

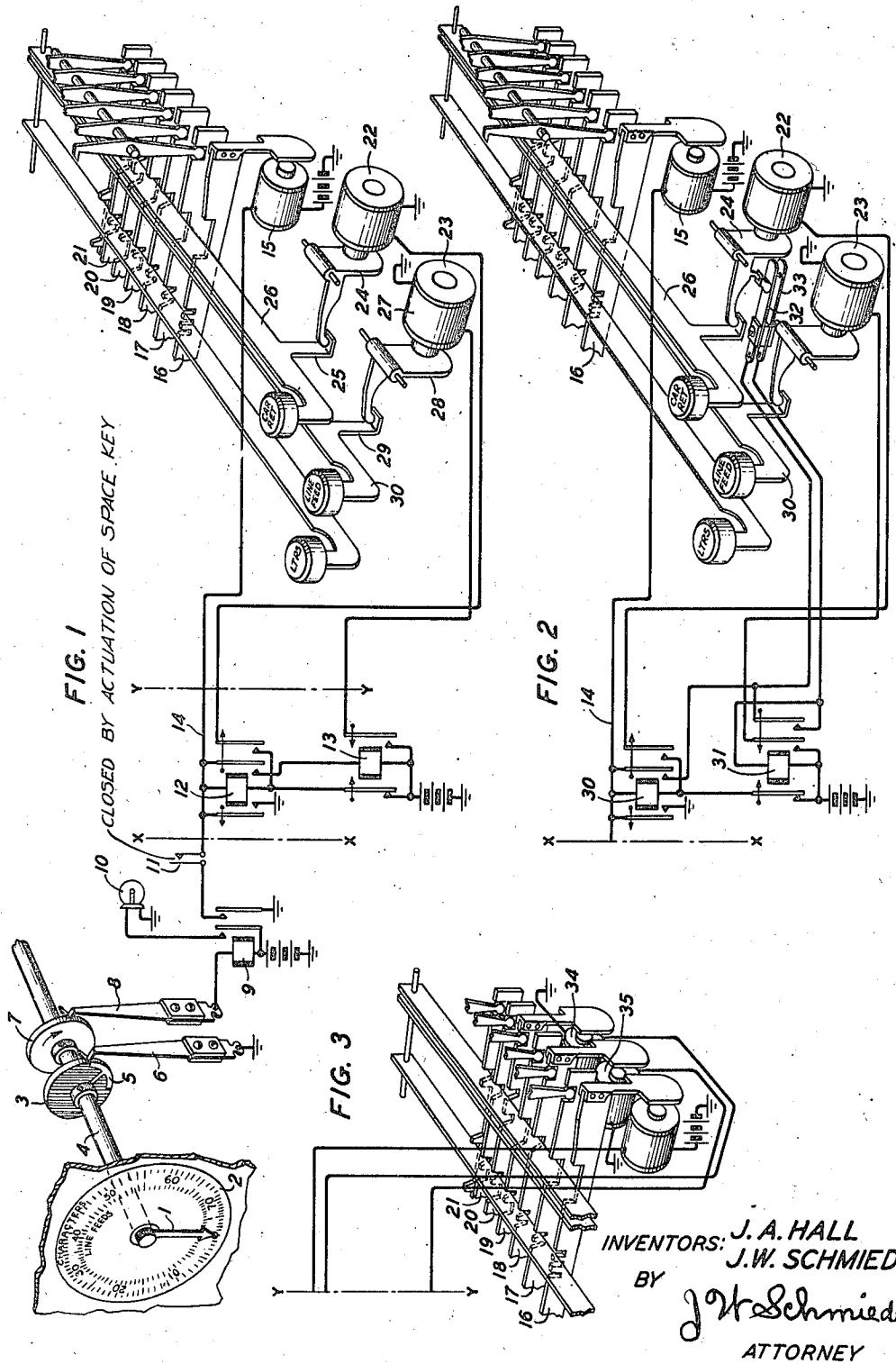
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AUTOMATIC TELETYPEWRITER OPERATION

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AUTOMATIC TELETYPEWRITER
OPERATION

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This invention relates to printing telegraph apparatus by means of which communication through permutation code is carried on and particularly to keyboard facilities for direct transmission of electrical impulses and/or the perforation of tape.

It is a known practice to place alongside of a tape perforator or a non-printing keyboard sender or the printing telegraph keyboard of a combined tape printer and sending keyboard and in view of the operator a counter dial whereby the operator will be notified that she is approaching the point where the carriage return and line feed keys will have to be operated. The object of the present invention is to provide automatic means, functioning regardless of the presence or absence of the indicator, whereby these operations will be interpolated in the message or corresponding codes will be punched in the tape if the operator neglects to do so.

