Jan. 2, 1934. S. W. ROTHERMEL 1,941,916

COMBINED KEYBOARD TRANSMITTER AND PERFORATED TAPE TRANSMITTER

Filed Nov. 27, 1931 3 Sheets-Sheet 1

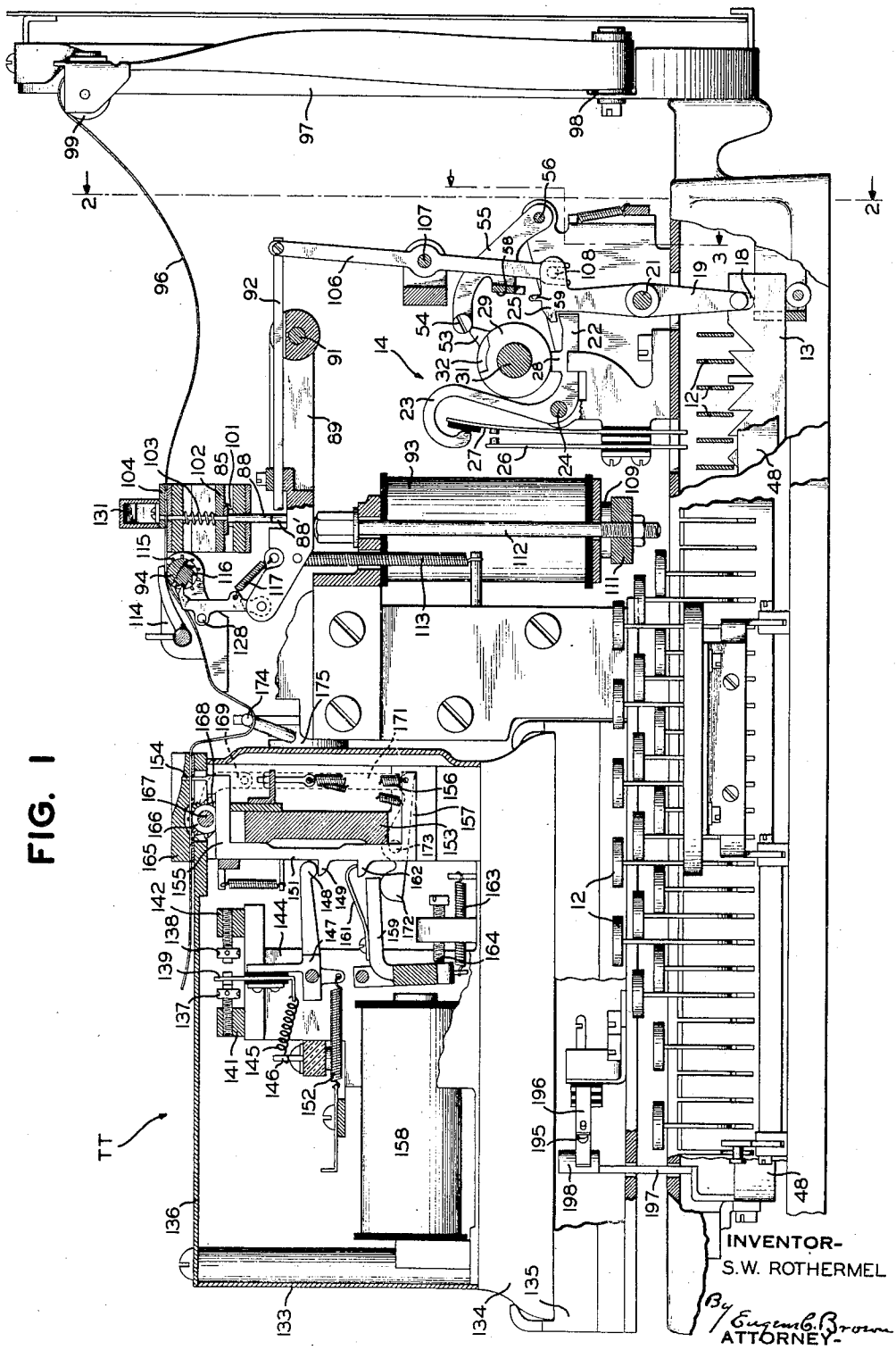


FIG. 1

Jan. 2, 1934. S. W. ROTHERMEL 1,941,916

COMBINED KEYBOARD TRANSMITTER AND PERFORATED TAPE TRANSMITTER

Filed Nov. 27, 1931 3 Sheets-Sheet 2

FIG. 4

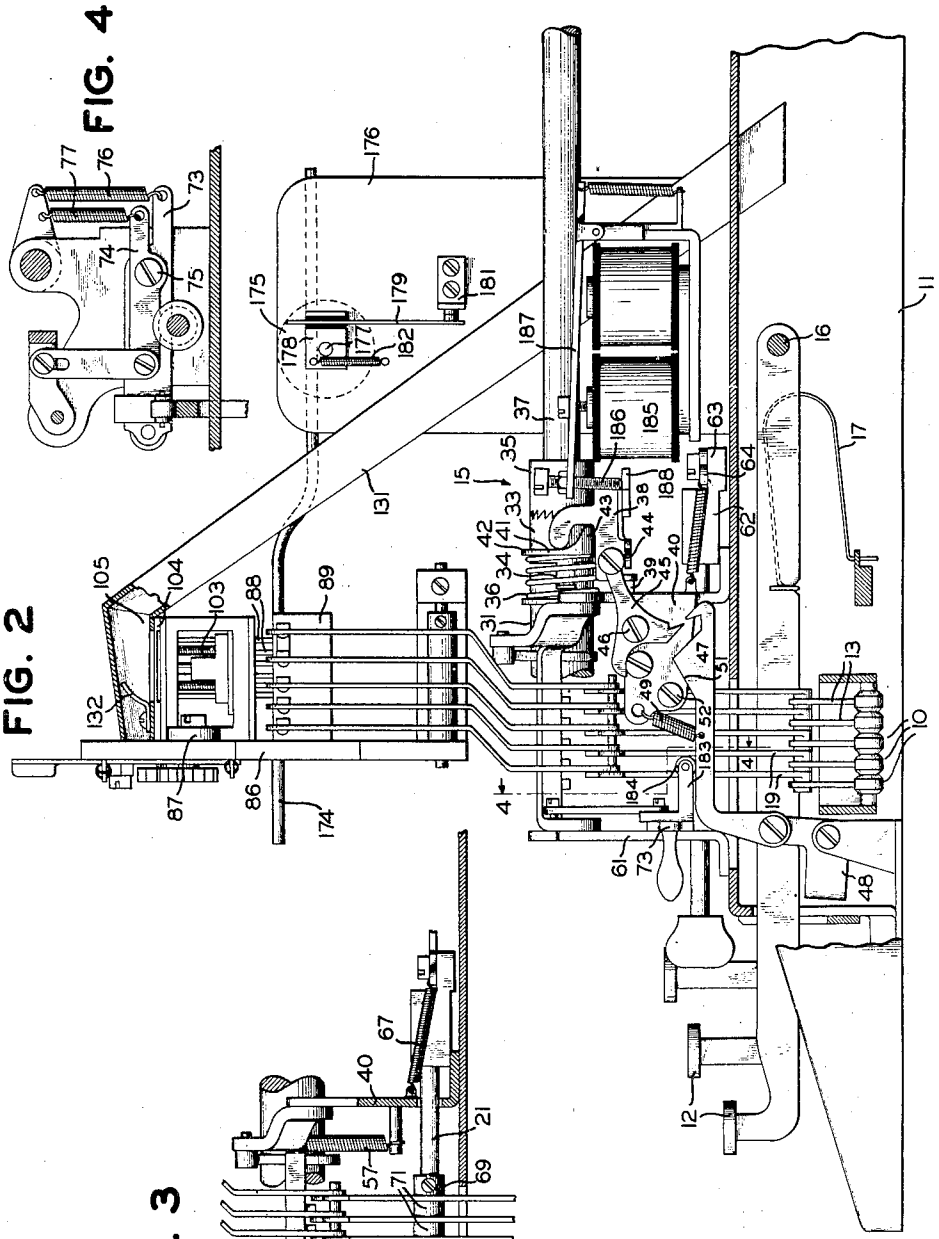


FIG. 2

FIG. 3

INVENTOR-
S. W. ROTHERMEL

BY

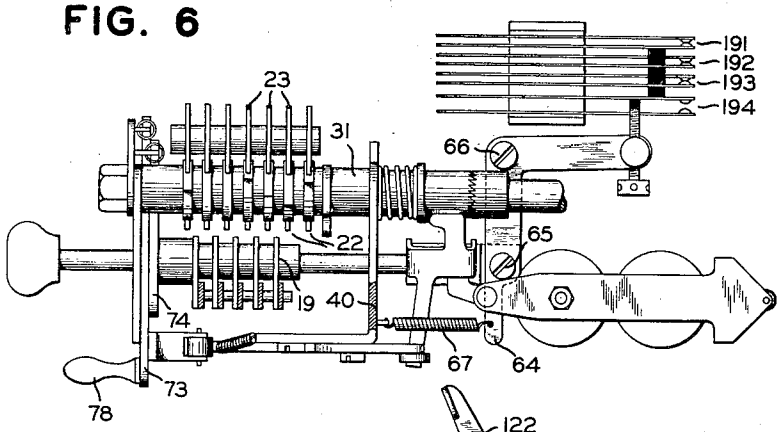
Eugene B. Brown
ATTORNEY-

Jan. 2, 1934. S. W. ROTHERMEL 1,941,916

COMBINED KEYBOARD TRANSMITTER AND PERFORATED TAPE TRANSMITTER

Filed Nov. 27, 1931 3 Sheets-Sheet 3

FIG. 6



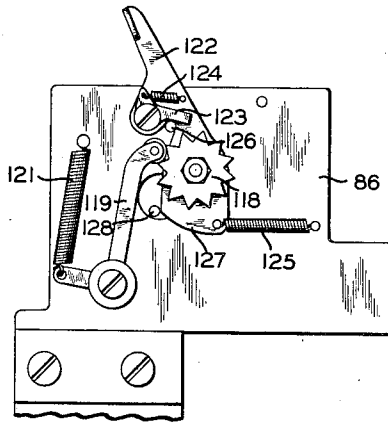
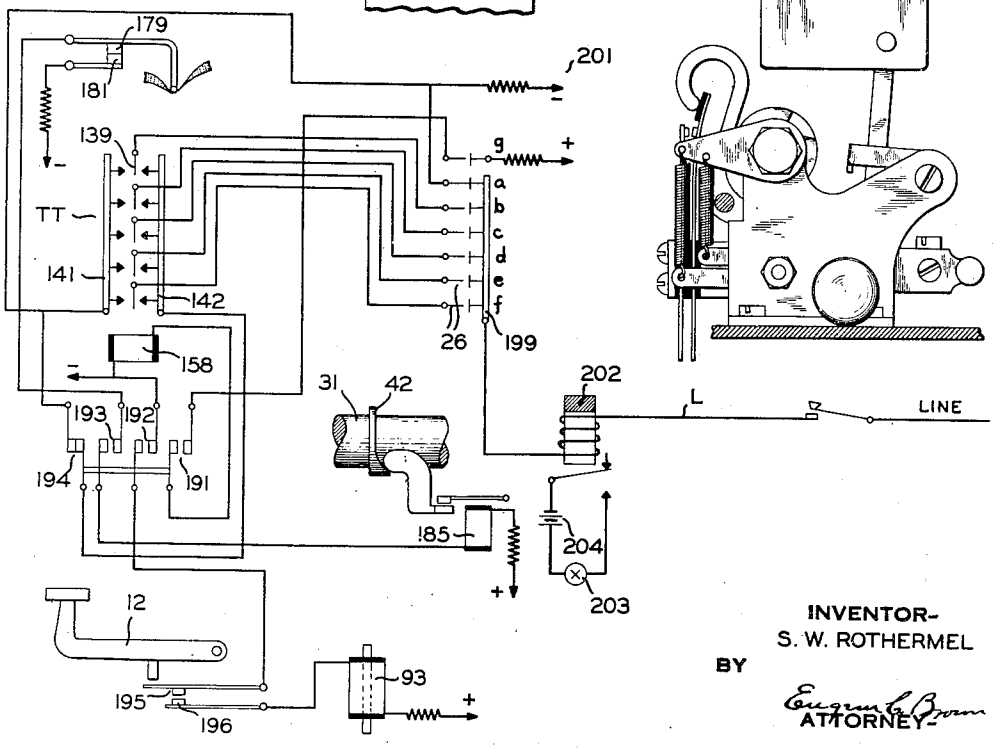


FIG. 5

FIG. 7



INVENTOR-
S. W. ROTHERMEL

BY

Eugene L. Brown
ATTORNEY-

Patented Jan. 2, 1934

1,941,916

UNITED STATES PATENT OFFICE

1,941,916

COMBINED KEYBOARD TRANSMITTER AND PERFORATED TAPE TRANSMITTER

Samuel W. Rothermel, Lynbrook, N. Y., assignor to The Western Union Telegraph Company, New York, N. Y., a corporation of New York

Application November 27, 1931
Serial No. 577,611

19 Claims. (Cl. 178—17)

This invention relates to telegraph transmitting apparatus and more particularly to a combined keyboard transmitter and keyboard controlled tape perforator and transmitter.

In the operation of automatic telegraph systems it is customary either to transmit the signals directly to the line from a keyboard transmitter or to perforate a tape and employ the tape for automatic transmission of signals to the line. The latter method has the advantage of increasing the rate of transmission but there is always a lag between the perforating of the tape and the transmission, corresponding to the number of characters in the tape between the punch block of the perforator and the pins of the tape transmitter. With tape transmission, if