July 5, 1938. R. E. GOLEMB 2,122,643

SWITCHING KEY

Filed Aug. 28, 1937

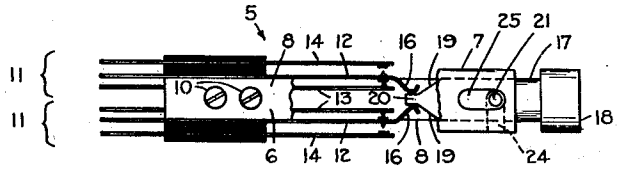


FIG 1

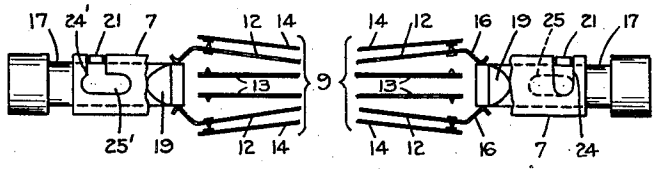


FIG. 6

FIG. 2

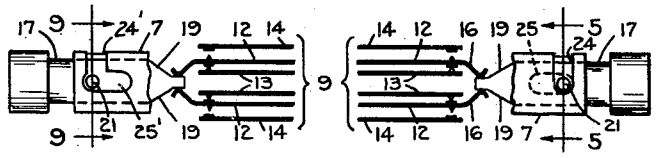


FIG. 7

FIG. 3

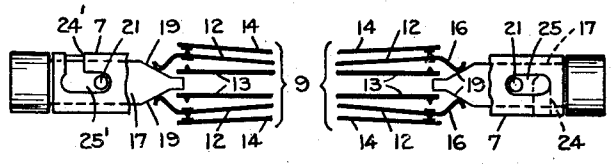


FIG. 8

FIG. 4

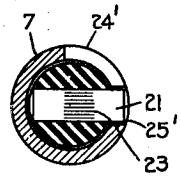


FIG. 9

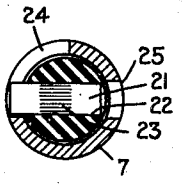


FIG. 5

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SWITCHING KEY

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Application August 28, 1937, Serial No. 161,489

9 Claims. (Cl. 200—1)

This invention relates to a switching key of the type generally used in telephone switchboards.

In the past it has been the practice to use both a non-locking pushbutton key and a rotatable locking key in switchboards. Thus it has been necessary for the manufacturer to make and to maintain a stock of both types of keys.

It is an object of this invention to obviate the necessity of supplying two types of keys, by combining in a single switching key, the features of both types.

An additional object of this invention is to provide a simple switching key structure which can be readily converted by an unskilled person from a locking key to a non-locking key.

It is a still further object of the invention to provide a switching key construction which may be selectively used as a locking key or as a non-locking push-button type key, without any rearrangement of its parts.

In the drawing, Fig. 1 is a plan view, of a switchboard key made in accordance with the present invention, a portion thereof being broken away for clearness in disclosure; Fig. 2 is a plan view of a portion of the key shown in Fig. 1 illustrating one position of its plunger; Fig. 3 is a view similar to Fig. 2 illustrating the plunger in another position; Fig. 4 is a view similar to Figs. 2 and 3 illustrating the plunger in a still different position; Fig. 5 is a section through the key taken on line 5—5 of Fig. 3 looking in the direction of the arrows; Fig. 6 is a fragmentary plan view of a modified switchboard key illustrating the plunger in the same position as Fig. 2; Figs. 7 and 8 are views of the modified key of Fig. 6, illustrating various positions of the plunger; and Fig. 9 is a section through the key taken on line 9—9 of Fig. 7 looking in the direction of the arrows.

Referring to Figs. 1 to 5, there is shown a switchboard key of the present invention, indicated generally by the reference character 5. This key comprises a frame 6 having a cylindrical end portion 7 and a pair of spaced, integrally formed arms 8 extending therefrom, one of the arms 8 being broken away in Fig. 1 to show the relation of the parts more clearly. A contact spring assembly 9 of usual construction is supported by a block of insulation (not shown) fastened by screws 10 to the outer ends of the arms 8. The spring assembly comprises two sets of insulatedly mounted contact springs 11, each set including a motor spring 12 as well as back and front contact springs 13 and 14 respectively. Each motor spring 12 of each set is curved inwardly and outwardly as shown at 16, for a purpose to be hereinafter described.

A plunger 17 which is slidably and rotatably mounted in the cylindrical portions 7, has a head or button 18 formed on its outer end. The inner end of the plunger, however, is wedge-shaped, the inclined faces 19 of which engage the curved ends 16 of the motor springs as shown in Figs. 1 and 3.

Referring now particularly to Fig. 5, it will be seen that the cylindrical portion of the frame 6 is provided with slots 24 and 25 adapted to receive a pin 21 projecting from a hole 22 through the plunger in which the pin is frictionally held by means of the knurling 23. This friction fit is such that the pin may be moved to project into either of the slots 24 or 25. The slot 24 extends circumferentially of the cylindrical portion 7 and is of such length that when it cooperates with the pin 21, the motion of the plunger is limited to a quarter turn rotation. The slot 25 which is diametrically opposed to one end of the slot 24 is of such length that it permits the plunger to be moved longitudinally of the frame from the position shown in Fig. 1 to the position shown in Fig. 4. Since one end of the slot 24 is diametrically opposite to one end of slot 25, the pin 21 (see Fig. 5) may be forced through the plunger to engage one or the other of these slots when it is desired to change the key from locking to non-locking operation.