In accordance with one embodiment of the invention the usual counter is adapted to close a contact when its pointer is within a predetermined distance from its limiting position. This may take the form of a contact closed by the pointer, a contact closed by a cam mounted on the shaft of the counter or a simple step-by-step switch with no visible dial. The closing of such a contact will cause the display of a warning signal before the operator to notify her that no more than the particular word which is being typed may be added to the present line. Thereafter the operator may, at the end of the word, operate the keys for carriage return and line feed and continue her operation as usual. The operation of the carriage return key will, as usual, return the counter to zero and in the present case will also erase the visual warning signal. If the operator prefers, she may depress the "space" key after typing the word on which she was working when the warning signal was displayed. The operation of the space key will cause the automatic operation of the carriage return and line feed keys and the erasure of the warning signal.

A feature of the invention is a train of sequentially operating relays started in operation by the first operation of the space key on the keyboard after a predetermined number of codes have been transmitted or punched in a tape, for operating in sequence the function keys which will result at the distant end in the starting of a new line of typing.

In accordance with another feature, interlocking circuits are provided so that the electrical operation of such train of relays will not overrun

the mechanical capabilities of the keyboard apparatus.

The drawing consists of a single sheet with three figures partly skeletonized perspective views of certain teletypewriter apparatus and partly circuit diagram.

Fig. 1 shows one form of the invention in which magnets are provided to depress the carriage return and line feed keys of the teletypewriter;

Fig. 2 shows an alternative form in which certain interlocking circuit arrangements are introduced; and

Fig. 3 shows an arrangement by which the code bars, rather than the key bars are moved by magnets.

Where a keyboard sender or keyboard perforator is employed for transmitting to apparatus commonly known as page printers it is general to employ an end-of-line indicator or character counter. Such a device is shown in Patent 2,014,368 granted to R. A. Lake, October 22, 1935. The usual form of such end-of-line indicator is shown in Fig. 1 of this patent. In the present arrangement such an end-of-line indicator is shown as the pointer 1 operating over the dial 2. It is proposed to mount on the shaft carrying the pointer 1 a contact arrangement which will close when the pointer has reached a predetermined point, say, sixty-five characters. One manner in which this can be accomplished is to have an insulated cam 3 mounted on the shaft 4 and having a contact 5 cooperating with the grounded spring 6. When the pointer 1 has reached an indication of sixty-five characters, ground will be applied to the shaft 4 and a circuit closed through the metal cam 7 to the spring 8 to cause the energization of relay 9. Relay 9 through its inner right-hand armature causes a signal lamp 10 to glow. This lamp may be mounted at any place where it will engage the attention of the operator and apprise her that it is time to operate the carriage return and line feed keys at the next convenient opportunity. If at the end of the word being typed the carriage return key is depressed, the shaft 4 will be returned to normal and the relay 9 deenergized. Means for returning the shaft 4 to normal under this condition is completely described in the above-noted Lake patent.

The apparatus just described is by way of example as other means will readily occur to one skilled in the art. For instance it is not necessary to employ the pointer 1 and dial 2 as the lamp 10 alone may be sufficient indication that the end of the line has almost been reached.

If the operator is preoccupied and neglects to depress the carriage return key at the end of the word being typed when the circuit for relay 9 is completed, then a contact 11 will be closed by the depression of the space key on the keyboard. Since contact arrangements of this nature are well known this is only indicated in diagrammatic form in Fig. 1.

Upon the closure of the contact 11, a circuit will be established from ground, the outer right-hand and front contact of relay 9, contact 11, the winding of relay 12, the left armature and back contact of relay 13 to battery. Relay 12 immediately locks itself in an energized position through its front contact and left-hand armature so that in releasing, contact 11 will not disturb the train of operations which has now been set in motion. Ground placed on conductor 14 for the purpose of energizing relay 12 will also cause the energization of magnet 15. This magnet operates a bar 16 similar to various code bars 17 to 21, inclusive. Bar 16 is cut in such a manner that upon its movement only the carriage return and line feed type bars may be depressed, and all others on the keyboard will be locked out of operation. This apparatus is provided as an insurance against the mutilation of the code signals representing carriage return and line feed during the following automatic operations. The magnet 15 and the bar 16 are not absolutely essential if the operator is properly trained to pause slightly after she has depressed the space key while the lamp 10 is illuminated. The magnet 15 and bar 16, however, will prevent mutilation in the sending of code signals or the punching of tape, should the operator fail to heed the warning of signal lamp 10.