a rush message is received, it is necessary to unload the tape from the transmitter, usually by tearing it, perforate a new tape containing the rush message and feed the new tape through the transmitter. After the transmission of the rush message, the original tape is again placed in the transmitter and the regular transmission resumed. These manipulations are time consuming and since rush messages may occur at frequent intervals, a considerable amount of both line and operator's time may be lost throughout the day. A separate keyboard transmitter may be provided of course with an arrangement for cutting the same on and off the line, but such transmitters are expensive and occupy valuable space on the operator's table.

One of the objects of the present invention is to provide a transmitting arrangement whereby the tape transmission may be interrupted at any time and a rush or flash message impressed on the line without disturbing the position of the tape in the transmitter and without requiring the use of a separate keyboard transmitter.

Another object is to enable a common keyboard to be employed for both perforating a tape and for controlling direct transmission to the line.

Another object is to provide a common distributor for both direct keyboard transmission and for perforated tape transmission.

Other objects are to provide a compact mechanism whereby either direct keyboard transmission or tape transmission may be employed and in which the change from one type of transmission to the other may be effected quickly and without signal distortion or mutilation.

Other objects and advantages will hereinafter appear.

In ordinary tape transmission it is necessary to provide a tape perforator, a tape transmitter and a signal distributor. These three devices normally constitute separate units which may be widely spaced on the operator's table. The keyboard perforator may be of a type such as that shown in patent to C. L. Krum et al. No. 1,182,179, granted March 9, 1916. The tape transmitter may be constructed as shown in patent to G. R. Benjamin, Serial No. 1,298,440, granted March 25, 1919, and the distributor may be of the usual rotary sunflower type or a cam controlled transmitter as shown in my Patent No. 1,805,374, granted May 12, 1931.

In accordance with the present invention the functions performed by all of these units are combined in a single compact mechanism and in addition the keyboard, which controls the perforating mechanism, is arranged to set up code permutations directly on the contacts of the distributor, independently of the perforated tape, when desired. Consequently, by a simple manipulation the machine may be employed for either direct keyboard transmission or for tape perforating and tape transmission.

The invention will be more fully understood by reference to the accompanying drawings wherein:

Figure 1 is a vertical sectional view of a machine embodying my invention;

Figure 2 is a vertical sectional view, taken on the line 2—2 of Figure 1;

Figure 3 is a fragmentary sectional view of the transfer mechanism for changing from keyboard to tape transmission, taken on the line 3—3 of Figure 1;

Figure 4 is a detailed view of the locking mechanism for the transfer device, as viewed on the line 4—4 of Figure 2;

Figure 5 is a front view of the distributing mechanism and perforating mechanism, as viewed from the left of Figure 2;

Figure 6 is a vertical plan view of the distributing and transfer mechanism; and

Figure 7 is a circuit diagram showing the arrangement of the controlling circuits.

Referring first to Figures 1 and 2, the mechanism for direct keyboard transmission will be described without reference to the tape perforating and tape transmitting means.

