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TELEGRAPHIC RECEIVER

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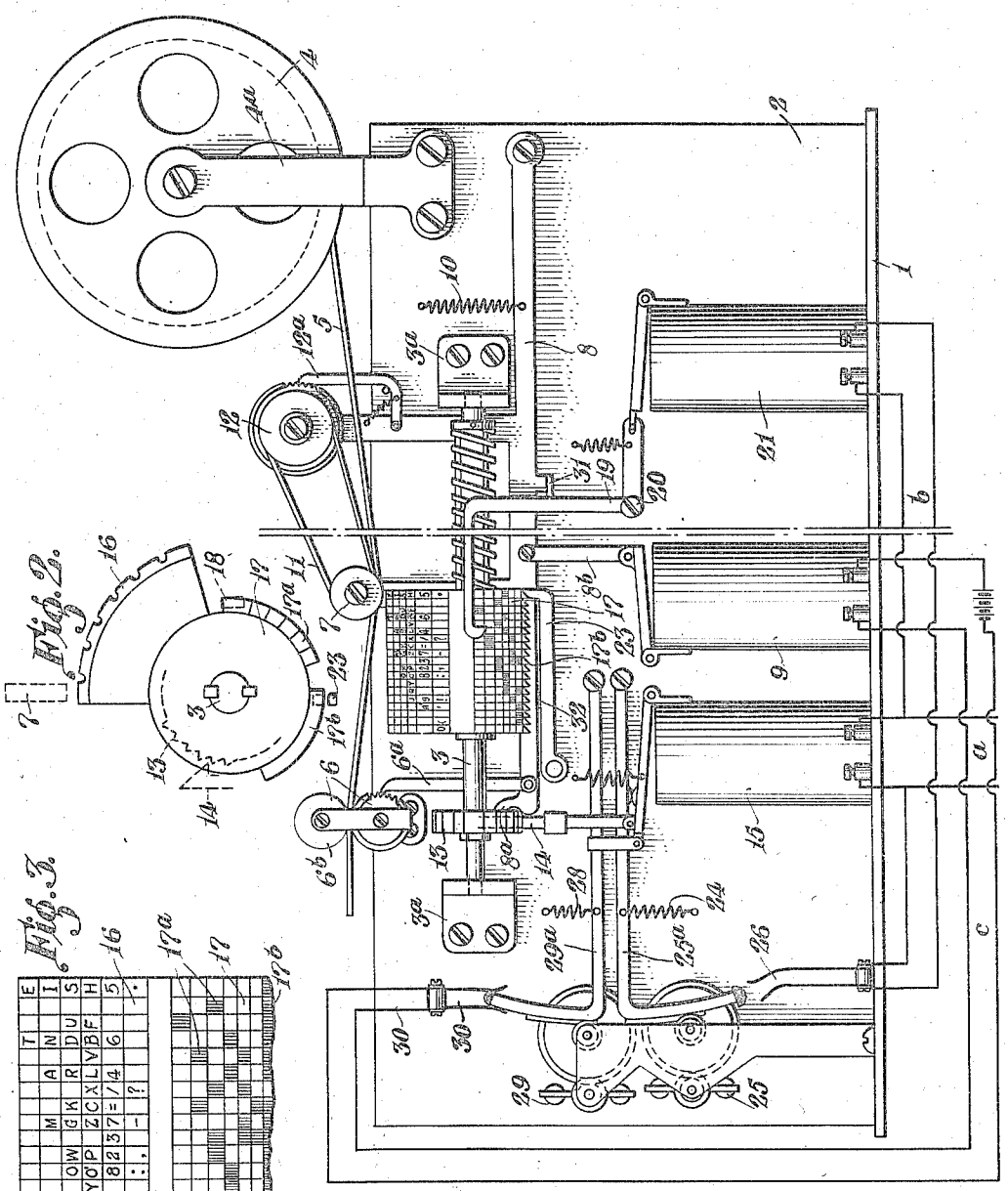

Fig. 1.

Fig. 2.

Fig. 3.

