

Dec. 19, 1950

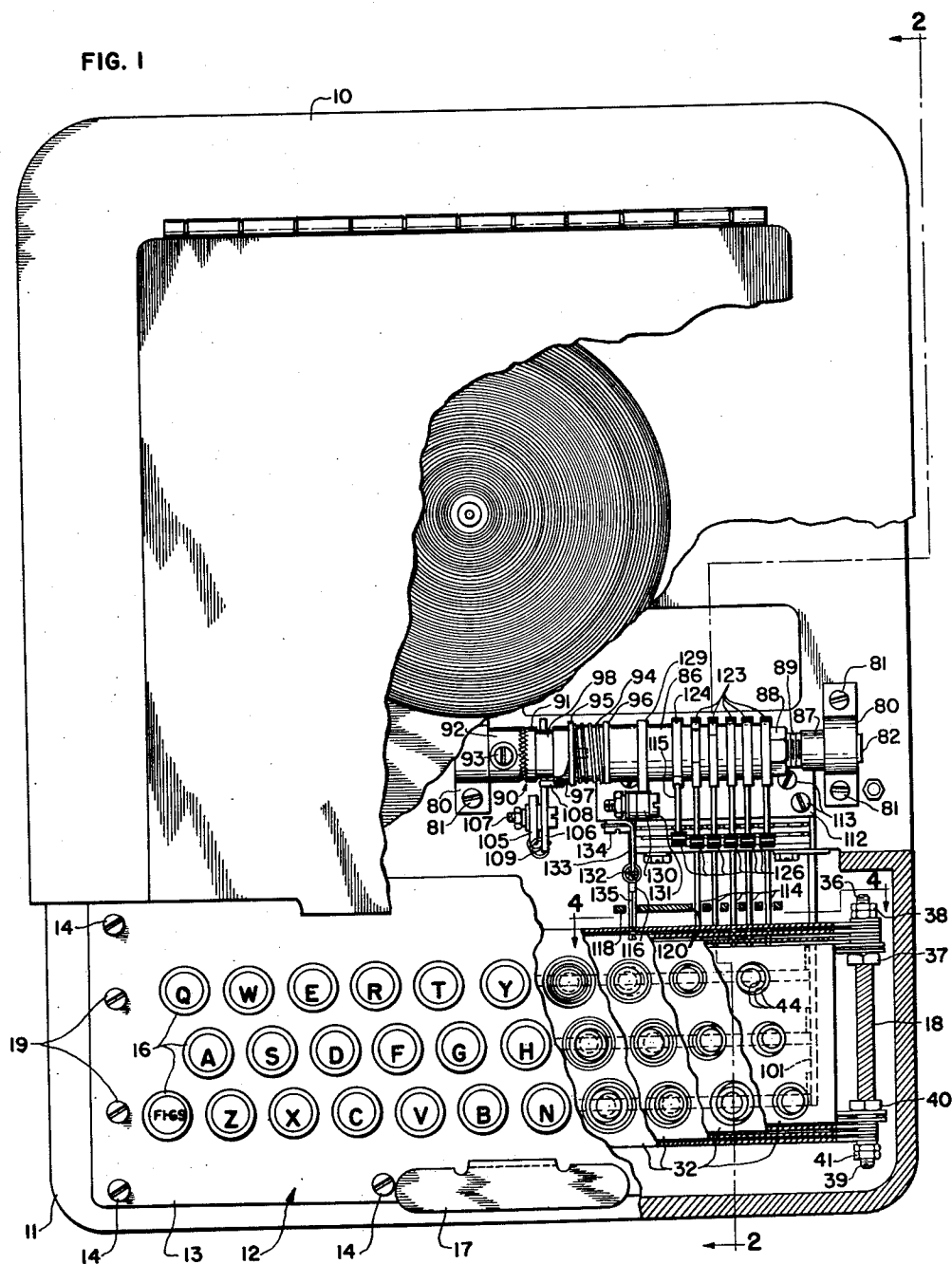
W. J. ZENNER
TELEGRAPH TRANSMITTER

2,534,494

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2 Sheets-Sheet 1

FIG. 1



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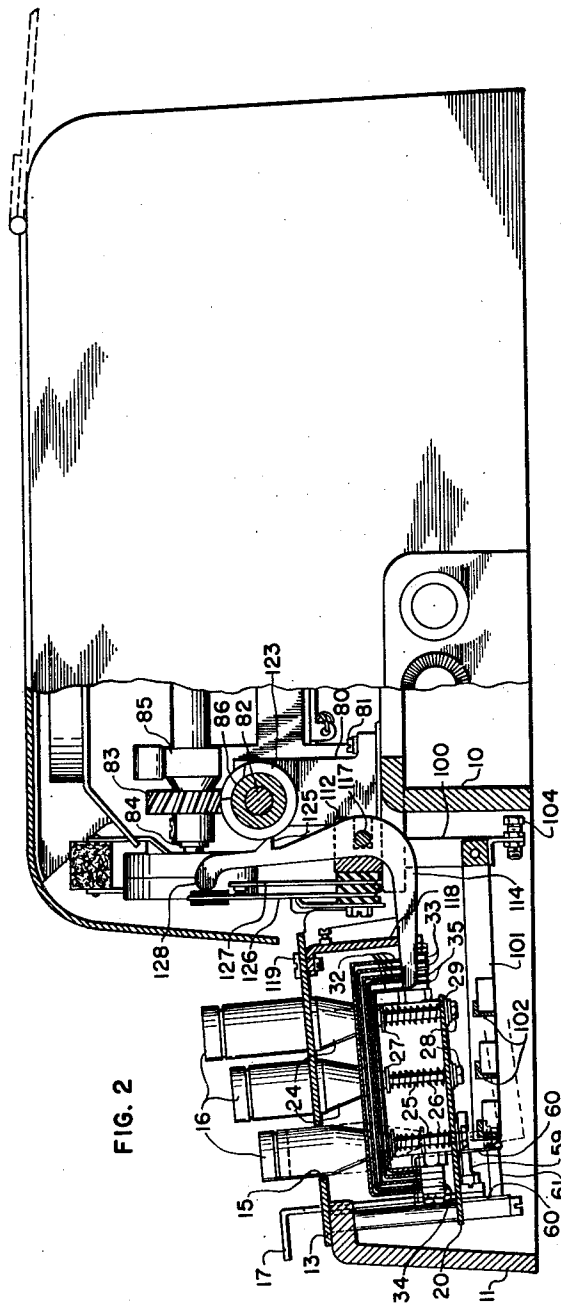
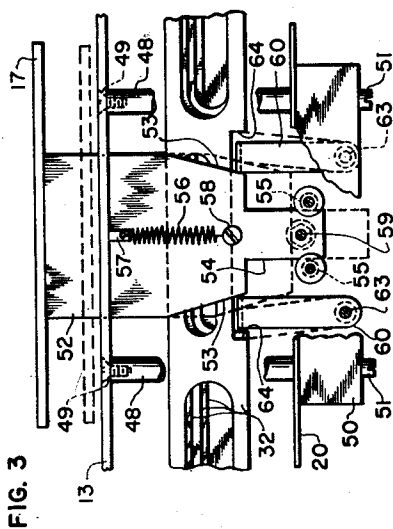
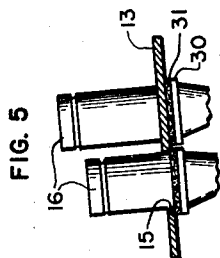
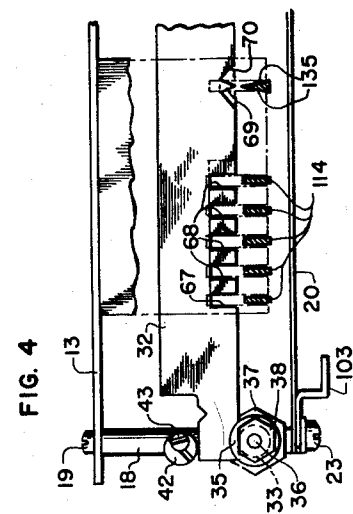
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UNITED STATES PATENT OFFICE

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TELEGRAPH TRANSMITTER

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4 Claims. (Cl. 178—79)

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This invention relates to printing telegraph transmitters and more particularly to a push button keyboard transmitter adapted for use with systems in which the signals comprise permutations of two different circuit conditions.

