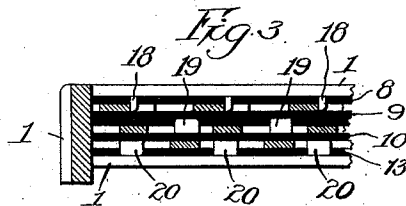
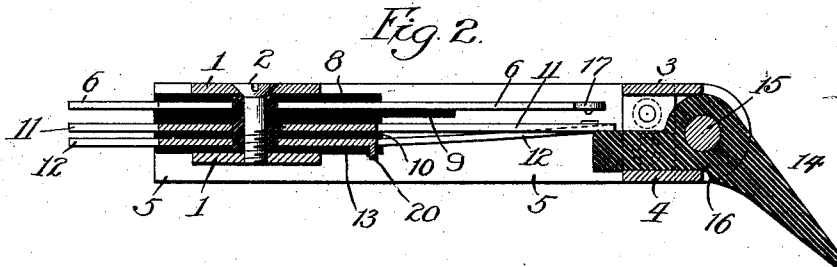
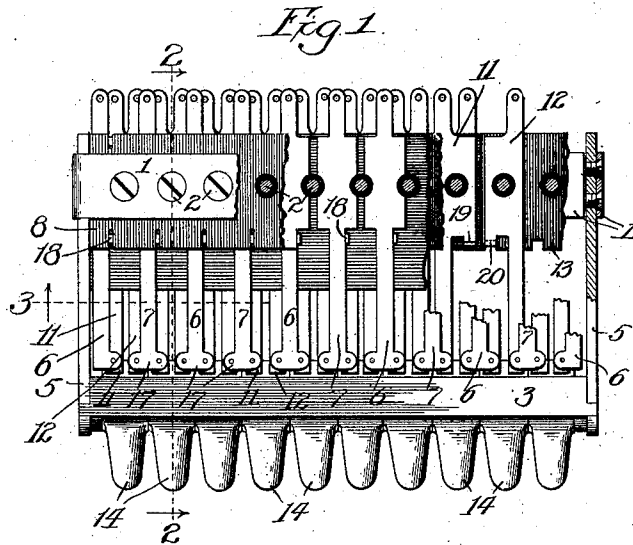


F. R. McBERTY.
ORDER WIRE KEY.
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985,191.

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UNITED STATES PATENT OFFICE.

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ORDER-WIRE KEY.

985,191.

Specification of Letters Patent.

Patented Feb. 28, 1911.

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To all whom it may concern:

Be it known that I, FRANK R. McBERTY, citizen of the United States, residing at New Rochelle, in the county of Westchester and State of New York, have invented a certain new and useful Improvement in Order-Wire Keys, of which the following is a full, clear, concise, and exact description.

My invention relates to keys for use in telephone switch-boards, and its object is to provide a key or strip of keys of compact form and simple structure.

My invention consists of a plurality of parallel rows of contact springs provided with coöperating keys adapted when manipulated to press the springs of the different rows into contact with each other.

My invention is capable of being put to various uses, and is particularly adapted for controlling the connections of order-wire lines, and hence I will describe such embodiment thereof.

Order-wire keys in common use are operated in the same manner as push buttons, the plungers when depressed serving to press the two contact springs with which the terminals of the order-wire line are connected into contact with the two springs forming the terminals of the operator's telephone set. Such keys are usually mounted in strips of ten, crosswise on the left hand portion of the key shelf of the multiple board. The push buttons or heads of the keys are thus arranged in a close row, and for sake of compactness are made small in size. There is thus a liability of the operator depressing the wrong button or of depressing two buttons simultaneously. My invention is designed to overcome these difficulties without sacrificing compactness of structure.

My invention, as embodied in a strip of order-wire keys, consists of a framework provided with a plurality of flat springs forming terminals of the operator's telephone set, a plurality of opposed flat springs forming terminals for the order-wire lines, one pair for each order-wire circuit, and a separate pivoted key or lever corresponding to each order-wire circuit, adapted when operated to close the corresponding contact springs, and thus to connect the operator's set in the order-wire circuit.

The several detailed features of my inven-

tion may be more readily understood by reference to the accompanying drawing, in which—

Figure 1 is a side view, with parts broken away, of a strip of order-wire keys embodying my invention; Fig. 2 is a section on the line 2—2 of Fig. 1; and Fig. 3 is a section on the line 3—3 of Fig. 1.

