

July 19, 1938.

J. H. WHELOCK

2,124,160

CODE SETTING DEVICE FOR SIGNAL SYSTEMS

Filed Feb. 28, 1936

3 Sheets-Sheet 1

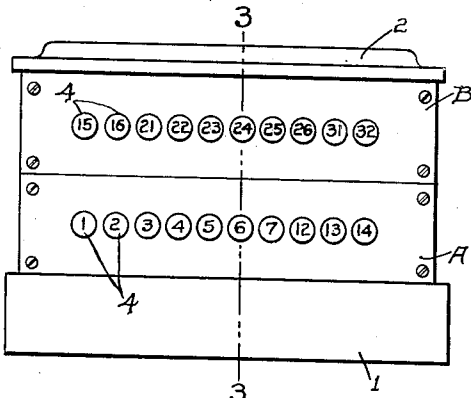


Fig. 1

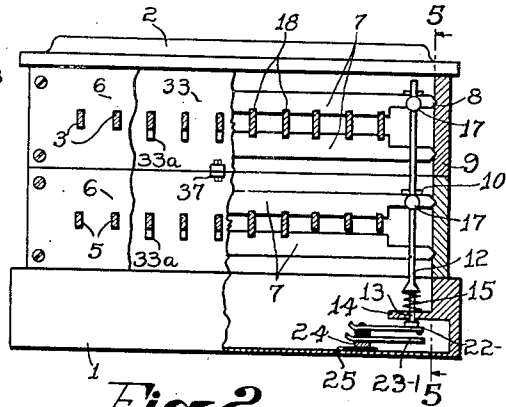


Fig. 2

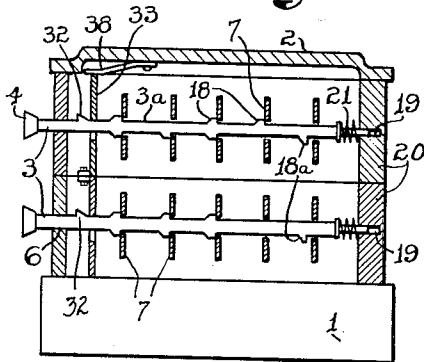


Fig. 3

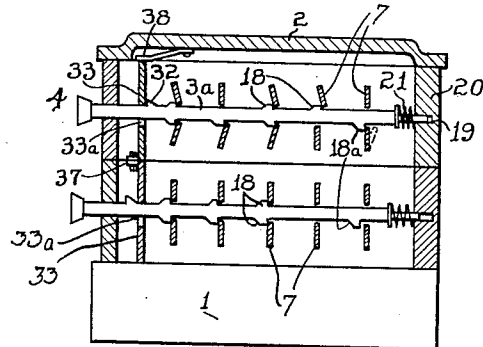