The keyboard transmitter consists of a suitable base 11 forming a support for the operating mechanism, which comprises a bank of key levers 12, a number of notched code bars 13, disposed so as to be engaged by the key levers when depressed, a contact mechanism, indicated

generally at 14, for setting up the selected signal combination, and a clutch 15 by which the contact mechanism is driven from a source of power, not shown.

The code or selector bars 13, usually five in number, are mounted within the base of the machine on rollers 10 and extend across the width of the keyboard beneath the key levers. They are provided with triangular notches arranged according to the requirements of the signal code so that they will be moved either to the right or left when the key levers strike the slanting sides of the notches. The key levers are pivoted at 16 and are normally elevated above the code bars by individual springs 17.

At the right hand end of each selector bar is a slot 18 in which one end of a vertical locking latch 19 is set. The latch 19 is pivoted upon a horizontal shaft 21 so that when the corresponding selector bar is moved to the right, the upper end of the latch moves towards the horizontal arm 22, of a contact lever 23, pivoted upon a shaft 24. The locking latch 19 has an extension 25 which lies over the end of the arm 22 of the lever 23 and prevents the same from rocking upwardly. When the code bars are moved to the left, the projection 25 is moved free of the arm 22. The contact lever 23, one of which is provided for each selector bar, has a hooked upper end engaging one of a pair of contacts 26 and 27. The contact levers in combination with the locking latches control the transmitting contacts 26 and 27, which are normally held open by their contact levers against the tension of spring contacts 27.

The arm 22 of each contact lever has a hump 28 thereon engaging the edge of a cam 29 mounted upon a shaft 31. The cam has a depression 32 therein, which when opposite the hump 28 permits the lever 23 to rock so as to permit the contacts 26 and 27 to close, provided they are not held open by the projections 25 of the associated locking latches 19. There is an individual cam 29 for each contact lever arranged so that as the cams revolve, the depressions 32 come opposite the humps 28 in succession. By permitting certain of the contacts to close and others to remain open, the desired character signal is formed.

In addition to the contacts and the contact levers corresponding to the selector bars, there is an additional contact lever and operating cam, the function of which is to transmit a "start" and "stop" impulse preceding and following the signal combination.

The cam shaft 31 is normally at rest and is permitted to make one revolution by means of the ratchet clutch 15 for each signal combination set up. The driven ratchet 33 of the clutch is keyed to the cam shaft by a key and slot 34 so as to move longitudinally into engagement with the driving ratchet 35, by a clutch spring 36. The driving ratchet is rigidly fixed to the driving shaft 37 which in turn is geared to the motor, not shown. The clutch faces are normally held out of engagement by a clutch stop arm 38 pivoted at 39 to a bracket 40. The stop arm 38 has a curved end 41 extended into the path of a collar 42 of the driven ratchet 33. The collar 42 has a cam face 43 which when engaged by the curved end 41 moves the driven ratchet 33 away from the driving ratchet 35 to disengage the clutch. The stop arm also has a horizontal extension 44 which is engaged by a lever 45 pivoted at 46 to a right angle extension of the bracket 40. The lever 45 is operated by a trip pawl 47 carried by the upper arm of a universal bar 48 extending beneath each of the key levers so as to be engaged thereby, after the selector bars have been actuated, to set up the desired code combination. The trip pawl 47 is normally held upwardly against the lower end of the lever 45 by a spring 49 and as the universal bar 48 is rocked, the pawl 47 is pulled forwardly, tripping the lever 45 and permitting engagement of the clutch 15. As the pawl 47 continues its forward movement, the cam face 51 thereof engages a pin 52 forcing the rear end of the pawl downwardly out of engagement with the lever 45 and thereby permitting the stop arm 38 to return against the collar 42 so as to disengage the clutch at the end of a revolution.

The contacts 26 of the distributor are all connected to marking or line battery and the spring contacts 27 are connected to the line. Consequently, as the contacts are closed or held open, in succession, marking or spacing signals are transmitted. The operation of the mechanism so far described is as follows.

Upon the depression of a key lever to shift the code bars 13 either to the right or left, the projections 25 of the locking latches 19 move over or away from the horizontal arms 22, as the case may be, in a predetermined code arrangement and at the same time the clutch 15 is engaged through the manipulation of the universal bar 18 and its associated mechanism to rotate the cam shaft 31 one revolution. As the cam shaft starts to rotate one of the cams 53 is moved from under the roller 54 carried by the end of a locking lever 55, pivoted at 56 to the bracket 40, permitting this lever to drop under the action of a spring 57 so as to move the bail 58 either ahead or back of vertical fingers 59 on the tops of the latches 19, so as to lock the latches in their set position. As the cam shaft continues to rotate the depressions 32 are brought opposite the humps 28 of the contact levers 23 to permit the same to rock about the shaft 24 and thereby close the contacts 26 to 27, unless they are held open by the latches 19, thus transmitting marking and spacing signals to the line. The circuit arrangement of the distributor will be described more fully hereinafter in connection with the detailed description of Figure 7.

Since the same key levers and selector bars are used for both direct keyboard transmission and for perforating the tape for subsequent transmission, it is necessary to provide means for preventing the transmission of signals directly to the line when the perforating mechanism is to be operated. For this purpose the shaft 21 upon which the latches 19 are mounted, is adapted to be shifted forwardly and backwardly, that is to the left or right as viewed in Figure 3. Shaft 21 is mounted in apertures in the spaced brackets 40 and 61. At the rear end the shaft has mounted rigidly thereon, a square block 62 providing a flat bearing surface 63 for a bell crank lever 64 pivoted thereto at 65 and pivoted to the base plate at 66. A spiral spring 67, connected between the free end of the lever 64 and the bracket 40, tends to move the shaft forwardly.

