March 28, 1944. J. W. LONG 2,345,137

TELEGRAPH MECHANISM

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FIG. 1

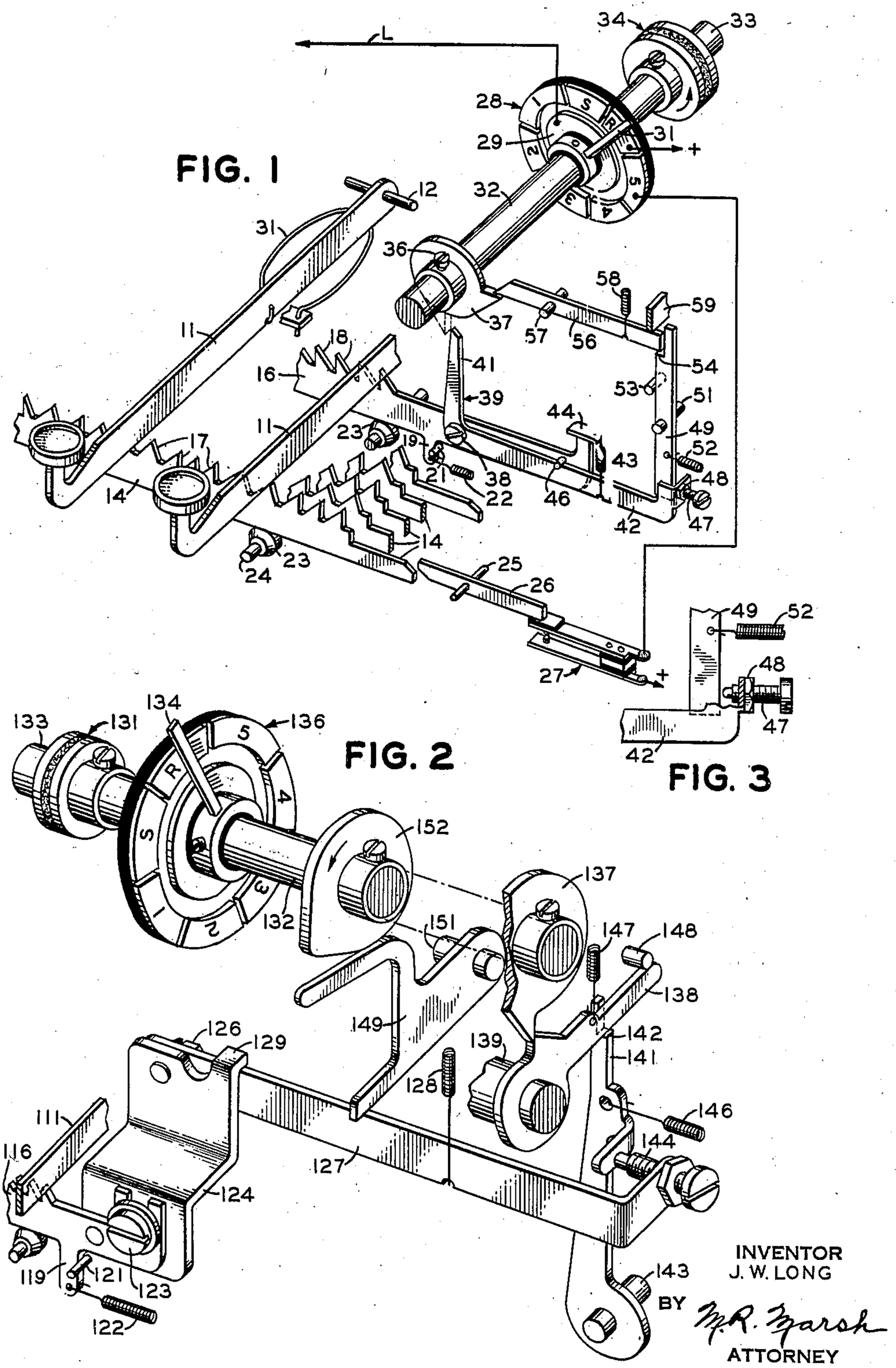

FIG. 3

FIG. 2

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TELEGRAPH MECHANISM

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The present invention relates to a telegraph mechanism and more particularly to trip or release mechanisms such as are employed to control the starting and stopping of a rotatable distributor members in telegraph keyboard mechanisms.

