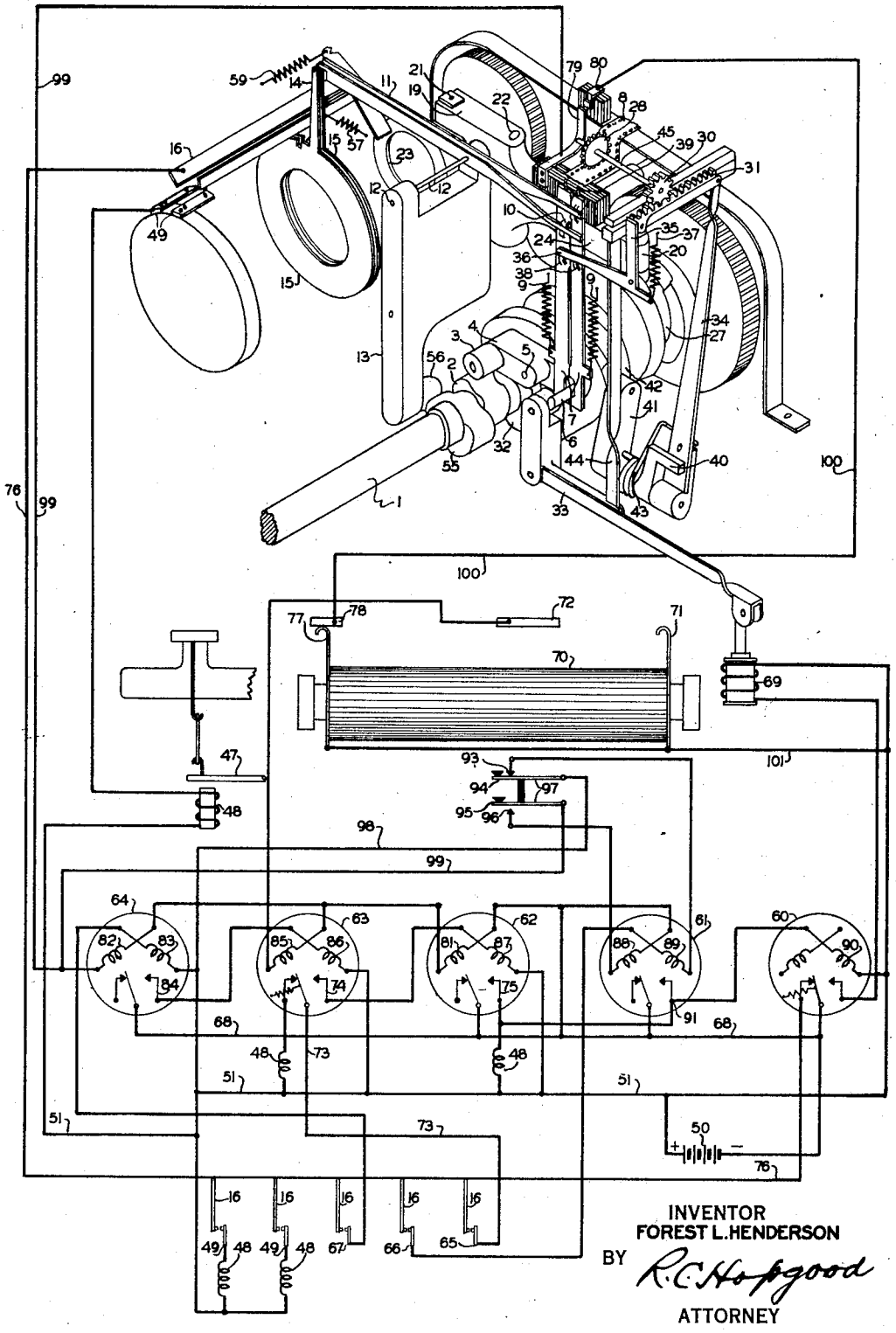
April 26, 1932. F. L. HENDERSON 1,855,185

PRINTING TELEGRAPH SYSTEM

Filed Nov. 7, 1930



INVENTOR
FOREST L. HENDERSON
BY R. C. Hopgood
ATTORNEY

Patented Apr. 26, 1932 1,855,185

UNITED STATES PATENT OFFICE

FOREST L. HENDERSON, OF SOUND BEACH, CONNECTICUT, ASSIGNOR TO INTERNATIONAL COMMUNICATIONS LABORATORIES, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

PRINTING TELEGRAPH SYSTEM

Application filed November 7, 1930. Serial No. 494,073.

