

May 14, 1940.

L. M. POTTS

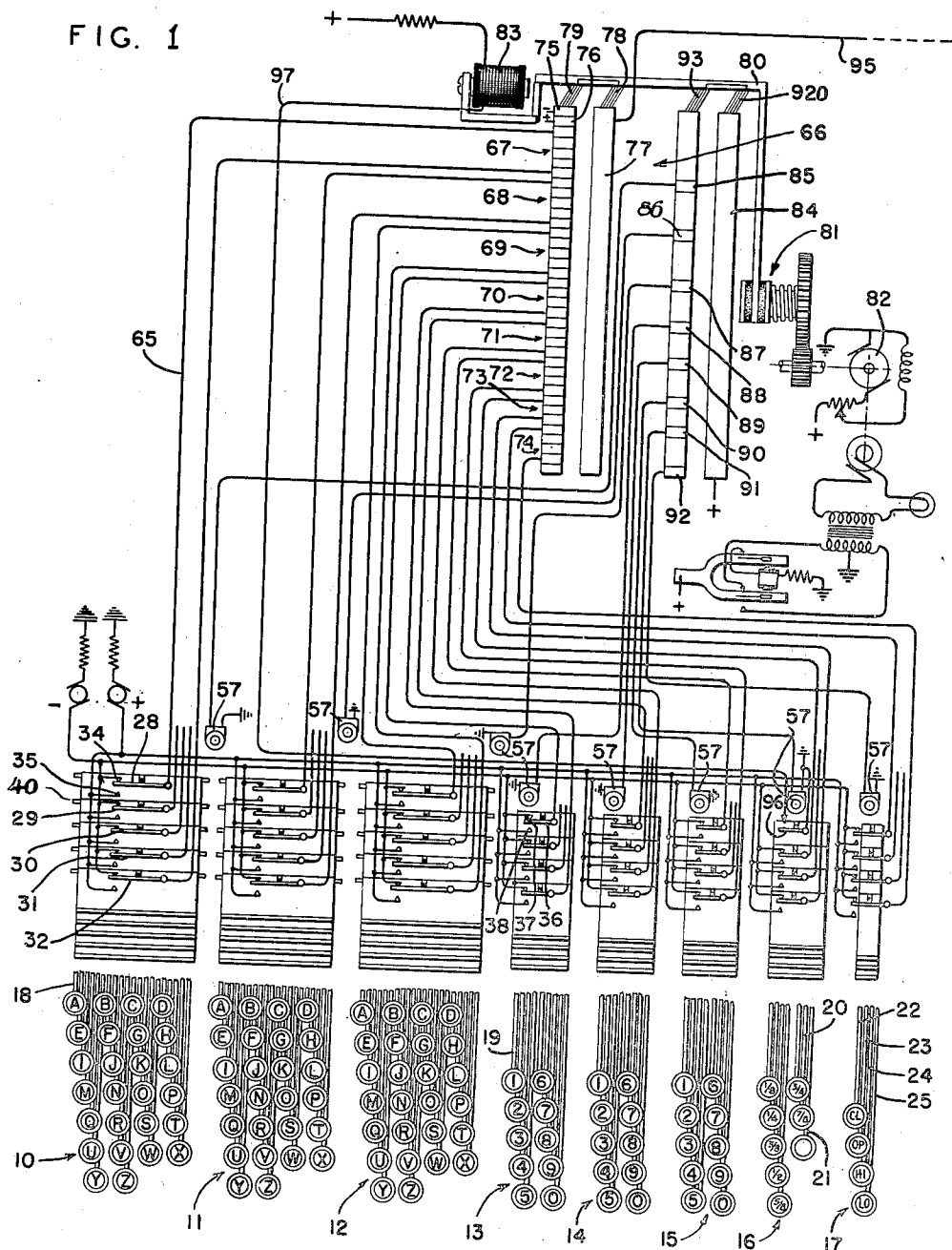
2,200,807

KEYBOARD

Original Filed Jan. 17, 1929

2 Sheets-Sheet 1

FIG. 1



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FIG. 2

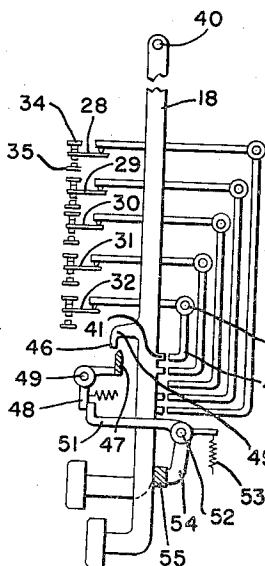


FIG. 3

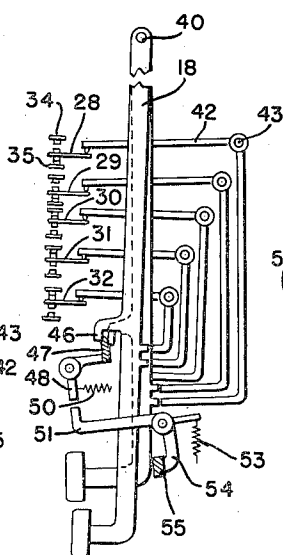


FIG. 4

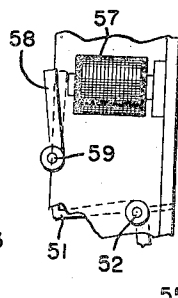


FIG. 5

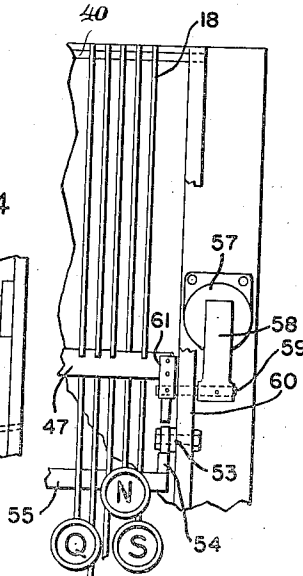


FIG. 6

A	000000	000000	1	000000	000000	000000	000000
B	000000	000000	2	000000	000000	000000	000000
C	000000	000000	3	000000	000000	000000	000000
D	000000	000000	4	000000	000000	000000	000000
E	000000	000000	5	000000	000000	000000	000000
F	000000	000000	6	000000	000000	000000	000000
G	000000	000000	7	000000	000000	000000	000000
H	000000	000000	8	000000	000000	000000	000000
I	000000	000000	9	000000	000000	000000	000000
J	000000	000000	0	000000	000000	000000	000000
K	000000	000000	1/8	000000	000000	000000	000000
L	000000	000000	1/4	000000	000000	000000	000000
M	000000	000000	3/8	000000	000000	000000	000000
N	000000	000000	1/2	000000	000000	000000	000000
O	000000	000000	5/8	000000	000000	000000	000000
P	000000	000000	3/4	000000	000000	000000	000000
Q	000000	000000	7/8	000000	000000	000000	000000
R	000000	000000	CL	000000	000000	000000	000000
S	000000	000000	OP	000000	000000	000000	000000
T	000000	000000	HI	000000	000000	000000	000000
U	000000	000000	LO	000000	000000	000000	000000
V	000000	000000		000000	000000	000000	000000
W	000000	000000		000000	000000	000000	000000
X	000000	000000		000000	000000	000000	000000
Y	000000	000000		000000	000000	000000	000000
Z	000000	000000		000000	000000	000000	000000

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2,200,807

KEYBOARD

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Original application January 17, 1929, Serial No. 333,161. Divided and this application October 12, 1938, Serial No. 234,566

3 Claims. (Cl. 177—380)

The present invention relates to telegraph systems and apparatus and more particularly to apparatus for the transmission of groups of signal impulses indicative of stock items and quotations.

The present application is a division of application Serial No. 333,161, filed January 17, 1929.

An object of the invention is a transmitter for the transmission of groups of signal elements, which may be operated at high speeds without signal interference.

A feature of the invention is a transmitter arranged with a plurality of key sections which are operated sequentially and in a definite order for the transmission of groups of signal elements.