The locking latches 19 are mounted upon the shaft 21 between two fixed collars 68 and 69 and are separated by spacers 71. A second collar 72 of lesser diameter is positioned forwardly of the collar 68. The bracket 61 has two levers 73 and 74 pivoted thereto at 75 and adapted, when in lowered position, to engage ahead of the collars

72 and 68, respectively. The levers 73 and 74 are urged downwardly against the shaft 21 by individual springs 76 and 77, respectively.

With the levers 73 and 74 lowered, as shown in Figure 3, the shaft 21 is held in its rearward position, at which time the latches 19 are positioned to one side of the horizontal arms 22 of the switch levers 23 and consequently do not exert any control thereover. Therefore, as the cam shaft 31 revolves, each of the contacts 26 and 27 are closed in succession and, unless modified by the tape transmitter as will hereinafter appear, transmit steady marking signals to line.

Lever 73 is provided with a small knob or handle 78 by which it may be raised upwardly by the operator when it is desired to employ direct keyboard transmission. The lever 74 is connected by a link 79 to the locking bail 58, so that as the bail is raised by the cam 53 at the end of each revolution of the cam shaft, the lever 74 is lifted from contact with the collar 68. With both levers 73 and 74 raised, the shaft 21 will be moved forwardly by the spring 67 to bring the latches 19 opposite the arms 22 of the switch levers 23. This can occur, however, only at the end of a revolution of the cam shaft and, therefore, cannot clip or mutilate the signals which may be in the course of transmission from the tape transmitter when the finger lever 78 is raised. When it is desired to return to tape transmission it is only necessary to press the knob 81 so as to shift the shaft 21 inwardly and enable the levers 73 and 74 to be pulled downwardly by their springs into locking position.

The mechanism in perforating the tape will now be described. It consists in general of a punch block 85 mounted upon a plate 86 by a lug 87 and having a group of punch pins 88, a punch hammer 89, pivoted at 91, for operating the punch pins, a number of interponent bars 92, one for each code punch pin, adapted to be shifted beneath the punch pins to determine the operation thereof, punch solenoids 93 for operating the punch hammer 89 and a paper feed roller 94, actuated by the punch hammer through a pawl 95. The tape 96 extends from a reel 97, mounted at one side of the machine, over rollers 98 and 99 and thence through the punch block 85.

The particular punch block illustrated is provided with punches of such number and arrangements as to adapt the perforator for use in perforating tape for automatic printing telegraph systems employing a five unit code although obviously the number of pnuches and the number of units of the code may be varied. In the present case it comprises six punch pins 88, five of which are employed for punching the code holes in the tape and the sixth or central punch 88' is designed to form feed holes in the tape. Each of the punches has an annular enlargement or collar 101 normally resting on the lower wall of the punch block, the punches extending downwardly through the wall and upwardly in reduced cross-section through openings in a retracting plate 102 and thence through openings in the top wall of the punch block. The punches are retained in their lower position by compression springs 103 surrounding certain of the punch pins. A die plate 104 is secured to the top of the punch block and is provided with openings in alignment with the punch pins. The top of the punch block is grooved at 105 for the passage of the tape between the die plate and the top of the punch pins.

Since the feed holes must be punched for every character and also for blank portions of the tape, the feed punch 88' is made longer than the other punches so that it will always be operated by the hammer 89. The other five punches are shorter than the punch 88' so that the hammer cannot force them through the tape unless the end of the corresponding interponent members 92 are interposed beneath the punch pins.

The five interponent members slide in grooves in the top of the punch hammer and are pivoted at their outer ends to individual levers 106, in turn pivoted at 107 to a fixed part of the machine. The levers 106 have their lower ends forked and resting over short pins 108, carried by an extension of the locking latches 19 so that as the latches are shifted by the code bars 13 the interponent bars 92 are moved underneath the punch pins 88 or away from said pins in accordance with the particular code combination set up by the code bars.

The cores 109 of the punch solenoids 93 are secured to a cross-bar 111 having a vertical push rod 112 bearing against the lower side of the hammer 89 to elevate the same against the tension of a retractile spring 113 to raise the interponent members which have been shifted against the punch pins to force the same upwardly through the tape.

The feed roller 94 is journaled in a block 114 and is provided with a circumferential row of radial pins 115 which engage the central feed openings of the tape to draw the tape through the punch block. Ratchet teeth 116 are also formed on the feed roller against which the pawl 95 is held by a spring 117, the pawl being positioned in one of the ratchet teeth upon upward movement of the hammer 89 and serving to rotate the feed wheel one space on the return movement of the hammer. One end of the feed wheel is reduced and extends through the plate 86. A star wheel 118 is attached to this extended end and a jockey roller 119 pivoted to the plate 86 is held against the star wheel by a spring 121 to accurately position the same after each movement thereof.

In order to make corrections on the tape when errors occur a back feed lever 122 is journaled upon the reduced end of the feed roller shaft and has pivoted thereon, a pawl 123, urged towards the teeth of the star wheel by a spring 124. The lever 122 is held in its inoperative or lefthand position by a spring 125 and in such position the pawl 123 is held free of the star wheel by a fixed pin 126. Upon movement of the lever to the right the pawl is lowered into engagement with the star wheel rotating the same backward one space. At the same time the curved lower end 127 of the lever 122 engages a pin 128 carried by the pawl 95 moving the pawl away from the ratchet teeth 116.