Fig. 4

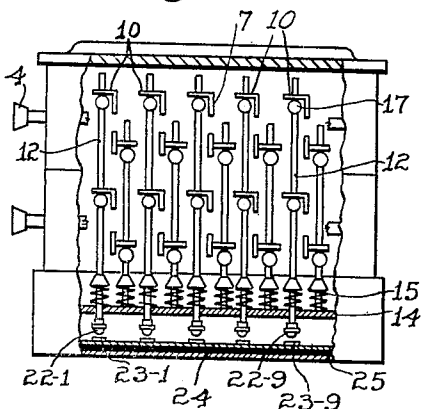


Fig. 5

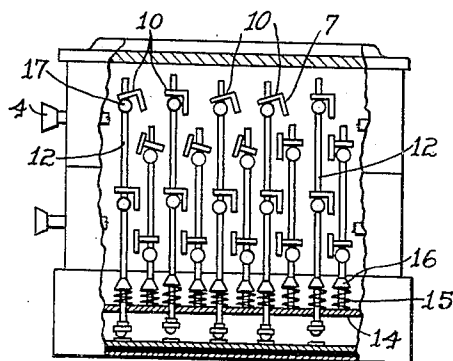


Fig. 6

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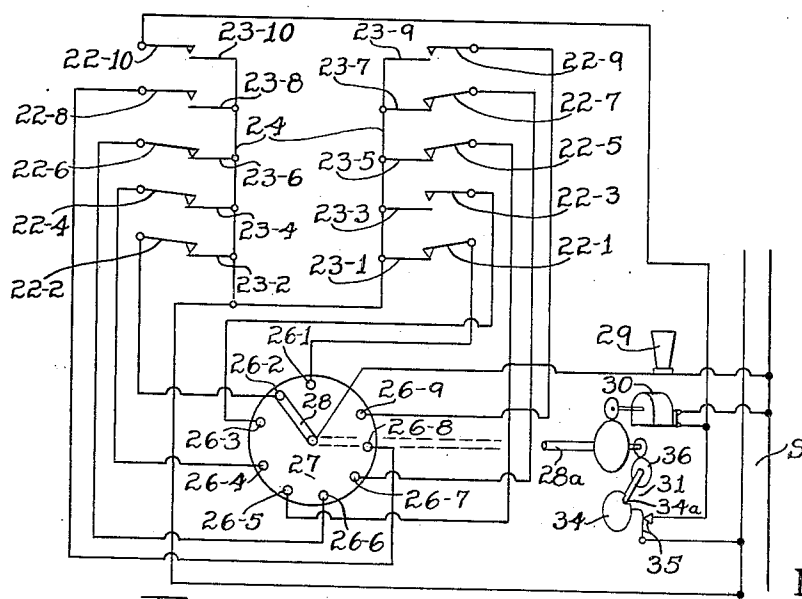
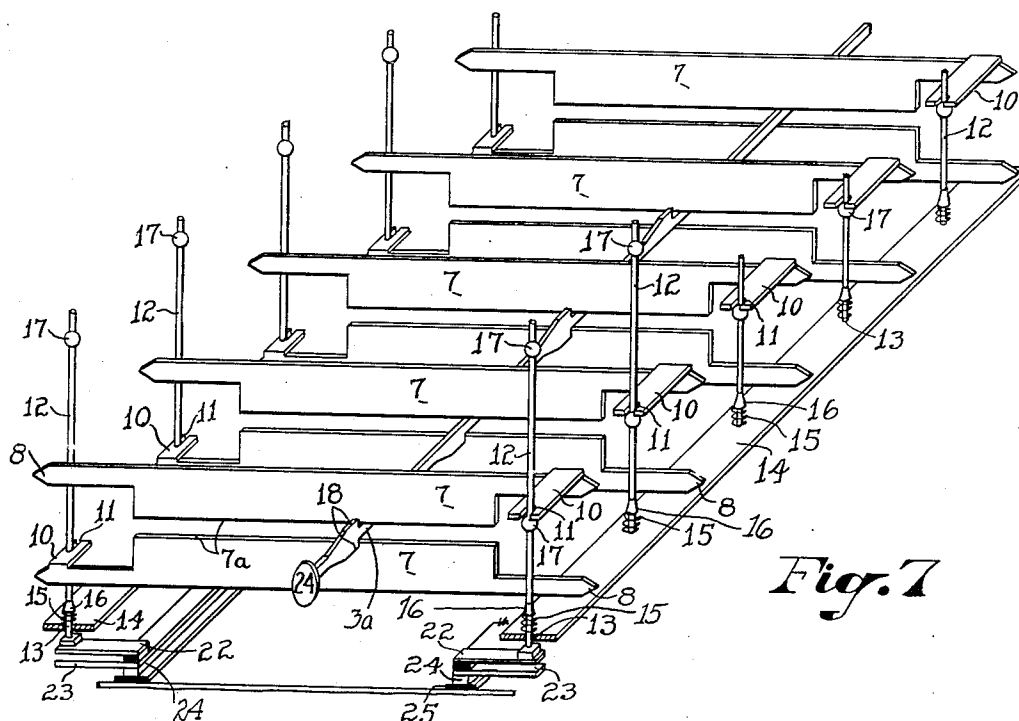
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3 Sheets-Sheet 2



