

Feb. 25, 1936.

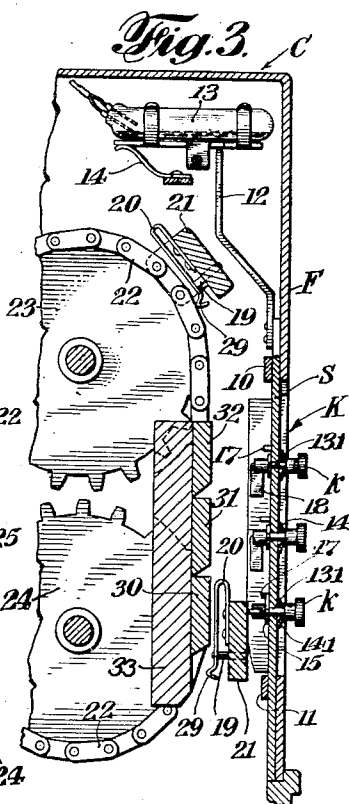
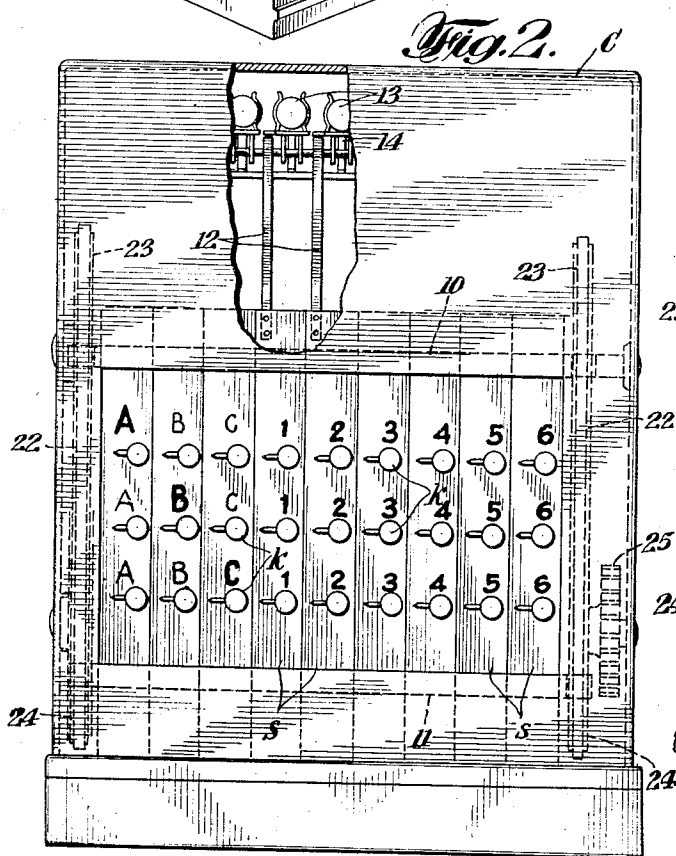
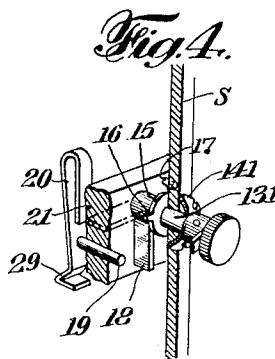
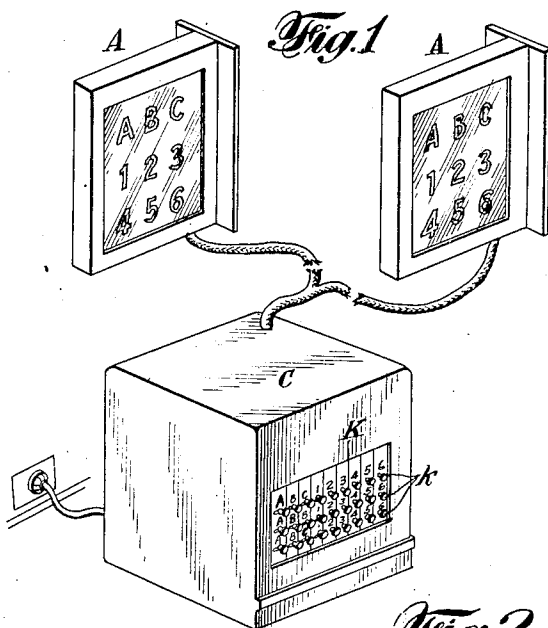
C. AUTH