A downwardly inclined chute 131 extends from the top of the punch block and is adapted to receive the punchings and to direct them through the base of the machine. The chute is provided with an arcuate baffle 132 at its upper end which directs the punchings towards the chute and prevents their accumulating in the forward part of the chute.

The tape transmitter TT is of well known design and briefly consists of a suitable casing 133 mounted upon a base 134 adapted to slide in a support 135 carried by the base 11 so as to be readily removable from the machine. The casing 133 is provided with a removable cover 136 adapted for the passage of the tape 96 thereover.

The transmitter has five distinct sets of transmitting contacts 137, 138, one set only being shown. A contact tongue 139 operates between each set of contacts. The contacts 137 are mounted upon a supporting bridge or marking bus bar 141 and the contacts 138 are mounted upon a spacing bus bar 142. The bus bars 141 and 142 are carried by insulating blocks 143 secured to uprights 144. The several transmitting contact tongues 139 are connected by conductors 145 to soldering posts 146 from which they may be connected to the contacts of the distributor as will subsequently appear.

Each of the transmitting contact tongues 139 is mounted on a separate bell crank lever 147 having a forward extension 148 which engages the upper side of lugs 149 formed on rectangular pin carriers 151. The levers 147 are normally urged in a clockwise direction by individual springs 152.

The pin carriers 151, one of which is provided for each unit of the code, are arranged to slide in guides formed in a block 153. The tape engaging pins 154 are mounted upon an offset arm 155 of the pin carrier, the carriers being urged upwardly by individual spiral springs 156 secured to the lower offset arm 157 of each pin carrier. The springs 156 tend to raise the pins 154 against or through the tape and in so doing to rock the levers 147 against the tension of springs 152 to position the transmitting contact tongues 139 on their lefthand or marking contacts 137.

The pins are moved downwardly from the tape against the action of springs 156 by an electromagnet 158, having a pivoted bell crank armature 159, provided with a bail 161 which engages with lugs 162, one of which is formed on each of the pin carriers 151. It will be apparent that when the magnet 158 is energized to attract its armature, all of the pins 154 which are then in elevated position will be depressed. A retractile spring 163 is provided for the armature to move the same against the adjustable stop 164 when the magnet is deenergized, thus assisting the springs 156 which have the same tendency to retract the armature of the magnet.

The cover 136 is provided with a guide plate 165 above the tape having a transverse slot through which the pins pass in their upward position. The guide plate limits the rise of the tape under the action of the pins which do not happen to be in line with perforations of the tape.

A star wheel 166 having a peripheral row of teeth serves to feed the tape forward, the teeth entering the center row of perforations in the tape as is well known in the art. The star wheel is mounted upon a shaft 167 having a ratchet wheel 168 thereon arranged to be advanced step-by-step by a pawl 169 mounted upon a sliding rod 171. The lower end of the rod 171 is engaged by a lever 172 pivoted at 173 and having its inner end engaged by the forward extension of the armature 159. The pawl carrying rod 171 is raised upwardly once for each stroke of the magnet 158 to advance the feed wheel one step.

The tape 96 between the punch block 85 and the tape transmitter passes underneath an auto-control lever 174 carried by a disc 175 pivoted to a vertical plate 176 (see Figure 2) by a pin 177 passing through the plate and having a block 178 rigidly secured thereto to which the contact 179 is fastened. The contact 179 is normally urged towards the fixed contact 181 by a spiral spring 182. When the loop of tape beneath the lever 174 exceeds a predetermined minimum the contacts 179,181 remain closed and as the loop decreases to said predetermined minimum the lever 174 is raised by the tape thereby rocking the contact 179 to open position. The purpose of contact 179 and 181 will appear hereinafter.

As previously stated, when the machine is set for tape transmission the shaft 21 is held in its rearward position by the latch bar 73 so that the upper ends of the locking latches 19 are offset or disposed to one side of the contact control levers 23. The latch bar 73 has an offset arm 183 carrying a roller 184 which in the downward or locking position of the bar 73 contacts with the trip-pawl 47 and holds it depressed below the clutch disengaging lever 45 so that upon depression of the keys the accompanying forward movement of the pawl 47 does not actuate the lever 45.

However, at this time the clutch stop arm 38 is arranged to be held continuously retracted away from the collar 42 by a magnet 185 having an adjustable screw 186 carried by its armature 187 and adapted when the armature is attracted to press downwardly upon a second horizontal arm 188 of the stop arm 38 to rock the same away from the collar 42. The circuit to the magnet 185 is controlled by one of a series of contacts 191, 192, 193 and 194 operated by the lever 64, which as previously stated is pivoted to the end of the shaft 21. With the shaft 21 in its rearward position contacts 191, 192 and 193 are closed and contact 194 is open.

Located beneath the tape transmitter TT is a pair of contacts 195 and 196 which are adapted to be closed upon each operation of a key lever by means of a vertical extension 197 of the bail 48. The extension 197 is thrown forward each time the bail 48 is depressed by a key lever and has a cam faced or beveled upper end 198 which as it moves forward engages contact 195, forcing it against contact 196.