A further feature of the invention is a telegraph transmitter wherein operation of its key levers is determined cyclically in response to a signal distributor with which it is operatively associated.

The above and other objects and features of the invention are accomplished by the provision of a keyboard with its key levers arranged in a plurality of groups or sections. Individual to each group or section are a plurality of contacts which, through the depression of the respective key levers, are operated permutably in accordance with the particular code identified with the several key levers. Different signal conditions such as, for example, the first, second, and third letters of a stock abbreviation, the units, tens, hundreds, and fractions part of the stock quotation, and the range thereof; that is, whether it be a low, high, last, or close quotation, are allocated to the various sections of the keyboard.

Each keyboard section is provided with a self locking apparatus which is not released until a predetermined interval during the transmission at which time a particular signal corresponding to said section has been transmitted.

Transmission of the groups of signal impulses, as determined by the operation of the contacts of the several sections of the keyboard is achieved through the operation of a start-stop distributor initiated in its operation through the closure of a contact associated with the section of the keyboard allocated to the fractions part of the quotation so that not until the stock item and its quotation have been set up on the various keyboard sections will a condition be established for the release of the distributor. During the cycle of rotation of the distributor, all of the groups of impulses identifying the stock item, its quotation, and range, will be transmitted.

A better understanding of the invention may be had from the following description, taken in conjunction with the accompanying drawings, wherein

Fig. 1 is a circuit diagram of the keyboard transmitter and distributor;

Fig. 2 is a detail view of a section of the keyboard showing the key levers in their normal position;

Fig. 3 is a detail view of a section of the keyboard showing a key lever depressed and locked in its depressed position;

Fig. 4 is a detail view of the keyboard unlocking mechanism;

Fig. 5 is a partial plan view of the keyboard; and

Fig. 6 illustrates the code combinations which may be utilized in the transmission of stock items, stock quotations, and quotation ranges.

As disclosed in Fig. 1, the keyboard includes eight different sections indicated generally by the reference characters 10, 11, 12, 13, 14, 15, 16, and 17. Each of the sections 10, 11, and 12 comprises a set of telegraph key levers 18, one for each letter of the alphabet. Included in each of the sections 13, 14, and 15 are ten key levers 19, one for each of the digits 0 to 9. Keyboard section 16 includes seven key levers 20, one for each of the fractions part of a quotation $\frac{1}{8}$ to $\frac{7}{8}$ and a blank key lever 21 for establishing a starting condition for the distributor, as will be subsequently described. Keyboard section 17 includes four key levers 22, 23, 24, and 25, one each for the closing, open, high, and low range quotations, respectively.

According to the illustrated embodiment, the key levers 18 of the keyboard section 10 selectively operate five contactors 28, 29, 30, 31, and 32 permutably in accordance with the particular key lever of the keyboard section which is depressed; that is, upon the depression of the various key levers, a different permuted setting of the contactors 28—32 will be established. Contactors 28—32 are arranged to engage either upper contacts 34 or lower contacts 35, depending upon the operation of the key levers. Normally, the contactors engage the contacts 34. All of the contacts 34 as well as all of the contacts 35 are connected in multiple to sources of negative and positive currents, respectively. Upon the depression of a key lever 18, the contactors 28—32 will be operated permutably to apply to their individual conductors current of polarity determined by the position of the contactors.

The key levers of the second and third sections of the keyboard; namely, 11 and 12, control five contactors similar to those described for the first keyboard section which is indicated generally by the numeral 10. In a manner similar to that described for the section 10 of the keyboard, the contactors of the sections 11 and 12 will be operated permutably for controlling the potential applied to the conductors individual thereto.

The levers 19 on the fourth section of the keyboard or the section numbered 13, comprising the ten digits, selectively control four contactors 36

operating between contacts 37 and 38 in a manner identical to that described for the contactors 28—32. Like contacts 34 and 35, contacts 37 and 38 are connected in multiple to the respective sources of battery.