Relay 12 is slow releasing and relay 13 is slow operating. Due to these characteristics and upon the placing of ground on conductor 14, the carriage return type bar will be depressed through the action of magnet 22 and the line feed type bar will be thereafter depressed through the action of magnet 23. Upon the operation of relay 12 a connection is extended from battery through the back contact and left-hand armature of relay 13, the front contact and outer right-hand armature of relay 12, magnet 22 to ground. Magnet 22 attracts its armature 24 which cooperates with a member 25 attached to the carriage return type bar 26. At the same time ground on conductor 14 is extended through the inner right-hand armature and front contact of relay 12 to the winding of relay 13 but the slow operating characteristic of relay 13 allows time for the proper energization of magnet 22. At the end of this period relay 13 becomes operated and through the movement of its left-hand armature opens the circuit of releasing relay 12 and at the same time opens the circuit of magnet 22. Magnet 22 immediately deenergizes but relay 12 holds its armatures in this energized position for a short period, thus continuing the operation of relay 13 and allowing sufficient time for a circuit to be established effectively from battery through the front contact and right-hand armature of relay 13 to magnet 27. Magnet 27 attracts its armature 28 which cooperates with a member 29 forming part of the line feed type bar 30.

The timing of the slow release relay 12 and the slow operate relay 13 are such that the magnets 22 and 27 will properly operate and cause the corresponding code signals to be transmitted or the tape punched as the case may be.

At the end of the period during which the slow release relay 12 holds up it will become deenergized and by removing ground from the conductor 14 will result in the proper deenergization of both relays 12 and 13. The contact 11 is open and the shaft 4 of the end-of-line indicator has returned to its starting position through the operation of the carriage return key bar 26.

In Fig. 2 an interlocking arrangement is provided. This portion of the diagram may be matched up to the left-hand portion of Fig. 1 at the line X—X. When, as before described, ground is placed on the conductor 14, relay 30 which corresponds to relay 12 becomes energized. Magnet 15 is energized and moves the bar 16 for the same purpose hereinbefore described. Magnet 22 is again energized but this time the circuit for the relay 31 which corresponds to relay 13 is not closed until the armature of magnet 22 has been completely operated. At this time two contact springs 32 and 33 are operated through the movement of armature 24 of magnet 22 so that a circuit is now completed from ground on the conductor 14 through the inner right-hand armature and front contact of relay 30, the spring 32, the spring 33, the winding of relay 31 to ground. An interval thereafter, determined by the slow operating characteristic of relay 31, relay 31 will become energized and will open the circuit of relay 30 in the manner hereinbefore described. Relay 31 is provided with an outer right-hand armature and front contact which are placed in parallel with the springs 32 and 33 to insure the closure of the circuit for relay 31 even after the magnet 22 becomes deenergized. In the manner hereinbefore described upon the energization of relay 31 a circuit is closed to the front contact and inner right-hand armature of relay 31 to magnet 23 so that the line feed type bar 30 is properly operated. After an interval determined by the slow releasing characteristic of relay 20, this relay becomes deenergized and in turn causes the deenergization of relay 31 and thus the return to normal of this automatic feature.

It so happens that in the usual five unit teletypewriter code system the code for carriage return consists of a single marking impulse in the fourth of the five time intervals and similarly the code for line feed consists of a single marking impulse in the second of the five time intervals. Therefore, the same result described in connection with the magnets 22 and 23 may be achieved by energizing magnets 34 and 35, respectively. Thus upon the energization of relay 12 battery instead of being extended to magnet 22 may be extended to magnet 34 as shown in Fig. 3. This will cause the fourth code bar 20 to be operated so that the signals now sent or the tape now punched will be characterized with a marking impulse in the fourth place. Thereafter and upon the energization of relay 13 instead of the magnet 27 being operated the magnet 35 will be operated and this will cause the code or the tape now being punched to be characterized by marking impulses in the second place through the portion of the code bar 18.

In this manner the codes for carriage return and line feed may be automatically interpolated in the message being typed by an operator.

As used herein the expression "function code" includes any code assigned to cause a mechanical or electrical operation or a machine operation such as line feed, carriage return, tabulating, bell ringing, case shift, or switching operation. Non-

function codes include letter and space codes. Space codes signify the codes for causing space between words and do not refer to so-called spacing impulses.

What is claimed is:

1. A code sender including (a) means for sending codes assigned as function codes, (b) means for sending codes other than those assigned as function codes, (c) conditioning means responsive to a predetermined number of said other codes, and (d) means rendered effective by the response of the conditioning means and the sending thereafter of a predetermined said other code for automatically sending a plurality of codes assigned as function codes.

2. A code sender including (a) means for sending codes assigned as function codes, (b) means for sending codes other than those assigned as function codes, (c) conditioning means responsive to the sending of a predetermined number of said other codes, (d) means rendered effective by the response of the conditioning means and the sending thereafter of a predetermined code for automatically sending a plurality of codes assigned as function codes, and (e) means consequent upon the said automatic sending for deconditioning said conditioning means.