It is an object of this invention to provide a keyboard wherein the keys are in the form of push buttons, which position a set of code or permutation bars in different combinations.

Another object of the invention is to provide a low cost transmitter wherein push buttons having cone shaped lower ends are adapted to engage in succession apertures of progressively smaller diameter in a series of nested code or permutation bars whereby the bars are shifted into predetermined combinations

Another object of this invention is to provide a series of code bars, each having a finger thereon which controls a circuit closing means in accordance with the position of the finger

Another object of this invention is to provide a printing telegraph transmitter apparatus wherein the depression of a key permutes a set of code bars, and a lever, actuated due to the depression of the key, engages a finger on each code bar to lock the code bars in their permuted positions.

Other objects and advantages of the invention will be apparent and the invention will be more readily understood from the following description when read with reference to the accompanying drawings, in which:

Fig. 1 is a top plan view of a printing telegraph transmitter partly cut away to show the improved keyboard controlled mechanism embodying the principal features of the invention;

Fig. 2 is a side elevation partly in section taken along the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary view showing the space bar mechanism in detail;

Fig. 4 is a fragmentary sectional view taken along the line 4—4 of Fig. 1; and

Fig. 5 is a fragmentary sectional side view of the upper portion of the keys.

In the drawings, the apparatus has a metal base or frame 10 with a front portion 11 thereof, in which a keyboard 12 is mounted, whereby a top plate 13 of the keyboard 12 is secured to the front portion of the base 10 by screws 14. The top plate 13 is provided with spaced apertures 15 therein through which a set of reciprocating keys or push buttons 16 protrude. A space bar 17 is reciprocally mounted in a longitudinal slot (not shown) in the top plate 13. End plates 18 are fastened to the top plate 13 of the keyboard by screws 19 and a base plate 20 is secured to the end plates 18 by screws 23. The base plate 20

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is provided with spaced apertures (not shown) which are of smaller diameter than, but aligned with, the spaced apertures 15 in the top plate 13.

The keys 16 are in the form of push buttons and have cone shaped central portions 24. The lower portions 25 of the keys are rod shaped and extend through the spaced apertures in base plate 20. A helical spring 26 surrounds the rod shaped portion 25 of each key and abuts the base plate 20 and a collar 27 on the rod shaped portion. The ends of the rod shaped portions extend through the apertures in the base plate 20 and are threaded to accommodate nuts 28 which prevent the springs 26 from withdrawing the keys from the base plate. Anti-noise washers 29 surround the rod shaped portions 25 of the keys and act as buffers between the nuts 28 and the base plate 20. Collar like lugs 30 around the keys 16 and beneath the top plate 13 prevent the springs 26 from throwing the keys out of the keyboard and felt washers 31 serve to prevent noise and act as shock absorbers between the collar like lugs and the top plate.

A series of five nested code bars or plates 32 of channel form are slidably supported on frictionless bearings 33 and 34 and laterally spaced thereon by frictionless spacers 35. The frictionless bearings 33 and spacers 35 are alternately spaced on a threaded bolt 36 protruding from each end plate 18 and are held in place thereon by lock nuts 37 and 38. The frictionless bearings 34 are spaced by lock nuts 40 and 41 on a threaded bolt 39 which also protrudes from each end plate 18. Eccentrics 42, fastened to the end plates 18 by screws 43, hold the code bars 32 against the frictionless bearings 33 and 34.

Each code bar 32 has apertures 44 therein corresponding to each key 16 of the keyboard 12, the size of the apertures 44 in each succeeding nested code bar 32 becoming progressively smaller to correspond with the reducing diameter of the cone portions 24 of the keys 16. Each aperture 44 is laterally aligned with its corresponding key 16 but is longitudinally spaced in one of two positions in order that the code bar 32 will be moved longitudinally to one of two positions when any particular key 16 is depressed. When a key 16 is depressed the cone portion 24 thereof engages the periphery of the corresponding apertures 44 to cam each code bar 32 longitudinally and set up that permutation of positions of all the code bars 32 which corresponds to the particular key depressed.