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TELEGRAPHIC RECEIVER

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2 Claims. (Cl. 178—39)

The telegraphic transmission by a dash and dot code (Morse or other code) is still largely used in transmitting apparatus using a perforated tape in consideration of the speed of automatic transmission and the possibility of utilizing the same tape for a plurality of telegraphic lines. This system, however, still has the disadvantage that the signals of the code have to be transcribed in alphabetical characters on reception of the message, which requires time and skilled attendance.

This invention has for its object a receiving apparatus which receives the conventional Morse signals or others, and prints them in typographical types. This apparatus is useful for lines served by automatic transmitters, as well as for manually operated ones, for the receiving apparatus works even without any attendance, starting and stopping by itself without call signals, controls, etc.

According to this invention the types are carried by a drum in rows and columns. By rotating the drum through a circular set of teeth and axially displacing it by means of a longitudinal set of teeth, any of the types can be brought beneath the inking roller. The order of types on the drum takes into account the composition of the Morse signal, namely the number of dots and dashes forming the signal as well as the order in which said dots and dashes follow one another therein, taking advantage of the fact that a dot has a length of one interval, a dash has a length of at least three intervals, a space between dots and dashes in the same Morse signal has a length of one interval and a space between two signals has a length of at least three intervals.

Each time an impulse of current is sent by the transmitting station the circuit of an electromagnet is closed; if the current remains on for a short period equal to the length of a dot, the drum is imparted through the action of the electromagnet on its circular (or longitudinal) set of teeth a rotary (or translational) motion by one step (row or column). If the current remains on for a longer period equal to the length of a dash, a retarding mechanism, actuated by the electromagnet with a delay of one interval, closes the circuit of a second electromagnet, producing a further translational (or rotary) motion of which the width of one or more steps (columns or rows, respectively) depends upon the form of a further longitudinal (or circular) set of teeth brought into engagement by the first motion produced by the first electromagnet. Consequently, to each signal of the Morse code, including signals of the same duration and similar composition like the letter A (. —) and N (— .), there corresponds a well-determined and different position of the drum under the inking roller. The type strikes the telegraphic tape passing between the roller and drum under the action of a third electromagnet of which the circuit is closed, two intervals after the signalling current has ceased, by a second retarding mechanism actuated by the return of the first electromagnet, the space between two signals having a length of at least three intervals. The tape is fed, after type has marked the tape, by a spring opposing the third electromagnet.

The accompanying drawing shows by way of example a construction of the object of this invention.

Figure 1 shows diagrammatically the receiver.

Figure 2 is a front view of the type drum.

Figure 3 shows the development of the drum.

According to the example shown, the sending of a current for the length of a dot rotates the drum by one step (one row), while a current for the length of a dash further produces the axial displacement of the drum by a given extent (one or more rows). The apparatus has a foundation board 1 on which rest the electromagnets and the retarding mechanisms, and a vertical board 2 supporting the shaft 3 of the drum between the brackets 3a and at one end the reel 4 for the telegraphic tape 5 on a fork 4a and at the other end a pair of rollers 6 mounted on a fork 6b and feeding the tape step-wise at each marking of a type, i. e. as each signal of the Morse code is received. The telegraphic tape 5 passes beneath the inking roller 7 carried by an extension 8d of the lever 8 pivoted to the board 2; the lever 8 is oscillated by a rod 8b under the action of an electromagnet 9 after the sending of each signal against the action of an opposing spring 10. The endless printing ribbon 11 passes over the inking roller 7 and extends between the latter and the feed roller 12 carried by another extension 8c of the lever 8. The telegraphic tape 5 as well as the inking roller are advanced by one step at each oscillation of the lever 8 by the spring pawls 6a and 12a acting on toothed wheels carried by one of the rollers 6 and by the roller 12. A saw-toothed wheel 13 keyed on the shaft 3 is rotated by a pawl 14 by one step under the action of the electromagnet 15 at each dot or dash sent by the transmitting station against the torsional action of the spiral spring 22, and is held by the pawl 8a of the lever 8. The shaft 3 further carries slidably mounted thereon a drum having a cylindri-