3. A code sender including (a) means for sending codes assigned as carriage return and line feed codes, (b) means for sending other codes, (c) conditioning means responsive to the sending of a predetermined number of said other codes, and (d) means caused to operate by the conjoint action, (1) of the conditioning means when conditioned and (2) the actuation of sending means for a specific other code, for automatically sending carriage return and line feed codes.

4. In combination, a key operated device for manually setting up codes, (a) a counter of space and character codes, (b) a conditioner activated by setting up a predetermined number of such codes as counted by the counter, (c) automatic means for setting up carriage return and line feed codes, and operative elements actuating said means upon and controlled by setting up a specific code following the actuation of said conditioner.

5. An instrumentality for setting up, under manual control, permutation codes to form words and spaces in combination with (a) devices effective automatically to insert one or more particular other codes among said codes, (b) means whereby said devices are conditioned to operate by (c) means conditioned incident to setting up a predetermined number of other codes following the previous conditioning and (d) subsequent operation of means setting up a space code.

6. In a permutation code sender, a keyboard, step-by-step means responsive to the operation of said keyboard for counting up to a predetermined number of codes sent, means effective within a predetermined range before said predetermined number has been counted by said step-by-step means for rendering effective further means thereafter responsive to the operation of a particular key on said keyboard for automatically and successively operating a plurality of other particular keys on said keyboard.

7. In a permutation code sender, a keyboard, step-by-step means responsive to the operation of said keyboard for counting up to a predetermined number of codes sent, means effective within a predetermined range before said predetermined number has been counted by said

step-by-step means for closing a circuit at one point, another means under control of a particular key on said keyboard for closing said circuit at another point, means in said circuit responsive to the closure of said circuit at both said points at the same time for starting a train of relays into automatic operation and means responsive to the operation of said relays for controlling keyboard functional operations equivalent to the successive manual operation of a plurality of particular keys on said keyboard.

8. In a permutation code sender, a keyboard, step-by-step means responsive to the operation of said keyboard for counting up to a predetermined number of codes sent, a circuit closing means operated by said step-by-step means within a predetermined number of steps before said first predetermined number is reached, a warning signal operated by said circuit closing means, means responsive to the manual operation of a first particular key on said keyboard for returning said step-by-step means to its zero position and for erasing said warning signal, means responsive to the operation of a second particular key prior to the manual operation of said first particular key for automatically and successively operating said first particular key and a third particular key.

9. In a permutation code sender, a keyboard, a character counter for indicating approach to the end of a line, a circuit closing means operated by said character counter within a predetermined distance from the end of a line, means responsive to the manual operation of the "carriage return" key on said keyboard for returning said character counter to a zero count position, means responsive to the manual operation of the "space" key on said keyboard prior to the operation of said "carriage return" key and after said character counter has advanced to a point within said predetermined distance from the end of a line for automatically and sequentially operating the "carriage return" key and the "line feed" key, and means responsive thereto for returning said character counter to a zero count position.

10. In a permutation code sender, a keyboard, step-by-step means for counting the number of key operations of said keyboard, a pair of contacts closed by said step-by-step means beyond a predetermined count, another pair of contacts closed by a first key on said keyboard, means responsive to the operation of a second key on said keyboard for releasing said step-by-step means to a zero count position, self-locking means responsive to the simultaneous closure of said two pairs of contacts for sequentially operating said second key on said keyboard, a third key on said keyboard and for unlocking said last means.

11. In a permutation code sender, a keyboard having a plurality of character and function keys and a plurality of code bars selectively operated thereby, a character counter having a circuit closer operated within a predetermined distance from the end of a line, means responsive to the operation of a first of said function keys after said character counter has operated said circuit closer for automatically and successively operating said code bars to simulate the successive operation of a second and a third of said function keys, and means responsive to the operation of or the simulated operation of the said second of said function keys for returning said character counter to a zero count position.

12. In a permutation code sender, a keyboard having a plurality of character and function keys, a character counter having a circuit closer operated after a predetermined number of characters have been counted, a circuit closer operated by a first of said function keys, a circuit including said two circuit closers having a train of slow releasing and slow operating relays for automatically and successively operating magnets constructed and arranged to operate a second and a third of said function keys, and means operated by said second function key for returning said character counter to a zero count position.

13. In a permutation code sender, a keyboard having a plurality of character and function keys, a character counter having a circuit closer operated after a predetermined number of char-

acters have been counted, a circuit closer operated by a first of said function keys, a circuit including said two circuit closers and a slow releasing relay, a magnet for operating a second of said function keys responsive to the operation of said slow releasing relay, a slow operating relay responsive to the operation of said magnet, a second magnet responsive to the operation of said slow operating relay for operating a third of said function keys, means controlled by said slow operating relay for releasing said slow releasing relay and means under control of said second function key for returning said character counter to a zero count position whereby said first circuit closer is released.

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