2,032,037

PAGING SYSTEM

Filed June 22, 1931

3 Sheets-Sheet 1.



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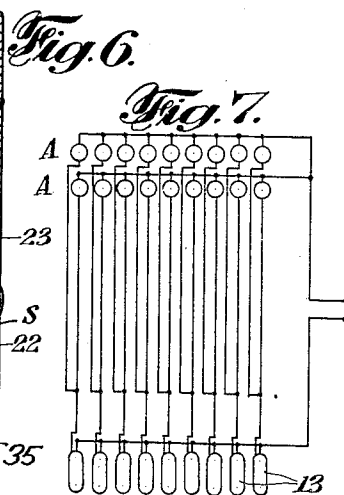
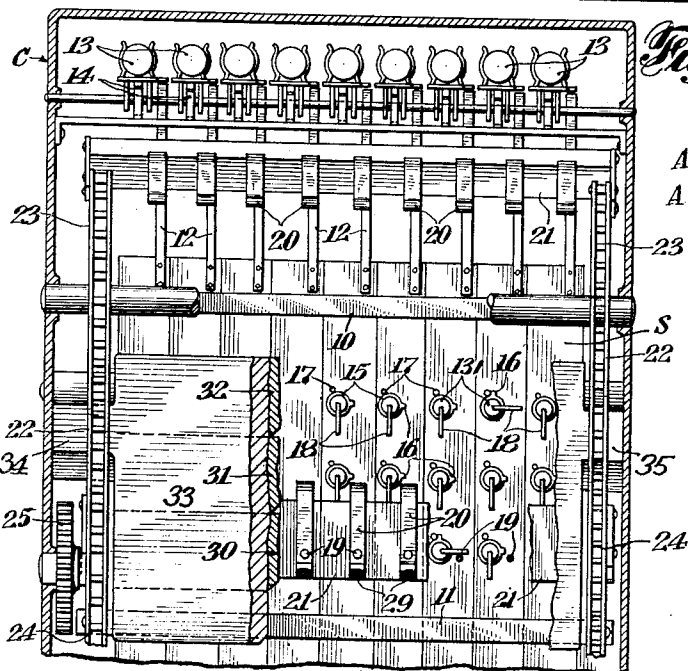
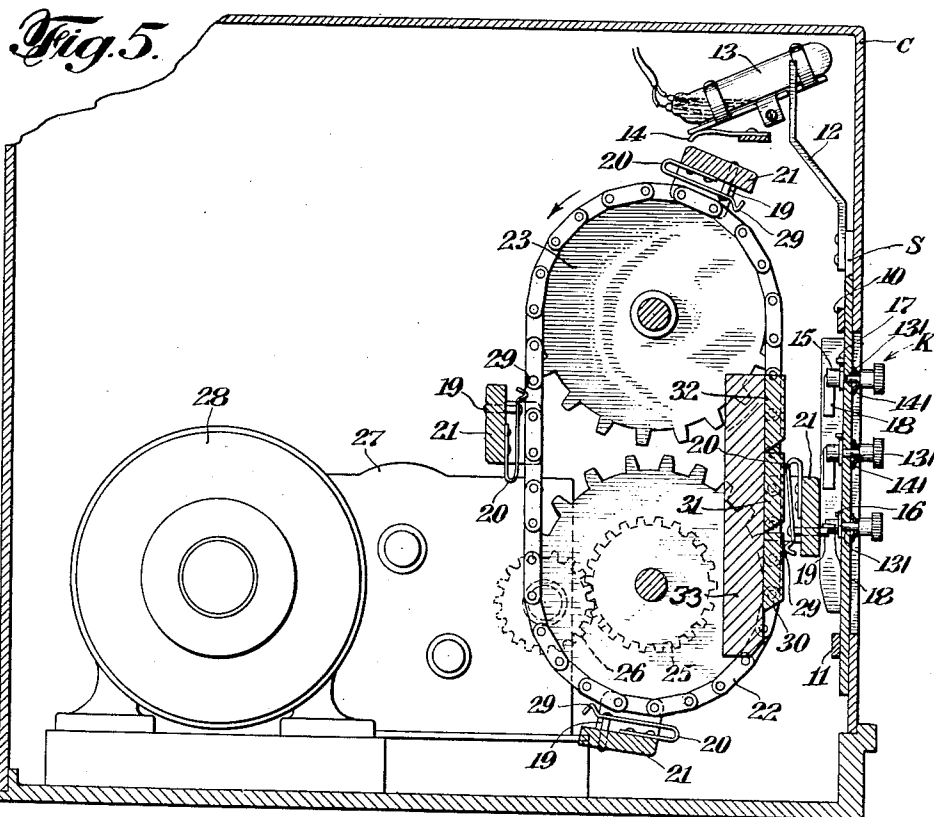
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Fig. 8.

