

May 29, 1923.

1,456,503

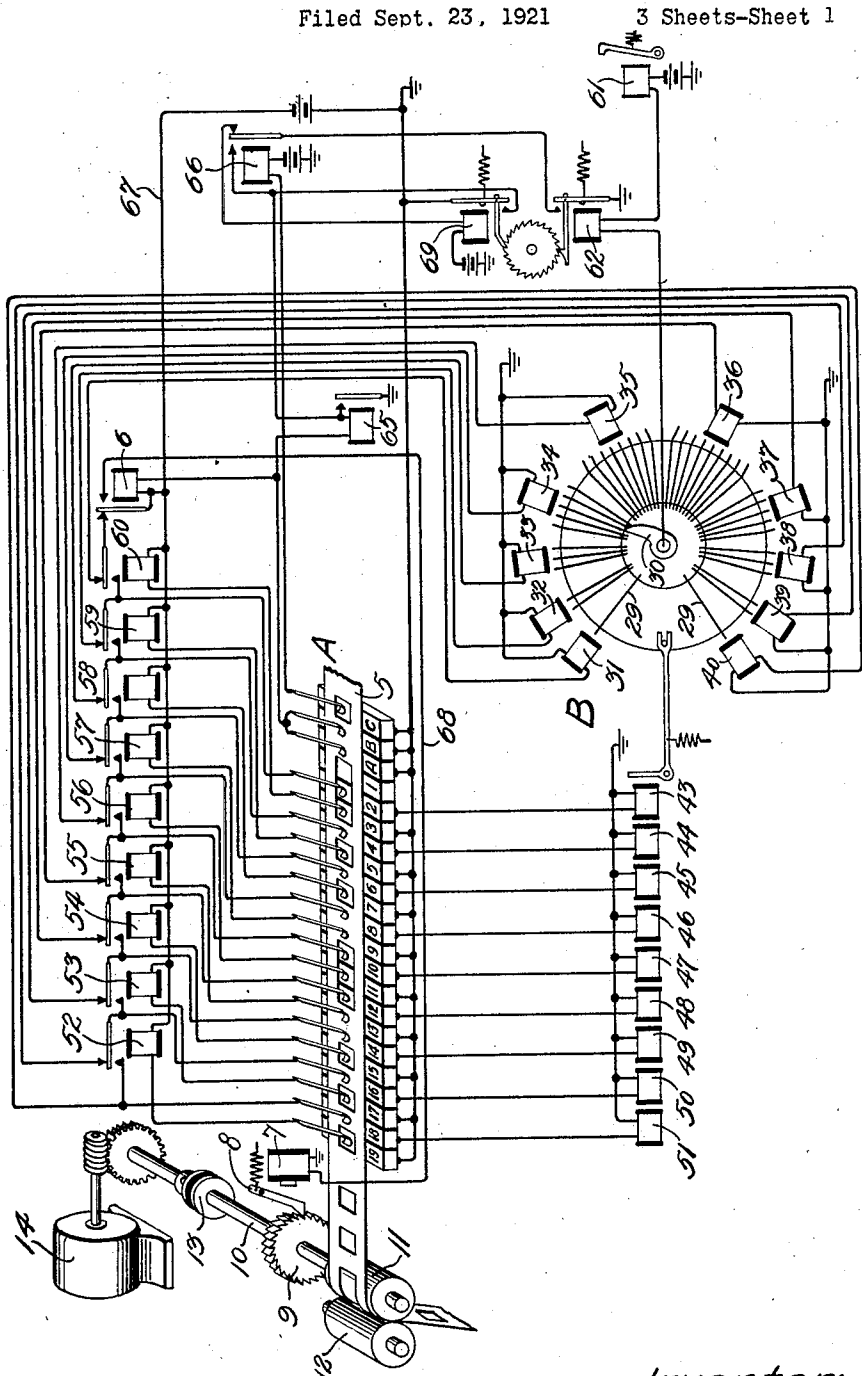
R. A. HEISING

TRANSLATING APPARATUS

Filed Sept. 23, 1921

3 Sheets-Sheet 1

Fig. 1