This invention relates to printing telegraphs and has for its principal object to provide an improved method of operating a page printer by the continental cable code or other similar codes in which the characters are not of uniform length.

Another object of this invention is to provide means for feeding the paper from line to line and for returning the carriage to the beginning of a line without sending special selecting signals for that purpose.

In transmitting a cablegram, it is customary to prepare a tape having the message characters perforated in cable code. The perforated tape is run through a transmitter and the message is received by means of a siphon recorder in the form of a wavy line which is translated and transcribed on a typewriter by an operator. Sometimes for retransmission and other purposes, the message may be received by a receiving perforator which perforates a duplicate of the original transmitting tape. This invention discloses a method of operating an automatic page printer by such a perforated tape, thus dispensing with the receiving operator. One of the objections to using a page printer on a cable has been that certain functions of a page printer, namely, the figure shift, the letter signal, the line feed and carriage return, require special signals which must be used so frequently that the capacity of a cable for handling traffic is much reduced. An ordinary cable message prepared for siphon recorder reception generally has but three extra characters; one designating the beginning of the message, a second before the signature, and a third indicating the end of the message. A message thus prepared is suitable for manual transcription at the receiving station or, if received by a receiving perforator, it may be printed automatically on a message blank by means of the invention disclosed herein. The apparatus employed consists of a selecting system similar to that described in Patent No. 1,529,873 to Creed which is modified to operate an electric power driven typewriter.

The invention will now be described with the aid of the single accompanying drawing.

The drawing shows a diagrammatic perspective view of a selecting mechanism together with the carriage of an electric typewriter and relays and circuits therefor. The selecting mechanism is controlled by a perforated tape which is fed through a tape guide by a suitable feed mechanism. Under the tape guide are a number of selector plates which are arranged to be reciprocated by a suitable cam action, the extent of their travel being governed by the perforations or absence of perforations in the tape. Permutated discs set by the selector plates select printer stop bars which make contact with segments on a contact drum, closing circuits to the various relays whose armatures are connected to the respective typewriter keys. The typewriter shift mechanism is not used. The typewriter action is entirely automatic once a key is depressed, and the keys not alone control the printing and spacing, but in addition a key is provided which, when depressed, causes the automatic operation of the line feed and carriage return mechanism.

In the present invention, selecting mechanism similar to that described in Patent No. 1,529,873 is used except that the print-hammer arm, type wheel and friction clutch are removed from the machine and a contact drum made of insulating material having segments 49 arranged about its periphery is set up in front of the bell crank ends so that a contact segment is lined up under each of the bell crank ends. The spacing rack frame cam arm 33 is extended as shown in the drawing and the end of the same is attached to a solenoid plunger which is free to allow the cam arm motion by moving up and down inside the solenoid 69.

The invention operates as follows:

The operation of the tape feed and selecting mechanism is substantially the same as that described in the Creed patent referred to above. A shaft 1 is constantly rotated by a motor (not shown). Once each revolution cam 2 engages roller 3 on one end of a lever 4 which is pivoted at 5. The other end of the lever carries a rod 6 which engages a depres-

sion on the lower ends of each one of a series of selector plates 7. Ten pairs of selector plates are generally used for cable code operation. When cam 2 engages 3 it causes rod 6 to withdraw the selector plate from the perforations on the tape 8. After 2 passes under 3 the rod releases the plates 7 which, under the influence of springs 9, press against the tape. Where there are perforations above certain of the plates, according to the characters in the tape, those plates will rise their maximum distance while the remainder will be stopped by the tape. Each selector plate has a pair of lugs 10 which engages one end of a resetting lever 11 pivoted on a rod 12 which is supported by the bifurcated arm of a carrier lever 13, the other end of each lever 11 is associated with an arm 14 of a permutated disc or comb 15 which will be engaged thereby when the particular selector plate associated therewith is selected. A series of bell crank shaped stop bars 16 is arranged about the permutated discs, there being as many bars as there are keys on the electric typewriter.