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CODE SETTING DEVICE FOR SIGNAL SYSTEMS

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3 Sheets-Sheet 3

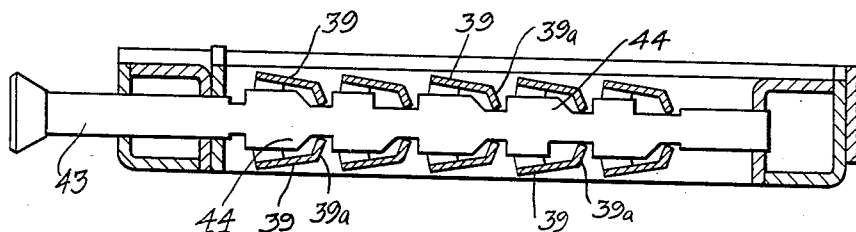


Fig. 9

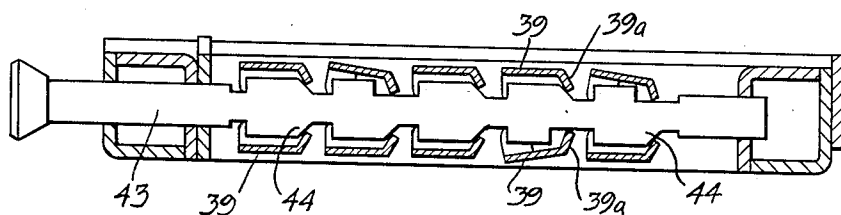


Fig. 10

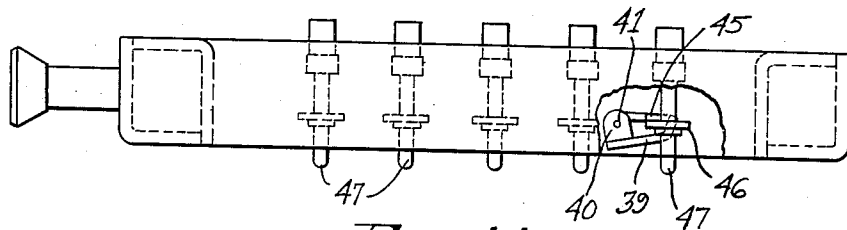


Fig. 11

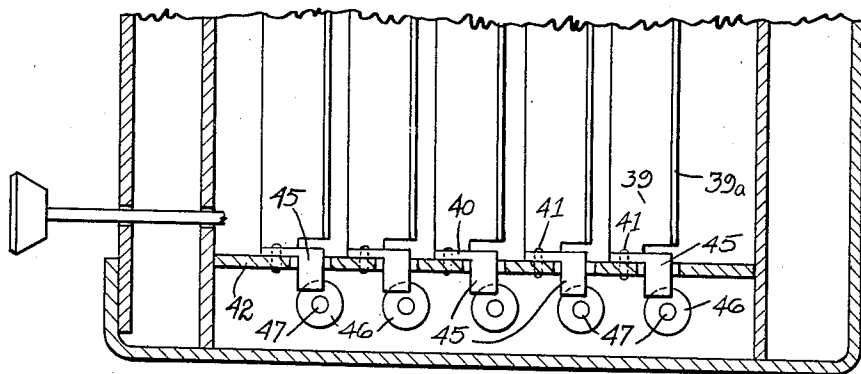


Fig. 12

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UNITED STATES PATENT OFFICE

2,124,160

CODE SETTING DEVICE FOR SIGNAL SYSTEMS

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Application February 28, 1936, Serial No. 66,279

4 Claims. (Cl. 177—380)

The present invention relates to electrical signalling apparatus and systems of the type commonly employed for controlling, from a given point, the operation of various kinds of signal devices for sounding or displaying a multiplicity of different signals, all in accordance with a predetermined code.