Referring to Figure 7 the circuit arrangement of the machine will be described. Assuming first that the mechanism is set for tape perforation and tape transmission with contacts 191, 192 and 193 closed and contact 194 open. The tongues 139 of the tape transmitter TT are connected to the corresponding contacts 26 of the distributor. For convenience the individual contacts of the distributor are designated as "*a*" to "*g*", contacts "*a*" to "*f*" being connected to a bus bar 199 to which the outgoing line L is attached and contact "*g*" being connected to positive battery. A circuit is established from positive battery through the clutch control magnet 185, contact 193 and auto-control contacts 179, 181 to negative battery. If a sufficient loop of tape exists between the perforator and transmitter contacts 179, 181 will be closed completing the circuit to the magnet 185 and thereby permitting engagement of the clutch to effect rotation of the cam shaft 31. The contact "*a*" is normally closed when the shaft is at rest supplying steady marking battery to the line from a negative source of potential 201 and upon rotation of the cam shaft the contact "*a*" first opens to transmit a start or spacing impulse. The contacts "*b*" to "*f*" then close in succession transmitting either a marking condition from the marking bus bar 141 of the tape transmitter or a spacing condition from the spacing bus bar 142 depending upon the position of the tongues 139. At the end of the revolution a circuit is completed from positive battery through contact "*g*" and contact 191 to the tape stepping magnet 158 and thence to negative battery. The operation of the magnet

158 advances a new code combination into the tape transmitter.

With the magnet 185 continuously energized the cam shaft 31 continues to rotate sending out a code combination with each complete revolution until such time as the supply of tape is sufficiently exhausted to raise the auto-control arm 174 and open contacts 179, 181. When this occurs the circuit to the magnet 185 is interrupted permitting the stop arm to fall back in the path of the collar 42 to effect disengagement of the clutch and thereby stopping the transmission until such time as additional tape is supplied from the perforator. During the operation of the tape transmitter the key levers may be actuated to set up the interponent bars 92 in various combinations beneath the punch pins 88. Upon each depression of a key lever for this purpose the bail 48 is rocked so as to close contacts 195, 196 whereby a circuit is completed from positive battery through the punch solenoid 93, contacts 195, 196 and contact 192 to negative battery. The solenoid, therefore, forces the hammer 89 upwardly to perforate the tape in accordance with the position of the interponent bars and on its downward stroke to advance the tape one step through the perforator.

It will be noted that the distributor and the tape transmitter operate independently of the key levers and the perforating mechanism, whereas during direct keyboard operation the distributor was actuated by the depression of the key levers.

If during the tape transmission a rush message is received it is only necessary for the operator to raise the lever 73 and hold it elevated until near the end of the revolution of the shaft 31 at which time the latch 74 is raised by the cam 53 through the locking lever 55 and link 79 to permit the shaft 21 to move forward under the action of spring 67 so as to position the upper ends of the locking latches 19 opposite the ends of the contact levers 23. In this position contacts 191, 192 and 193 are opened and contact 194 is closed. The opening of contact 191 interrupts the circuit to the tape stepping magnet 158 so that it will not be operated during subsequent revolutions of the cam shaft. The opening of contact 192 interrupts the circuit to the punch solenoid 93 and prevents perforation of tape corresponding to the signals transmitted directly from the keyboard and the opening of contact 193 interrupts the circuit to the clutch control magnet 185 so that the clutch is entirely under the control of the lever 45. The closing of contact 194 places marking battery from the source 201 upon both the marking and spacing bus bars of the tape transmitter thus assuring that marking battery will be applied to each of the contacts 26 of the distributor irrespective of the setting of the contact tongues 139 of the tape transmitter.

After the rush message has been completed the machine may be reset for tape transmission merely by pressing the shaft 21 inwardly so as to allow the levers 73 and 74 to drop down into locking position.

A slow-to-release relay 202 is included in the line circuit L and controls the operation of a signal lamp or other signal device 203 connected in circuit with a battery 204 and the tongue and back contact of the relay. The relay does not release upon ordinary spacing signals but should the line become open at any point unbeknown to the transmitting operator, the relay tongue will fall back to its back contact completing the signal circuit and thereby notifying the operator so that the transmission may be stopped, as otherwise the signals would be transmitted to the wind. The relay 202 also permits the operator at the distant end of the line to break in and signal the transmitting operator merely by opening the line. Obviously in place of the signal lamp 203 a control relay may be provided for automatically locking the transmitter against further operation.

It is obvious that many changes and modifications may be made without departing from the invention and, therefore, I do not desire to be limited to the particular details of construction shown and described except in accordance with the following claims.

What I claim is:

1. In a telegraph transmitter, a keyboard, a code selector controlled thereby, a distributor controllable by said selector for transmitting code combinations to line, a storage transmitter controllable by said selector, said distributor also being controllable by said storage transmitter for transmitting code combinations to line and a transfer mechanism for operatively associating said selector and distributor with said storage transmitter or for rendering said storage transmitter nonoperative in response to said selector and for operatively associating said selector directly with the distributor only.

2. In a telegraph transmitter, a keyboard, a code selector controlled thereby, a distributor controllable by said selector for transmitting code combinations to line, a storage transmitter controllable by said selector, said distributor also being controllable by said storage transmitter, mechanism for operatively associating said selector and distributor with said storage transmitter or for operatively associating said selector directly with the distributor, said transfer mechanism effecting said transfer only during an inactive period of said distributor.

3. In a telegraph transmitter, a keyboard, a code selector controlled thereby, a distributor controllable by said selector for transmitting code combinations to line, an automatic transmitter, said distributor also being controllable by said automatic transmitter for transmitting code combinations to line and a transfer mechanism for operatively associating said automatic transmitter with said distributor or for rendering said storage transmitter nonoperative in response to said selector and for operatively associating said selector directly with said distributor only.

4. In a telegraph transmitter, a keyboard, a code selector controlled thereby, a distributor controllable by said selector for transmitting code combinations to line, an automatic transmitter, said distributor also being controllable by said automatic transmitter for transmitting code combinations to line and a transfer mechanism for operatively associating said automatic transmitter with said distributor or for operatively associating said selector directly with said distributor, said transfer mechanism being ineffective to complete said transfer during the period of transmission of a code combination.