cal sector 16 (Fig. 2) carrying in relief in a given order (Fig. 3) in rows and columns the types corresponding to the various signs of the Morse alphabet, and a cylindrical sector 17 having sawteeth 17*a* spaced in accordance with the columns of types, the teeth engaging the pawl 18 forming part of a bell crank lever 19 pivoted at 20 to the board 2 and actuated by the electromagnet 21. In the condition of rest shown in Figure 1 the tooth on the pawl 18 is in front of the fifth circular row of teeth 17*a* starting from the right end, and when the dash electromagnet 21 is energized the tooth on the pawl 18 performs a stroke equal to five times the pitch of the circular rows of teeth 17*a*. If it meets in this motion a tooth 17*a*, it carries along to the right the drum by an extent corresponding to the distance of the tooth from the right end. Supposing, for instance, the top row on the sector 17, which has only one tooth 17*a* in the third column from the right, is brought by the rotation of the drum underneath the pawl 18, when the electromagnet 21 is energized, the pawl 18 moves to the right idly over the fifth and fourth column, meets in the third column the tooth 17*a* and thereupon carries along the drum to the right by a length corresponding to the width of three columns. During this motion to the right, the drum compresses the spring 22 and is then retained in its new position by a pawl 23 engaging with the rack 17*a* formed by circular slits cut in a sector on the drum. The electromagnet 15 or dot electromagnet releases every time it is energized the spring 24 of a centrifugal retarding device 25 having its pinion mounted unidirectionally, which after two intervals closes the switch 26 placed in the circuit —*b*— of the electromagnet 21 or dash electromagnet. The latter is energized only when the current remains on for a period exceeding the length of two intervals, namely when a dash is transmitted, for the circuit —*b*— of the second electromagnet is opened and closed at the same time as the circuit —*a*— of the telegraphic line, being in parallel with the latter (see Fig. 1) or by means of a relay energized by the circuit —*a*—. The armature of the dot electromagnet 15 stretches through the strap 27 the spring 28 of a second centrifugal retarding device 29; when the armature resumes its position of rest, the dot or dash having been sent, the retarding device 29 is started. If the space between two signals has the duration of one interval only, the retarding device 29 has not time to come into action. If the space is of the length of two intervals, the retarding device closes for an instant the switch 30 of the circuit —*c*— (the circuits —*a*— and —*b*— being still open) of the marking electromagnet 9 fed by a local battery; the lever 8 swings against the action of the spring 10 and causes the inking roller 7 with the printing ribbon 11 and the telegraphic tape 5 to strike on the cylindrical sector 17, which brings opposite the latter the type in the row and column which the sending of the Morse signal has brought beneath the inking roller by means of a certain rotation and translation of the drum 16—17.

The return oscillation of the lever 8 releases by means of suitable abutments 31 and 32 (diagrammatically shown on the drawing) the drum 16—17 with the sets of teeth 17*a* and 17*b* from the pawls 18 and 23 and the wheel 13 from the pawl 8*a*; the spring 22 returns the drum to its initial position shown on the drawing.

The return of the lever 8 under the action of the spring 10 actuates the pawls 12 and 6*a* which advance the inking roller 7 and the telegraphic tape 5 by one step.

The working of the apparatus will be illustrated by the following examples.

When the letter E, which is a point (.) of the Morse code is to be received, the current sent energizes the dot electromagnet 15 which rotates the drum 16—17 by one step through the pawl 14 bringing the first row of types under the inking roller 7. The release of the armature of the electromagnet sets the retarding device 25 in motion; this device would stop the switch 26 of the dash electromagnet 21 after two intervals but as a point is now being transmitted the current ceases after the first interval and the motion of the retarding device is reversed without the closure of the switch 26, energizing of the electromagnet 21 and translation of the drum 16—17 taking place. The return of the electromagnet sets in motion the retarding device 29; when the marking electromagnet 9 is energized after two intervals by the closure of the switch 30 actuated by the retarding device 29, the first row and the first column are still beneath the inking roller and the type E is printed on the telegraphic tape.