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3 Sheets-Sheet 2

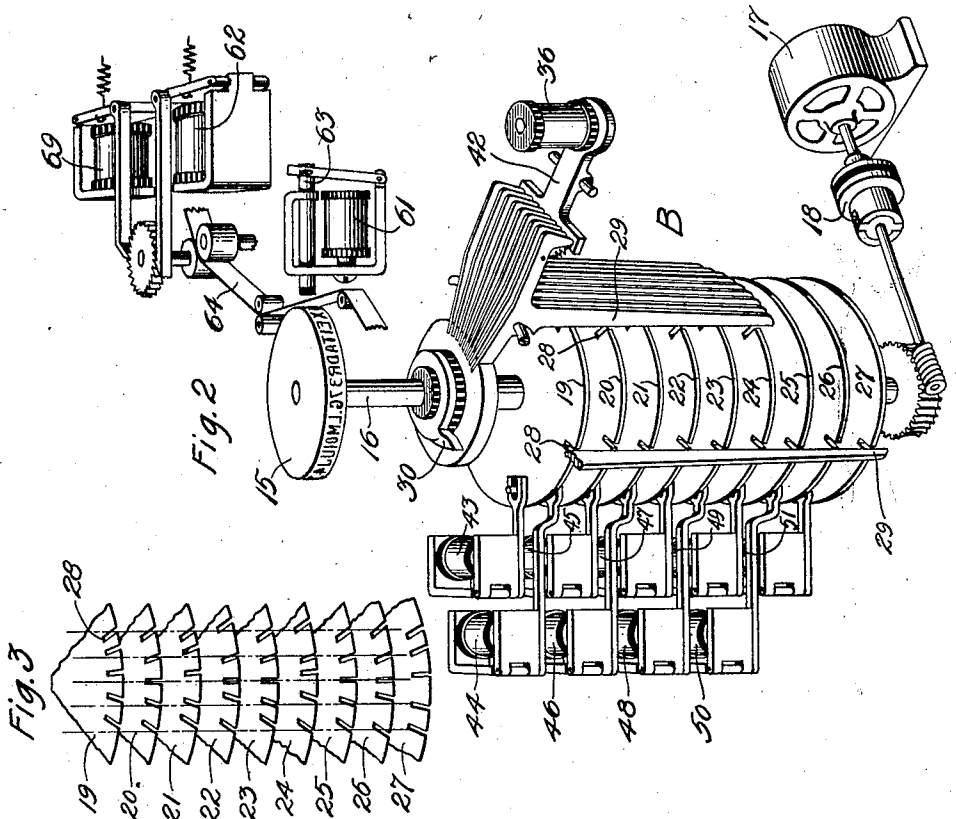
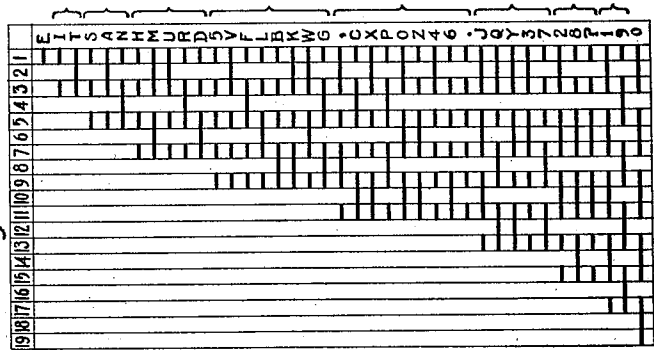