An endwise moving sleeve 23 for moving the stop bars 16 of the selecting mechanism out of the notched discs 15 is actuated at required times by the bifurcated arm 19 of a lever 20—21 mounted to turn about a vertical axis at 22 and the other arm 24 of which is arranged to be actuated by a cam 27 on the cam shaft. The tape is fed by means of a toothed wheel 28 on spindle 45. A pinion 30 is driven from a feed rack 31 arranged below and to gear with the pinion during a forward or feed stroke and from which it is disengaged by a downward movement, practically in the plane of the pinion and rack preparatory to its backward and selective stroke and held out of gear during such a stroke.

The movement of the feed rack 31 into and out of engagement with the pinion 30 is effected by a cam 32 on the cam shaft 1 acting through a lever and link mechanism 33 independently of the spring blade 34 used to reciprocate the rack 31.

Associated with each pair of selector plates is a stop lever 35—36 connected to a spring 37 that acts normally to draw the arm 35 of the lever into the path of the feed rack 31 and to hold the other arm 36 of the lever downward against the abutment or lug 38 on one side of each of the selector plates of the pair. The arrangement is such that when the pin 39 on top of the plates passes through a perforation in the tape, the stop lever 35—36 will be moved out of the path of the feed rack, but if both selector plates of the pair are prevented from rising, owing to the double blank portion at the end of a letter, the stop lever will not be raised and the arm 35 thereof will act to limit the motion of the feed rack under the influence of spring blade 34.

Spring blade 34 is held against an arm 40 of a lever 41 by a spring 43. A cam 42 on shaft 1 imparts an oscillating movement to lever 41 and blade 34.

Each time shaft 1 revolves, the following operations take place: Rod 6 is permitted to rise to permit selector plates 7 to be raised by springs 9 so as to cause such of their pins 39 as are opposite the holes in the perforated tape to pass through said holes and lift the corresponding stop levers 35—36 out of the path of feed rack 31. This rack is simultaneously disengaged from the pinion 30 by the link 44, lever 33 and the cam 32. The rack is then moved backward by the spring blade 34 until arrested by the stop lever 35—36 associated with that pair of selector plates whose pins are prevented from rising by the blank section tape at the end of a letter.

Resetting levers 11 are set by the selector plates 7, according to the perforations of the character in the tape 8 in the guide plate, and brought into position to engage the arms 14 of permutated discs 15. Cam 55 is then in position to permit the upper end of carrier lever 13 to move under the influence of a spring (not shown) in the direction of the arms 14 of the permutated discs 15 which at this time are held clear of all stop bars 16 by sleeve 23 and set the plates against the tension of springs 57. The notches of the discs will then line up under a certain stop bar which corresponds to the signal perforated in the tape. Cam 27 then causes lever 20—21 to move on its axis 22 moving sleeve 23 away from the stop bars 16 which are then pressed against the permutated discs by their springs 59. The bar under which the notches are aligned will drop lower than others. This bar alone will make contact with a segment 49 on the contact drum. This will close the circuit from the positive side of battery 50 through a common conductor 51, through a key bar magnet 48, there being a magnet identical to magnet 48 for each typewriter key, through a contact 49, stop arm 16, through the left or spacing contact of relay 60 to the negative side of the battery, causing the armature 47 of the magnet 48 to operate a key of the typewriter. All the printing functions of the typewriter are operated in the same manner. The circuits closed by bell cranks 16 for non-printing functions are somewhat different. They are, however, selected in the same manner as those for the printing functions and are shown diagrammatically at the bottom of the drawing in order that they may be more easily traced.