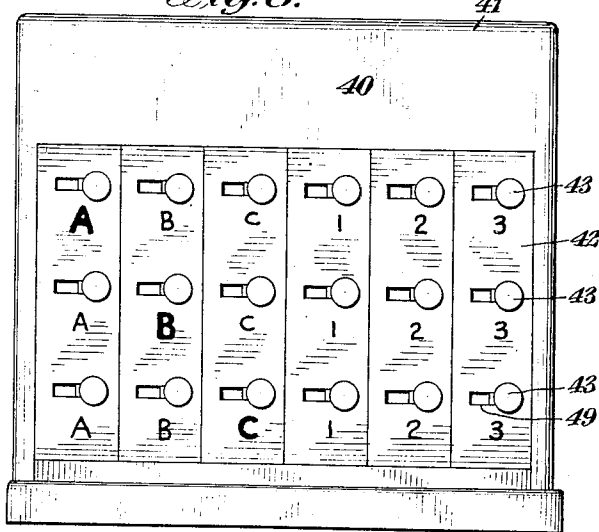


Fig. 10.

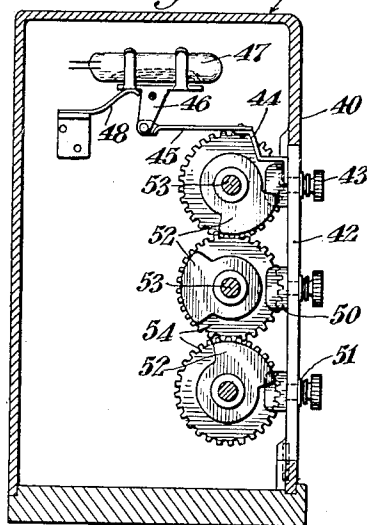


Fig. 9.

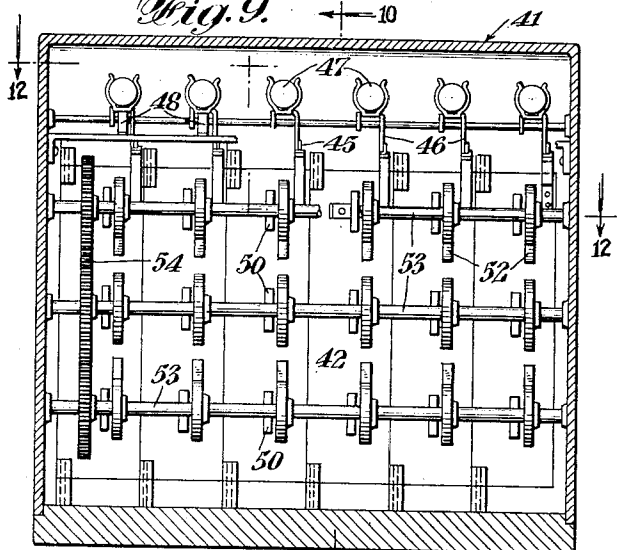


Fig. 11.