Fig. 3

Fig. 2

Fig. 4



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3 Sheets-Sheet 3

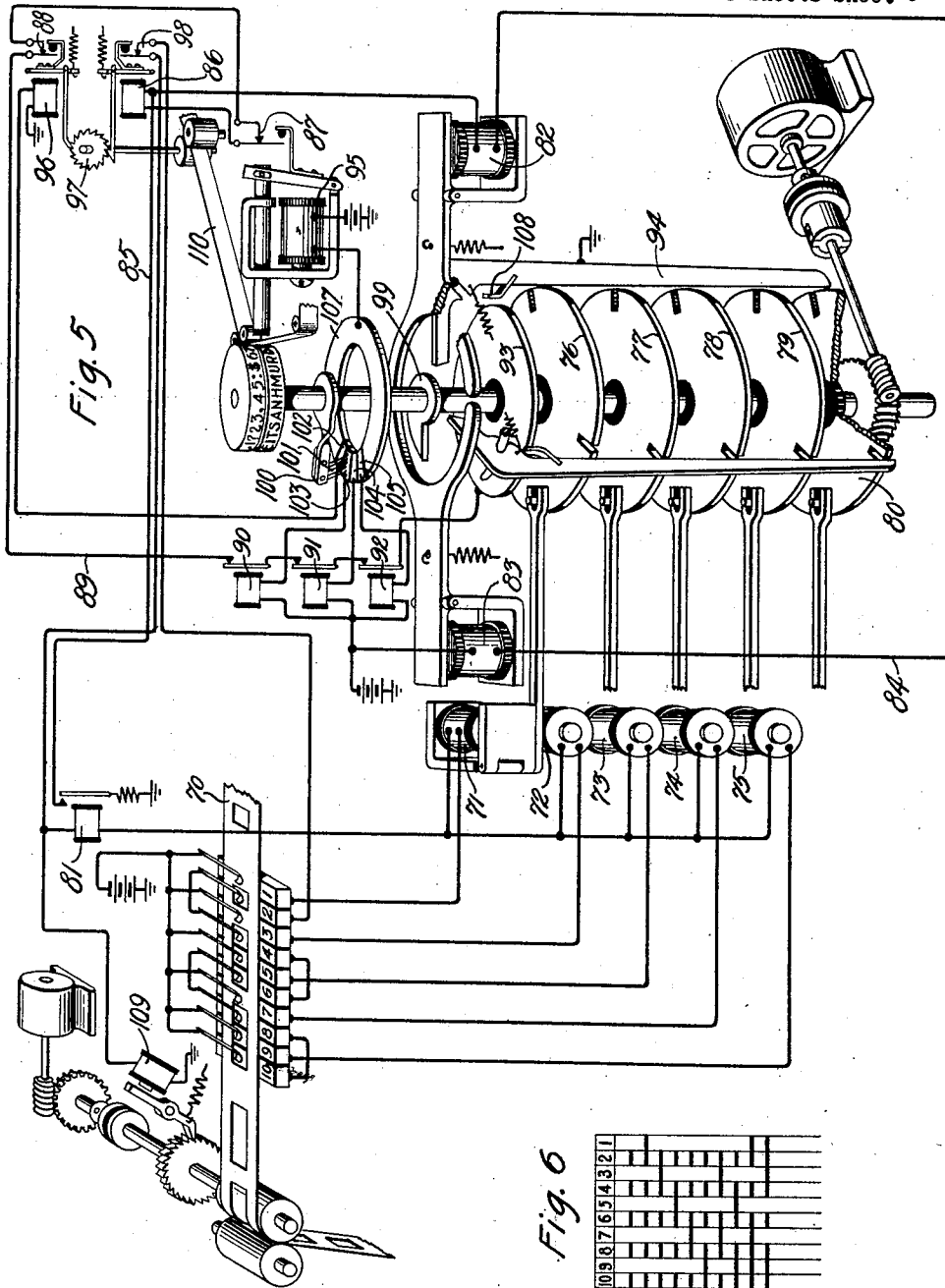


Fig. 6

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UNITED STATES PATENT OFFICE.

RAYMOND A. HEISING, OF MILLBURN, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TRANSLATING APPARATUS.

Application filed September 23, 1921. Serial No. 502,608.

To all whom it may concern:

Be it known that I, RAYMOND A. HEISING, a citizen of the United States, residing at Millburn, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Translating Apparatus, of which the following is a full, clear, concise, and exact description.

This invention relates to translating and recording apparatus.

An object of the invention is to provide means for translating signals represented by code combinations varying in number and length such as the continental Morse code into printed characters.

Another object is to provide a translating unit which may be operated independently of a line circuit.

Other objects will hereinafter appear.

Referring to the drawing, Fig. 1 shows the arrangement of the translating and recording apparatus diagrammatically.

Fig. 2 is a perspective of the recording apparatus.

Fig. 3 is a view of the discs of the recording apparatus showing the manner of alignment of the notches therein.

Fig. 4 is a diagrammatic representation of the signals with the corresponding letters of the alphabet and numerals together with other special characters.

Fig. 5 illustrates a modification of the invention.

Fig. 6 is a diagrammatic representation of a portion of the signals for which the printer shown in Fig. 5 is designed.

The invention comprises in general a tape-controlled distributor "A", a recorder "B", such as a telegraph printer, and groups of selecting relays and magnets controlled by the distributor for controlling the operation of the recorder.

