

R. H. MANSON.
 PARTY LINE RINGING KEY.
 APPLICATION FILED APR. 17, 1909.

985,820.

Patented Mar. 7, 1911.

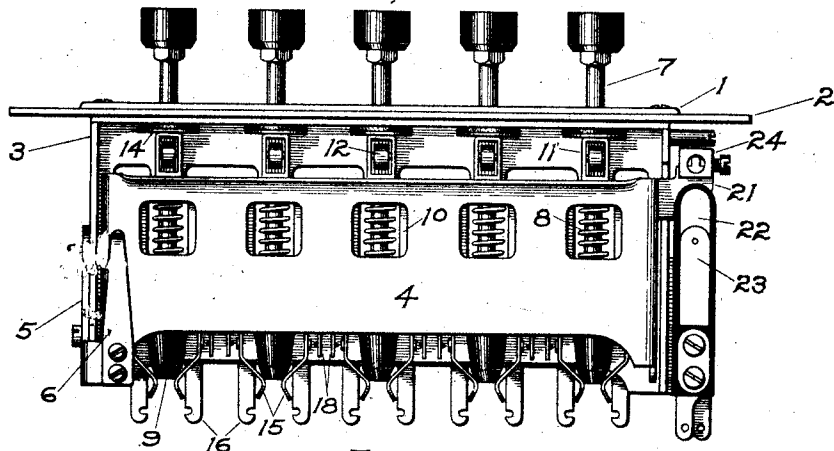


FIG. 1

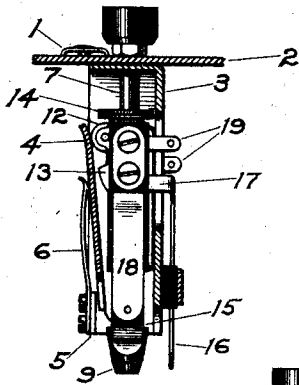


FIG. 2

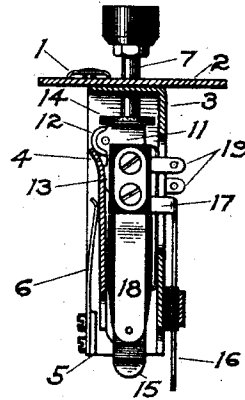


FIG. 3

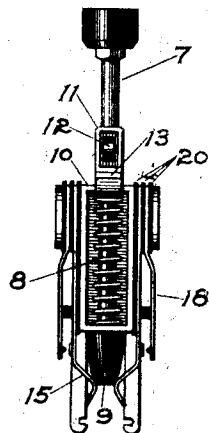


FIG. 4

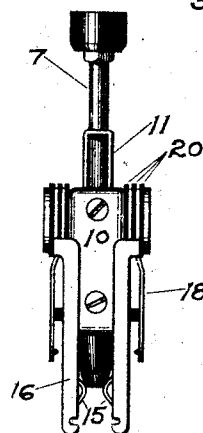


FIG. 5

Witnesses
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UNITED STATES PATENT OFFICE.

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PARTY-LINE-RINGING-KEY.

985,820.

Specification of Letters Patent.

Patented Mar. 7, 1911.

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To all whom it may concern:

Be it known that I, RAY H. MANSON, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Party-Line Ringing-Keys; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates more particularly to a key structure consisting of inter-related plunger keys for party line or intercommunicating systems. Each key has several positions: the normal position, the intermediate position in which contacts are closed and in which the key is held by a catch, and the third or way-down position, in which other contacts are closed. When the plungers are caught and retained in a depressed position, the subsequent depression of any other plunger, releases those which have been caught and held down. In general, such a key structure has been disclosed and patented in patent granted to me May 12, 1908, No. 887,260.

In the practical use of these keys I have found that in several particulars the construction and the operation admit of improvement, and it is with this purpose in view that I have made this invention.

More particularly I find that when the contacts are worn or otherwise disarranged, owing to the fact that the contact end of the switch springs is in the interior of the casing, the bank of keys must be disassembled to get at them, and, if I reverse the springs so that the contacts will be at the exterior of the casing, the lead conductors passing through the structure to the other end of the spring, will impede the operation. To obviate this difficulty, I reverse the position of the contact springs so that the contact ends will be accessible at the rear of the bank of keys. I then bend over the other end of the contact spring and extend it in a direction substantially parallel to the body of the spring, making a contact terminal in proximity to the other end of the spring. This furnishes an arrangement in which both the contact portion and the terminal of the spring are readily accessible at the

rear of the bank. To reach these I lift up the top of the switchboard, or open the telephone case, where this bank is used in an intercommunicating system. I have also found that the pins, or other friction surfaces, wear away the catch plate so that in time the two are out of adjustment. This derogates from the efficiency of the operation, and in time prevents the operation altogether, as the groove cut by the pin, is opened in the bent portion of the catch plate above the proper intermediate position for the key, so that the contacts are not closed when the key is resting in the second position. The plunger is returned from way-down position to the intermediate position by the joint action of the plunger spring and a spring-pressed catch. I find that the friction between the bearings which have been used, is so great that the effect of the pressure exerted by the catch spring is largely ineffective. To obviate these difficulties, I provide a "frictionless" bearing between the plunger and the catch plate. In the specific embodiment of the invention shown in the drawings, I show a rotative member, preferably a roller, on the plunger which engages the catch plate when the plunger is depressed. I make the catch member on the plunger broad enough to present a large area contacting with the catch plate. This reduces the wearing of the plate. When in the way-down position, the roller bearing alone engages the plate so it may be readily returned to the intermediate position when released.