The mechanism employed in a start-stop telegraph keyboard usually consists of a rotatable distributor member which is released for one revolution at a time in conjunction with the actuation of any one of the keylevers. During the rotation of the distributor member, it causes the transmission of a code group of impulses representative of the keylever which initiated it into rotation. Modern telegraph keyboards are capable of transmitting at high speeds, in the neighborhood of three hundred and sixty characters per minute, and obviously with such high speeds the time allotted for the transmission of a single character is very short. The distributor member has to be started and stopped for each character transmitted, and in order to prevent the repetition of the transmission of a code group when a keylever is held depressed for a longer interval of time than is necessary to transmit a single code group, a so-called non-repeat mechanism is employed.

In accordance with the above, it is one of the primary objects of the present invention to provide an improved keyboard trip mechanism embodying the non-repeat feature which is of improved and simplified design and easy to manufacture and maintain.

The release of the rotatable member in a keyboard is usually controlled by the motion of a universal bar which is operable by each one of the keylevers. After initiating the rotation of the rotatable member, the universal bar needs to be returned to its normal position before the same can be re-operated to initiate the rotation of the rotatable member for a second revolution. Where the amount of movement required for the universal bar to effect release of the rotatable member is appreciable, it may not have sufficient time to be restored to its normal position between operation and accordingly may not effect release of the rotatable member once for each keylever operated. Hence, a group of impulses representing one of the actuated keylevers may not be transmitted. Such operation is likely to occur when the keylevers are being operated at a high rate of speed or are being "forced," as when one key may be depressed before the previously operated key is completely restored to its normal position.

Accordingly, it is still another object of the invention to provide a trip mechanism employing a universal bar which has an adjustment whereby the movement thereof to effect tripping of the rotatable member may be made variable and extremely small.

Still another object of the invention is to provide a trip mechanism which is restored to its normal position where it is effective to stop rotation of the rotatable member early and at an adjustable point in the cycle of operation. This provides greater margin of adjustment and gives the tripping elements a longer interval of time to settle down in their normal positions before re-operation occurs.

A still further object of the invention is to provide a keyboard wherein the load on the keylever to effect release of the rotatable member is extremely light and substantially uniform.

The above and further objects of the invention will be more apparent in the following detailed description when taken in conjunction with the accompanying drawing, in the latter of which:

Fig. 1 is a perspective view of the elements comprising the present invention as employed to control the release and stopping of a rotatable distributor member included in a keyboard mechanism;

Fig. 2 is a modification of the invention wherein the axis of the rotatable distributor member is positioned perpendicular to the keylevers, as distinguished from the preferred embodiment of Fig. 1 where the axis of the rotatable member is parallel to the keylevers; and

Fig. 3 is an elevational detail view of some of the elements of Fig. 1.

Referring now to the drawing, and particularly Fig. 1, there is shown the preferred embodiment of the invention and the cooperating elements of a keyboard mechanism believed necessary for a complete and thorough understanding of the invention and the manner of operation thereof. The keyboard employs the usual arrangement and number of keylevers 11, only two of which are shown, pivotally mounted adjacent their rear ends on a pivot pin 12. Individual springs 13 return the keylevers to and maintain the same in their normal elevated positions on the release thereof. Extending transversely of the keylevers 11 beneath the central portion thereof are a set of five permutation bars 14 and one universal bar 16. The permutation bars 14 have arranged on their upper edges notches such as 17 which cooperate with the lower edge of an actuated keylever 11 so that the bars are selectively positioned into one or the other of two positions in accordance with which one of the keylevers is actuated. The universal bar 16 has similar notches 18 therein, all sloping in one direction, with a notch in operative relation with each keylever so that, whenever a keylever is operated, the universal bar is invariably operated to the left. The universal bar 16 is held in its normal right hand position with a projection 19 extending from the under edge thereof in contact with a

stop pin 21 by an attached spring 22. The spring 22 also returns the universal bar to its normal right hand position on the release of any actuated one of the keylevers 11, the actuation of which invariably moves the universal bar to the left. The permutation bars 14 remain in either one or the other of their two positions until the setting thereof is changed by the operation of a subsequent keylever. Rollers such as 23 mounted on a rod 24 support the permutation bars and the universal bar and permit movement thereof in the direction of their length with a minimum of friction.