The key is used in the following manner. If it is desired to have the key operate as a locking key, the pin 21 will be in the position shown in Fig. 5 with the wedge-shaped end of the plunger normally disposed between the curved ends 16 of the motor springs as shown in Fig. 3. The plunger may be rotated one-quarter of a turn to its locking position shown in Fig. 2 wherein it separates the motor springs 12 so that they engage their front springs 14. Since the motor springs 12, when thus operated, rest upon the cylindrical surface of the plunger, it will be retained or locked in this position. If it is desired to release the key, the plunger will be rotated in the reverse direction one-quarter of a turn to its original position, wherein the motor springs 12 will again make contact with their back contact springs 13 as shown in Fig. 3.

If it is desired to have the key of the non-locking type the pin 21 is forced to the right as viewed in Fig. 5 until it clears the slot 24 and projects into the longitudinal slot 25 (see Figs. 1 and 4). If the plunger is now depressed to the position shown in Fig. 4, the inturned ends 16

of the motor springs 12 will slide up the wedge-shaped portion of the plunger until they engage their front contact springs 14. When, however, the operator removes her finger from the plunger, the motor springs, due to their resiliency, will resume their normal position such as shown in Fig. 1, and thus will slide down the inclined faces of the plunger to restore it to the position shown in Fig. 1.

The construction just described, provides a combined key which with one adjustment may be selectively rotated into one of two positions as shown in Figs. 2 and 3 wherein it is locked or which with another adjustment may be used for non-locking operation.

Referring now to Figs. 6 to 9 there is shown a modified switching key arrangement. This key is constructed and operates in the same manner as the previously described key except that the longitudinal and circumferentially extending slots communicate with each other so that it is unnecessary to shift the pin 21 in the plunger from the position shown in Fig. 3 to the position shown in Fig. 4. In this construction the cylindrical portion of the frame 6 is provided with a transverse slot 24' which extends substantially a quarter of the way around the cylindrical portion 7, so that the pin and plunger may be rotated approximately one-quarter of a turn. A longitudinally extending slot 25' in the cylindrical portion of the frame, communicates with one end of the slot 24' and is of such length as to permit the plunger to be moved from the position shown in Fig. 7 to that shown in Fig. 8. The plunger is rotated in the same manner as in the preceding device when it is desired to use the key as a locking key and is also adapted to be moved longitudinally in the frame to the position shown in Fig. 8 when it is desired to use it as a non-locking push button key.

What I claim is:

1. In a key assembly, a frame provided with a guide, a plunger mounted in said guide, one end of said plunger being tapered, contact elements supported on said frame in operative relation to the tapered end of said plunger, at least one of said contact elements being shiftable by said tapered end, means on said frame for guiding said plunger for longitudinal movement only therein, additional means on said frame for guiding said plunger for rotation only therein, and means on said plunger selectively engageable in either of said guiding means.

2. A key assembly, comprising a plurality of spaced contact spring members, a supporting element for said members, a plunger carried by said supporting element, one end of such plunger being adapted to move related spring members into contact, longitudinally extending and circumferentially extending guide means on said supporting member, and means mounted on said plunger and selectively engageable with said guiding means.

3. A key assembly, comprising a support, contact elements mounted on said support, a wedge-shaped plunger mounted on said support in operative relation with said contact elements, longitudinal and circumferential guide means for said plunger, whereby said plunger may be selectively reciprocated or rotated in said supporting means.

4. In a key assembly, a support, a pair of opposed springs carried by said support, a plunger mounted in said support, one end of said plunger being tapered and disposed between said pair of springs, whereby upon application of pressure on said plunger to effect movement thereof toward said springs, said tapered portion will force the springs apart and on release of said pressure said springs will return said plunger to its original position, a longitudinal guide on said supporting member, a circumferentially extending guide on said supporting member, and means carried by said plunger and adapted to be selectively engaged by said guides.

5. In a switching key assembly, a support comprising a sleeve-like portion and arms extending therefrom in a direction substantially parallel to the principal axis thereof, contact spring members supported by said arms to project in the direction of said sleeve-like portion, two of said spring members having their ends bent outwardly with respect to each other adjacent the sleeve-like portion, a plunger mounted in said sleeve portion, one end of said plunger having opposed inclined surfaces adapted to move said bent springs with respect to said other spring member, longitudinally extending and circumferentially extending guide means carried on said sleeve portion, and means carried by said plunger adapted to be selectively engaged in said guide means.

6. In a switching key assembly including a support, contact elements, a plunger mounted for rotary or longitudinal displacements to move said contact elements, a plurality of guide means on said support, and means carried by said plunger adapted to be selectively engaged in either of said guide means to effect the respective displacements.

7. A switchboard key assembly adapted to operate either as a locking or non-locking type key comprising a support, contact springs mounted on said support, a contact spring actuating member carried by said support for movement longitudinally thereof to actuate said spring contacts and for rotation to actuate said spring contacts, and guide means whereby said member may be selectively limited to either longitudinal or rotative movement.

8. In a key, a frame, a spring assembly carried by said frame, a plunger carried by said frame and adapted to be reciprocated and rotated in said frame to move certain springs of said assembly, and means for limiting said plunger to either reciprocation or rotation.

9. In a switchboard key, a frame including a cylindrical portion and projecting arms integral therewith, a spring assembly carried by the projecting ends of said arms, at least one of the springs of said assembly having a curved end, a plunger having an inclined face adjacent one end thereof, said plunger having an inclined face adjacent one end thereof, said plunger being carried in said cylindrical portion with the inclined face adjacent said curved spring end, said sleeve having a longitudinally extending slot and a circumferentially extending slot formed therein, one end of said circumferentially extending slot being diametrically opposite one end of said longitudinally extending slot, a pin carried by said plunger and adapted to extend selectively into either of said slots whereby said plunger may be limited to either reciprocation or rotative movement.

RAYMOND E. GOLEMB.