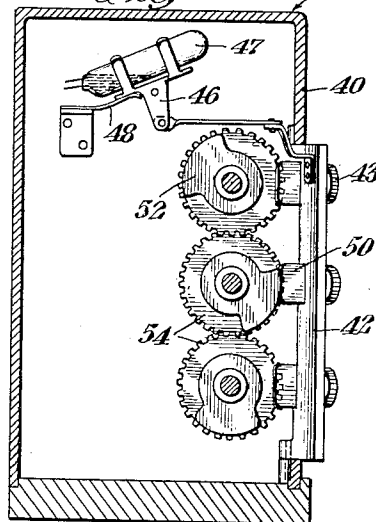
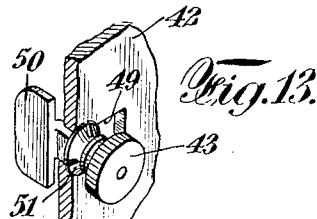
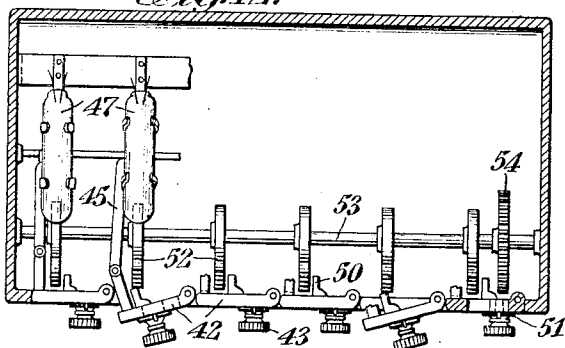


Fig. 12.



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PAGING SYSTEM

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6 Claims. (Cl. 177—353)

This invention relates to paging or calling systems.

One of the objects of the present invention is to improve and extend the range of paging systems for paging individuals by using signal devices and a coded system of signals, and to eliminate complicated and extra pieces of apparatus.

More specifically, an object of this invention is the provision of mechanism avoiding the use of complicated wiring systems and thereby permitting a construction which is cheap to manufacture and easy to repair.

Another object of the invention is the provision of mechanism by means of which different signals may be flashed rapidly alternately, or in which the same signals may be flashed in series in rapid succession.

Another object of the invention is the provision of mechanism by means of which each of the digit indicators of the same value on the annunciators may be controlled by the same circuit closing switch, which may be closed at the same time that a circuit closing switch for any of the letters associated with digits in the code system employed is closed.

Other objects of the invention will appear from the following description taken in connection with the drawings, in which

Fig. 1 shows the general hook-up of a control cabinet and a plurality of annunciator boards;

Fig. 2 is a front elevation of a control cabinet with parts broken away to show the relation between the keyboard slides and the circuit closing switches;

Fig. 3 is a fragmentary section through a control cabinet taken through one of the keyboard slides, showing the operating mechanism for the slides;

Fig. 4 is a detail of a key and part of the operating mechanism for the slide;

Fig. 5 is a view similar to Fig. 3 showing an entire cross section of the cabinet;

Fig. 6 is a sectional rear elevation of the keyboard slides and operating mechanism therefor;

Fig. 7 is a wiring diagram including the circuit closing switches and the signal devices in the annunciator boards;

Fig. 8 is a front elevation of a control cabinet constructed according to another embodiment of the invention;

Fig. 9 is a vertical section of Fig. 8 with the face of the cabinet removed;

Fig. 10 is a vertical section on the line 10—10 of Fig. 9 showing the keys in normal position;

Fig. 11 is a section similar to that in Fig. 10 showing a circuit closing switch operated;

Fig. 12 is a horizontal section with the key carrying doors and mercury switches in top plan view; and

Fig. 13 shows a key and the manner in which it is supported.

