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TELEGRAPH TRANSMITTING APPARATUS

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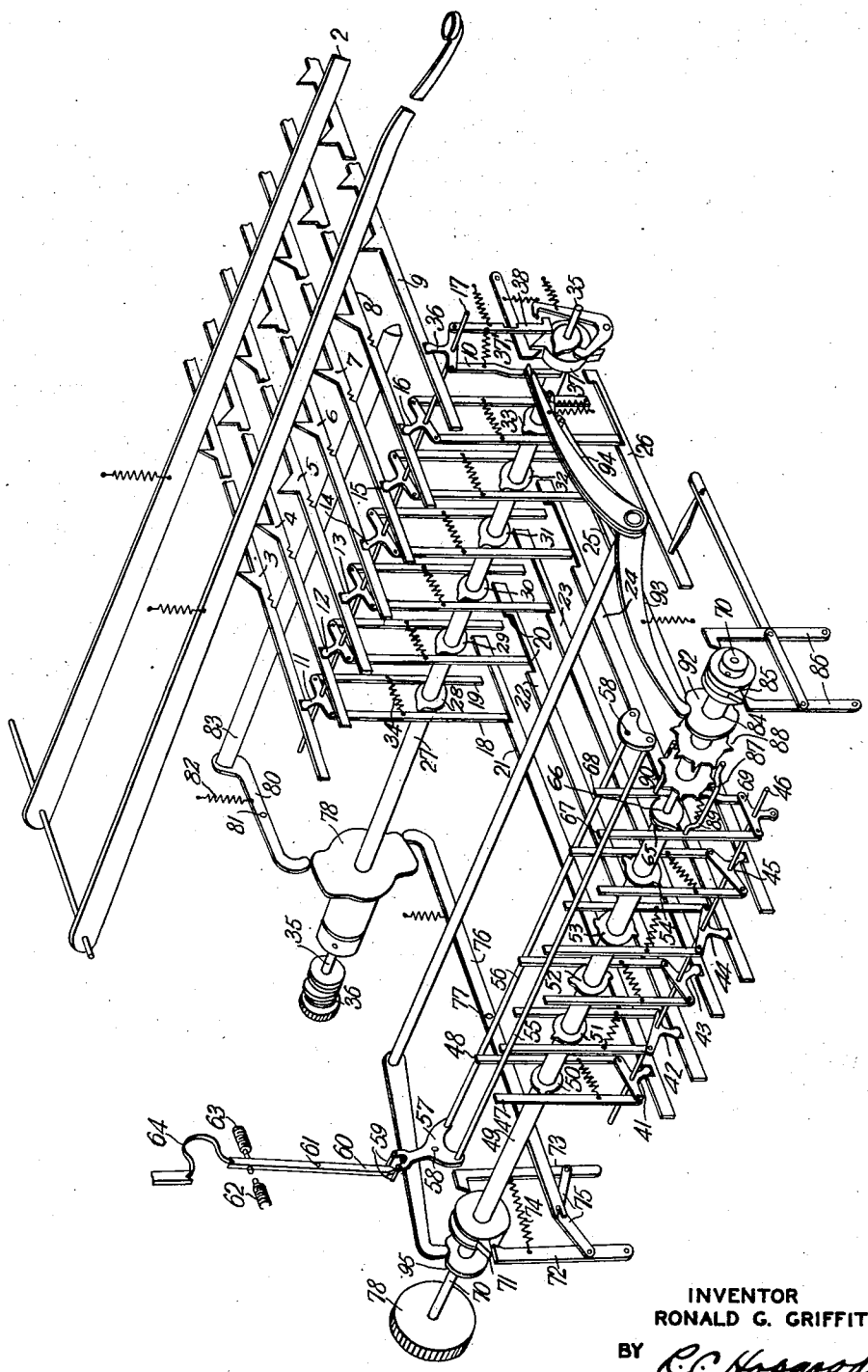

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TELEGRAPH TRANSMITTING APPARATUS

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This invention relates to keyboard controlled apparatus for telegraph systems employing case grouping of characters.

In telegraph systems employing case grouping of characters, identical signal code combinations are utilized for different characters and a separate case signal is employed for identifying the particular character desired. The most common example of this is in telegraph systems operating on a five unit code. As the maximum number of permutation of the five units in the code is insufficient for normal telegraphic requirements, figures and letters, for instance, are assigned to two separate case groups and two signal code combinations are assigned in the code to the function of identifying the particular case group to which the signals following either of these two code combinations belong. In printing apparatus for such systems these two case identifying signals effect the actuation of a case shift and re-shift respectively.

