multiplied together. All the line switches C belonging to a single group of subscribers' lines have common access to a group of first selectors E. The bank contacts of all the first selectors of corresponding hundreds are multiplied throughout the different thousands. The first level of bank contacts of these first selectors is connected to trunk lines leading to second selectors associated with the first thousand, the second level is connected with trunk lines leading to second selectors associated with the second thousand, and so on. The bank contacts of all the second selectors associated with a given thousand are multiplied together and the first level is connected to trunk lines leading to connector switches having access to the lines of the first hundred group of that thousand. The second level is connected to trunk lines leading to connectors of the second thousand, and so on. At L there is represented a time announcer which is connected to a set of bank contacts in a group of connectors. The private bank contacts of the set to which the time announcer is connected are preferably not multiplied between the different connectors of the group, so that a plurality of connections may be made with it simultaneously. This trunking system is in general well known in the art and it is not thought necessary to go into a minute description of it herein.

Referring now to Figs. 8 and 9, the subscriber's telephone is connected to the central office by means of two conductors 90 and 91 terminating at the switch C, which, by means of a plunger (not shown) and the bank springs 66 to 73 inclusive, extends the connection to a first selector E, which in turn extends the connection to the second selector F. This selector, in like manner, further extends the connection to the connector H (Fig. 9), in certain bank contacts of which terminates a line leading to the time announcer L. The telephone A is provided with a receiver 50, transmitter 51, ringer 53 and condenser 54. It is also provided with a suitable impulse-sending device, which may be similar to that described in British patent to S. G. S. Dicker No. 29,654 of 1910, and which is represented herein as comprising an impulse wheel 57, springs 55 and 56 and a dial (not shown) which has holes around its periphery for convenience in turning. The impulse wheel 57 and dial are secured to the same shaft, so

that as the dial is rotated forward, a number of impulse teeth 58 corresponding to the digit to be called are carried past the end of the spring 55, and as the impulse wheel returns to normal after the dial is released, each of these teeth, as they pass the end of the spring 55, momentarily forces said spring out of engagement with the spring 56.

The line switch C and master switch D are of the general type of line and master switches disclosed in British patent to R. W. James No. 26,301 of 1906, and more particularly of the form shown in British patent to T. G. Martin No. 1419 of 1910. As shown herein, the line switch C comprises, among other details, a plunger (not shown) which is attached to the end of a so-called plunger arm 65, which latter is controlled by a plural-wound magnet 92. The magnet 92 is also provided with armatures 64 and 66^a and comprises four windings, namely, a pull-down winding 61, holding winding 60, line winding 63 and an auxiliary winding 62. The lateral projection 93 near the center of the core of the magnet, by means of which said magnet is mounted upon the bracket 94, divides the magnetic circuit of the magnet into two parts, so that the windings upon one end of the core do not have any effect on the armatures on the other end. Of the two windings 61 and 60, the former is the stronger, its function being to attract the plunger arm 65 and to thrust the plunger of the line switch into the bank terminals. The coil 60, although not strong enough to attract the plunger arm 65, will retain it in its operated position after it has once been pulled down. When the plunger is forced into the group of contact springs 66, 67, 68, 69, 70, 71, 72 and 73, it forces them into contact in pairs. Although only one set of springs 66—73 is shown, each switch is provided with a plurality of such sets, each set forming a terminal of a separate trunk line leading to a selector E. The plungers of all the line switches of the group which is controlled by the master switch D engage a so-called plunger guide shaft (not shown) and through the medium of said shaft are normally maintained opposite the terminals of an idle trunk line. The master switch consists essentially of a motor magnet 93^a for rotating the ratchet wheel 94^a. The ratchet wheel 94^a is connected with the plunger guide shaft in such a manner that a rotary motion of the ratchet wheel gives to the plunger guide shaft an oscillatory motion to carry the idle plungers back and forth in front of their trunk terminals. To the plunger guide shaft there is secured a locking plate 95 provided near its outer edge with a number of openings which are adapted to be engaged by a pin 96 upon the end of the armature 97 of the locking relay 98.

The openings in the plate 95 are so spaced that the pin 96 can engage one of them and allow the armature 97 to resume its normal position only when the plungers of the idle line switches are directly opposite the terminals of a trunk line. The master switch is also provided with a bank of contacts comprising a common segment 99 and an individual contact α for each trunk line to which the line switches have access. The wiper 101 always maintains the segment 99 in electrical connection with the individual contact α of the trunk line before which the plungers of the idle line switches are being held by the master switch D.