Each permutation bar 14 has associated with the right hand end thereof a pivot lever 26, only one of which is shown, mounted on a pivot rod 25. In operative relation with the right hand end of the pivot lever are contacts 27 so arranged that with the associated permutation bar in its left hand position the contacts 27 are open, whereas the movement of a permutation bar to its right hand position pivots the lever 26 to close the contacts 27. A set of contacts such as 27 is associated with each permutation bar 14, and as set forth the contacts assume either a closed or opened position in accordance with the position of the permutation bars, which are in turn controlled by the keylevers 11.

One of the springs of each of the contacts 27 is connected to potential, while the other spring is connected by an individual conductor to an associated segment on a face plate indicated in general by reference numeral 28. The face plate 28 also includes a solid ring 29 to which is connected the line L. A brush 31 cooperates with the rings of the face plate 28 to transmit the signals set up on the segmented ring to the line. The brush 31, which is fixed to a shaft 32, constitutes the rotatable distributor member, the shaft being rotated from a constantly rotating shaft 33 through a clutch such as the friction clutch indicated in general by reference numeral 34. Also fixed to the shaft 32 for rotation therewith by means of a set screw 36 is a stop arm 37. The stop arm and associated elements are released for one revolution at a time in conjunction with the operation of each keylever in a manner hereinafter pointed out.

Pivotally mounted on a shoulder screw 38 carried in the right hand end of the universal bar 16 is a bell crank 39 which has an upwardly extending arm 41 and a rightwardly extending arm 42. A spring 43 is attached to the arm 42 and to a projection 44 of the universal bar 16 and tends to pivot the bell crank 39 in a counterclockwise direction and normally holds the same against a stop 46. The right hand end of the arm 42 carries therein an adjusting screw 47 with a lock nut 48, Fig. 3. The inner or left hand end of the adjusting screw 47 is normally in operative relation with the lower end of a blocking member 49, Figs. 1 and 3, which is pivotally mounted on a pivot rod 51. A spring 52 attached to the blocking member normally tends to pivot the same in a counterclockwise direction to hold the upper end against a stop 53. The upper end of the blocking member has a shoulder or ledge 54 formed therein, upon which normally rests the right hand end of a stop gate 56. The stop gate 56 is pivoted on a pin 57, and the left hand end thereof normally engages the stop arm 37 to hold the shaft 32 and brush 31 from rotating. A spring 58 is attached to the gate 56 and is effective to hold the right hand end of the gate against a stop 59 when the left hand end thereof is out of engagement with the stop arm 37.

The operation of any one of the keylevers 11 causes the universal bar 16 and the bell crank 39 to move to the left. This movement of the bell crank 39 brings the screw 47 in the right hand end thereof into engagement with the lower end of the blocking member 49 to cause the same to pivot in a clockwise direction. The pivoting of the blocking member 49 withdraws the ledge 54 from beneath the right hand end of the gate 56, whereupon the stop arm, tending to rotate through power communicated thereto from the friction clutch 34, is free to rotate and in rotating pivots the gate 36 in a clockwise direction. After the stop arm 37 has rotated a few degrees from its normal rest position, it moves out of engagement with the left hand end of the gate 56, whereupon the attached spring 58 pivots the gate back into engagement with the stop 59 where it is in position to re-engage the stop arm 37 at the end of a revolution thereof. When the operated keylever 11 is released before the shaft 32 completes a revolution or a substantial portion thereof, the spring 22 returns the universal bar 16 and bell crank 39 to their normal right hand positions, which permits the spring 52 to pivot the blocking member 49 into its normal position against the stop 53 with the ledge 54 beneath the right hand end of the gate 56. Hence, when the stop arm 37 reengages the gate 56, the same is pivoted a slight amount in a clockwise direction, or until the right hand end engages the ledge 54 on the blocking member 49. This stops further rotation of the shaft 32, and the brush 31 rotating therewith is stopped in its normal position.