Referring to Fig. 3, a pair of rods 48 are secured to the keyboard top plate 13 by screws 49 and extend to the base plate 20. A space bar guide plate 50 is secured to the base plate 20 by screws

51 which extend transversely through the space bar guide plate, and through the base plate 20, into the rods 48. A flat space bar support 52 extends through and is reciprocable in the longitudinal slot (not shown) in the top plate 13. The space bar support 52 is provided with tapered cam surfaces 53 and a depending portion 54 is engaged and guided by a pair of guide rollers 55 which are bolted to the space bar guide plate 50. The upper end of a tension spring 56 is fastened to a lug 57 on the top plate 13 and the other end is fastened to the space bar support 52 by a bolt 58 and normally holds the space bar 17 in its upper position. A stud 59 (shown more clearly in Fig. 2) is threaded into the depending portion 54 of the space bar support and engages an anti-noise pad (not shown) on the bottom of the base plate 20 to prevent the spring 56 from throwing the space bar 17 out of the keyboard.

U-shaped levers 60 are pivotally secured to the space bar guide plate 50 by a pair of bolts 63. When the space bar 17 is depressed the tapered cam surfaces 53 on the space bar support 52 engage the levers 60 to pivot them on their supporting bolts 63, whereby the levers 60 engage the edges 64 of notches in the code bars 32 to move the code bars longitudinally so that the permutation of positions thereof will correspond to the "space" code combination.

Referring to Fig. 4, each code bar 32 is provided with a cut-out 67 in the edge thereof and a finger 68 protrudes from each code bar within this cut-out 67. A V-shaped locking finger 69 also protrudes from each code bar 32 within another cut-out 70.

A pair of brackets 80 is secured to the metal base 10 by bolts 81, and has a shaft 82 journaled therein. A driven gear (not shown) is pinned to the shaft 82 and meshes with a coacting drive gear 83, which is pinned to a continuously rotating drive shaft 84. The drive shaft 84 is journaled in a bracket 85 which is secured to the metal frame 10 and is driven by an electric motor, not shown. A transmitter cam drum 86 is adjustably keyed to the shaft 82, and is held in adjusted position thereon by a nut 88 which engages a set of threads 89 in a spacer collar 87 pinned to the shaft. A keyboard clutch 90 of the one revolution type has a driven member 91 which is keyed to the transmitter cam drum 86 but longitudinally slidable thereon, and a drive member 92 which is pinned to the shaft 82 by a screw 93. A helical compression spring 94 abuts a collar 95 on the driven member 91 and a collar 96 on the transmitter cam drum 86, to force the driven member into engagement with the drive member 92. The driven member 91 is provided with a throw-out cam 97 and a start-stop cam 98 which control the operation of the keyboard clutch 90.

A pair of lugs 100 fastened to the frame 10 pivotally supports a universal bail 101 which is adapted to pivot downwardly whenever a key 16 or the space bar 17 is depressed. A set of cross bars 102 on the universal bail 101 is aligned with the rows of keys 16 so that when a key is depressed the rod-shaped portion 25 thereof will engage one of these cross bars and thus pivot the universal bail. When the space bar 17 is depressed the stud 59 will engage one of the cross bars 102 to pivot the universal bail 101. A stop 103 (Fig. 4) is fastened to the base plate 20 to limit the upward movement of the universal bail 101 and a set screw 104 limits the downward movement thereof.

A rocking lever 105 is fastened to the universal

bail 101, and a clutch releasing lever 106 is pivotally supported on the rocking lever by a bolt 107. The clutch releasing lever 106 extends beneath the start-stop cam 98 of the driven member 91, and a tooth (not shown) on the clutch releasing lever engages a clutch throw-out lever 108 which in turn engages the throw-out cam 97 on the driven member 91. The clutch releasing lever 106 is held against the start-stop cam 98 and clutch throw-out lever 108 by a tension spring 109, which is fastened to the clutch releasing lever and to a lug (not shown) protruding from the rocking lever 105. Thus, whenever a key 16 or the space bar 17 is depressed, the universal bail 101 pivots, the rocking lever 105 moves forward pulling the clutch releasing lever 106 forward, and the tooth on the clutch releasing lever engages the clutch throw-out lever 108 to move it from engagement with the throw-out cam 97 on the driven clutch member 91. The helical spring 94 then forces the driven member 91 into engagement with the drive member 92 and the transmitter cam drum 86 rotates. The transmitter cam drum 86 rotates through only one revolution because the high portion of the start-stop cam 98 causes the clutch releasing lever 106 to pivot, thereby causing the tooth on the clutch releasing lever to become disengaged from clutch throw-out lever 108. The clutch throw-out lever 108 then returns to the normal position whereby it re-engages the throw-out cam 97 to force the driven member 91 from engagement with the drive member 92.