The selector E is of the general type of selector switches disclosed in United States Letters Patent No. 815,321, granted March 13, 1906, to Keith, Erickson and Erickson, the circuits being modified, however, as shown in the above-mentioned British patent to T. G. Martin No. 1419 of 1910, in order to operate in a two-wire system. This selector comprises, among other details, a line relay 74, vertical and rotary magnets 75 and 76, private magnet 102, release relay 103 and the side switch wipers 104, 105, 106 and 107. The switch shaft (not shown), which has a vertical and rotary movement, and the line and private wipers 77, 78 and 79 are the direct means of connection between this switch and the next, namely, the selector F. The selector F is the same as the selector E with the exception that it possesses an extra side switch wiper 108. This selector extends the line connection in the usual manner to the connector switch H, which is of the same type as that disclosed in United States Letters Patent No. 815,176, granted March 13, 1906, to Keith, Erickson and Erickson, being slightly modified, however, in order to adapt the same for use in a two-wire system. The connector comprises, among other details, a line relay 109, vertical and rotary magnets 83 and 84, release relay 110, back-bridge relay 86 and a side switch controlled by the private magnet 85. Like the selectors E and F, this switch has the usual shaft which carries the wipers 80, 81 and 82 onto the contact of whatever line the subscriber happens to call. As shown at L, the reproducers 11 and 11^a are connected in a local circuit with a battery B' and the primary winding of an induction coil 204. The secondary winding of the induction coil is adapted to be connected with the line bank contacts of the connector switches through the condensers 202 and 203 by means of the relay 146. The magnet 40 (Figs. 1 and 3) is included in a ground tap from one side of the line.

Upon the subscriber removing the receiver 50 from the switch hook 52, the springs 111 are brought into contact, closing a circuit 65 through the line winding 63 of the line

switch C, which winding, upon energizing, attracts the armature 66^a, causing the springs 112 and 113 to make contact and close a circuit from ground G' through the pull-down winding 61 and the auxiliary winding 62 to the battery lead 100. The winding 61, upon becoming energized, attracts the plunger arm 65 and the small armature 64 the latter operating to separate the springs 113 and 114, 115 and 116 and at the same time to make contact between the springs 116 and 117. The operation of the plunger arm thrusts the plunger into the bank terminals to connect the line through the first selector E and to also break the circuit of the winding 63. The armature 66^a does not immediately fall back by the de-energization of the line relay 63 owing to the winding 62 being in series with the pull-down winding 61. The plunger arm, upon being completely drawn down, closes the contact of the springs 118 to shunt the auxiliary winding 62, thus allowing the armature 66^a to fall back at this time. Before the armature 66^a falls back to break the circuit of the winding 61, a circuit has been closed from ground G² through the contact of the springs 119 in the selector switch E by way of the bank springs 72 and 70 and through the holding coil 60 to the battery lead 100. The circuit of the relay 103 in the selector is closed by the line relay 74, which is energized when the line connection is extended to the selector by the engagement of the springs 66 and 68 and 67 and 69. Upon the springs 71 and 73 being pressed together by the plunger of the line switch C, a circuit is closed from the ground G³ through said springs and by way of the arm 101 and through the relay 93^b to battery, to operate the master switch in a well-known manner to move the remaining plungers to the next idle trunk.

The above operations follow immediately upon the subscriber removing his receiver from the switch hook preparatory to operating his dial for the first digit. We will assume that the number to be called to obtain connection with the time announcer is 2220. The subscriber now operates his dial in the usual manner for the first digit 2, thereby causing the contact of the springs 55 and 56 to be broken twice momentarily, thereby de-energizing the line relay 74 a corresponding number of times. This momentary de-energization allows the spring 120 to make contact with the springs 122 twice, thus sending two impulses through the vertical magnet 75, said circuit being traced from ground G⁶ through the contact of springs 120 and 122, contact of springs 124 and 123, private relay 102 and through the vertical magnet 75 and the side switch wiper 107 to the battery lead 100. Upon the vertical magnet being operated twice momentarily, the switch 120

shaft is raised two steps opposite the row of contacts in which terminates the trunk line leading to the second selector F. The relay 103 being slow acting retains its armature all the time impulses are being transmitted. Likewise, the private relay 102 being slow acting is also maintained in operated position until the last impulse has been transmitted, at which time its armature falls back to break the circuit of the private magnet 125, which allows the side switch to pass from first to second position, thereby transferring battery current by means of the side switch wiper 107 from the vertical magnet 75 to the rotary magnet 76, which latter operates to automatically rotate the wipers onto an idle contact. The circuit of the rotary magnet is as follows: from ground G^5 through the interrupter springs of said magnet, slow acting relay 126, side switch wiper 107 to the battery lead 100. The function of the slow acting relay 126 is to place a guarding potential from ground G^7 onto the private contact 79 immediately upon the wipers coming to rest, so as to insure against another selector engaging these contacts before the switch ahead has time to throw back the guarding potential from ground G^8 . This circuit is traced from ground G^7 through the contact of springs 127 and 128 and the side switch wiper 106 to the private wiper 79.