Ordinarily, a signal system of the above described type, comprises in addition to the signals, a code determining or setting device co-operating with a code sending device, the function of the code setting device being to enable an operator to manually determine, or set, the code sequence desired, whereupon the sending device operates under control of the setting device to automatically sound the selected signal sequence. In code setting devices, as heretofore constructed, the code determinations have been obtained either by arranging electric contacts in different code sequences, or by providing dissimilar mechanically operated code determining elements arranged in groups, in accordance with the code sequences. Code setting devices of the above indicated character possess certain practical limitations from the standpoint of quantity production, owing to the multiplicity of combinations that are required for the code determining contacts or elements, as the case may be.

According to the present invention, there is provided an improved code setting device characterized by the utilization of identical code determining elements that may be manufactured cheaply in large quantities, and readily assembled, so as to set up the desired code combinations in response to the operation of actuating members or setting keys having the code combinations thereon. The device of the present invention is further characterized by its certainty of operation and the fact that it is entirely free from electrical troubles, due to the purely mechanical relation that exists between the code determining elements and their associated actuating members. The above and other advantageous features of the invention will hereinafter more fully appear from the following description, with reference to the accompanying drawings, in which:—

Fig. 1 is a view in front elevation of a code setting device, embodying the invention.

Fig. 2 is a view of the device of Fig. 1 with parts broken away to show details of construction.

Fig. 3 is a vertical sectional view along the line 3—3 of Fig. 1.

Fig. 4 is a sectional view similar to Fig. 3, showing the actuation of a code setting key.

Fig. 5 is a vertical sectional view along the line 5—5 of Fig. 2, looking in the direction of the arrows.

Fig. 6 is a sectional view similar to Fig. 5, showing the actuation of a code setting key.

Fig. 7 is a fragmentary perspective view, showing the relation between a code setting key and a group of code determining elements.

Fig. 8 is a wiring diagram, illustrating the connection of the device in a signal system, in co-operation with a code sending device.

Figs. 9 to 12 inclusive are views showing one unit of a modified form of device.

Like reference characters refer to like parts in the different figures.

Referring first to Fig. 1, the code setting device comprises a base 1 and a cover 2, between which are assembled a number of code setting units A and B, arranged in stack relation, the units being similar in construction and each being adapted to determine a different group of code sequences, as will hereinafter appear. Each unit A and B provides a series of code setting members or keys 3 terminating in buttons 4 bearing different code designations, such as numerals, and the keys 3 are longitudinally movable in slots 5, provided in a key plate 6 at the front of each unit.

As shown in Figs. 2, 3 and 7, each unit provides a plurality of identical code determining elements 7, arranged vertically in pairs and with the several pairs of elements spaced horizontally in a unit. Furthermore, the several pairs of elements 7 of each unit are in vertical alignment with the corresponding pairs of elements in a unit immediately above or below in the stack. Each element 7, is in the form of a flat bar reduced at its ends, to form pivots 8 that are received in end plates 9, provided by each unit and the horizontal spacing between adjacent pairs of elements 7 is such as to permit each element to be turned on its pivots independently of other elements in a unit.

The elements 7 of each pair are mounted in opposed relation with parallel edges spaced apart a distance slightly greater than the depth of a key shank 3a, as best shown in Fig. 3. Each element 7 provides a laterally extending arm 10 adjacent its pivot at one end, and the arms 10 in the upper row of elements of a unit extend oppositely to the arms 10 of the lower row of elements in the same unit. Each arm 10 provides a slot 11 at its free end and the vertically aligned

arms 10 of corresponding elements in different units of the stack are connected by a rod 12 passing through the slots 11. Thus, each unit provides two series of rods 12 at opposite ends, with the right-hand rods 12 co-operating with the elements 7 in the upper row and the left-hand rods 12 co-operating with the elements in the lower row.

