

A. E. KEITH.

RELAY.

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1,151,796.

Patented Aug. 31, 1915.

Fig. 1.

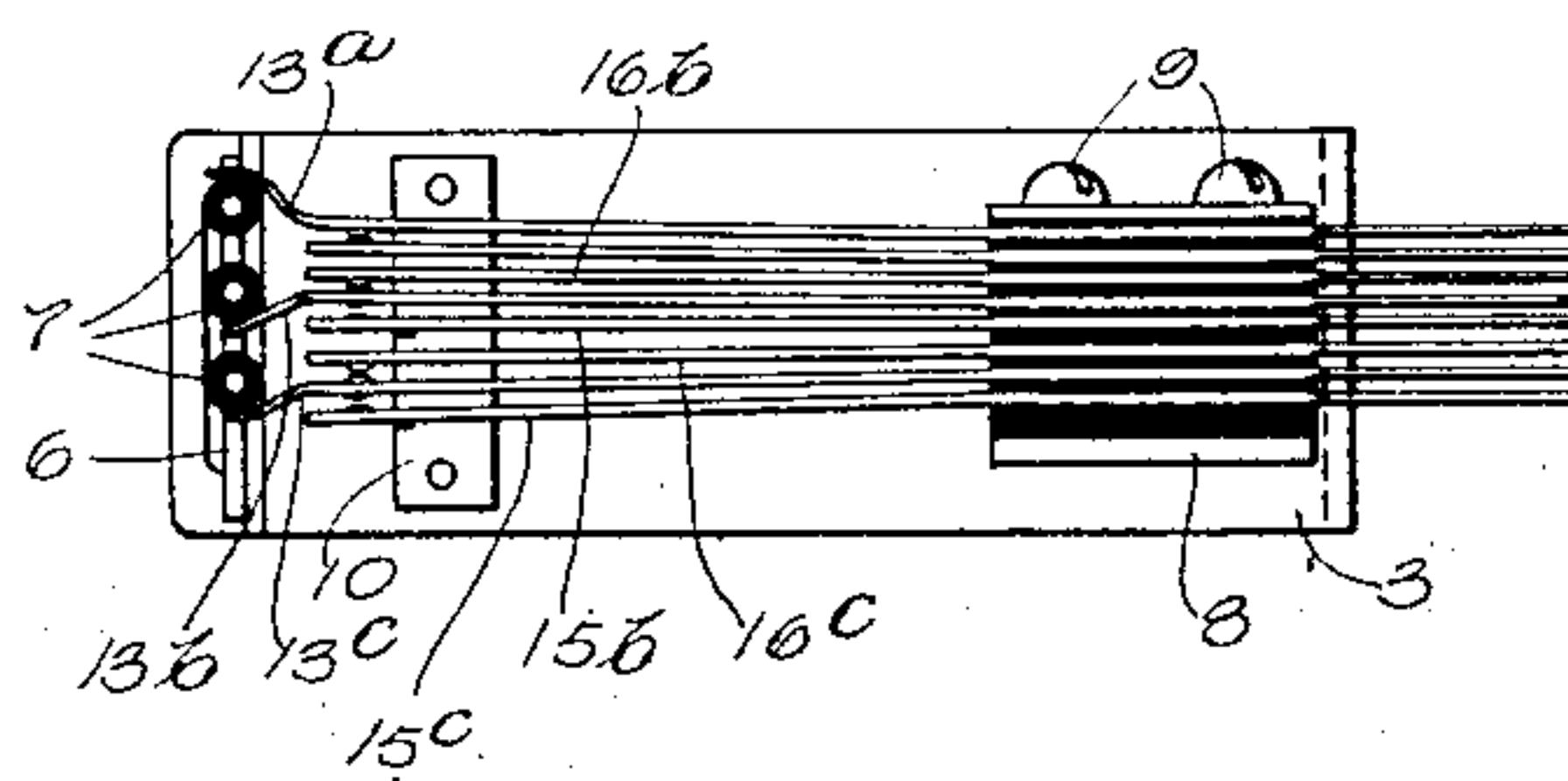


Fig. 2.