If the operated keylever is held depressed longer than is necessary for the shaft 32 to make one revolution, the stopping thereof at the end of a revolution is assured by repositioning the blocking member 51 to its normal blocking position independently of the universal bar 16. This is accomplished by pivoting the bell crank 39 in a clockwise direction to move the adjusting screw 47 in the right hand end thereof down and out of engagement with the lower end of the blocking member 49. Such pivoting movement of the bell crank 39 is effected by the stop arm 37 engaging the upper end of the arm 41 thereof and permits the blocking member 49 to return to its normal blocking position regardless of how long the universal bar may be held to the left. As the stop arm passes out of engagement with the arm 41 of the bell crank 39, the spring 43 attached to the arm 42 thereof is effective to pivot the bell crank so that the left hand end of the screw 47 engages the bottom of the blocking member 49. When the keylever is finally released, the movement of the universal bar 16 to its right hand position moves the screw 47 to the right and out of engagement with the bottom of the blocking member 49, whereupon the spring 43 pivots the bell crank to its normal position with the arm 42 engaging the stop 46 and the screw 47 in operative relation with the lower right hand edge of the blocking member 49. Thus, the blocking member 49 is invariably returned to its normal blocking position in conjunction with each revolution of the shaft 32 regardless of the length of time an actuated keylever is held depressed. Accordingly, the shaft 32 can make but one revolution at a time and is invariably stopped in its normal stop position

until the actuation of the same or another keylever.

By means of the adjusting screw 47, the amount of movement of the universal bar 16 that is required to effect sufficient pivoting of the blocking member 49 to move the ledge out of engagement with the right hand end of the gate 56 can be varied and reduced to a very small amount, which is an advantage in this type of keyboard, as it permits faster operation. Another advantage is effected by the positioning of the pivot 57 of the gate 56 to the left of the center so that the right hand arm is considerably longer than the left hand arm. With such an arrangement the pressure of the right hand end of the gate 56 on the ledge 54 is less than the pressure of the stop arm 37 on the left hand end of the gate. Accordingly, the locking member 49 can be moved out from beneath the gate 56 more easily than would be the condition if the stop arm 37 rested directly on the ledge 54. Accordingly, less pressure or load is required on the keylevers to effect release of the shaft 32 for a given rotative force of the friction clutch 34 which must be at least a predetermined amount to assure that no slippage occurs therein during the rotation of the shaft 32.

In the modification of the invention shown in Fig. 2, the shaft 132 is arranged perpendicular to the keylevers 111. In this figure only the universal bar 116 is shown, there being the usual permutation bars and associated keyboard elements arranged similarly to the manner shown in Fig. 1. The spring 122 attached to the universal bar holds the same in its normal right hand position with the projection 119 thereon against the stop 121. Whenever any of the keylevers such as 111 are operated, the universal bar is moved to the left, and on release of the operated keylever the spring 122 returns the universal bar to its normal position. Attached to the right hand end of the universal bar 116 by means of a screw 123 is a bracket 124. Pivotally attached to the bracket 124 by a shoulder screw 126 carried therein is a trip lever 127. A spring 128 is attached to the trip lever and tends to pivot the same in a counterclockwise direction as limited by a bent portion 129 of the bracket 124. The shaft 132, which is frictionally driven through a friction clutch 131 from a constantly rotating shaft 133, constitutes the rotatable distributor member and may have rotatable therewith a brush 134, which cooperates with a face plate 136 to distribute impulses in the usual manner to a line circuit in accordance with the operation of permutation bars. The arrangement of the segments of the face plate 136 may be the same as that of the face plate 28 in Fig. 1.