As best shown in Figs. 2 and 7, the lower end of each rod 12 passes through an opening 13 in a plate 14, extending transversely to the elements and a spring 15 surrounding the rod 12 between the plate 14 and an enlargement 16 of the rod serves to yieldingly support the rod with spaced lugs 17 engaging the arms 10 of aligned elements 7 in different units. The spring 15 for each rod 12 is so proportioned, and the lugs 17 are so spaced, that normally each element is yieldingly maintained in a vertical plane, although free to turn in either direction about its horizontal pivotal axis.

As best shown in Fig. 3, each key 3 provides a series of projections 18 along its axis extending either above or below the parallel surfaces of the shank 3a which, as previously pointed out, is movable freely between the spaced edges of the several pairs of elements 7 in a unit. The key projections 18 are arranged in a sequence determined by the code designation of the button 4 at the outer end of the key. Thus, the upper key, shown in Fig. 3, which carries the code designation "Twenty-four" provides two adjacent projections 18 extending from opposite sides of the shank 3a, then omits a projection, followed by four successive projections extending alternately from opposite sides. Similarly, the lower key 3, which carries the code designation "Six", provides six successive projections 18, extending alternately from opposite sides of the shank 3a. Each key also provides a starting projection 18a, the purpose of which will hereinafter appear.

The inner ends of the several keys 3 of a unit extend into openings 19, provided by the back plate 20 of the unit, and a spring 21 serves to yieldingly maintain each key 3 in the position of Fig. 3, wherein the several projections 18 on the key are just out of engagement with the front vertical surfaces of the several pairs of code determining elements 7. When a key 3 is depressed by pushing in its button 4, as shown in Fig. 4, the several projections 18 thereon simultaneously engage the adjacent elements 7 and turn them about their pivots. When this occurs, the arms 10 of the particular elements 7 which have been turned, as shown in Fig. 6, serve to impart downward movement to the corresponding rods 12. It is evident from Fig. 7 that turning movement of any of the elements of the upper row will cause downward movement of the corresponding right hand rods 12, while turning movement of elements 7 in the lower row will impart downward movement to the corresponding left hand rods 12 of a unit. Thus, depression of any key will cause turning movement of a group of code determining elements 7, in accordance with the arrangement of code setting projections 18 on the operated key, and the manner in which the resulting vertical movement of the rods 12 is utilized to energize the signals of the associated system, in conjunction with the operation of a code sending device, will next be described.

Referring now to Figs. 7 and 8, each rod 12 bears lightly on a flexible contact 22, and each contact 22 is opposed to but slightly separated

from one of a series of spaced stationary contacts 23 mounted on a bar 24, insulated from the base 1 at 25. Two bars 24 are provided, the right hand bar co-operating with the contacts 22-1, 22-3, 22-5, 22-7, 22-9, while the left hand bar co-operates with contacts 22-2, 22-4, 22-6, 22-8, and 22-10. The contacts 22-1 to 22-9, inclusive, are connected to stationary contacts 26-1 to 26-9, inclusive, of a commutator 27 forming part of a code setting device, 10 which may be of any desired type, since it forms no part of the present invention. The bars 24 are connected to one side of a suitable power source S, so that shifting of one or more rods 12, upon pressing in a key 3 will engage corresponding contacts 22 and 23, with consequent energization of one or more commutator contacts 26, in accordance with the arrangement of code setting projections 18 on the depressed key.

The commutator 27 also provides an arm 28, 20 mounted on a shaft 28a so as to successively engage the commutator contacts 26, and since the arm 28 is connected to the other side of the source S in circuit with a suitable signal device 29, rotation of the commutator shaft will cause the signal 29 to be energized, in accordance with the code, as determined by a depressed key. Thus, when the key bearing the code designation "Twenty-four" is depressed, as shown in Fig. 4, the commutator contacts 26-1, 26-2 and 26-4, 26-5, 26-6 and 26-7 will be energized, so that one revolution of the commutator arm 28 results in sending two signal impulses, followed by a pause and then four signal impulses in succession, representing the code designation "Twenty-four".