In keyboard controlled apparatus for such systems where separate case signals are used, it has been usual to provide two key levers for these signals in the keyboard and for the character keys to be arranged in the keyboard either with the same keys for the different characters having identical signal code combinations in the different case groups, or alternatively with a separate key for each character.

The object of the present invention is to provide keyboard controlled apparatus for telegraph systems employing these separate case signals in which the disposition of the character keys in the keyboard and the mode of operation of the keyboard for telegraphic purposes is as nearly as possible identical with that of the standard four-row typewriter keyboard wherein separate key levers are provided for letters and figures and no case shift key is required to be depressed on changing from letters to figures or vice versa.

According to the present invention, therefore, in keyboard controlled apparatus for telegraph systems employing separate case signals, separate keys are provided for different characters having identical signal code combinations in different case groups and means is provided operable on depression of a character key on each change of case to insert an appropriate case signal.

The mode of application of the invention to a keyboard controlled tape perforator will readily be comprehended after a consideration of the following description which relates to the more difficult but more important application to a keyboard controlled signal transmitter. An important feature of either application however, is that means for storing the elements of at least one signal code combination is interposed between the key levers and contacts which eventually transmit the signals in order that the two signal combinations which require to be transmitted for each single depression of a key lever on change of case can be transmitted consecutively by the same transmitting contacts and without impeding unduly the normal operation of the keyboard.

In the case of a tape perforator it will be appreciated that the perforated tape itself forms the storage means mentioned. It is a comparatively simple matter to arrange for the perforation of two signal combinations simultaneously, but in the case of a keyboard controlled transmitter, in order to simplify the means involved, the objects of the invention can be satisfactorily attained by providing storage for only one complete signal code combination as in the known methods of overlap of selecting functions. By improved methods of overlap shown in the following detailed description it is possible greatly to reduce the time interval in which a key lever in the keyboard is locked following the depression of the key, to ensure the full and correct transmission of all the elements of the signal, so that when used for the purpose of the present invention it is only on depression of two keys in rapid succession in opposite case groups that the slightly longer period of locking of the keyboard due to the automatic insertion of the case signal can be detected.

Although according to the invention the usual telegraph case shift key levers can be dispensed with for changing from letters to figures and vice versa it will be appreciated that if desired other case signals could be provided for by separate key levers for the purpose of providing a still further series of possible character selections. Alternatively, if desired, key levers can also be provided in the keyboard for controlling manually the transmission of the case signals which according to the method of the present invention are normally controlled automatically. By this means, certain characters having identical code combinations, in different case groups can still be assigned to the said key levers with the manual insertion of a case signal, whilst the case signal is inserted automatically for other key levers.

An illustrative example of the manner in which the invention may be applied to a keyboard controlled signal transmitter will now be described with reference to the single figure of

the accompanying drawing showing a perspective view.

It will be further appreciated from a consideration of the means shown in the drawing that the arrangement as shown furnishes various constructional and manufacturing advantages which will be evident to those skilled in the art. It is at present thought that the example hereinafter shown and described of a mechanical method of carrying out the invention is the preferred lines on which development should take place but it will be understood that electrical methods employing rotary distribution and contacts may be used in place of cams and levers.

The key levers of a keyboard are represented in the drawing by the two keys 1 and 2. Beneath the key levers are a series of permutation bars 3—7 having inclined teeth, which bars are actuated longitudinally in one direction or the other in accordance with the elements of a signal to be transmitted on depression of a key lever in the manner already well known. A further toothed bar 8, which from its function may be called a case determining bar but in reality resembles the sixth permutation bar in a six unit code keyboard, is also movable longitudinally and carries a series of teeth under the character key levers, the teeth being inclined in one direction for each of the keys appertaining to one case group of characters and in the opposite direction for the keys appertaining to the other case group. As in the present instance only two case signals are required to be provided for, this bar 8 at each of its two longitudinal positions effects the required operations. Bar 8 is only operated from one to the other position on depression of a character key in a change of case. The depression of key levers appertaining to the same case group would only tend to actuate the bar to the same position and it is only when a key appertaining to the opposite case group is depressed that bar 8 is operated to the other position. A further bar 9 has an inclined tooth under each key lever and serves as a universal bar actuated by any key lever to release the mechanical functions of the apparatus.