A metal support 112 is secured to the frame 10 by screws 113. A set of circuit makers or contact levers 114 and a locking lever 116, in the form of bell cranks, and a start contact lever 115 are mounted on a common pivotal support 117 which extends longitudinally through the metal support 112, and are freely pivoted within transverse slots (not shown) in the metal support. A comb bar 118 is mounted on the top plate 13 of the keyboard by bolts 119, and has a series of slots 120 therein for guiding the contact levers 114 and the locking lever 116.

The horizontal arms of the contact levers 114 extend forward to beneath the cut-out portions 67 of the nested code bars 32 and are adapted to either engage the set fingers 68 in the code bars or to pivot upwards within the cut-out portions, according to the positions of the code bars as determined by the particular key 16 depressed to set the code bars.

The transmitter cam drum 86 is divided into cam sections 123 and a start-stop cam 124 which cooperates with the contact levers 114 and start contact lever 115, respectively. A lug 125 on the vertical arm of each contact lever 114 or 115 coacts with its corresponding cam section 123 or start-stop cam 124. A set of spring contact fingers 126 and a set of cooperating contact fingers 127 which are connected to a signal line circuit (not shown) are mounted upon but are insulated from the support 112. Each spring contact finger 126 tends to engage its associated contact finger 127 and also presses against the upper extremity 128 on each of the contact levers 114 and 115 to hold the lug 125 of each contact lever in engagement with its corresponding cam section 123 or start-stop cam 124.

A locking cam 129 mounted on the transmitter cam drum 86 coacts with a roller 130, which is mounted on the vertical arm of the locking lever 116 by a bolt 131. A tension spring 132, carried by an arm 133, which arm is secured to the sup-

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port 112 by a screw 134, holds the roller 130 against the locking cam 129. The horizontal arm of the locking lever 116 extends forward to beneath the cut-out portions 70 in the code bars 32 where it has two cam surfaces 135 (shown more clearly in Fig. 4), which cooperate with the locking fingers 69 of each code bar. The co-operation between the cam surfaces 135 of the locking lever 116 and the locking fingers 69 is such that the code bars 32 are locked in that particular permutation of positions which corresponds to the key 16 depressed.

The low portions of the cam sections 123 and start-stop cam 124 are sequentially spaced around the periphery of the transmitter cam drum 36. When the apparatus is in operation, but at a time when neither a key 16 nor the space bar 17 is depressed (the condition of the apparatus as shown in Fig. 1), the transmitter cam drum 36 is stationary, and the low portion of the start-stop cam 124 is adjacent the lug 125 on the start contact lever 115. Thus, the spring contact finger 126, which cooperates with the start contact lever 115, forces the lug 125 into engagement with the low portion of start-stop cam 124 and also engages its associated contact finger 127 to close the circuit. Also at the time when the transmitter cam drum 36 is stationary, the high portion of the locking cam 129 engages the roller 130, which pivots the horizontal arm of the locking lever 116, whereby the cam surfaces 135 on the locking lever are withdrawn from engagement with the locking fingers 69 on the code bars 32.