The system consists of one or more annunciator boards adapted to be placed in desired locations in hospitals or about the corridors in large offices, buildings or public institutions or in any other place in which such systems may be used. The system is of a flash type design to periodically give a series of different signals in quick succession, and thus, in calling one or more individuals their corresponding letters and/or numbers will be simultaneously set up on all of the annunciator boards and the letters and/or numbers will be successively flashed at intervals on the various annunciator boards.

The control board consists of a cabinet with a number of keys corresponding to the indicators on the annunciator boards. These keys are arranged in banks and if the annunciator boards consist of from 36 to 40 indications and the control panel consists of five or six banks of keys, approximately 200 doctors or individuals can be paged within a period of eight to twenty seconds. Coded sets of signals will be successively flashed on the annunciator boards.

Fig. 1 shows one embodiment of a control cabinet C and a plurality of annunciator boards A, the number of which is determined by the requirements of service. The keyboard K on the control cabinet may comprise any number of letter keys A, B, C, etc., and any number of digit keys 1, 2, 3, 4, 5, 6, etc., and the signals on the annunciator boards A may comprise letters A, B, C, etc. and digits 1, 2, 3, 4, 5, 6, etc., the number of letters and digits employed being determined by the service requirement.

Mounted in the control cabinet C and comprising the keyboard K, shown more specifically in Fig. 2, are shown three keys A, three keys B, and three keys C, the number of keys A, keys B and keys C depending upon the number of letters employed. The keyboard also includes three sets of digit keys 1 to 6, the number of sets of digit keys employed depending upon the number of letters employed. As will appear later, when coded signals C—1 to C—6, B—1 to B—6 and A—1 to A—6 are to be flashed in succession the keys marked with the heavy letters A, B and C will be operated and when any letter and a digit or digits are to be flashed in succession then several of

the same letter keys will be operated together with the appropriate digit keys in the banks of such operated letter keys.

As shown in Figs. 2, 3, 4, 5 and 6, the keys *k* are mounted in slides *S* which are in contact with each other and are held in contact with the rear surface of the front member *F* of the cabinet by means of straps 10 and 11, the outer edges of the end slides being preferably guided by any suitable means such as shoulders on the straps 10 and 11, as is readily understood. The upper end of each slide carries an operating rod 12 which, when the slide is raised, engages and rocks a mercury switch 13 against a restoring spring 14 to close a circuit through the corresponding lamps on the annunciator board, as is well understood. As the mercury switch is rocked into the position shown in Fig. 5 and closes the circuit across the terminals as indicated, parallel circuits are closed, as shown in Fig. 7, through the signal lines to the various annunciator boards so that the lamps in the various annunciator boards corresponding to the slide *S* operated will be energized to display the letter or digit corresponding to the key *k* operated.

In the system disclosed in which, as stated before, for the purpose of illustration only three letters and six digits are made use of, each slide *S* carries three keys which for the purpose of description have been referred to by the letter *k*. Each of the keys *k* comprises a manipulative portion secured on a stem 131 rotatably mounted in the slide *S*, the key being held in any of its rotated positions frictionally by means of a spring fingered bell-shaped collar 141. Mounted on and rotatable with the stem 131 is a collar 15 which bears against the rear face of the slide *S*. The collar 15 is provided with a projection 16 which when the key is thrown into the operative position engages a pin 17 on the slide *S* to hold an arm 18 secured to the stem 131 in horizontal position in which it is engageable by a pin 19 on a spring member 20 mounted on a horizontal bar 21 which extends the whole width of the slide assembly and at its ends is connected to sprocket chains 22, as indicated in Figs. 2, 3, 5 and 6. It is obvious, of course, that other types of keys well known in the keyboard art may be employed.