The movements of bars 3 to 8 effect the rocking of a corresponding series of three-armed members 11 to 16 each independently pivoted on rod 17 and each member having two rods 18—19 depending from two of the arms respectively so that on actuation of each permutation bar 3—7 and case determining bar 8 to their one or other positions, one or other of the associated rods 18—19 are brought alternatively into operative relation with a notch 20 in each of a further series of longitudinally movable bars 21—25 and 26. Situated between the series of depending rods 18 and 19 is a cam sleeve 27 carrying a series of cams 28—32 and 33 each cam having two projections on opposite sides of a diameter and adapted during each half revolution of sleeve 27 momentarily to actuate each of the pair of rods in an outward direction from sleeve 27 against the tension of individual springs 34 attached to each pair of rods.

Sleeve 27 is rotatably mounted on a driving shaft 35 which is arranged to be rotated at a suitable speed through gear wheel 36 from a source of mechanical power, not shown, which is normally provided for apparatus of the class to which the invention relates. A clutch mechanism of any suitable type collectively represented by the symbol 37 in the drawing is arranged to couple sleeve 27 to shaft 35 for a half revolution only on each actuation of bar 9. This is effected as is shown in the drawing, through a further cranked lever 36 independently pivoted on rod 17 raising latch 37' through depending member 38. Depending member 38 is disengaged from latch 37' during each subsequent half revolution on release of the clutch and is only re-engaged therewith on release of the depressed key in readiness for the depression of the next key. A rejector cam not shown in the drawing, also acts on rod 10 during each half revolution to return bar 9 mechanically to its initial position. This provides a useful "throw out" action to an actuated key lever after its functions have been completed. Cams 28—32 are arranged on sleeve 27 relatively to the normal position of rest of the sleeve as determined by clutch 37 so that the projections on the cams actuate the series of rods 18 and 19 soon after the clutch is released and actuate to the one or other position the series of members 21—25 and 26 in accordance with the one or other position of the series of 3-armed members 11—15 and 18.

It will thus be seen that on depression of a key lever the signal combination set out on bars 3—7 is mechanically transferred to bars 21—25 and bar 26 is actuated on each change of case to one position for characters in one case group and to the other position for characters in the other case group. Various other methods of effecting a similar result are already known in the art and can be employed for the purposes of the present invention if desired. It will be seen that the means described forms a species of overlap mechanism, as a further signal combination can be set up on bars 3—7 and 8 whilst transmission is being effected under control of the signal combination which has been transferred to bars 21—25.

Each of the series of bars 21—25 co-operates with a further series of 3-armed members 41—45 independently pivoted on rod 46 and having vertical rods 47 and 48 pivoted on two opposite arms of members 41—45 with a further cam sleeve 49 situated between the rods. The cam sleeve carries a series of cams 50—54 each cam having projections on opposite sides of a diameter as before, but in this case each cam has its projections angularly spaced around the sleeve so that each pair of rods in the series is actuated outwardly in sequence and according to the longitudinal position of each bar 21—25 the one or other associated rod 47 or 48 is brought into operative relation with horizontal rods 55 and 56 common to all of the series of vertical rods. The horizontal rods 55 and 56 are fixed to two arms of a lever 57 pivoted at 58. A third arm of the lever carries pins 59 which actuate a contact lever 60 pivoted at 61 from one to the other of two contact screws 62 and 63. A spring 64 or other convenient means holds contact lever 60 firmly on to the one or other contact screw to which it has been actuated. A sixth and seventh cam 65 and 66 is also mounted on a sleeve 49. Each cam has two projections but each pair of projections are axially disposed on the sleeve to co-operate with only one of two vertical arms 67 and 68 respectively during rotation of sleeve 49. The arms 67 and 68 in this case are pivoted to a member 69 which is fixed and does not oscillate on rod 46 and being invariably operated during each revolution of the cam sleeve.

The sleeve 49 is mounted on a shaft 70 to which it is coupled by clutch 71 under control of two pivoted latch members 72 and 73. The latch

members are normally actuated by the spring 74 into a position to arrest the ratchet tooth of the clutch at each half revolution, but toggle arms 75 pivoted to the latch members are each under the control of a common actuating bar 76 pivoted at 77. Shaft 70 is driven by the source of mechanical power above mentioned through gear wheel 78 at a speed as determined by the required speed of transmission of the signal elements. Cam sleeve 49 together with clutch 71, vertical rods 47 and 48 and contact lever 60 will be recognized as a form of the usual start stop signal transmitting mechanism, each signal combination being sent during each half revolution of sleeve 49, the sixth and seventh cams 65 and 66 being adapted to send the starting and stopping elements to each signal and the permutation elements of the signal being determined by the position of each of the series of bars 21—25.