The distributor "A" comprises a series of conducting segments arranged in a horizontal plane and having a contacting brush individual to each segment. Contact between the brushes and the respective segments is controlled by a perforated tape which has been previously perforated in accordance with the code combinations making up the message. The alternate brushes are connected to the energizing windings of the selecting relays 52 to 60 inclusive, while the remaining ones thereof are connected with the windings of the magnets 31 to 40

inclusive, through the contacts and armature of relays 52 to 60. Connected to the even numbered segments of the distributor are the windings of the operating magnets 43 to 51 inclusive, while the other segments of the distributor are connected in a common circuit which is grounded. The tape 5 is designed to be advanced by the mechanism shown to the left of Fig. 1. The tape 5 may be perforated in accordance with a desired code combination by any well-known manually operable means or by impulses received over a line or antenna. A perforating mechanism which is suitable for association with a radio-receiving set for perforating a tape in accordance with the incoming signals is shown in my copending application, Serial No. 825,729, filed September 23, 1919.

The recorder as shown in Fig. 2 comprises a type wheel 15 on which the characters are arranged in a single row and which is carried by a rotatable shaft 16 which may be driven as hereinafter described by a motor 17. Concentrically with the shaft 16 are nine movable discs 19, 20, 21, 22, 23, 24, 25, 26 and 27, each of which is provided with a series of peripheral notches 28. There is one notch in each of the discs corresponding to each vertical line of characters carried by the type wheel 15 and corresponding to each line of notches is a pivoted lever 29 which is adapted under certain circumstances as will be more clearly described in the following description to engage with a contact arm 30 also carried by the shaft 16. The pivoted or selectable bars 29 are arranged in groups, there being a magnet individual to each of the groups, each magnet being in turn controlled by the selecting relays 52 to 60, inclusive, depending upon the position of the respective armatures. The discs 19 to 27, inclusive, are arranged to be rotated through a small arc to position the notches therein in alignment whereby one of the pivoted or selectable bars 29 may move into a set of aligned notches. The discs are rotated by means of the magnets 43 to 51, inclusive, which in turn are controlled through segments of the distributor "A". Upon rotation of the discs, one of the pivoted levers 29 is permitted to move about its pivotal point in a manner whereby a portion thereof is moved into the path of the arm 30 carried by the shaft

16. Consequently upon the engagement of the arm 30 with a projection on the pivoted lever 29, the shaft together with the type wheel 15 will be arrested to position the desired character in alignment with the printing hammer.

The selection of a particular character and the various operations incidental thereto are as follows:

10 As the tape 5 is advanced by the motor driven mechanism shown to the left of Fig. 1, the various brushes make contact with the conducting segments with which they are associated upon the passage of the perforations 15 in the tape thereunder. When the tape has been advanced to a position where two spaces intervene between succeeding perforations, the operating circuit for relay 6 is broken. The deenergization of this relay 20 opens at its left contact, an energizing circuit for magnet 7. Magnet 7, thereupon releases holding pawl 8 and permits this pawl under the action of a retractile spring to engage the ratchet wheel 9, thereby stopping 25 the rotation of shaft 10 and in consequence thereof the advancement of the tape 5. The stopping of the tape in this manner positions the same with respect to the conducting segments so that there are three sets of 30 perforations representing as many characters over the segments. There will, however, be but one set of perforations selected for the setting up of a desired selection,—in the particular case selected, the perforations 35 falling on segments 1, 3, 5 and 7. Although the remaining perforations complete circuits with various relays connected with the associated brushes which engage the segment over which these perforations are at this 40 time positioned, they will not cause the operation of the selecting magnets controlled thereby. This is due to the fact that relay 57 will not be operated, since the brush controlling the energizing circuit thereof does 45 not engage the conducting segment individual thereto. The battery connection extending to the back contact of relay 56 is also broken at the conducting segment 8. When 50 contact occurs through segment numbered 2, a circuit is completed connecting a source of battery with magnet 43 which moves the selecting disc controlled thereby. This also indicates that segments 1 and 3 are covered by a dash. Failure of the brushes of segments 55 4 and 6 to make contact indicates that segments 5 and 7 have dots over them. As stated before, the absence of contact between segment 9 and the brush individual thereto, disconnects segment 8 and others of a higher 60 number from registering with the brushes individual thereto. Inasmuch as dots are registered by absence of connection to an even numbered segment causing no modification of the selector discs, the arrangement 65 of the discs would allow, in turn, the follow-

ing letters to be printed, T, A, V, B or the numeral 4. However, as shown in Fig. 4, these letters fall in different groups and when relay 57 fails to operate, its right contact puts battery on magnet 33 which controls the pivoted levers for one group only. 70 Since the operating magnet 43 was operated, due to the completion of its energizing circuit as previously described, the selector discs will thus be in a position whereby the 75 notches individual to but one of the pivoted levers 29 under the control of magnet 33 will move. This pivoted lever thereupon falls into the notches thus aligned.