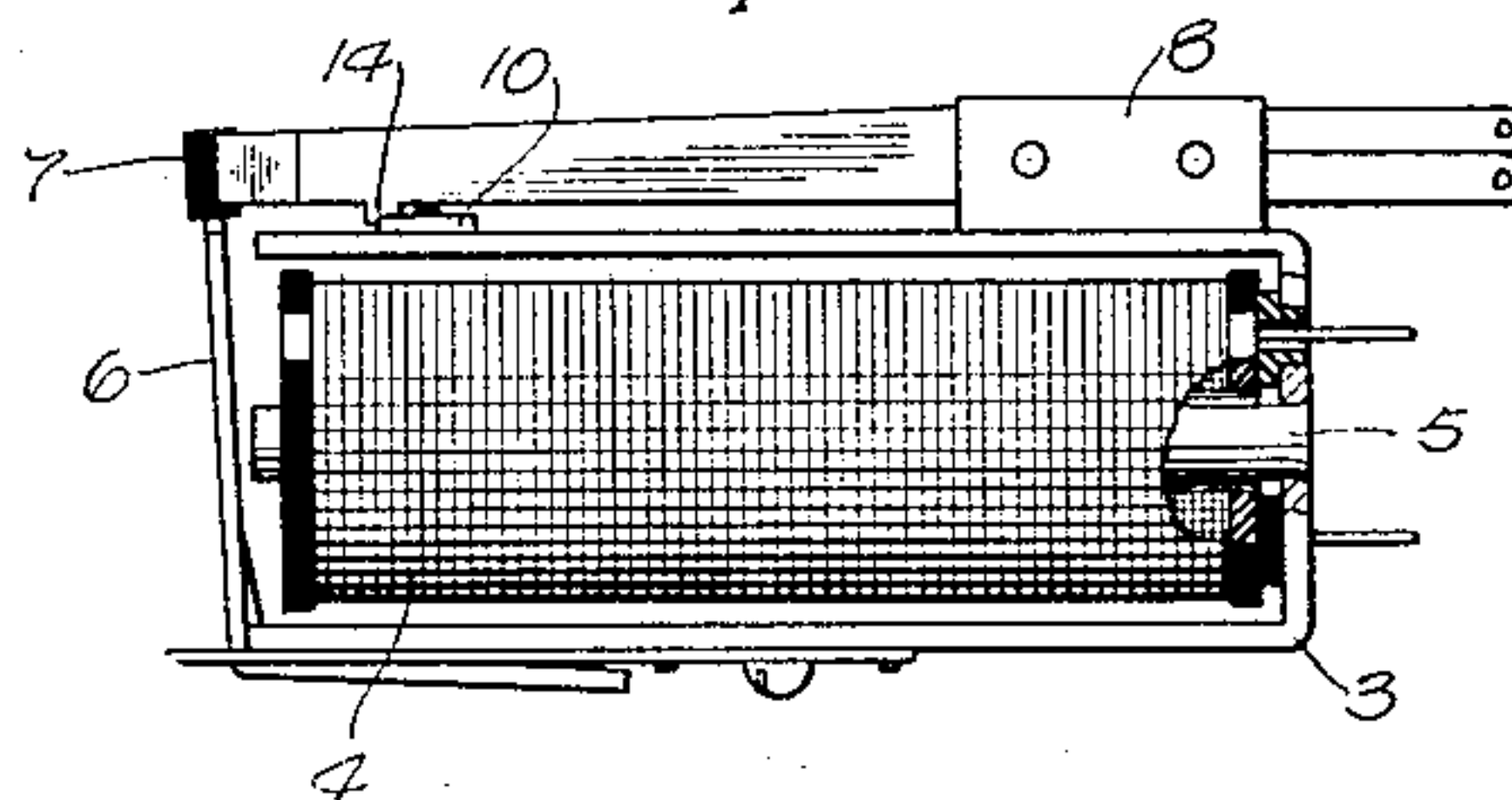


Fig. 3.