The actuating lever 76 in the arrangement shown in the drawing instead of being directly actuated by the universal bar in the keyboard as in the usual keyboard transmitter, is actuated through a delay or intercepting mechanism for the purpose of the present invention to delay the transmission of a signal combination consequent upon the depression of a character key on change of case, whilst a case signal is transmitted. The delay mechanism shown in the particular embodiment of the invention illustrated in the drawing, consists of a cam 78 fixed to the first mentioned cam sleeve 27 and provided with two raised portions by which arm 76 is operated to a position to release clutch 71. In the normal rest position of cam sleeve 27 at each half revolution, an extension of arm 76 rests on a raised portion of the cam 78 and clutch 71 is held from rotation. A locking means for the permutation bars 3—7 and 8 of the keyboard is also conveniently operated by this cam 78. This locking means is represented by lever 80 pivoted at 81, one end of the lever bearing on cam 78 the other end of the lever carries a locking bar 83 which can engage under tension of spring 82 on release of lever 80 with one or the other of two notches in the permutation bars 3—8 according to the position to which each bar has been actuated. The object of the locking means is to lock the combination set up on bars 3—7 and 8 whilst the combination is being transferred to bars 21—25 and 26 and for any desired period following necessary to prevent a too rapid operation of the keyboard. As the combination is arranged to be transferred to bars 21—25 and 26 soon after sleeve 27 commences to rotate on release of clutch 37, the lever 80 is preferably arranged relatively to cam 78 so that the locking bar 83 is released to lock the combination immediately the sleeve 27 commences rotating and cams 28—32 can then effect the actuation of depending rods 18 and 19 to transfer the combination. After a further period of rotation of sleeve 27, arm 76 then falls from a raised portion of the cam 78 and clutch 71 is released to effect the transmission of the signal combination. This further period of rotation of sleeve 27, however, can be arrested until a case signal is transmitted.

The means for transmitting a case signal is illustrated in the drawing by an auxiliary cam sleeve 84 independently mounted on driving shaft 70 to which it can be coupled by clutch 85 under the control of coupled latch members 86 actuated from bar 26. When bar 26 is actuated to one position the cam sleeve 84 is clutched to the driving shaft 70 for one half revolution and on actuation of bar 26 to the opposite position the cam sleeve rotates a further half revolution. On sleeve 84 are fixed two cams 87 and 88 having projections arranged according to the one or other character of the code elements of the two case signals. The cams 87 and 88 are conveniently arranged to actuate the signal contact lever 60 through pins 89 and 90 fixed to the two vertical rods 67 and 68 respectively which normally effect the transmission of the start and stop elements of a character combination. Each cam as shown controls the movement of one vertical rod so that during one half revolution of sleeve 84 the positive and negative code elements, for instance, of a letter shift signal, are transmitted by contact lever 60, and during other half revolution the positive and negative elements of a figure shift signal are transmitted.

During rotation of each half revolution of cam sleeve 84 a cam 92 raises a lever 93 and depresses another lever 94 into the path of rotation of the ratchet teeth of clutch 37. This other lever 94 is preferably spring yielding as indicated to avoid locking over the tops of the teeth of the clutch. Lever 94 is adapted when actuated to arrest clutch 37 and sleeve 27 in that portion of its rotation after the locking of permutation bars 3—7 and the actuation of depending rods 18 and 19 to transfer the combination but before the period in which lever 76 falls from the raised portion of cam 78 to release main clutch 71. A cam 95 on cam sleeve 49 similar to cam 92 on cam sleeve 84 can also be arranged to actuate lever 94 so as to prevent the completion of rotation of clutch 37 and the unlocking of the keyboard until the completion of the transmission of the signal. When the signal is completed lever 93 falls into a depression in cam 92 and lever 94 is raised clear of the teeth of clutch 37.