When a pivoted lever 29 falls into a series of notches, the continuously rotating arm 30 secured to the same shaft as type wheel 15 engages the end of lever 29 and is arrested. The arresting of the arm 30 in this manner 80 positions the desired character on the type wheel in alignment with the printing hammer controlled by magnet 61 and also completes an energizing circuit for printing magnet 61 and releasing magnet 62. Magnet 61, upon being energized, moves the 85 printing hammer 63 into engagement with the tape 64 for causing the impression of the desired character. 90

The releasing or the restoring to normal of the circuit is accomplished by magnet 62 95 which completes the circuit broken by the tape 5 between conducting segments A and B with their brushes. The operation of magnet 62 completes an energizing circuit for relay 6 which may be traced from 100 grounded battery through the windings of relays 6 and 65 in series, front contact and armature of relay 66 and the contact and armature of magnet 62, to ground. The closure of the contact of relay 6, due to the 105 energization thereof, completes the energizing circuit for magnet 7. This circuit extends from grounded battery, conductor 67, armature and front contact of relay 6, conductor 68 and the winding of magnet 7 to 110 ground. Holding pawl 8 is thereupon withdrawn from engagement with the ratchet wheel 9 which permits the shaft upon which it is mounted to revolve for advancing the 115 tape 5. Relay 6, in operating, also disconnects the source of battery from the magnet 37, releasing the selector discs and the rotating arm 30. It has been assumed, in the releasing operation just mentioned, that another letter is following the letter which 120 operated the printer mechanism and the first dot or dash allows contact to be made between segment C and the brush individual thereto. Relay 66 will then be energized.

If three or more intervals follow the letter 125 just printed without a perforation, it indicates a space between words. No circuit will be completed to segment C and relay 66 will thus not be operated. The closure of the contact of magnet 62 when relay 66 130

is in its normal unactuated position, completes the energizing circuit for spacing magnet 69. This circuit may be traced from grounded battery through the winding of relay 69, back contact and armature of relay 66 and the contact and armature of magnet 62 to ground. Magnet 69, upon being energized, advances the tape 64 or the platen depending upon whether the characters are being printed in a continuous line or in page form.

When the magnet 69 operates, it completes the releasing circuit that magnet 62 would have completed had the relay 66 also been operated. The tape 5 thus resumes its movement upon the closure of the back contact of magnet 69.

Due to the fact that magnet 62 is not likely to remain energized long, while it may take time for the tape 5 to move sufficiently to bring a perforation over the segments A and B so that contact may be made between the brushes individual thereto, relay 65 operates when magnets 62 or 69 close the circuit and hold the energizing circuit of relay 6 closed which is momentarily closed through the operation of either of these magnets. The tape 5 moves along only while a current flows through the winding of relay 6 which is either due to the energization of relay 65 or while a perforation is over segments A and B.

In accordance with the diagrammatic showing of Fig. 4, segment 1 enters into all of the desired combinations which, therefore, makes it unnecessary to provide electrical connections for this segment.

The modification shown in Fig. 5 is designed to respond to the positioning of a tape 70 perforated to conform to signals diagrammatically shown in Fig. 6. In this case but one set of perforations representing one letter is positioned on the conducting segments at a time.

As soon as the entire group of perforations is over the conducting segments, a circuit is completed for stopping the tape. Since the space between letters is two intervals long, as in the previous case, and the letters ten intervals long, no position of the tape over the conducting segments will produce a circuit necessary to stop the tape, except when perforations are over bars 2, 4, 6, 8 and 10. As is more clearly shown in Fig. 5, the stopping of the tape in this position completes a circuit including certain ones of the selecting magnets 71, 72, 73, 74 and 75 which controls the movement of the movable discs 76, 77, 78, 79 and 80 forming a part of the printer mechanism. A printer mechanism similar to the one shown in Fig. 5 is disclosed in Patent No. 1,103,133 to A. F. Dixon. The selecting mechanism is operated in accordance with the positioning of the tape 70 for causing the movement of the

respective ones of the selectable discs. The movement of the selector discs positions a row of notches therein, whereby a selected bar 94 corresponding to the perforations in the tape will be permitted to fall into the notches so aligned. At the same time a second circuit is completed including relay 81, which, upon closing its contact, completes an energizing circuit for releasing magnets 82 and 83. This circuit may be traced from grounded battery through the winding of relay 83, conductor 84, winding of magnet 82, conductor 85 and the contact and armature of relay 81 to ground. The energization of magnets 82 and 83 releases the selected bar 94 and permits it to move radially towards the selector discs.

