G. P. TROMP.

SWITCH KEY.

APPLICATION FILED FEB. 10, 1914.

1,109,947. Patented Sept. 8, 1914.

Fig. 1.

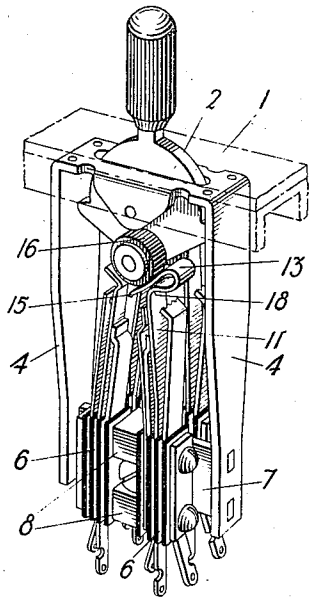


Fig. 2.

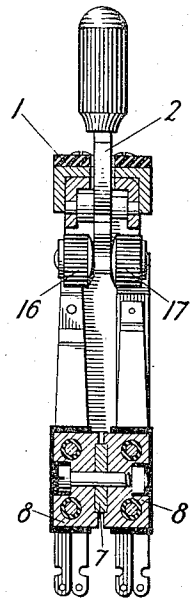


Fig. 3.

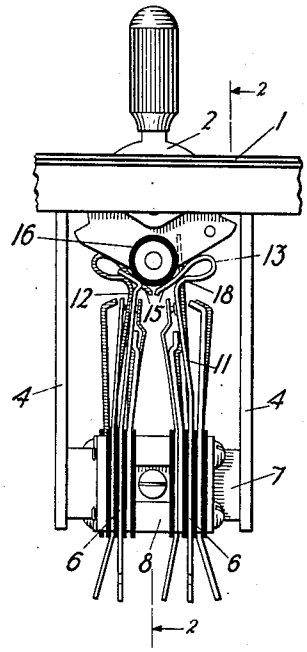


Fig. 4.

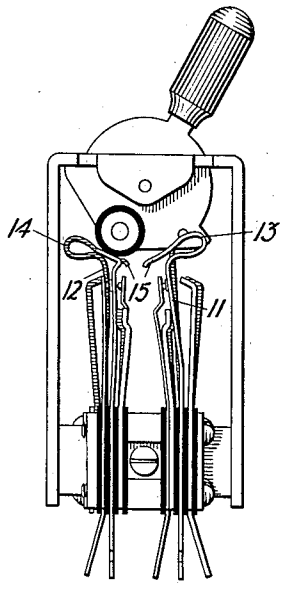
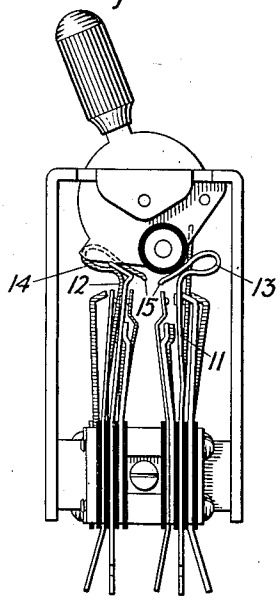


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SWITCH-KEY.

1,109,947. Specification of Letters Patent. Patented Sept. 8, 1914.

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To all whom it may concern:

Be it known that I, GERARD PIETER TROMP, a subject of the Queen of the Netherlands, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Switch-Keys, of which the following is a full, clear, concise, and exact description.

This invention relates to telephone keys, and more particularly to what are known as listening and ringing keys.

The object of the invention is to provide a cushioning means to prevent the rebound or blow of the key lever when restored to normal position from opening the normally closed contacts of the key.

In accordance with the invention, one or more of the master switch springs, that is, those engaged by the operating means, are provided with a yielding portion which is engaged by the operating roller to prevent the bodily movement of said springs out of contact with their engaging contacts until said lever has been moved a considerable distance out of normal. This resilient means comprises a loop formed of the ends of the master contact springs, said loop being normally closed so as to limit the amount of flexure in the loop itself when compressed by the operating roller; and so shaped that the loop is distorted out of normal position when engaged by the actuating roller before the bodily movement of the said master springs begins.

In the accompanying drawings,—Figure 1 is a perspective view showing a switch key embodying this invention; Fig. 2 is a vertical section taken on line 2—2 of Fig. 3; Figs. 3, 4 and 5 are side elevations, showing the key in a normal, listening and ringing position, respectively.