Upon the line connection being extended to the second selector F, the line relay 74^a and the slow relay 103^a are energized in a manner similar to that described for the first selector E. The subscriber now turns his dial for the second digit 2, thereby operating the selector F in precisely the same manner as the selector E to raise and rotate the line wipers 77^a and 78^a and wiper 79^a onto an idle trunk line leading to the connector H. Upon the connection being extended to the connector, the line relay 109 is energized, together with the relay 110, the circuit of the former being traced from ground G^9 through the lower winding of the relay 109, conductor 130, line wiper 78^a, side switch wiper 104^a, line wiper 78, side switch wiper 104, bank springs 69 and 67, conductor 90, through the subscriber's telephone, back over the conductor 91, bank springs 66 and 68, side switch wiper 105, line wiper 77, side switch wiper 105^a, line wiper 77^a, conductor 131 (Fig. 9), through the upper winding of the relay 109 to battery B and to ground G. The circuit of the relay 110 is traced from ground G^{10} through the contact of springs 132 and 133 and through the relay 110 to the battery B. The central office is now in a position to receive the impulses for the third digit 2, upon which the subscriber operates his dial in the usual manner to interrupt the circuit of the line relay 109 twice momentarily. Each

time the line relay deenergizes, a circuit is closed from ground G^{10} through the contact of springs 132 and 134, contact of springs 136 and 135 and through the vertical magnet 83, side switch wiper 137 and through the private relay 138 to battery B. The vertical magnet 83 is energized twice to raise the shaft wipers 80, 81 and 82 two steps opposite the row of contacts in which is situated the terminals of the line leading to the speaking clock L. The private relay 138 operates in a manner similar to that of the relay 102 in the selector E to close the circuit of the private magnet 85 while the vertical magnet is operating. This circuit extends from ground G^{11} through the contact of springs 140 and 141^a, through the private magnet 85 to battery B. After the last impulse of the series has been transmitted, the relay 138 deenergizes, thereby breaking the circuit of the private magnet 85, which in turn deenergizes and allows the side switch to pass to second position. The passing of the side switch wiper 137 to second position transfers the battery connection from the vertical magnet 83 to the rotary magnet 84. The subscriber now operates his dial for the last digit 0, thereby causing the line relay 109 to deenergize ten times to transmit a series of ten impulses through the rotary magnet 84. The circuit for the rotary magnet is traced from ground G^{10} through the contact of springs 132 and 134, springs 136 and 135, contact of springs 141 and 142 and through the rotary magnet 84 and private relay 138 to battery B. The private relay again breaks the circuit of the private magnet 85 at the cessation of the impulses to release the side switch to third position. As is well known, the private contacts of one connector are generally wired to the corresponding contact in all other connector switches of the same group for the purpose of protecting a called line from being engaged by more than one subscriber at a time. Upon the side switch wipers 145 and 147 passing to third position, circuits are closed through the upper winding of the relay 86 and the magnet 40 and through the lower winding of the relay 86 and relay 146, the latter circuit being traced from ground G^{12} through the side switch wiper 148, lower winding of the relay 86, contact of springs 149 and 150, side switch wiper 145, line wiper 82 and through the relay 146 to battery B. The former circuit is traced from battery B, upper winding of the relay 86, side switch wiper 147, line wiper 80 and through the magnet 40 to ground G^{13} . Upon the relay 146 becoming energized, the talking circuit is closed at the springs 153, 154, 155 and 156. Upon the relay 86 becoming energized, the springs 156^a and 157 break contact, so as to prevent the circuit of the ringer relay becoming

closed when the side switch wiper 137 passes to third position, at which time battery current is transferred from the rotary magnet 84 to said ringer relay. The springs of the ringer relay 87 are adjusted with much more tension than those of the relay 86, so as to enable the last-mentioned relay to pull up before the ringer relay 87 should the circuit of the ringing interrupter 200 be closed. Upon the energization of the magnet 40, the reproducers 11 and 11^a are lowered onto the record in the manner explained in connection with Figs. 1, 2, 3, 4, 5 and 6, whereby the time of day is announced to the calling subscriber.