When the word space is reached, a bell crank 16 makes contact with a segment 65 on the contact drum and energizes the magnet attached to the space bar through the tongue and left-hand or spacing contact of relay 63 which depresses the typewriter space bar. As the selecting mechanism feeds

the tape along, the typewriter is actuated in this manner for subsequent words and word spaces until the typewriter carriage 70 in its movement towards the left makes contact by means of a contact strip 71 attached to the right-hand end of the typewriter carriage wth another strip 72 secured to but insulated from the typewriter frame.

This completes a circuit through one of the windings 85 of a relay 63 which is biased to the spacing side and causes the tongue thereof to move to the right-hand or marking side; then on the next word space, while contacts 71 and 72 are still in engagement with each other, as the space bell crank 16 is operated, a circuit will be completed through its contact 65, conductor 73, marking contact 74 of relay 63, coil 87 of unbiased relay 62, conductor 51 to battery thereby operating relay 62 and the tongue of which will remain on contact 75, thus closing a circuit from positive battery through magnet 48 associated with the carriage return and line feed key of the typewriter, operating the same, through contact 75 and tongue of relay 62, conductor 68 to negative battery. At the same time relay 60 which is biased to the left-hand or spacing side and is connected in parallel with the carriage return key magnet 48, will be operated. The operation of relay 60 completes a circuit through the solenoid 69 actuating its plunger which pulls the spacing rack frame cam arm down, disengaging the spacing rack 31 and pinion 30. The result of this is that the slip is held in the guide-way while the carriage of the typewriter is returned to the right at the beginning of a new line. At the same time the platen roller is rotated by the typewriter mechanism to a new line. Observation of relay 60 will disclose that when the tongue is in its right-hand or marking position, battery 50 is cut off from all the stop bars. The purpose of this is to prevent the printing of any letters during the time the carriage is being returned to the right for the beginning of a new line. The armature of relay 63, having a spacing bias, returns to its spacing side when the carriage contact 71 breaks contact with the right-hand contact strip 72. The armature of relay 62 being unbiased, rests on the marking contact 75 until the carriage is returned to the right and the left-hand carriage contact 77 makes contact with the left-hand contact strip 78 which is attached to, but insulated from the frame of the typewriter.

In the meantime, the selecting mechanism previously described has been constantly operating, though the feed mechanism has been temporarily disabled by the operation of the solenoid 69 and the battery on the stop bars has been cut off by relay 60. As the selecting mechanism continues its cycle of operations after contacts 77 and 78 have closed, a contact 79 on lever 20—21 makes with the contact 80 which is mounted on a support fixed to the base of the printer and insulated therefrom. These contacts close at a fixed point in the selecting cycle and their purpose is to insure that the printing will resume at the proper place in the selecting cycle. when contacts 79 and 80 make they complete a circuit through the spacing windings 81 and 82 of relays 62 and 64 respectively. The tongue of relay 62 having previously been on its marking side now moves to spacing side which allows relay 60, which was locked in through the tongue of contacts 75 of relay 62, to return to spacing, switching the battery back to the stop bars 16 and breaking the circuit holding solenoid 69, thus releasing the spacing rack frame cam arm 33, and the feeding of the perforated slip and the printing of a new line is begun.

Assuming that there is a signature to the matter being printed, an extra signal is inserted between the body of the message and the signature. The particular stop bar 16 which is selected by the signal makes contact with its contact segment 67 on the drum and closes a circuit from the negative side of battery 50 through the tongue and spacing contact of relay 60, conductor 76, bell crank 16, contact 67, marking coil 83 of relay 64, to the positive side of battery 50. This moves armature of relay 64 to its marking contact 84, and, the relay being unbiased, the tongue remains on the marking contact. The operation of relay 64 closes a circuit from battery 50, over conductor 68, contact 84, coil 86 of relay 63, conductor 51 to battery 50, thus overcoming the spacing bias of relay 63 and holding the tongue thereof on its marking contact 74.

After relay 63 is operated, the space signal which is perforated between the signature and the special signal sent to indicate the signature, will select the space stop bar which will make with its contact 65 and current will flow from the negative side of battery 50 through the tongue and spacing contact of relay 60, stop bars 16 and contact 65, conductor 73, tongue and contact 74 of relay 63, coil 87 of relay 62, conductor 51 to battery 50. This will operate relay 62 which in turn will operate the carriage return and line feed key of the typewriter in the same manner as described previously in connection with the operation of this key by the co-operation of the space signal and contacts 71 and 72. When the carriage returns to the right, contacts 77 and 78 will make again and selecting and printing will automatically resume.