When a key 16 or the space bar 17 is depressed, the one revolution keyboard clutch 90 is actuated which causes the transmitter cam drum 36 to rotate, and the cone-shaped portion 24 of the particular key depressed or the tapered cam surfaces 53 of the space bar support cause the code bars 32 to shift longitudinally, thus setting the correct permutation of the set fingers 68. With the transmitter cam drum 36 having thus been set in motion, the locking roller 130 is riding on the low portion of the locking cam 129, which allows the tension spring 132 to raise the locking lever 116 until its cam surfaces 135 engage the locking fingers 69 to lock the permuted code bars 32. Also, during the rotation of the transmitter cam drum 36, the high portion of the start-stop cam 124 engages the lug 125 on the start contact lever 115, whereby the corresponding spring contact finger 126 is thrown out of contact with its associated contact finger 127, and the circuit is thus thrown open. The low portions of each cam section 123 are sequentially rotated to a position adjacent the corresponding lug 125 on each contact lever 114, whereby the corresponding spring contact finger 126 tends to force the lug into engagement with the low portion of the corresponding cam section, which allows the spring contact finger to engage its corresponding contact finger to momentarily close the line circuit. Whenever a set finger 68, on one of the code bars 32 is aligned with its corresponding contact lever 114, the corresponding spring contact finger 126 is prevented from forcing the lug 125 against the low portion of the adjacent cam section 123 and thus the circuit remains open. Therefore, this apparatus converts the permutation of positions of the code bars 32, which corresponds to the particular key 16 or space bar 17 depressed into a definite series of electrical impulses in the circuit, which can be received and printed by the local

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telegraph printer or by a printer at a distant receiving apparatus or which can be used by a tape perforating apparatus to perforate a tape.

This invention has been described in connection with a specific embodiment thereof but is capable of modification without departing from the spirit or scope of the invention, and is to be considered as limited only by the scope of the appended claims.

What is claimed is:

1. In a telegraph apparatus, a keyboard, a plurality of push button type keys mounted in said keyboard, a space bar mounted in said keyboard, a plurality of channel shaped movable code plates each having apertures therein corresponding to each of said keys, cam surfaces on each of said keys being adapted to enter the corresponding aperture in each of said code plates whenever a key is depressed to cam said code plates into a permutation of positions corresponding to the key depressed, a cam surface on said space bar being adapted to shift said code plates into a permutation of positions corresponding to a space whenever said space bar is depressed, a locking finger on each code plate, a lever actuated whenever one of the keys or the space bar is depressed for engaging said locking finger on each code plate to lock said code plates in the permutation of positions corresponding to the key or space bar depressed, a finger on each code plate and movable therewith to either a circuit making position or to a noncircuit making position whenever said code plates are permutablely positioned, and a plurality of circuit makers which normally sequentially close a circuit, each of said circuit makers cooperating with one of said fingers whereby the permutation of positions of said code plates is converted into a permutation of open and closed circuit conditions.

2. In combination, a keyboard, a plurality of depressible keys in said keyboard, a plurality of nested code plates movable to permutations of positions corresponding to each of said keys, said code plates each having a plurality of openings, said openings being provided in each of said code plates corresponding to each of said keys, and cone shaped portions on each of said keys for entering the corresponding opening in each of said code bars upon depression of one of said keys to cam said plurality of code bars to the permutation of positions corresponding to the depressed key, said openings in successive code bars becoming progressively smaller in the direction of depression of said keys whereby the permutation of said code bars corresponding to the depressed key is set up only upon full depression thereof.

3. In a telegraph transmitter, a keyboard, a plurality of depressible keys in said keyboard, a plurality of code bars movable to permutations of positions corresponding to each of said keys, said code bars each having a plurality of openings, said openings being provided in each of said code bars corresponding to each of said keys, cone shaped portions on each of said keys for entering the corresponding opening in each of said code bars upon depression of one of said keys to cam said plurality of code bars to the permutation of positions corresponding to the depressed key, said openings in successive code bars becoming progressively smaller in the direction of depression of said keys whereby the permutation of said code bars corresponding to the depressed key is set up only upon full depression

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thereof, a set of transmitting contacts, and means effective upon full depression of one of said keys for transferring the permutation set up in said code bars to said transmitting contacts.

4. In combination, a keyboard, a plurality of depressible push button type keys mounted in said keyboard, a cone shaped portion on each of said keys, and a plurality of code plates each movable to either of two positions and each having apertures therein corresponding to each of said keys, the apertures in successive code plates being successively smaller than the aperture in the next preceding code plate, whereby said cone shaped portion on any depressed key is effective to cooperate with said apertures to cam each of said code plates to either of said two positions only upon full depression of such key.

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