After the subscriber has learned the time, he may release the connection by hanging up his receiver. Upon the hanging up of the receiver at the substation A, the circuit of the connector line relay 109 is broken, and said relay deenergizes to open the circuit of the connector release relay 110, as well as the holding circuit of the release relays 103^a and 103 of the selectors F and E, respectively, this holding circuit being transferred from ground G²⁰ by the passing of the connector side switch wiper 165 from second to third position. The relays 110, 103^a and 103, upon deenergizing, close the circuits of the release magnets 166, 167^a and 167 of their respective switches. These circuits are all similar to each other, that for the connector release magnet extending from ground G¹⁰ through the springs 132 and 134, back contact of the spring 136, release magnet 166 and off-normal contact 168. The mechanism of the respective switches is restored to normal position immediately upon the energization of the magnets 166, 167^a and 167 and the circuits of the magnets are broken at the shaft-controlled off-normal contacts when the shafts reach their lowest positions.

The relay 103 of the selector E not only closes the circuit of the release magnet 167, but destroys the holding circuit of the winding 60 of the switch C, which deenergizes and allows the plunger arm of said switch to return to normal position.

It will thus be seen that I have devised a very efficient phonographic announcer, and while I have illustrated one specific embodiment of my invention and have shown this in connection with an automatic telephone system of a particular type, it will, of course, be understood that my invention is capable of many modifications and changes. Thus, while I have shown the cylinder provided with two groups of impressions and two reproducers in order to record the time of day, it is obvious that the record might be provided with a separate impression for each minute of the twelve hours and only one reproducer employed, which reproducer would be stepped along one step each minute and returned to its starting point once in twelve

hours. Likewise, while I have referred to my announcer as a time announcer, it is, of course, understood that this device can be used for imparting any other information, or for advertising purposes, or, if desired, these features can be combined, as, for example, each groove could contain a time announcement together with some advertisement, or items of news could be interpolated when desired. Likewise, I do not wish to be limited to the form of telephone system with which I have chosen to illustrate my invention, as it is obvious that my invention is adapted for use in connection with other forms of automatic or semi-automatic systems.

What I claim as my invention is:—

1. In a telephone system, subscribers' lines, an automatic announcer, and automatic progressively movable means controlled by a calling subscriber for establishing connection between any of said subscribers' lines and said announcer.

2. In a telephone system, subscribers' lines, automatic progressively movable switches associated with said lines, a phonographic announcer, and means under the control of a calling subscriber for operating said switches to establish connection with said announcer.

3. In a telephone system, subscribers' lines, a phonographic announcer, an automatic connector switch, means for establishing connection from any one of said lines to said connector, and means controlled by a calling subscriber for then operating said connector to establish connection with said announcer.

4. In a telephone system, subscribers' lines, a phonographic announcer, an automatic connector switch, means for establishing connection from any one of said lines to said connector switch, bank contacts with which said connector is adapted to establish a connection, connections from certain of said contacts to the subscribers' lines, and connections from other of said contacts to said announcer.

5. In a telephone system, subscribers' lines, a phonographic announcer, an automatic connector switch, means for establishing connection from any one of said lines to said connector switch, bank contacts with which said connector is adapted to establish a connection, connections from certain of said contacts to the subscribers' lines, connections from other of said contacts to said announcer, a source of ringing current, a ringing relay for said connector for automatically connecting said ringing current to a subscriber's line when said connector makes connection with one of said lines, and means for breaking the circuit of said ringing relay when said connector makes connection with said announcer.

6. In a telephone system, a subscriber's line, a phonographic announcer, an automatic connector switch, means for establishing connection from said line to said switch, bank contacts with which said connector is adapted to make contact, normally open connections between certain of said contacts and said announcer, means for operating said switch, and means for closing said normally open connections when said switch engages with one of the contacts associated with the announcer.

7. In a telephone system, a subscriber's line, a phonographic announcer, an automatic connector switch, means for establishing connection from said line to said switch, bank contacts with which said connector is adapted to make contact, normally open connections between certain of said contacts and said announcer, means for operating said switch, means for closing said normally open connections when said switch engages with one of the contacts associated with the announcer, a source of ringing current, a ringing relay for said connector for automatically connecting said ringing current to the subscriber's line when said connector makes connection with said line, and means for breaking the circuit of said ringing relay when said connector makes connection with said announcer.

8. In a telephone system, subscribers' lines, a phonographic announcer comprising a record and a stylus normally disengaged from said record, automatic switches for establishing connection from said lines to said announcer, and means operating to permit said stylus to engage said record upon the establishment of said connection.

9. In a telephone system, subscribers' lines, a phonographic announcer comprising a record and a stylus normally held out of contact with said record, an automatic connector switch, means for establishing connection from any one of said lines to said connector switch, means for then operating said connector switch for establishing connection with said announcer, a relay adapted to be energized when such connection is established, and means controlled by the energization of said relay for permitting said stylus to engage said record.