The shaft 132 also has rotatable therewith a stop arm 137 in operative relation with a stop gate 138 pivotally mounted on a pivot 139. A blocking member 141 with a ledge 142 pivoted on a pin 143 blocks releasing movement of the gate 138, which thereby holds the shaft 132 from rotating. The trip lever 127 moving to the left with the universal bar 116 causes a screw 144 in the right hand end of the trip lever to pivot the blocking member 141 against the action of its attached spring 146 to move the ledge 142 out from beneath the stop gate 138. Thereupon the stop arm 137 is free to rotate the gate 138 until it clears the same. A spring 147 then returns the stop gate to its stopping position against a stop pin 148.

In order to insure that the blocking member 141 is returned to its normal position following the release of the stop arm 137, the trip lever 127 is pivoted in a clockwise direction to disengage the screw 144 in the right hand end thereof from engagement with the blocking member 141. The disengagement is effected by a lever 149 pivoted on a pin 151 with one arm thereof resting on the top of the trip lever 127 and the other arm in operative relation with a cam 152 fixed to the shaft 132. When the stop arm 137 has rotated a few degrees from its normal rest position, the cam 152 effects pivoting of the lever 149, which in turn pivots the trip lever 127 to effect disengagement of the screw 144 with the blocking member 141. Thus, regardless of the length of time a keylever is held actuated, the blocking member 141 is permitted to return to its normal position with the ledge 142 beneath the stop gate 138, where it is effective to block the gate 138 when the stop arm 137 completes its revolution and reengages the gate. Thus, the stop arm 137 and the shaft 132 are released for one revolution in conjunction with each operation of a keylever 111 and are invariably stopped at the end of each revolution.

By positioning the cam 152 on the shaft 132 so that it is effective to pivot the lever 149 shortly after the release of the stop arm 137, sufficient time is available to insure the return of the blocking member 141 to its normal blocking position, and such an arrangement permits high speed operation of the keyboard without the necessity of having relatively strong springs on the operating members, since a comparatively large portion of an operating cycle is available to return the elements comprising the trip mechanism to their normal positions. The time of the return of the blocking member 141 to its normal blocking position can be varied in a cycle of operation by varying the position of the cam 152 relative to the stop arm 137 on the shaft 132.

If the disengagement of the screw 144 with the blocking member 141 is effected through the cam 152 while the trip lever 127 is held in its left hand position, the subsequent return of the trip lever to its right hand position on the release of the keylever places the screw in operative relation with the blocking member 141, where it is capable of operating the blocking member to effect release of the stop member 137 on the operation of the subsequent keylever. When the trip lever 127 is returned to its normal position by the immediate release of the actuated keylever before the operation of the trip lever by the lever 149, the latter lever is effective to merely idly pivot the trip lever 127 so that the screw 144 merely moves out of and then back into operative relation with the blocking member 141.

It is obvious, of course, that various other modifications of the invention may be made without departing from the spirit or essential attributes thereof, and it is desired, therefore, that only such limitations be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims.

What is claimed is:

1. In a telegraph keyboard, a set of keylevers, a universal bar invariably operated on the actuation of any one of said keylevers, a frictionally driven rotatable member, a yieldable stop, a blocking member for said yieldable stop, means including said yieldable stop and said blocking member for holding said rotatable member at rest, a pivotable member operable by said universal bar, means including said pivotable mem-

ber on the operation of said universal bar to operate said blocking member to unblock said yieldable stop to thereby release said rotatable member for rotation, and means operated by said rotatable member during rotation thereof to effect pivoting and disengagement of said pivotable member with said blocking member whereby said blocking member is positioned to again block said yieldable stop.