5. In a telegraph system, a manual transmitter, an automatic transmitter, a common distributor for said transmitters, a transfer mechanism for operatively associating said distributor with either said manual transmitter or said automatic transmitter and means for precluding the transfer to the manual transmitter during the period

of transmission of a signal combination by the automatic transmitter.

6. In a telegraph system, a manual transmitter, an automatic transmitter, a common distributor for said transmitters, a transfer mechanism for operatively associating said distributor with either said manual transmitter or said automatic transmitter and means for locking said transfer mechanism against operation during the period of transmission of a code combination from said automatic transmitter.

7. A telegraph transmitter comprising a tape perforator, key controlled mechanism for operating said perforator, a tape transmitter associated with said perforator, a distributor controlled by said transmitter for distributing code signals to line and means, operable at will, for disconnecting said perforator and transmitter from said key controlled mechanism and distributor and for operating said distributor directly from said key controlled mechanism.

8. A telegraph transmitter comprising a keyboard, a code selector controlled thereby, a signal distributor, a signal recorder and means for disabling said recorder and operatively associating said code selector with said distributor only for transmitting code combinations to line or for operatively associating said selector with said recorder only to record said code combinations.

9. A telegraph transmitter comprising a code selector, a rotary distributor associated therewith, means for releasing said distributor for one cycle of operation for each code combination occurring in said code selector, a storage transmitter, means for disassociating said distributor from the code selector and associating it with said storage transmitter and means operating upon said transfer for releasing said distributor for continuous rotation.

10. A telegraph transmitter comprising a keyboard, a code selector controlled thereby, a rotary distributor having a plurality of sets of contacts, means under the control of said selector for closing said contacts in code combinations, to transmit said code combinations to line, a storage transmitter, a transfer mechanism for disassociating said distributor from said selector and for operatively associating the storage transmitter with the selector for setting up corresponding code combinations in the storage transmitter and for operatively associating said storage transmitter with the distributor to apply previously prepared code combinations to the contacts of the distributor and means operable to close said distributor contacts in succession for transmission of said code combinations to line.

11. A telegraph transmitter comprising a keyboard, a code selector controlled thereby, a rotary distributor having a plurality of sets of contacts, a storage transmitter, a transfer mechanism operable in one position to connect said distributor with said selector and another position to disconnect the distributor from the selector and for operatively associating the storage transmitter with the selector to set up corresponding code combinations in the storage transmitter and for operatively associating the storage transmitter with the distributor for applying the previously prepared code combinations to the contacts of the distributor and means operable when the transfer mechanism is in the first mentioned position for closing said contacts in code combinations and in the second position of said transfer mechanism for closing the contacts in succession.

12. A telegraph transmitter comprising a code selector, a distributor, a storage transmitter, a transfer mechanism serving in one position to connect said code selector with said distributor only and in the other position for operatively associating the code selector with the storage transmitter only.

13. A telegraph transmitter comprising a code selector, a distributor, a tape perforator, a control circuit for the perforator, a tape transmitter, a tape stepping mechanism for the transmitter, a control circuit for the tape stepping mechanism, the transfer device serving in one position to connect said code selector with said distributor and in the other position for associating the code selector with the tape perforator and a contact means operated by said transfer mechanism when in the first position for interrupting said circuits to render the tape perforating and tape stepping mechanisms inoperative and in the other position of said transfer mechanism for completing said circuits to render the tape perforating and tape stepping mechanism operative.

14. In a telegraph transmitter, a keyboard, a perforator controlled by said keyboard for producing a perforated record, a tape transmitter having contact means, a distributor having contact means, means for completing transmitting circuits through the transmitting contact means and the distributor contact means in accordance with the perforated record and other means for completing transmitting circuits through said distributor contact means alone, independently of said perforated record and in accordance with the operation of said keyboard.

15. In a telegraph transmitter, a keyboard mechanism, a perforator controlled by said keyboard mechanism for producing a perforated record, a tape transmitter having a plurality of contacts arranged to be operated in code combinations in accordance with said perforated record, a distributor having corresponding contacts, means for completing transmission circuits through said transmitting and distributor contacts, and selective means adapted to be actuated by the keyboard operator for rendering said transmission circuits incomplete and for completing transmission circuits through said distributor contacts only, under control of said keyboard mechanism.

16. In a telegraph transmitter, a keyboard mechanism, a perforator controlled thereby for producing a perforated record, a distributor, means controlled by said perforated record for applying code combinations to said distributor, and means controlled by a single operating member for rendering said perforated record transmitting mechanism inoperative and for permitting transmission directly from said keyboard through said distributor.

17. In a telegraph transmitter, a distributor having a plurality of contacts, means selectively controlled for closing said contacts, one at a time, either in accordance with a prearranged code or in succession, and means operable when said contacts are closed in succession for applying marking and spacing impulse conditions to the contacts in accordance with the prearranged code.

18. In combination, a keyboard mechanism, a perforated tape mechanism, a common distributor having a plurality of contacts, means tending to close said contacts in succession, means controlled by said keyboard for preventing closure of predetermined contacts in accordance with a pre-

arranged code, means for rendering said keyboard controlled mechanism inoperative whereby each of said contacts is permitted to close in succession, and means for applying marking and spacing signal conditions to said contacts.

19. In a telegraph transmitter, a keyboard mechanism, a storage device, a transmitting distributor, means for applying code combinations from said keyboard mechanism to said storage device, and selective means comprising a single operating member for rendering said means inoperative and for applying said code combinations directly from said keyboard mechanism to said distributor.

SAMUEL W. ROTHERMEL.