The sprocket chains preferably carry four bars 21, though this number is arbitrary. The sprocket chains may be mounted on sprocket wheels 23 and 24 of which the sprocket wheel 24 carries a gear 25 meshing with the gear 26 driven through any speed reducing mechanism 27 from a motor 28. As the sprocket chains and bars 21, each of which carries as many springs 20 and pins 19 as there are slides, move in a counterclockwise direction the pins 19 are moved to the right as the cam-shaped ends 29 of the springs 20 engage the lower cam edges of the pin engagement controlling bars 30, 31 and 32. These bars may be integral with or secured to a supporting bar 33 in any suitable manner. The bar 33 is provided with narrow ends 34 and 35 which may be secured to the walls of the casing *C* by any suitable means, not shown. If any one of the letter keys *A*, *B* and *C*, or one or more of the digit keys 1, 2, 3, 4, 5 and 6 in the lowermost bank of keys is operated, the associated pins 19, as the pins are pressed inwardly by the controlling bar 30 as indicated in Fig. 5, will engage the arms 18 of the operated keys and lift the slides in which they are mounted thereby rocking the associated mercury switches 13 and closing the cir-

uits over the corresponding lines to the various annunciator boards.

As the bar 21 travels upwardly and the cam-shaped end 29 of each spring is moved beyond the upper edge of the bar 30, the spring 20 is permitted to withdraw the pin 19 from engagement with the arm 18 thus permitting the corresponding slide *S* to drop and to open the circuit over the corresponding lines. As the cam-shaped end 29 of the spring moves upwardly across the bar 31 the pin 19 is moved to engage with the arm 18 of the key in the second horizontal row or bank of keys, Fig. 2, in case such key is operated. If the key is operated the slide will again be lifted to complete the circuit over the corresponding lines to the annunciator boards. As the cam-shaped end 29 of the spring 20 passes the bar 31 the pin 19 will be withdrawn to permit the slide to drop and to open the circuit over the corresponding lines. As the bar 21 continues its movement against the bar 32 the pin 19 will be moved into position to cooperate with the arm 18 on the key in the upper horizontal row or bank of keys, Fig. 2, if this key is operated, and the slide will again be lifted to close the circuit over the corresponding lines to the annunciator boards.

By means of the construction shown any coded numbers set up on the keyboard will be flashed in rapid succession on each of the annunciator boards.

As shown in Fig. 2, each of the slides *S* for the letters *A*, *B* and *C* may be provided with as many keys *A*, *B* and *C* as there are banks of numeral or digit keys. In certain uses of the system coded numbers such as *A1* to *A6*, *B1* to *B6* and *C1* to *C6* may be set up by pressing the keys represented by the heavy letters *A*, *B* and *C*, and when the system is started the coded signals *C1* to *C6* will be flashed first and then the coded signals *B1* to *B6* and then the coded signals *A1* to *A6*, after which the signals will be repeated in the same order until the mechanism is stopped, or the keys are brought back to normal.

By providing each letter slide with as many keys as there are banks of digit keys I am enabled to operate one or two or three of the letter keys on a slide together with the digit keys in the same bank, and thus get a succession of the same signals which I make use of in cases of emergency. I may also have the same coded signal repeated twice in succession followed by a different coded signal which may indicate that the signal flashed twice in succession is an emergency call, and that the signal flashed but once is a call that is not as urgent.

In the embodiment of my invention shown in Figs. 8 to 13, the front face 40 of the cabinet 41 is provided with hinged members 42 each of which carries a plurality of keys 43, the number of which depends upon the number of letters employed in the coded signals for which the system is designed. Each hinged member is provided with an arm 44 connected by a link 45 to a rocker 46 supporting a mercury switch 47, the connection being such that when the hinged member 42 is rocked outwardly as shown in Figs. 11 and 12, the mercury switch 47 is rocked to close a circuit to signals in the various annunciator boards corresponding to the keys carried by the hinged members. The mercury switch is normally urged into the position shown in Fig. 10 by means of a spring 48 which through the link connection described causes the hinged member 42 to close, as indicated in Fig. 10.