In the transmission of the letter T which is a dash (—) in the Morse code, the current remains on the length of three intervals, the electromagnet 15 is energized and rotates the drum by one step bringing the first row beneath the roller; two intervals thereafter, the retarding device closes the switch 26 and the electromagnet 21 is energized, the pawl 18 performs a five-step stroke meeting a tooth after two steps thus feeding the drum in axial direction by three steps and bringing the fourth column beneath the roller. The letter T thus comes under the inking roller and is typed two intervals after the current has ceased.

In the transmission of the letter A (— .) the sending of the dot rotates the drum by one step. The dash is sent with a spacing of one interval only from the dot, namely without energizing the marking electromagnet 9 rotating the drum by another step, bringing the second row beneath the roller and then axially moving the drum by five steps bringing the sixth column beneath the roller; the type A which is at the intersection of the second row with the sixth column is thus opposite the inking roller and is printed two intervals after the current has ceased.

In the transmission of the letter N (— .) the first current rotates the drum by one row and moves it axially by three columns; the second current sent after an interval rotates the drum by a further row. The letter N thus comes beneath the inking roller.

In the transmission of the letter V (. . . —), each dot sent rotates the drum by one row, bringing the third row beneath the inking roller; when the dash is emitted, the drum rotates by one row more and is displaced by four columns bringing the fifth column with the type V beneath the inking roller.

In the transmission of the letter W (. — —) the dot rotates the drum by one row; the first dash produces a rotation by a further row and a translation by five columns; the second dash produces rotation by a further third row and translation by further five columns bringing the eleventh column with the type W beneath the roller.

Generally a dot produces the rotation by one row, a dash the translation by two to five columns, and a three intervals spacing the marking and return of the drum to its initial position. The

space between two words can be obtained by a striking of the drum without typing corresponding to a special sign of the Morse code (for instance 7 dots) or a third retarding device can be employed which comes into action after a space of the length of over three intervals.

Practically, the construction of the apparatus may be varied in its details from what has been described and diagrammatically shown by way of example. The transmission of a dot might move the drum axially by one step and the transmission of a dash might rotate it by one or more steps, conversely to what takes place in the example described; the retarding devices might be of different type and one retarding device might perform both functions, the ratchet gears might be replaced by other feed and stop gears, these modifications obviously not departing from the spirit of this invention.

The apparatus can be used for decoding rapidly even by a non-skilled operator a message in any conventional dot and dash code, each code having its own special drum; in this case the line —*a*— is reduced to a few inches wire, and the operator who need not be a telegraphist operates the keyboard according to the dot and dash records of the message received.

What I claim is:

1. In a telegraphic receiving apparatus using the conventional Morse code dot and dash signals, the combination with a printing mechanism of a type-carrying drum comprising a cylindrical sector having the types distributed thereon in longitudinal rows according to a predetermined order, a second cylindrical sector having a plurality of saw-teeth distributed on the same according to a predetermined order corresponding to the predetermined type order, means actuated by the incoming dash signals and co-acting with said saw-teeth for producing an axial displacement of said drum, a third sector carrying stop teeth and means engaging said stop teeth to hold the drum against further axial displacement, a toothed wheel rigidly connected in rotation with the drum, and means responsive to the dot signals for producing a rotation of said drum in order to bring the type corresponding to the transmitted signal under the printing mechanism.

2. In a telegraphic receiving apparatus using the conventional Morse code dot and dash signals, the combination with a printing mechanism of a type-carrying drum, comprising a cylindrical sector having the types distributed thereon in longitudinal rows according to an order depending upon the composition of the Morse signal, a second cylindrical sector having a plurality of saw-teeth distributed on the same according to an order corresponding to that of the types, a third sector carrying stop teeth, a toothed wheel solidly connected in rotation with the drum, a dot relay energized by the incoming signal means responsive to the energizing of said dot relay and operatively co-acting with said toothed wheel to rotate said drum by one step for each dot signal, a dash relay having means connected therewith to axially move said drum, a retarding device, means responsive to the dot relay to cause the retarding device to control the energizing circuit for the dash relay, so as to energize the latter only on receiving an incoming dash signal, a second retarding device and means actuating the dot relay to cause said second retarding device to close a circuit controlling the printing mechanism at the end of the displacement of the drum.

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