The mode of operation of the apparatus will probably be clear from the foregoing description of the portions of the apparatus, but briefly it may be stated that normally on depression of any character key clutch 37 is released for a predetermined degree of rotation, cam sleeve 27 immediately locks the combination set up on bars 3—7 and 8 which combination is then transferred to bars 21—25 and 26 and main clutch 71 is then released to effect the transmission of the signal combination as determined by the vertical rods 47 and 48. When sleeve 27 has completed its rotation lever 76 is again actuated to a position to re-arrest the main clutch. When on the other hand a character key belonging to the other case group is depressed, bar 26 is actuated to its opposite position and cam sleeve 84 is released and the signal combination corresponding to that key is locked whilst the cams 87 and 88 effect the transmission of the appropriate case signal. Cam 92 meanwhile prevents the completion of rotation of sleeve 27 and thereby maintains the keyboard locked during the transmission of the case signal. As soon as the case signal is completed arm 94 is raised and the main clutch is immediately released to effect the transmission of the signal as determined by the position of bars 21—25 whilst the keyboard is unlocked in preparation for a further signal.

It will be appreciated that the foregoing description is only illustrative of one method of carrying out the invention and although it is at present thought that this shows the most satisfactory lines by which the objects sought may be

achieved, many portions of the apparatus shown and described such as the method of transferring a signal combination from one series of members to another and the signal transmitting means for instance are already in general known in the art and other forms of such known mechanism can be adapted for the purpose of the invention. Although in the means actually shown, the various cam shafts are arranged to rotate a half revolution for each operation it will be appreciated that this is entirely optional. By slight modifications, one revolution clutches and cams could be utilized if desired or any other predetermined degree of rotation to effect the necessary operation. In the arrangement shown moreover although the delay of the transmission of a signal combination during the transmission of a case signal is effected through clutch 37 and sleeve 27, this delay could be effected direct from sleeve 27. It will also be clear to those skilled in the art and from a consideration of the method described that various other modifications can be made in the manner and sequence in which the portions of the apparatus co-act in order that the additional signal necessary on each change of case can be inserted with a minimum of extra means necessary for the purpose and this without unduly interfering with the speed with which successive keys in the keyboard may be operated.

What is claimed is:

1. In telegraph signal transmitting apparatus, a keyboard, separate keys in said keyboard for characters in separate case groups, and means operable in response to the actuation of a character key on a change of case to insert an appropriate case signal.

2. In telegraph signal transmitting apparatus, a keyboard containing character keys, a series of permutation bars corresponding to the elements of a signal combination and operable by said keys, a case determining bar operable to one of a plurality of positions in accordance with the case grouping of each key in said keyboard, and means operable in response to the actuation of said case determining bar to insert an appropriate case signal.

3. In telegraph signal transmitting apparatus, a keyboard having character keys arranged in two different case groups, signal transmitting means, signal storage means intermediate said keyboard and said signal transmitting means, a case determining bar operable from said keyboard upon actuation of one of said keys, and means to insert an appropriate case signal in accordance with the actuation of said case determining bar while the signal represented by the actuated key is held in said signal storage means.

4. In a telegraph signal transmitter, a keyboard having character keys arranged in two case groups, a series of permutation members controlled by said keys, signal transmitting contacts operable in accordance with settings of said permutation members, a case determining bar controlled by the character keys, and means controlled by said bar to actuation said transmitting contacts in accordance with the elements of an appropriate case signal.

5. In a telegraph signal transmitter, a keyboard having separate keys for characters in separate case groups, a series of permutation members operable by said keys, a corresponding series of contact controlling members, signal transmitting contacts, a case determining bar also operable by any one of said keys, and cam means released at each operation of said case determining bar to actuate said signal transmiting contacts and to lock during such actuation the setting of said series of controlling members.

6. In a telegraph signal transmitter, a keyboard having separate keys for characters in separate case groups, signal transmitting contacts, overlap means comprising a series of contact controlling members in which the elements of a signal can be stored, and cam means having code projections corresponding to the elements of a case signal for actuating said signal transmitting contacts on change of case group.

7. In a telegraph signal transmitter, a keyboard, a case determining bar operable to one of a plurality of positions by keys in said keyboard belonging to different case groups, and cam means controlled by said case determining bar and having code projections corresponding to the elements of corresponding case signals.

8. In a telegraph signal transmitter, a keyboard, a series of contact controlling members, signal transmitting contacts, a main cam sleeve for sequentially operating said contacts in accordance with the setting of said series of controlling members, a case determining bar operable from one to the other of two positions, a separate cam sleeve controlled thereby and having code projections also for actuating said contacts, and means operable during rotation of said separate cam sleeve for delaying the release of said main cam sleeve.