Keyboard sections 14, 15, 16, and 17 are similar to the previously described sections of the keyboard and include a plurality of key levers and a plurality of contacts which are operated permutably in accordance with the depressed key levers of the respective sections of the keyboard. Section 17 of the keyboard serves to establish, through the operation of its contactors, a signal condition identified with the range selection which is effective at the connected receiving station to determine the indicators of a selected group of indicators to be operated through the mechanism provided for that purpose.

Upon operation of a key lever such as, for example, 18, in section 10 of the keyboard, a locking mechanism functions to lock the key lever in its depressed position and lock the remaining key levers in the section against operation. As shown particularly in Figs. 2 and 3, the key levers such as, for example, 18, are pivotally mounted on a rod 40 which extends transversely of the keyboard and which is suitably secured to the frame thereof. Each of the key levers is provided with downwardly projecting lugs 41 on the under surface thereof. These lugs are arranged in various combinations on the respective key levers so that for the several key levers a different signal condition, upon its depression, will be established. The lugs 41 on the under surface of the key levers cooperate with levers 42 pivoted on rods 43; that is, there is a rod 43 individual to each of the levers 42 and there is a lever 42 for each of the possible five projections 41 on the underside of the key levers 18. In response to the operation of a key lever, the levers 42 will be rotated in a counterclockwise direction, as viewed in Fig. 2, to cause corresponding operation of contactors 28—32 to disengage contact 34 and engage contact 35 in accordance with the projections 41. As specifically disclosed in Fig. 2, key lever 18 has on its under surface two projections 41. Consequently, upon its depression, the levers 42 associated with such projections will be operated for causing the contactors 31 and 32 to disengage their contact 34 and engage their contact 35 for applying to the conductor individual thereto the polarity of the source of current to which it is connected.

Extending upwardly from each of the key levers 18 is a curved lug member 45 provided with a horizontal section 46. As shown in Fig. 2, the horizontal section 46 extends a distance insufficient normally to engage a universal member 47 of a locking lever 48 when all of the key levers 18 are in their unoperated position. Lever 48 is pivoted upon a rod 49 suitably mounted in the frame of the keyboard and normally under the tension of a spring 50 which has one end secured to lever 48 and the other end secured to a spring post on the frame of the keyboard. Also as shown in Fig. 2, the universal member 47 is adjacent the lug members 45 on each of the key levers.

Spring 50 normally maintains lever 48 in engagement with a latch lever 51 pivotally mounted on a rod 52 suitably carried in the frame and normally urged into engagement with the locking lever 48 by the action of spring 53, one end of which is secured to an extension on the latch lever 51 and the other end of which is secured to a spring post mounted in the frame. Latch lever 51 has an extension 54 on which is mounted a uni-

versal member 55 extending beneath all of the key levers 18.

Under normal conditions with all of the key levers of that section in a nondepressed position, spring 53 maintains the universal member 55 in engagement with the lower side of all of the key levers 18. In that position, latch lever 51 is in engagement with lever 48 and acts against the tension of spring 50 to maintain the universal member 47 out of engagement with the horizontal extension 46 of the lug member 45 of each of the key levers 18. Upon the depression of any of these key levers, the universal member 55 is rotated in a counterclockwise direction, as viewed in Fig. 2, to the position shown in Fig. 3. Under such conditions, latch lever 51 is rocked against the tension of spring 53 until it disengages lever 48. Spring 50 thereupon rocks lever 48 in a counterclockwise direction about rod 49 to move the universal member 47 to the position shown in Fig. 3 in operative relation with the horizontal extension 46 of the lug member 45 on the depressed key lever 18. The nondepressed key levers 18 and the depressed key lever 18 will be locked in the nondepressed and depressed positions, respectively, by the universal member 47 occupying a position as shown in Fig. 3. In the case of the depressed key lever, the universal member 47 will engage the upper surface of horizontal extension 46, whereas for the nondepressed key levers the universal member 47 will engage the under surface of the horizontal extension 46 of the nondepressed key levers.