2. In a telegraph keyboard, a set of keylevers, a universal bar invariably operated on the actuation of any one of said keylevers, a frictionally driven rotatable member, a yieldable stop, means including said yieldable stop and said blocking member for holding said rotatable member at rest in a normal position, a pivotable member operable by said universal bar, means including said pivotable member on the operation of said universal bar to operate said blocking member to unblock said yieldable stop to thereby release said rotatable member for rotation, means operated by said rotatable member during rotation thereof to effect pivoting and disengagement of said pivotable member with said blocking member whereby said blocking member is positioned to again block said yieldable stop and means for varying the amount of rotation of said rotatable member from said normal position necessary to effect disengagement of said pivotable member with said blocking member.

3. In a telegraph keyboard transmitter, a rotatable member normally tending to rotate, a yieldable stop for said rotatable member, a pivotable blocking member for preventing yieldable movement of said yieldable stop to thereby hold said rotatable member from rotating, a plurality of keylevers, a universal member invariably operated a predetermined amount on the actuation of any one of said keylevers, means controlled by said universal member to pivot said pivotable blocking member out of blocking relation with said yieldable stop to thereby release said rotatable member for rotation, means operative by said rotatable member during rotation thereof to disable said last mentioned means whereby said pivotable blocking member after unblocking movement thereof is invariably repositioned into blocking relation with said yieldable stop, and means for varying the amount of movement of said universal member necessary to effect release of said rotatable member.

4. In a telegraph keyboard transmitter, a rotatable distributor member normally tending to rotate, a yieldable stop gate normally holding said distributor member from rotating, a blocking member for blocking yielding movement of said stop gate, resilient means for biasing said blocking member into said stop gate blocking position, a set of keylevers, a universal bar having a normal position and invariably moved from said normal position on the actuation of any one of said keylevers, an operating member for said blocking member and normally in operative relation therewith, said operating member being operative to move said blocking member out of blocking relation with said stop gate on the movement of said universal bar from said normal position, and means operated by said distributor member during rotation thereof to move said operating member out of operative relation with said blocking member to thereby permit said resilient means to return the same to said stop gate blocking position.

5. In a telegraph keyboard transmitter, a rotatable distributor member normally tending to rotate, a yieldable stop gate normally holding said distributor member from rotating, a blocking member for blocking yielding movement of said stop gate, resilient means for biasing said blocking member into said stop gate blocking position, a set of keylevers, a universal bar having a normal position and invariably moved from said normal position on the actuation of any one of said keylevers, an operating member for said blocking member and normally in operative relation therewith, said operating member being operative to move said blocking member out of blocking relation with said stop gate on the movement of said universal bar from said normal position, means operated by said distributor member during rotation thereof to move said operating member out of operative relation with said blocking member to thereby permit said resilient means to return the same to said stop gate blocking position, and means for varying the time of moving said operating member out of operative relation with said blocking member relative to the time of the unblocking of said stop gate.

6. In a telegraph keyboard transmitter, a rotatable distributor member normally tending to rotate, a yieldable stop gate normally holding said distributor member from rotating, a blocking member for blocking yielding movement of said stop gate, resilient means for biasing said blocking member into said stop gate blocking position, a set of keylevers, a universal bar having a normal position and invariably moved from said normal position on the actuation of any one of said keylevers, an operating member for said blocking member and normally in operative relation therewith, said operating member being operative to move said blocking member out of blocking relation with said stop gate on the movement of said universal bar from said normal position, means operated by said distributor member during rotation thereof to move said operating member out of operative relation with said blocking member to thereby permit said resilient means to return the same to said stop gate blocking position, and means for varying the point in the movement of said universal bar from said normal position that said blocking member is moved out of blocking relation with said stop gate.

7. In a telegraph keyboard transmitter, a rotatable distributor member normally tending to rotate, a yieldable stop gate normally holding said distributor member from rotating, a blocking member for blocking yielding movement of said stop gate, resilient means for biasing said blocking member into said stop gate blocking position, a set of keylevers, means operative by any one of said keylevers for moving said blocking member out of blocking relation with said stop gate and means operated by said rotatable distributor member for controlling said last mentioned means to release said blocking member whereby said resilient means moves said blocking member back into blocking relation with said stop gate to thereby stop rotation of said distributor member at the end of a revolution thereof.

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