Like parts are designated by similar reference characters throughout the several views.

The structure shown comprises a top plate 1, supporting a switch actuating rocking lever 2. Associated with the key is a supporting frame of inverted U-shape, having downwardly extending arms 4, 4, which are united by a bridging member or rib 7, upon either side whereof spring pile-up units 6, 6, are mounted by means of blocks 8, 8. Said units are positioned so as to hold the contact springs in operative relation with the actuating rollers.

The means provided for cushioning the operating lever consists of master spring members 11, 12, formed at the top into flexible loops 13, 14, said loops being normally closed. The spring ends 15 projecting from the loops bear against the plunger rollers 16, 17, unless the key lever 2 is in an operated position, in which case one or the other of said projecting ends will be disengaged. When one of said extensions 15 is disengaged, the resiliency of the metal causes a gap to form at the neck of the loop as shown in Fig. 4. Fig. 3 shows the master spring members 11, 12 with the key plunger in a normal position. When the key is in this position, there is a slight pressure exerted against the plunger rollers 16, 17 by the terminals 13, 14 of said master spring member, which tend to hold the key in said position. Figs. 4 and 5 show the key in an operated position, whereby one or the other of the master spring members is disengaged.

When the lever 2 is operated it may be moved a considerable distance before contacts that are normally closed are interrupted, and contacts that are normally open become closed. Upon the actuation of the lever, one of the plunger rollers engages the extension of one of the loop shaped top portions, causing said loop shaped portion in contact with the roller to change its angular position in regard to the lever roller until a position is reached where no further change takes place, which in a locking key is a short distance from the end of the stroke. During the time that the lever is returning when released, this same movement is again gone through, except that, of course, it is reversed. The combined action of the spring and roll prevents the lever from quickly releasing until it has been manually moved nearly to its normal position. It is thus possible to obtain a relatively slow release for a major part of the stroke, and a quick release for the last part, as a result of which the blow of the plunger striking the opposite set of springs is considerably lessened.

During the compression of the loop shaped top portion upon the operation of the key lever, the projecting end 15 comes to rest upon shoulder 18 formed in the master

spring member at the point where the loop is made in said master spring member, thus reinforcing the part of the spring included in the loop and, by limiting the amount of flexure in the loop itself, greatly relieving the elastic stress which would otherwise be exerted upon the metal. By thus reducing the elastic strain upon the part of the spring forming the loop shaped top portion, the life of the master spring member is greatly prolonged.

By the means provided in this invention, whenever the lever 2 is returned from an operated to normal position, a cushioning effect just before the end of the stroke is obtained when the plunger strikes the opposite or unoperated master spring member, and by effecting a slight compression in it. This cushioning effect absorbs the shock of the plunger, thereby preventing the opening of contact springs normally closed, thus eliminating any disagreeable disturbance in the line connection.

What is claimed is:

1. In a key switch, the combination with a pair of normally closed contact springs, of a roller adapted to engage one of said springs to separate said contacts, the engaged portion of said spring being formed into a normally closed resilient loop, said roller in its engagement with said loop first acting against the resilience of said loop to absorb the inertia of said roller and then acting against the pressure of said switch spring to open the contacts.

2. In a key switch, a group of contact springs embracing a master contact member, an operating lever, a loop shaped portion on said master contact member, said loop having an extension thereon, a shoulder formed where said loop is made in said contact member against which said extension engages under pressure of said operating lever.

3. In a key switch, a group of contact springs embracing a master contact member, an operating device, a resilient loop shaped portion on said master contact member, said portion being normally engaged by said operating device, causing said loop to be closed while said resilient portion is engaged by said operating device.

4. In a key switch, a group of contact springs embracing a master contact member, an operating device, said master contact member having a resilient loop shaped portion, said portion being normally engaged and closed by said operating device, said loop on said portion having a gap at its neck when said top portion is disengaged by said operating device, whereby a cushioning effect is obtained to absorb the shock of said operating device when said operating device is returned from an operated to normal position.

5. A master spring contact member having a loop shaped portion, said loop shaped portion having an extension thereon, and said contact member having a shoulder formed where said loop is made, said shoulder functioning as a stop for said extension when said loop is compressed.

6. In a key switch, a switch spring having one end secured to the switch frame and having its free end formed into a resilient loop, and an operating device normally engaging and closing said loop.

In witness whereof, I hereunto subscribe my name this 6th day of February A. D., 1914.

GERARD PIETER TROMP.

Witnesses:
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