Restoration of a depressed key lever to its normal or unactuated position is controlled by an electromagnet 57, shown in detail in Figs. 4 and 5, and diagrammatically in Fig. 1. As shown in Figs. 4 and 5, the armature 58 of the electromagnet 57 is secured to a pin 59 which is journaled in side plate 60 constituting a part of the keyboard frame. Secured to the opposite end of pin 59 is a lever 61 fastened to the universal member 47. When the electromagnet 57 is energized, its armature is attracted to the dotted line position shown in Fig. 4, and lever 48 is rotated in a clockwise direction against the action of spring 50 to move universal member 47 free of the horizontal extensions 46 on the lug member 45 of each of the key levers 18. Spring 53 thereupon restores lever 51 to the position shown in Fig. 2 and likewise the depressed key lever will be restored to its normal or unactuated position.

Referring now to Fig. 1, it will be noted that each of the contactors 28—32 is connected by a conductor such as 65 individual thereto to individual segments of a start-stop distributor 66, which comprises a plurality of groups of segments 67, 68, 69, 70, 71, 72, 73, and 74 or a group of segments individual to each of the sections of the keyboard indicated generally by the reference numeral 10—17. Of course, as is customary, the distributor 66 includes in the ring with the respective groups of segments 67—74, a stop segment and a start segment numbered 75 and 76, respectively. Distributor 66 also includes a solid ring 77 arranged to be bridged with the ring including the respective groups of segments by electrically interconnected brushes 78 and 79 which are secured to a brush arm 80. Brush arm 80 normally tends to rotate by power communicated thereto through a friction clutch 81 from a motor 82 which may be supplied with any suitable source of power and is normally held against rotation by the armature of an electromagnet 83.

Also included in the distributor 66 is a solid ring 84 connected to positive battery and a segmented ring which includes segments 85, 86, 87, 88, 89, 90, 91, and 92, one individual to each section of the keyboard. Electrically connected brushes 920 and 93 carried by brush arm 80 bridge the continuous ring 84 with the segments 85—92 of the adjacent ring of the distributor.

As also shown in Fig. 1, the solid ring 77 of the distributor is connected to a line conductor 95 extending to a distant receiving station where apparatus responsive to the signal impulses generated through the operation of the distributor under the control of the respective sections of the keyboard may be located.

Segment 75 connected to the negative side of battery acts as the stop segment, whereas segment 76 connected to the positive side of battery serves as the start segment. The next fifteen segments or the segments included in the groups 67, 68, and 69 are connected to the fifteen contactors 23—32 of the sections 10, 11, and 12 of the keyboard. The succeeding twelve segments or the segments included in the groups 70, 71, and 72 are connected to the contactors 36 operated by the key levers of the sections 13, 14, and 15 of the keyboard. The next three segments or the segments included in group 73 are connected to the contactors of section 16 of the keyboard and the next four segments or the segments included in group 74 are connected to the contactors controlled by the key levers in section 17 of the keyboard.

By the arrangement previously described, there is transmitted for each rotation of the distributor 66, three letter characters, three numbers, a fraction, and a range signal. It will be noted that the same combination of impulses may be used for a letter, for a number, and for a fraction, due to the fact that the position of the combination is determined with respect to the start impulse as allocated to a particular position in the cycle of rotation of distributor 66.

As disclosed in Fig. 1, the segments 85—92 are positioned with respect to the groups of segments 67—74, so that following the passage of brush 79 over the last segment in the respective groups of segments, brush 93 will engage a segment 85—92 to connect positive battery to the winding of the unlocking magnet 57 of the respective sections of the keyboard. Consequently, as the distributor brush arm 80 progresses in its cycle of rotation, the key levers of the respective sections previously depressed will be released and the contactors controlled thereby will be restored to their normal or unactuated position, following which another key lever may be depressed for utilization in a subsequent cycle of rotation of distributor 66.