When one of the bars 94 moves into the notches in the selector discs aligned as previously described, the contact made between the bar 94 and the selector discs completes a circuit including the winding of magnet 86. This circuit may be traced from grounded battery through the winding of magnet 83, conductor 84, winding of magnet 82, winding of magnet 86, contact 87, contact 88, conductor 89, normal contacts of relays 90, 91 and 92 in series, the conducting disc 93 and the pivoted bar 94 to ground.

As described in connection with the printer mechanism shown in Fig. 2 and also in the previously mentioned patent, the type wheel together with the shaft upon which it is mounted and the stop arm 99 is rotated from power communicated thereto by a motor. With the engagement of the pivoted bar 94 with the notches in the selector discs, the stop arm 99 engages an extension on the pivoted bar 94, whereby the type wheel is arrested.

There is also mounted on the same shaft as the one carrying the type wheel, an arm 100 carrying a brush 101 designed to engage a segmented ring 107. Upon the positioning of the type wheel and the engagement of the brush carried by the arm 100 with the larger portion of the segmented ring 107, a circuit is completed extending from battery through the winding of the printing magnet 95, ring 107, brush 101 carried by the arm 100, the shaft carrying the type wheel, stop arm 99 and the pivoted bar 94 to ground. The printing magnet thereupon operates for causing the engagement of the printing hammer controlled thereby with the tape 110 upon which an impression of the desired character is made. Printing magnet 95, upon being energized, also opens contact 87 which causes the deenergization of magnet 86 controlling a pawl normally in engagement with the ratchet wheel 97. Ratchet wheel 97 will thereupon be advanced one step, upon the deenergization of its controlling magnet. The rotation of the ratchet wheel 97 in this manner

causes a like movement of the tape 110 which is thereupon positioned so that an unprinted area is in alignment with the extension on the printing hammer.

5 For accomplishing the various auxiliary operations common in a printer of this general type, three magnets, 90, 91 and 92 are provided. The circuits of these magnets are controlled through segments 102, 103, 10 104 and 105 forming a part of the segmented ring 107. A magnet 96 is also provided for causing the advancement of the tape 110 when it is desired to cause its advancement and not effect the printing of 15 any characters.

The operation of the printer system as shown in Fig. 5 is as follows:

Assuming that the tape 70 is positioned over the conducting segments in the manner shown in this figure, circuits will be 20 completed through brushes individual to each of the segments and the corresponding selector magnets. One of these circuits may be traced from grounded battery, brush 25 and its associated contact, winding of magnet 75, winding of relay 81, and the winding of magnet 109 to ground. The completion of contact between the brushes and the respective segments completes an energizing 30 circuit for the magnet 109 through contact 98 and magnet 86, whereupon the pawl controlled thereby is caused to engage the associated ratchet wheel which causes a stoppage of the tape 70. The manner of advancing the tape has been previously described in connection with the operation of 35 the system shown in Fig. 1, and need not be described further here.

Upon the energization of selected ones 40 of the selector magnets 71 to 75, due to the positioning of perforations in the tape 70 over the connected segments, the corresponding selector discs 76, 77, 78, 79 and 80 will be positioned. By positioning respective ones of the selected discs, one set 45 of notches therein will be aligned for permitting the pivoted bar 94 to move radially. Before the pivoted bars 94 may move radially, it is necessary that an energizing 50 circuit be completed for the release magnets 82 and 83. This circuit extends from grounded battery through the winding of magnet 83, conductor 84, release magnet 82, conductor 85 and the off normal contact 55 of relay 81 to ground. As previously described, a projection on the pivoted bar 94 moves into the path of the stop arm 104. Thus upon the engagement of this arm with the pivoted bar 94, the type wheel is stopped 60 thereby positioning the selected character in alignment with the printing hammer controlled by the printing magnet 95. At the same time, the circuit of the magnet 95 is completed whereupon the desired character 65 is printed on tape 99. As the pivoted bar