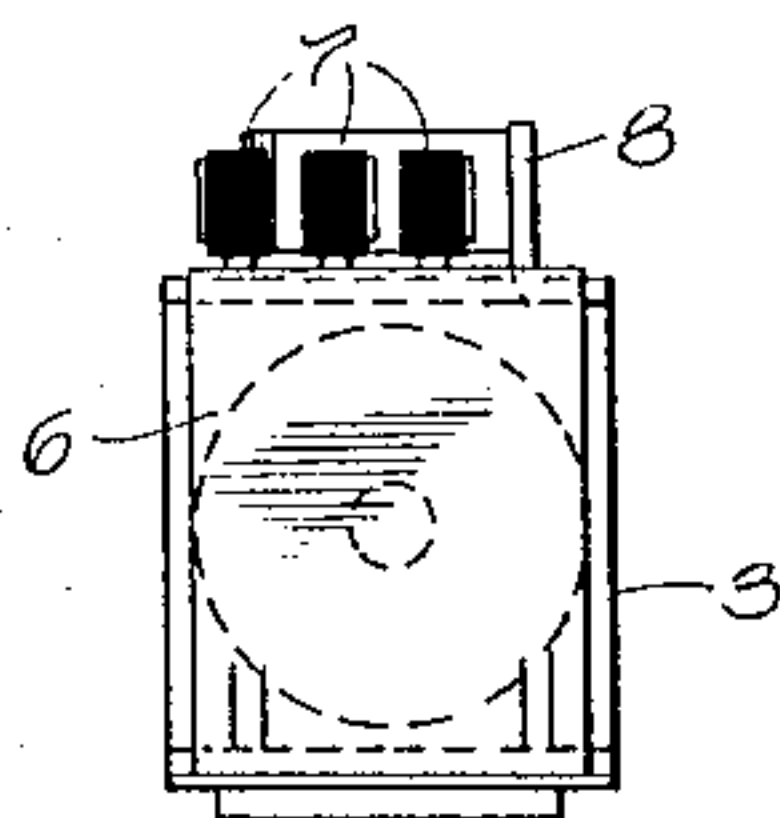
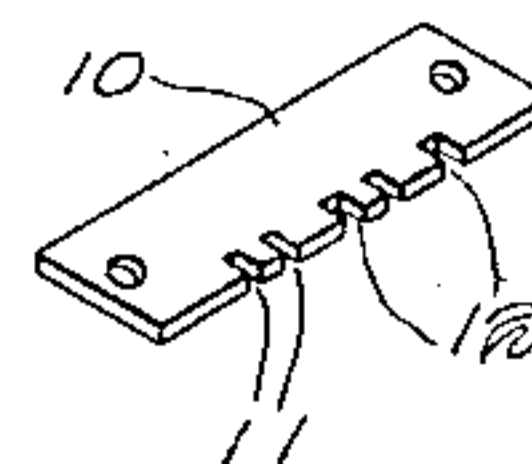


Fig. 4.



WITNESSES
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UNITED STATES PATENT OFFICE.

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RELAY.

1,151,796.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALEXANDER E. KEITH, a citizen of the United States of America, and resident of Chicago, Illinois, have invented a certain new and useful Improvement in Relays, of which the following is a specification.

My invention relates to a relay, and more particularly to a relay for use in connection with telephone systems. In such relays it is customary to have a single armature operate a plurality of sets of contact springs, which springs control suitable circuits. These relays are usually arranged in banks and it is, therefore, quite difficult to obtain access to these springs in order to properly adjust the same.

One of the objects of my invention is to produce a relay in which the springs are so mounted relative to the magnet and armature that the individual springs are readily accessible, so that their tension can be adjusted.

A further object of my invention is the arrangement of the springs whereby a more efficient contact can be obtained between the various pairs.

These and other objects of my invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a plan view of a relay embodying the features of my invention. Fig. 2 is a front elevation of the same. Fig. 3 is an end elevation. Fig. 4 is a detail view of the plate which supports the ends of the contact springs.

As shown in the drawings, the relay comprises a U-shaped frame 3 within which is secured the magnet core 5. The coil 4 is slipped over this core 5 so that it is readily removable from the same. The armature 6 is L-shaped and is supported within the forward end of the U-shaped frame 3, being mounted therein on a knife-edge bearing in a manner well known in the art. The upper end of this armature is provided with a plurality of insulating knobs 7 which are adapted to engage certain of the contact springs in a manner to be hereinafter more fully described. Part of the upper arm of the U-shaped frame 3 is cut away upon three sides and then the portion bent back upon the fourth side so as to form an upwardly-extending projection 8 to which the contact springs are secured by means of the screws 9. These contact springs are mounted on

edge, so that the intermediate springs are easily accessible from the top in order to adjust the tension of the same. Mounted upon the forward end of the upper arm of the U-shaped frame 3 there is a plate 10 the forward edge of which is provided with a plurality of notches 11. Certain of these notches, such as 12, are made slightly wider than the others for a purpose which will be hereinafter pointed out. Certain of the springs 13 are elongated and are provided with end portions which are adapted to be engaged by the insulated knobs 7. The remaining springs are provided with downwardly-extending extensions 14 which engage with the corresponding notches 11 and 12 in the plate 10. The notches 11 are of just sufficient width to receive these projections and hold the corresponding spring stationary. Those springs which are provided with an extension which engages with the large notches 12 are capable of a slight lateral movement.