The section of the keyboard indicated generally by the numeral 16 includes mechanism whereby, upon the depression of any of the key levers 20, a contact 96 will be closed. This contact is connected to ground, and when closed, completes a circuit over conductor 97 through the winding of electromagnet 83 to grounded battery. Consequently, upon the completion of the noted circuit, electromagnet 83 will be energized to move its armature out of the path of brush arm 80, which, as previously described, normally tends to rotate by power communicated thereto from a motor 82 through a friction clutch 81. The brush arm 80 rotates and in doing so, the brushes 78 and 79 and 920 and 93 carried by the brush arm 80 pass over the re-

spective segmented and solid rings for performing their allocated function. The brush arm will complete a cycle of rotation when its rotation will again be arrested by its engagement with the armature of electromagnet 82, in which position it will be maintained until a key lever of the section 16 of the keyboard is depressed, when the operation just described will be repeated.

It is significant to note that the previous description of the keyboard locking mechanism applied specifically to section 10 of the keyboard, whereas the same mechanism is applied to each section of the keyboard and functions in a manner identical to that described in connection with section 10 of the keyboard.

In order to transmit a quotation of a particular stock item, the operator first depresses a key in each of the first three sections 10, 11, and 12 of the keyboard, assuming that the stock item includes in its abbreviation three letters. However, if the stock item includes only two letters in its abbreviation, a key in each of the first two sections; namely, 10 and 11, of the keyboard will be depressed. If a key in section 12 is not depressed, a blank signal for that particular section of the keyboard will be transmitted through the operation of the distributor 66. Due to the depression of a key in each of the sections 10, 11, and 12, a code identified with the letters of the alphabet, as indicated in the first three columns of Fig. 6, will be transmitted through the operation of distributor 66.

The operator will also depress a key in each of the sections 13, 14, 15, and 16 which will set up conditions indicative of the codes for the units, tens, hundreds, and fractions part of the quotation. As previously described, the depression of a key in section 16 causes the operation of contact 96 which completes a circuit from ground at battery through the winding of electromagnet 83, conductor 97, and contact 96 to ground. Electromagnet 83 is thereupon energized and withdraws its armature from engagement with brush arm 80, which rotates by power communicated from motor 82 through friction clutch 81.

With brush 79 resting on segment 75, current from the negative pole of the source of current connected to segment 75 will flow over line conductor 95, which is connected to solid ring 77 of distributor 66. As the brush 79 moves to the next or start segment 76, positive battery is connected to line 95 through brushes 78 and 79 and solid ring 77. The application of the start impulse to line conductor 95 will cause the receiving distributor at the receiving or distant station to begin its rotation, for such distributor, like distributor 66, has a brush arm normally held against rotation by the armature of a normally de-energized start magnet. The start impulse energizes the start magnet of the receiving distributor at the distant station and permits rotation of its brush arm which will rotate in timed relation with brush arm 80 of distributor 66.

As the brushes 78 and 79 pass over the first five segments or the segments included in group 67, a code is impressed upon line conductor 95 in accordance with the position of the contactors 23—32 of section 10 of the keyboard. The impulses will be transmitted from the positive and negative sources of current connected to contacts 34 and 35, as previously described.

As the brushes 78 and 79 continue their rotation, engagement with the segments of groups 68 and 69 will be effected sequentially and a code

for each of the noted groups of segments 68 and 69 will be transmitted over the line conductor 95, as determined by the position of the contactors under the control of key levers in the sections 11 and 12 of the keyboard. The code impulses transmitted as a result of the passage of the brushes 78 and 79 over the group of segments 67, 68, and 69 will be effective at the receiving station to select an indicator allocated to the three groups of code signals transmitted.

The brushes 78 and 79, in passing over the next four segments or the segments included in group 70, transmit a code signal comprising a combination of four impulses individual to a digit such as, for example, the hundreds part of a quotation for the particular item selected through the operation of keys in the sections 10, 11, and 12. The impulses so transmitted will function to operate correspondingly the indicator at the distant receiving station selected through the operation of the key levers in sections 10, 11, and 12. Similar operation occurs as the brushes 78 and 79 pass over the segments included in groups 71, 72, and 73. Code signals dependent upon the depression of particular keys of the sections 14, 15, and 16 of the keyboard will accordingly be transmitted.