Similar reference numerals designate similar parts wherever shown.

The framework preferably consists at the rear of two clamping strips 1, 1, held together by clamping screws 2, and at the front of two parallel strips 3, 4, spaced apart by the connecting end strips 5, 5, of the framework. Said strips may be made of metal or other suitable material.

The contact springs, suitably insulated from each other, are held in assembled position by the clamping strips 1, the rear end of said springs being of the usual form for receiving the wires of the circuit to which they are connected, and the inner ends being provided with the usual contact points.

The terminals of the operator's telephone set consists of a row of contact springs clamped between strips 8, 9, of insulating materials. The springs are arranged in pairs of alternate springs 6 and 7, connected to opposite terminals of the operator's telephone set. Clamped between the insulating sheets 9 and 10 is a row of contact springs 11, each forming one terminal of an independent order-wire line, the other terminal of which consists of a similar contact spring 12. The springs 12 are likewise arranged in a row and are clamped between the insulating strips 10 and 13. The terminals of each order-wire line, it will thus be seen, consist of a pair of adjacent contact springs 11, 12.

Each pair of contact springs 11, 12, rests upon the inner end of a pivoted key 14, there being one key for each pair of springs 11, 12. The keys 14 are preferably in the form of angular levers pivoted at the bends or vertices upon a common rod or pivot pin 15. The rod 15 has its ends mounted in the strips 5. The free ends of the keys 14 are preferably tapered to provide a space between the ends of the keys, as shown in Fig. 1, in order that the finger used to depress one key may not overlap and thereby depress an adjacent key at the same time. The keys 14 are made of hard rubber or other suitable in-

insulating material. Each key 14 is provided with a shoulder 16 adapted to contact with the edge of the strips 4 and thus to limit the extent of depression of the key. The inner ends of the keys are normally pressed by the springs 11, 12, into contact with the inner face of the strip 4, as shown in Fig. 2.

As shown in Fig. 1, each of the contact springs 6, 7, except the two springs at the ends, are provided with heads 17 which overlap springs 11, 12, of different order-wire lines. Each of the springs 6 and 7 thus provided with heads 17 is adapted to form a contact with a spring for two different order-wire lines, thus reducing, approximately by one-half, the number of the terminal springs for the operator's set necessary to serve a given number of order-wire lines. Thus in a strip of ten keys, instead of twenty contact springs 6, 7, commonly used for terminals of the operator's set, the number is reduced to eleven.

Each of the springs 6, 7, has an upturned lug 18 which lies in a kerf or notch formed in the strip of insulating material 8. Likewise the springs 11 and 12 have lugs 19 and 20, which lie in notches formed in the insulating sheets 9 and 13, respectively. These lugs 18, 19 and 20 thus serve to properly position the springs and to prevent their displacement.

It will thus appear that the strips of keys embodying my invention have the flat contact springs arranged with their flat surfaces in parallel rows, thus reducing the thickness of the strips. The free ends of the contact springs are so disposed with reference to each other that by manipulating a key the two terminals of the corresponding order-wire line are pressed into engagement with contact springs forming terminals of the opposite sides of the operator's set, and the number of springs required as terminals for the operator's set is reduced. The ends of the keys which are to be depressed by the finger are spaced apart in such manner as to lessen the likelihood of the wrong key being depressed.

I claim:

1. In an order wire key structure, the combination with the frame, of a row of contact springs mounted edge to edge in said frame, additional rows of contact springs also mounted in said frame, and a key, mounted in said frame and adapted to cause the engagement of springs of said first mentioned row with a spring of each of said additional rows.

2. In an order wire key structure, the combination with the frame, of a row of contact springs mounted edge to edge in said frame, two additional rows of contact springs also mounted in said frame in parallel relation to said first named row of springs, and a plurality of keys mounted in the frame and each

adapted to cause the engagement of springs of said first named row with a spring of each of said additional rows.

3. In an order wire key structure, the combination with a frame, of a row of contact springs mounted edge to edge in said frame, two additional rows of contact springs also mounted in said frame, and a key, mounted in said frame, cooperating with corresponding springs in each of said additional rows adapted to force said springs into contact with springs of said first named row.

4. In an order wire key structure, the combination with a frame, of a row of contact springs mounted edge to edge in said frame, two additional rows of contact springs also mounted in said frame, in parallel relation to said first mentioned row of springs, and a plurality of keys mounted in the frame and each adapted to press a spring from each of said last named rows into contact with adjacent springs of said first named row.