After the signature is printed the "finish" signal indicating the end of the message arrives in the guideway and the "finish" signal stop bar will be selected, making with its contact 66. This closes a circuit from battery 50, tongue and spacing contact of relay 60,

conductor 76, stop bar 16 and contact 66, coil 89 of relay 61, contact 93 and lever 94 of switch 97, conductors 98 and 51 back to the positive side of battery 50, which will operate relay 61 and its tongue will remain on its marking contact 91 as the relay is not biased. When the tongue of relay 61 is on its marking contact, the carriage return magnet will be operated by a circuit from the positive side of battery 50, conductor 51, carriage return key magnet 48, contact 91 and tongue of relay 61, conductor 68 to the negative side of battery 50. The relay 60 is also held operated by relay 61 by means of a circuit from the negative side of battery 50, conductor 68, tongue and contact 91 of relay 61, coil 90 of relay 60 to the positive side of battery 50. The operation of relay 60 cuts off the battery from the stop bars 16 of the selecting mechanism and operates the solenoid 69, stopping the feeding of the tape and the printing as previously described.

When the new message blank has been inserted, the operator may depress both levers of the double key or switch 97. Contact 93 and lever 94 will break and contact 96 and lever 95 will make, closing a circuit from the negative side of battery 50, conductor 68, coil 88 of relay 61, contact 96 and lever 95, conductor 99 to contact 79 which will close and make contact with 80 as the selector mechanism is actuated, and the circuit continues through conductor 100, contacts 78 and 77, conductor 101, back to the positive side of battery 50. The closing of the circuit just traced will operate coil 88 of relay 61, returning the armature to the spacing side, thus releasing the carriage return magnet 48. Battery also will be cut off from relay 60 and the tongue thereof will make with its spacing contact, restoring battery to the selector stop arms 16 and releasing the solenoid 69, which will permit the tape feeding and printing mechanism to resume operation.

Thereafter, the operation of the printing, selecting, carriage return and line feed mechanism is entirely automatic until another message is completed.

What is claimed is:

1. In a telegraph printer, a movable carriage having a rotatable platen, means for rotating said platen, means including word space means selectable according to the various characters of a telegraph code arranged to advance said carriage from an initial position, and means for restoring said carriage to its initial position, said word space means being a means for initiating the operation of said platen rotating means and said restoring means.

2. In a page printer, mechanism for printing selected characters, means for spacing said characters, a movable member arranged to be advanced as the characters are printed, means for restoring said movable member to its initial position, said character spacing means and said movable member being arranged to operate said restoring means after said movable member has advanced a predetermined distance.

3. In a printing device, a movable carriage having a rotatable platen, means for rotating said platen, means including word space means selectable according to the various characters of a telegraph code arranged to advance said carriage from an initial position, and means for restoring said carriage to its initial position from any point thereafter, said word space means being a means for initiating the operation of said platen rotating means and said restoring means.

4. In a printing device, a movable carriage having a rotatable platen, means for rotating said platen, means including word space means selectable according to the various characters of a telegraph code arranged to advance said carriage from an initial position, and means for restoring said carriage to its initial position and feeding a new line only when a word has been completed at the end of the previous line.

5. In a printing device, a movable carriage having a rotatable platen, means for rotating said platen, means for advancing said carriage continuously from an initial position, means for restoring said carriage to said position, and means responsive to received word space signals for operating said platen rotating means and said carriage restoring means.

6. In a printing device, a movable carriage having a rotatable platen, means for rotating said platen, means for advancing said carriage continuously from an initial position, printing means effective during the advance of said carriage, means for restoring said carriage to initial position, means effective while said carriage is being restored for rendering said printing means inoperative, and means for rendering said printing means operative only upon the return of said carriage to initial position.

In witness whereof, I hereunto subscribe my name this 3rd day of November, 1930.

FOREST L. HENDERSON.