It was noted previously that section 17 of the keyboard includes key levers 22, 23, 24, and 25, which are identified with the range of the quotation; that is, the key levers may be identified with the open, high, low and last quotations of the stock items. In other words, a code signal transmitted in accordance with the depression of any of the key levers 22—25 will control, at the receiving or distant station, mechanism for selecting an indicator identified with the class of the quotation; that is, for each of the stock items there may be four indicators, an open, high, low, and last indicator. The code signal transmitted as the brushes 78 and 79 pass over the group of segments 74 will select one of the named indicators on which the hundreds, tens, units, and fractions part of the quotation will be displayed, as determined by the operation of the key levers of sections 13, 14, 15, and 16 of the keyboard.

Brushes 920 and 93, which are also mounted on brush arm 80, rotate with brushes 78 and 79. Brush 93 successively engages segments 85—92 and connects such segments electrically with solid ring 84 which, as shown, is connected to the positive terminal of battery. Upon the engagement of brush 93 with the segments 85—92, a circuit for the respective locking magnets of the respective sections of the keyboard is established; for example, when brush 93 engages segment 95, a circuit is completed for energizing the unlocking magnet 57 of section 10 of the keyboard. Electromagnet 57, in operating, moves lever 49 in a clockwise direction against the tension of spring 58 to restore universal member 47 and lever 51 to the position shown in Fig. 2. Under such conditions the depressed key lever 13 will be restored to its normal or unactuated position. The operator may then operate any of the keys in section 10 of the keyboard.

As the brush 93 successively engages segments 86—92, the unlocking magnets 57 identified with the other sections of the keyboard will be operated sequentially to restore the keyboard sections to normal. Following the operation of the unlocking magnet 57 of each of the sections of the keyboard, another or the same key lever in such

section or sections may be depressed. The brush arm 80 of the distributor 66 continues its rotation until it again engages the armature of electromagnet 83, where it will be held until a subsequent operation of a key lever in section 16 when contact 96 will again be operated to complete the energizing circuit for electromagnet 83 to again release brush arm 80 of the distributor 66 for rotation.

The various code signals for the parts of the quotation and the open, high, low, last, or close quotations are shown in Fig. 6. It is manifest, however, that other codes might be developed for identifying the various letters of the stock items and the quotations.

According to the foregoing description, the invention embodies a plurality of keyboard sections each including a plurality of key levers for operating a plurality of contacts permutably dependent upon the group of signals identified with a character to be transmitted. Upon the depression of a key lever in the respective sections of the keyboard, the key levers of the actuated section are held or locked against depression. Successive sections of a segmented ring of a start-stop distributor are connected successively to the several groups of contacts of the various sections of the keyboard which, upon the depression of a key lever in one of the sections of the keyboard, is started in operation and as it progresses, the various groups of signals determined by the setting of the contacts will be transmitted. However, as the group of signals for the respective sections of the keyboard are transmitted, a condition is established whereby the previously operated section of the keyboard may be reoperated inasmuch as the latch mechanism therefor has been restored to its normal position.

What is claimed is:

1. In a telegraph transmitter, a series of key levers, a lock for holding the key levers in operated and unoperated position upon the operation of a key lever, a latch normally holding the lock in free position, means to release the latch upon the operation of any key lever, and remotely controlled means to relatch the lock.

2. In a telegraph transmission system, a plurality of keyboards, keyboard latching apparatus adapted to store a plurality of signals successively transmitted by said keyboards, means to initiate transmission under a predetermined condition of said apparatus, means to store signals of a second group in said apparatus before the signal of a preceding group has been completely transmitted, and means to delay the storage of a second group of signals until the corresponding group of signals of a first group has been transmitted.

3. In a telegraph system, a signal storage device adapted to receive and store groups of permutation code signals for transmission successively, a start-stop transmitter for transmitting the signals stored in said storage device, means to initiate said transmitter after said storage device has been predeterminedly conditioned, means to begin the storage of a succeeding group of signals in said storage device before a preceding group of signals has been completely transmitted, and means to delay the storage of a succeeding group of signals until the corresponding signals of a preceding group have been transmitted.

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