Each of the keys 43 is slidably mounted in a slot 46 in the hinged member 42, as indicated in Fig. 13. The rear portion of the key 43 may carry a cam element 50 which may engage the rear face of the hinged member 42 as shown. The key may be held in either of its positions by a bell-shaped spring member 51 which bears against the front face of the hinged member 42 as shown.

When the key is moved to the left hand end of the slot 46, as shown in Fig. 13 and as indicated in Fig. 12, the cam portion 50 on the key is moved into alignment with a cam operating disk 52 on a shaft 53, there being one shaft for each bank of keys and one cam operating disk 52 on each shaft for each key in the associated bank as is indicated more clearly in Fig. 9. All of the cam operating disks on a shaft preferably occupy the same angular position with respect to the shaft, as indicated in Figs. 9 and 10. The series of cam operating disks on the several shafts are arranged angularly with respect to each other, as indicated in Figs. 9, 10 and 11, in order that the cams may cooperate with the keys of the several banks of keys successively to operate the mercury switches to indicate coded signals successively. The shafts 53 may be operated from any suitable driving mechanism, and as is obvious from Fig. 5, the lower shaft may be driven from a motor through a speed reducing mechanism, and the upper shafts 53 may be driven from the lower shaft by means of gears 54, as indicated in Figs. 9, 10 and 11.

The modified form of control board, shown in Figs. 8 to 13, operates in all respects the same as that shown in Figs. 1 to 7.

It is to be understood that the number of letter keys may be increased to suit the requirements of the service, and that for each letter key there is a bank of digit keys, the number of keys in each digit bank being determined by the service required.

While the invention has been shown and described with reference to two embodiments, it is to be understood that the invention may be practiced by still other embodiments and that applicant intends to cover all equivalents that fall within the scope of the appended claims.

What I claim is:

1. The combination of a circuit closing switch, a slide for operating said switch, a plurality of keys movably mounted on said slide, means for operating said slide, means on said keys adapted when the keys are operated, to be engaged by said slide operating means, and means for controlling said slide operating means to successively engage and disengage said means on said keys

for successive operation of said slide and switch when said plurality of keys are operated.

2. The combination of a circuit closing switch, a slide for operating said switch, a plurality of keys movably mounted on said slide, a plurality of successively functioning operating means for operating said slide, and means for operatively connecting each slide operating means to said keys when operated, to cause said slide to move to close said switch for each key operated.

3. The combination of a circuit closing switch, a slide for operating said switch, a plurality of keys movably mounted on said slide, means for operating said slide, means for effecting an operative connection between said operating means and said keys when operated, said means including a pin on said operating means, cam means for camming said pin into operative engagement with a key, and means for moving said pin into normal disengaging position after it has moved said slide under control of any one of said keys.

4. In a control mechanism for controlling the operation of electric signals, circuit closing switches for closing circuits to said signals, a control keyboard including banks of keys, pivoted members each operatively connected to a switch and each movably supporting a plurality of keys of the same designation, operating means for operating said members, and cooperating means on said operating means and the keys on each of said members adapted when one or more keys on a member are operated to operate said member once for each key operated.

5. In a control mechanism for controlling the operation of electric signals, circuit closing switches for closing circuits to said signals, a control keyboard including banks of keys, pivoted members each of operatively connected to a switch and each movably supporting a plurality of keys of the same designation, a plurality of simultaneously rotatable operating shafts, and angularly related means on said shafts cooperating with one or more operated keys on any member to operate said member once for each key operated.

6. A paging system including electrical switches, said switches having actuating mechanisms each including a plurality of parts movable between active and inactive positions, said last mentioned parts being located in banks, and one or more movable members periodically moving in such relation to said above mentioned banks as to periodically operate each switch whenever its corresponding above mentioned part is in active position, said parts being out of the range of action of said members when in inactive position.

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