While the commutator 27 provides only nine coding contacts, 26-1 to 26-9 inclusive, each code sending unit provides a tenth element 7, co-operating with a rod 12 and a movable contact 22-10. The purpose of this contact 22-10 is to start the operation of a suitable motor 30 for driving the commutator shaft 28a, upon full depression of a key, with provision being made for opening the contact 22-10 as soon as the motor starts, after which the motor turns the arm 28 through one or more complete revolutions, as determined by a control switch 31 operated from the commutator shaft 28a.

Referring again to Figs. 3 and 4, it is to be noted that the innermost lower projection 18a of each key 3 is spaced farther from the adjacent element 7 than are the other projections 18 on the key in its normal undepressed position. Therefore, it is necessary to push a key in all the way before the lower element 7 of the last pair is turned enough to cause its rod 12 to close the motor starting contact 22-10. As a key 3 is pushed all the way in, as shown in Fig. 4, an inclined projection 32, at the front end of the key, raises a locking plate 33, having slots 33a for the keys, which drops into place behind the projection 32 to prevent return of the key when pressure is released on its button 4. The key is shown in its locked position in Fig. 4, from which it is apparent that while certain code determining elements 7 of the first four pairs will be held in tilted position, in accordance with the disposition of the projections 18, the lower element of the last pair will not be appreciably tilted, on account of the fact that the starting projection 18a is just in engagement with the element in the locked position of the key. In other words, it is necessary to push a key all the way in to the dotted line position of Fig. 4 in order to give a starting impulse to the motor 30, with the start-

ing circuit being interrupted upon release of the key and its return to the locked position in which the code sequence is set and held.

As soon as the motor 30 starts, a cam 34, forming part of the switch 31, closes contacts 35 so as to establish a circuit for the motor before the starting circuit is interrupted upon release of the depressed key and its return to the locking position, as described above. The circuit of the motor 30 is held through the switch 31 for one or more complete revolutions of the commutator arm 28, in accordance with the ratio of the gearing 36, which drives the cam 34 from the shaft 28a. After the arm 28 has made one or more complete revolutions, the motor circuit is interrupted when one of the contacts 35 enters a depression 34a on the cam 34, after which the motor circuit remains open until another key is depressed to send a different code sequence, or the same key is again depressed to repeat the same sequence.

Following the depression and locking of a key 3 to cause the signal 29 to give a code sequence, the key remains in this position until the depression of a key in the same or in another unit of the device. With a key locked in setting position in the upper unit B, as shown in Fig. 4, it is obvious that the depression of a key in the lower unit A will cause its projection 32 to lift the lower locking plate 33, which movement is imparted to the locking plate immediately above. This has the effect of releasing a previously depressed key so that there can be only one key depressed at a time. Furthermore, upon release of a key, the compressed springs 15 of the previously depressed rods serve to move the rods upwardly and thereby return all of the tilted elements 7 to their vertical non-code determining position. In order to provide for lifting of the lower locking plate 33, upon operation of a key in the upper unit, the locking plates 33 are secured together by lugs 37, so they will move in unison, and both locking plates are yieldingly held in locking position by a leaf spring 38, shown in Fig. 3.

Referring now to Figs. 9-12 inclusive, there is shown a modified form of the device, wherein the code determining elements are arranged for movement in a substantially horizontal plane in order to obtain a more compact arrangement of each unit. The modified device operates in substantially the same manner as described in the foregoing, so that only one unit is shown as comprising a plurality of identical code determining elements 39 arranged in pairs, with each element in the form of a flat bar, terminating in an inclined portion 39a. Each element 39 is bent at opposite ends to provide ears 40 and each ear 40 is pivotally mounted on a pin 41, carried by a plate 42, see Fig. 12.