In operation, when the magnet is energized and the armature attracted, the insulated knobs 7 engage with the elongated portions of the springs 13 so as to move these springs laterally in a plane at right-angles to the movement of the armature. The movement of the spring 13^a merely tends to open the contact between that spring and the other spring of its pair. The movement of the two springs 13^b and 13^c separates these springs from the springs 16^b and 16^c, respectively, and forces them into contact with the springs 15^b and 15^c. These springs 15^b and 15^c are provided with projections which engage with the enlarged notches 12 and thus, as the springs 13^b and 13^c engage with the springs 15^b and 15^c, these latter springs are capable of a slight lateral movement and they are then brought to a positive stop on account of the projection 14 engaging with the side of the notch 12. By the provision of the notches 12 and the projections 14 the springs 15 can be placed under a much greater tension than heretofore, as the side of the notch 12 provides a positive stop which limits the movement of these springs toward the movable spring 13 and thus prevents the tension of these springs from causing them to make contact with the springs 13. When the springs 13 engage with these springs 15, however, the springs 15 are capable of a slight lateral movement which thereby insures a more perfect contact, for if this

slight lateral movement is not permitted, and the springs 13 happen to be so adjusted that one of the springs 13 engages with its corresponding spring 15 before the others
5 make contact, it will tend to stop the motion of the armature and thus prevent a good contact being made between the other two springs.

It is thus seen that I have provided a very
10 efficient construction and a simple means for holding certain of the springs stationary, and for permitting certain of the other springs to have a limited movement, but yet having a positive stop which prevents these
15 latter springs from accidentally coming into contact with the movable springs. By this construction it is possible to place a higher tension upon these springs, such as 15, which have a slight lateral movement, than has
20 heretofore been possible, and thus insuring a more positive and better contact. Furthermore, by arranging these springs upon edge on top of the magnet structure, and having the movable springs operate in a
25 plane at right-angles to the plane or motion of the armature, these springs are brought into such a position that they are much more readily accessible and their tension can thus be much more readily adjusted.

30 What I claim as my invention is:—

1. In a relay, a magnet, an armature controlled thereby, a set of contact springs supported above said magnet, a supporting plate, a plurality of notches in said plate,
35 and a plurality of projections extending downward from said springs and engaging with said notches, certain of said notches being of sufficient size to allow the corresponding contact spring to have a limited
40 movement, while the other notches tend to hold the corresponding springs stationary.

2. In a relay, a U-shaped frame, a magnet, an armature controlled thereby, a plurality of movable and stationary contact
45 springs supported on edge on top of said frame, a plurality of insulating members carried by said armature and adapted to engage with certain of said movable contact springs, a supporting plate provided with
50 a series of notches, and corresponding projections extending downward from certain of said springs and adapted to engage with said notches for holding said springs in a stationary position, said armature adapted
55 to move said movable contact springs into engagement with said stationary contact springs.

3. In a relay, a U-shaped frame, a magnet, an armature controlled thereby, a series
60 of contact springs mounted on edge on top of said frame, a supporting plate provided with a series of notches, a corresponding series of projections extending downwardly

from certain of said contact springs and engaging with said notches, certain of said
65 notches being enlarged to thereby permit a slight lateral movement of the corresponding contact spring, while the other notches tend to hold the corresponding contact
spring stationary, a plurality of movable
70 contact springs, means controlled by said armature for operating said movable contact springs to force them into contact with said first-mentioned springs.

4. In a relay, a frame, a magnet having
75 a core mounted on said frame, an armature controlled by said magnet, a set of contact springs mounted on said frame, one group of said springs being permanently stationary, mechanical means for restricting the
80 movement of another group of said springs, and a third group of said springs, the individual members of which have free movement between members of the first and second groups, the movement of said last
85 springs controlled by the armature of said magnet.

5. In a relay, a magnet, an armature controlled thereby, a pair of contact springs, a stop for preventing one of said contact
90 springs from connecting with the other of said springs, a second stop for limiting the movement of said other contact spring in the opposite direction whereby the movement of said other spring is restricted, one
95 of said springs being under the control of said armature whereby said armature may move said last mentioned spring into contact with the other spring, and mechanical means whereby the armature can move the
100 first mentioned spring at right angles to the movement of the armature.

6. In a relay, a U-shaped frame, a magnet, an armature controlled thereby, a series of contact springs mounted on edge on
105 top of said frame, a supporting plate provided with a series of notches, a corresponding series of projections extending downwardly from certain of said contact springs and engaging with said notches, certain of
110 said notches being enlarged to thereby permit a slight lateral movement of the corresponding contact spring, while the other notches tend to hold the corresponding contact springs stationary, a plurality of movable
115 contact springs, mechanical means comprising said armature for operating said movable contact springs to force them into contact with said first-mentioned springs.

Signed by me at Chicago, Cook county, Illinois, this 6th day of November, 1911.

ALEXANDER E. KEITH.

Witnesses:

ARTHUR J. RAY,
ALBERT ANDERSEN.