94 moves into the aligned notches but before the type wheel is stopped, a circuit is completed extending from grounded battery through the winding of magnet 83, conductor 84, magnet 82, winding of magnet 70 86, contact 87, contact 88, conductor 89, normal contacts of relay 90, 91 and 92, ring 93, contact 108 secured to the bar 94 to ground. Magnet 86 is thereupon energized for causing the pawl controlled there- 75 by to engage the next succeeding tooth. This magnet, however, remains energized until contact 87 is opened due to the energization of the printing magnet. The brush 101 in engaging the segments of the 80 conducting ring 107, conditions a circuit for the printing magnet 95. Such a circuit is completed upon the engagement of the stop arm 104 with the projection on the 85 pivoted bar 94, thus causing the printing of the desired character on the tape 99. When magnet 86 energizes, contact 98 is opened thereby causing the release of relay 81 and magnet 109. The pawl controlled 90 by the magnet 109 thereupon moves out of engagement due to the action of a retractile spring with its associated ratchet wheel whereby the tape 70 is caused to be moved 95 as described in connection with the printer shown in Fig. 2. The release of relay 81 opens, at its contact, the previously established energizing circuit of the release magnets 82 and 83, whereupon these magnets are released for restoring the pivoted bar 94 100 to normal.

It is often desired to space the tape 110 without causing the impression of a character thereon. For accomplishing this feature, magnet 96 is provided which upon the 105 transmission of a particular set of impulses, the type wheel is positioned so that contact is made between brush 101 carried by the arm 100 and the segment to which this magnet is connected. Thus, upon the energiza- 110 tion of this magnet, its associated pawl is caused to engage the next succeeding tooth whereby the tape 110 is advanced to position an unprinted area before the printing hammer.

Although the invention has been described 115 in connection with a printer wherein the characters are printed in a continuous line, it is, of course, obvious that the invention could be applied to a printer of the type which prints the characters in page form, 120 without departing from the spirit and scope of the present invention.

The invention claimed is:

1. In combination, a printing mechanism comprising a rotatable type wheel, a plu- 125 rality of concentrically arranged discs having notches therein, a selector bar for each set of notches in said discs, means controlling the release of said bars, further means selectively operative for aligning the notches 130

in the discs with respect to said bars, a tape perforated to conform to signals of different lengths, a plurality of segments over which said perforations are arranged to pass, and circuit closing means for completing contact with segments through said perforations, whereby said selectively operated means is operated to effect the impression of the character corresponding to such perforations.

2. In combination, a printing mechanism comprising a rotatable type wheel, a plurality of concentrically arranged discs having notches therein, a selector bar for each set of notches in said disc, means controlling the release of said bars, further means selectively operative for rotating the discs whereby the notches therein are aligned with respect to said bars, a tape perforated to conform to signals of the Morse continental code, a plurality of segments over which said tape is designed to pass, tape advancing means, and means controlled by the space intervening between succeeding groups of perforations for stopping said tape advancing means whereby only one set of perforations over said segments will be effective to cause the operation of said selectively operative means to transcribe the perforations in said tape into print directly.

3. In combination, a printing mechanism comprising a rotatable type wheel, a plurality of concentrically arranged discs having notches therein, a selector bar for each set of notches in said disc, means controlling the release of said bars, further means selectively operative for rotating the discs where-

by the notches therein are aligned with respect to said bars, a tape perforated to conform to signals of the Morse continental code, a plurality of segments over which said tape is designed to pass, means for advancing said tape, and means controlled by the space intervening between succeeding groups of perforations for stopping said tape advancing means whereby but one set of perforations over said segments will be effective to cause the operation of said selectively operative means to transcribe the perforations in said tape directly.

4. In combination, a printing mechanism comprising a rotatable type wheel, a plurality of concentrically arranged discs having notches cut therein, a selector bar for each set of notches in said discs, electrically operated means for controlling the release of said bars, electromagnetic means selectively operative for rotating the discs whereby said notches are aligned with respect to said bars, a tape perforated to conform to signals of the Morse continental code, a plurality of segments over which said tape is designed to pass, a brush individual to each of said segments, and a group of relays associated with said brushes and controlling the energization of said electrically operated means whereby the character corresponding to the perforations in said tape is printed directly.

In witness whereof, I hereunto subscribe my name this 21st day of September, A. D. 1921.

RAYMOND A. HEISING.