The several elements 39 of a unit are pivotally mounted in pairs with the inclined portions 39a of each pair facing towards each other, and a number of keys 43 extend between the several pairs of elements 39, which keys are similar to the keys 3, in that they provide spaced projections 44 extending above or below the shank of the key in a sequence determined by the code designation of the key. Thus the key shown in Fig. 9 carries the code designation "24", and in the non-code setting position of the key, the inclined portions 39a of the elements 39 all rest on the key shank between the projections 44.

When a key 43 is depressed, as shown in Fig. 10, only certain of the elements 39 will be turned about their pivots, in accordance with the arrangement of the key projections 44. When an

element 39 is so turned, an extension 45 of the element is adapted to press on a collar 46, forming part of a vertically movable rod 47. Thus turning movement of an element 39 is converted into rectilinear movement of a rod 47 and, obviously, the several rods 47, shown in Fig. 11, can be arranged to operate electrical contacts in the same manner as previously described, with reference to the rods 12. The modified device is therefore adapted to operate in substantially the same manner as the device previously described, with the difference that the code determining elements lie in a substantially horizontal plane, thereby making possible a more compact arrangement of a unit and a considerable reduction of its vertical dimension in a stack.

From the foregoing, it is apparent that by the present invention there is provided an improved code setting device, characterized by its simplicity and reliability in operation. The device is particularly adapted for quantity production, owing to the fact that the code determining portions of the pivotally mounted elements are identical, and that they are assembled uniformly in the several units. Each setting key has its code determination directly readable thereon from the arrangement of the projections, so that the only necessary condition to be met in assembling a unit is arrangement of the keys between the elements with their code designations in the desired sequence. By increasing the number of units arranged in stack relation, almost any desired number of code sequences can be provided for with the interconnected operating rods serving to set up any selected code sequence in the commutator contacts, in accordance with the depression of any key in the stack.

I claim:

1. A code setting device, comprising a plurality of identical pivotally mounted code determining elements arranged in pairs lying in the same plane with opposed edges in spaced parallel relation, a plurality of different code setting members common to a series of pairs of said elements, with each member extending between the opposed spaced edges of said elements and providing projections for engaging and turning certain of said elements in response to longitudinal movement of said member, translating members and connections between said members and the elements of each pair, for converting turning movement of said elements into rectilinear movement of said translating members in accordance with the arrangement of the projections on a code setting member.

2. A code setting device, comprising a plurality of identical pivotally mounted code determining elements arranged in pairs lying in the same plane with opposed edges in spaced parallel relation, a plurality of different code setting members common to a series of pairs of said elements, with each member extending between the opposed spaced edges of said elements and providing projections for engaging and turning certain of said elements in response to longitudinal movement of said member, relatively movable electrical contacts corresponding in number to the number of elements in a series, translating members and connections between said members and the elements of each pair in a series for converting turning movement of said elements into relative movement between certain of said contacts, in accordance with the arrangement of the projections on a code setting member.

3. A code setting device, comprising a plural-

ity of identical pivotally mounted code determining elements arranged in pairs with opposed edges of the elements of each pair in spaced parallel relation, a plurality of code setting members each common to a series of pairs of said elements and each having projections differently arranged with respect to the code determining elements for engaging and turning certain of said elements in response to longitudinal movement of said member between said opposed spaced edges of a series of elements, translating members, and connections between said members and the elements of each pair for converting turning movement of said elements into rectilinear movement of said translating members in accordance with the arrangement of the projections on a code setting member.

4. A code setting device, comprising a plurality of similar code setting units assembled in

stack relation, with each unit comprising a plurality of pivotally mounted code determining elements arranged in pairs with opposed edges in spaced parallel relation, a plurality of code setting members each common to a series of said elements, with each setting member extending between the opposed edges of a series of elements and providing projections differently arranged with respect to said elements for engaging and turning certain of said elements in response to longitudinal movement of a setting member, translating members common to the elements of more than one unit of the stack, and connections between said translating members and said elements for transmitting turning movement of any element independently of corresponding elements in different units of the stack.

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