In the assembling of the frame and keys, I provide a main frame which consists of one punching, having both ends and a top side bent up, forming a four-sided frame piece. To this is attached a box-shaped member in which the plunger spring is housed, and against which one end of the spring bears. The upper end of this member is cut away, forming a groove through which the plunger passes. A rectangular cross-section shaped member passes through this groove, preventing the plunger from rotating.

My invention will be best understood by reference to the following description when taken in connection with the accompanying illustrations, showing one specific embodi-

ment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings:—Figure 1 is a side elevation of a bank of keys of my invention. Fig. 2 is a cross-section of this bank showing one of the keys in way-down position. Fig. 3 is a cross-sectional view showing a key in intermediate position. Fig. 4 is a front elevation of one of the key units which has been removed from the frame. Fig. 5 is a rear elevation of the same unit.

Referring to the drawings, and to the embodiment of my invention there shown, 2 is the main plate which is attached to the telephone box or switchboard.

1 is an escutcheon plate fastened to the main plate.

3 is the main part of the framework which is made from a single piece of metal having three of its edges bent up and which is attached by one of these edges to the main plate 2.

The catch plate 4 is pivoted in the open face of the main part of the frame as shown in Fig. 1. The catch plate is cut away to furnish edges which retain the plungers in depressed positions. The bracket 5 is fastened to one end of the member 3 and to this is attached a leaf spring 6 which always presses the catch plate in the direction of the plungers. The plungers themselves consist of a shaft 7 which passes through the main plate and the top of the member 3 into the box-shaped case 10. The lower end of the plunger passes through the bottom of the member 10 and terminates in an insulation button 9. The spiral spring 8 wound around the shaft of the plunger and bearing against the bottom of the member 10 at one end and against a member 11, fast to the plunger shaft at the other end, tends always to return the plunger to its uppermost position. Journaled in the member 11 is a roller 12 which is adapted to engage the catch plate 4 when the plunger is depressed. The lower part of the member 11 is formed in the shape of a cam catch which is adapted to engage the catch plate 4 and to catch against the edges of the opening in the catch plate. A buffer 14 is placed upon each plunger to protect the blow of the engagement between the plunger and the top of the frame 3. The contact springs are shown at 15 and 18. The springs 15 terminate in bus bar terminals 19. The ends of the springs 18 are bent over and drawn out in a direction substantially parallel to the contacting ends into terminals 16. These springs are separated by insulation material 20. These contact springs engage each other when the plunger is in intermediate position. A further depression of the plunger causes engagement between contact springs 22 and 23 shown, fastened to the end of the frame

piece 3. A cross bar 24 is shown by which the catch plate may be connected to the catch plate of another bank of keys. By this arrangement I may provide a series of banks so related that when the plunger is depressed in any one of the banks, each catch plate will be operated and the plungers which have been depressed, will be released.

In the operation of my invention, should I depress a single plunger, the contacts 15 and 18 will close the listening circuit and the catch plate engages the catch on the plunger to retain it in that position; should I depress the plunger farther, the ringing contacts will be closed and the roller bearing engages the plate, rocking it on its pivot. When released from the way-down position, the tension of the leaf spring, together with the plunger spring, returns the plunger to its intermediate position. It will be held there until a second plunger is depressed which action rocks the plate to release the first depressed plunger.

While I have shown my invention in this particular embodiment, it is evident that I may embody it in any of the well known forms of key banks; and it will be obvious to those skilled in the art, that numerous and extensive departures may be made without departing from the spirit of this invention, the same being herein shown solely for the purpose of clearly illustrating one specific embodiment thereof.

I claim:

1. In a switch mechanism, a frame, switch operating means mounted in said frame, switch springs mounted in said frame with their contacting parts exposed at the rear of said frame, terminals for said switch springs extending substantially parallel to said springs and exposed in proximity to said contacting portions.

2. In a switch mechanism, a frame, switch operating means mounted in said frame, switch springs having their contacting ends exposed at the rear of said frame, mounted in said frame, the other end of said springs being attached to the frame, and terminals for said springs exposed to the rear of the contacts.

3. In a switch mechanism, a frame, switch operating means mounted in said frame, switch springs mounted in said frame, having both ends extending in the same direction and exposed at the rear of said frame, one end forming a contacting surface and the other a lead terminal, and means for fastening the middle of said spring to said frame.

4. In a switch mechanism, a frame, a casing attached to said frame, a plunger adapted to be depressed through said casing, a spring in said casing bearing against said plunger and casing, and adapted to return said plunger to normal position, a groove in

said casing, and means on said plunger operating in said groove to prevent said plunger from rotating.

- 5 5. In a switch mechanism, a frame, plungers mounted in said frame, means for catching and retaining said plungers when depressed, means on said plungers for engaging and operating said catching means to release any previously depressed plungers, contact springs operated by said plungers, the contact portion of said springs exposed at the exterior of said frame and terminals for said springs exposed at the exterior of said frame, proximate to the contacting portions.
- 10 6. In a switch mechanism, a frame, switch operating means mounted in said frame, switch springs having contact carrying ends exposed at the rear of said frame, said springs doubled over and attached at their

middle to the frame, the other ends extending rearward beyond the contacts, and carrying terminal parts.

7. In a switch mechanism, a frame, switch operating means mounted in said frame, switch springs having their contact parts exposed at the rear of said frame, said springs doubled back and attached at an intermediate point to said frame and bearing terminal parts at the other ends, said terminal part bearing ends extending to the rear of the frame beyond the contact bearing parts.
- 15 20 25 30

In testimony whereof I affix my signature in presence of two witnesses.

RAY H. MANSON.

Witnesses:

F. O. RICHEY,
THERESA M. LIBBY.