5. In an order wire key structure, the combination with the frame, of a row of contact springs mounted edge to edge in the frame, of additional rows of contact springs also mounted in said frame in parallel relation to said first named row, said additional rows being superposed one upon the other and a plurality of keys cooperating each with one of the corresponding contact springs in each of said additional rows adapted to force said springs into contact with springs of said first named row.

6. A strip of contact-closing keys comprising a frame, a row of contact springs mounted edge to edge in said frame, two additional rows of contact springs mounted in said frame in parallel relation to said first named row of springs, and a plurality of keys mounted in the frame in proximity to the free ends of said contact springs, each key being arranged, when manipulated, to press a spring from each of said last named rows into engagement each with one of a pair of adjacent springs of said first named row.

7. In an order wire key structure, a row of contact springs mounted edge to edge in a rectangular frame longitudinally thereof, the free ends of said springs having extensions approximately at right angles to the main body of the spring, a contact mounted on each of said extensions, each alternate spring being adapted to be joined to one side of an operator's telephone circuit and the remaining springs to the other side, of two rows of additional contact springs separated by insulation, one row being superposed upon the other, the adjacent springs of alternate rows being adapted to form the terminals of an independent order wire circuit, and a key adapted to press the springs forming the terminals of an order wire circuit into engagement with two of said springs forming

ing the terminals of the operator's telephone set.

8. In an order wire key structure, the combination with a frame, of a plurality of pairs of contact springs mounted in said frame, additional springs less in number than said first named springs mounted in a row in close relation to said first named row, and a plurality of keys mounted in said frame and having operating sections on one side of both rows of springs adapted upon the rocking of said keys to cause the engagement of said additional contact springs with said first named springs.

9. In an order wire key structure, the combination with a frame, of two rows of contact springs, one superposed upon the other in staggered relation and separated by insulation, the adjacent springs one in each of said rows, forming a pair of terminals for an order wire circuit, an additional row of flat contact springs, less in number than said first named springs, mounted in said frame in parallel relation to said first named rows, each spring of said additional row overlapping a spring in two adjacent pairs of said pairs of springs, each alternate spring of said last named row being connected with opposite sides of an operator's telephone set, and a plurality of keys mounted in said frame and adapted to be actuated to cause the engagement of adjacent springs of said additional row with a pair of springs forming the terminals of an order wire circuit.

10. In an order wire key structure, the combination with the frame, of a plurality of pairs of flat contact springs mounted in said frame, additional contact springs less in number than said first named springs, and keys, one for each of said pairs of springs, adapted to press each member of a pair of contact springs into contact with a separate one of said additional springs.

11. In an order wire key structure, the combination with the frame, of a plurality of pairs of flat contact springs mounted in said frame, additional contact springs less in number than said first mentioned springs, and a key adapted to engage with each of said pairs of springs and press said springs

into contact each with adjacent springs of said additional springs.

12. In an order wire key structure, the combination with the frame, of a plurality of pairs of flat contact springs mounted in said frame, additional contact springs less in number than said first mentioned springs, and a plurality of keys each adapted to engage with one of said pairs of springs, the operation of the several keys being adapted to press corresponding members of said pairs of springs into contact with adjacent springs of said additional springs.

13. In a strip of contact closing keys, the combination with a rectangular frame, of a plurality of pairs of flat contact springs clamped in said frame longitudinally thereof, a plurality of keys, one for each pair of said springs, and an additional row of contact springs clamped in said frame, the inner springs of said row each overlapping a spring in each of two adjacent pairs of said first named pairs of springs.

14. In an order wire key structure, the combination with a rectangular frame, of two rows of flat contact springs clamped in said frame one row being superposed upon the other, each spring of one row forming one terminal and each spring of the other row forming the opposite terminal of independent order wire circuits, a row of flat contact springs also clamped in said frame adjacent said first named rows of springs, and parallel thereto, each overlapping a spring in two adjacent pairs of said first named springs, each alternate spring of said last named row being connected to opposite sides of an operator's telephone circuit, and a plurality of keys adapted to press said pairs of order wire springs into engagement with the springs forming terminals of the operator's circuit.

In witness whereof, I hereunto subscribe my name this first day of September A. D., 1908.

FRANK R. McBERTY.

Witnesses:

D. C. TANNER,
A. H. MOORE.