9. In a telegraph signal transmitter, a keyboard, a series of permutation bars, a corresponding series of contact controlling members, signal transmitting contacts, a main cam sleeve cooperable with said contact controlling members to actuate said contacts, a separate cam sleeve having code projections also adapted to actuate said contacts, and an auxiliary cam sleeve released from said keyboard and having cams adapted to actuate said series of controlling members in accordance with the setting of said series of permutation members.

10. In a telegraph signal transmitter, a keyboard, a series of permutation members, a corresponding series of contact controlling members, signal transmitting contacts, a main signalling shaft, a separate signalling shaft, a case determining bar controlling the rotation of said separate shaft, an auxiliary shaft released from said keyboard, cams on said auxiliary shaft adapted to actuate said series of controlling members under control of said permutation members, means actuated by said auxiliary shaft to release said main signalling shaft, and other means operable during rotation of said separate signalling shaft to arrest the rotation of said auxiliary shaft.

11. In a telegraph signal transmitter, a main signalling cam shaft, a separate signalling cam shaft for transmitting case signals, a keyboard, a case determining bar operable therefrom and controlling the rotation of said separate shaft, an auxiliary cam shaft releasable from said keyboard and operable during rotation to release said main cam shaft, and means actuated during rotation of said separate cam shaft to arrest said auxiliary shaft before the release of said main shaft.

12. In a telegraph signal transmitter, a keyboard, a series of permutation bars, a corresponding series of contact controlling members, an auxiliary cam shaft released for rotation from said

keyboard, cam means on said auxiliary shaft adapted to actuate said series of controlling members in accordance with the setting of said series of permutation members, and means also operable on commencement of rotation of said auxiliary cam shaft to lock said series of permutation bars and to unlock when the setting of said permutation bars has been transferred to said controlling members.

13. In a telegraph signal transmitting apparatus, a keyboard having a plurality of keys arranged in two different case groups, a series of permutation members corresponding to the elements of a signal combination and operable in paticular combinations according to the key actuated, a case determining member operable to one of two positions in response to the actuation of a key of one case group and to another of said two positions in response to actuation of a key of the other case group, and means responsive to the operation of said case determining member to either position to insert the appropriate case signal corresponding to the case group of the key actuated.

14. In a telegraph signal transmitting apparatus, a keyboard having a plurality of keys arranged in two different case groups, a series of permutation members corresponding to the elements of a signal combination and operable in particular combinations according to the key actuated, a two position case determining member, a means for moving said member from one position to the other in response to the actuation of a key of one case group following actuation of a key of the other case group, signal transmitting means operated in accordance with the signal combinations set up on the permutation members by each key, and means responsive to the operation of said case determining member to either position to cause said signal transmitting means to transmit a special signal combination corresponding to the particular case group containing the actuated key prior to the transmission of the signal combination representing said actuated key.

15. In a telegraph signal transmitting apparatus, a keyboard having a plurality of keys arranged in two different case groups, a series of permutation members corresponding to the elements of a signal combination and operable in particular combinations according to the key actuated, a two position case determining member, a means for moving said member from one position to the other in response to the actuation of a key of one case group following actuation of a key of the other case group, signal transmitting means operated in accordance with the signal combinations set up on the permutation members by each key, and means responsive to the operation of said case determining members for transmitting an appropriate signal corresponding to the particular case group containing the actuated key and during the transmission of the case signal blocking the transmission of the character signal representing said actuated key.

16. In a telegraph signal transmitting apparatus, a keyboard, separate keys in said keyboard for certain characters arranged in separate case groups, and means operable in response to the actuation of any of said character keys on a change of case to insert an appropriate case signal.

17. Signal transmitting apparatus according to claim 16 provided with signal transmitting means, and means responsive to the operation of the case signal inserting means to cause signal transmitting means to transmit, first, the case signal and then the character signal represented by the actuated key.

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DISCLAIMER

1,921,407.—*Ronald George Griffith*, Croydon, England. TELEGRAPH TRANSMITTING APPARATUS. Patent dated August 8, 1933. Disclaimer filed September 25, 1936, by the assignee, *Creed and Company, Limited.*

Hereby enters the following disclaimer with respect to claim 1 of said patent.

To so much of said claim as may cover a class of telegraph signal transmitting apparatus wherein said case signal is an element of each character signal combination; thereby limiting said claim 1 to a class of telegraph signal transmitting apparatus wherein on a change of case the transmission of character signal combinations is interrupted and a case signal, separate from the elements of the character signal combinations, is specially inserted.

[*Official Gazette October 27, 1936.*]