10. In a telephone system, subscribers' lines, a phonographic announcer, an automatic connector switch, means for establishing connection from one of said lines to said switch, bank contacts with which said connector is adapted to contact, normally open connections between certain of said contacts and said announcer, connections from other of said contacts to subscribers' lines, a relay, means controlled by said relay for closing said normally open connections when said switch engages with one of the contacts associated with said announcer, a source of

ringing current, a ringing relay for said connector for automatically connecting said ringing current to one of said subscribers' lines when said connector makes connection with such line, another relay for said connector, and means controlled by said other relay for breaking the circuit of said ringing relay when said connector makes connection with said announcer.

11. A phonographic announcer, a plurality of lines associated therewith, means for extending any one of said lines to said announcer, a receiver for said extended line, a first and a second reproducer for said announcer for affecting said receiver, one record for said first reproducer, several records for the second reproducer, means for placing said reproducers in operative engagement with their records, said means controlled over the extended line, means for shifting said second reproducer from one record to another.

12. A phonographic announcer, a plurality of lines associated therewith, means for extending any one of said lines to said announcer, a receiver for said extended line, a first and a second reproducer for said announcer for affecting said receiver, one record for said first reproducer, several records for the second reproducer, means for placing said reproducers in operative engagement with their records, said means controlled over the extended line, means for shifting said second reproducer from one record to another, whereby the receiver may respond to the record of the first reproducer and to a plurality of records of the second reproducer while the first reproducer is retained in operative engagement with its record.

13. A phonographic announcer, a plurality of lines associated therewith, automatic means for extending any one of said lines to said announcer, a receiver for said extended line, a first and a second reproducer for said announcer for affecting said receiver, one record for said first reproducer, several records of the second reproducer, means for placing said reproducers in operative engagement with their records, said means controlled over the extended line, and means for shifting said second reproducer from one record to another.

14. A phonographic announcer, a plurality of lines associated therewith, automatic trunking means for extending any one of said lines to said announcer, a receiver for said extended line, a first and a second reproducer for said announcer for affecting said receiver, one record for said first reproducer, several records for the second reproducer, means for placing said reproducers in operative engagement with their records, said means controlled over the extended line, and means for shifting

said second reproducer from one record to another.

15. A phonographic announcer, a plurality of lines associated therewith, automatic trunking means comprising a plurality of progressively movable switches for extending any one of said lines to said announcer, a receiver for said extended line, a first and a second reproducer for said announcer for affecting said receiver, one record for said first reproducer, several records for the second reproducer, means for placing said reproducers in operative engagement with their records, said means controlled over the extended line, and means for shifting said second reproducer from one record to another.

16. A phonographic announcer, a plurality of lines associated therewith, means for extending any one of said lines to said announcer, a receiver for said extended line, a first and a second reproducer for said announcer for affecting said receiver, a plurality of records for said first reproducer, several records for the second reproducer, means for placing said reproducers in operative engagement with their records, said means controlled over the extended line, means for shifting said second reproducer from one record to another, whereby the receiver may respond to the record of the first reproducer and to a plurality of records of the second reproducer while the first reproducer is retained in operative engagement with its record, and means for shifting said first reproducer from one record to the other.

17. A phonographic announcer, a plurality of lines associated therewith, means for extending any one of said lines to said announcer, a receiver for said extended line, a first and a second reproducer for said an-

nouncer for affecting said receiver, a plurality of records for said first reproducer, several records for the second reproducer, means for placing said reproducers in operative engagement with their records and for withdrawing them from such engagement, said means controlled over the extended line, means for shifting said second reproducer from one record to another, whereby the receiver may respond to the record of the first reproducer and to a plurality of records of the second reproducer while the first reproducer is retained in operative engagement with its record, and means for shifting said first reproducer from one record to the other before said withdrawing means operates to withdraw said reproducer from operative engagement with their records.

18. A phonographic announcer, a plurality of lines associated therewith, means for extending any one of said lines to said announcer, a receiver for said extended line, a first and a second reproducer for said announcer for affecting said receiver, one record for said first reproducer, several records for the second reproducer, means for placing said reproducers in operative engagement with their records and for withdrawing them from such engagement, said means controlled over the extended line, and means for shifting said second reproducer from one record to another before said withdrawing means operates to withdraw said reproducer from operative engagement with their records.

Signed by me at Chicago, Cook county, Illinois, this 28th day of June, 1913.

JOHN G. BLESSING.

Witnesses:

ALBERT ANDERSEN,
GEORGE YANOCHOWSKI.