To all whom it may concern:

Be it known that I, AUGUSTUS D. HARGAN, a citizen of the United States, residing at Bayonne, in the county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Telephone Switching Keys, of which the following is a full, clear, concise, and exact description.

This invention relates in general to electrical switching devices and more particularly to telephone key switches of the type generally known as ringing or recording keys.

Such keys are used in telephone systems and comprise a plurality of key units having a single mounting. They are generally provided with interlocking means to lock each unit in its operated position and means to release such unit upon operation of another unit. The most generally adopted form of key unit comprises a plurality of keys provided with an interlocking means which maintains one or more of the keys in a circuit controlling position until released by the operation of another key. The interlocking means for the keys heretofore employed comprised levers or plates hinged or sliding in the mounting frame.

This invention relates particularly to the interlocking means employed with keys and has for its object to provide a simple and inexpensive construction which is positive in its action and substantially frictionless.

To accomplish these objects, the interlocking mechanism is mounted on springs which also provide a means for actuating the mechanism.

One form in which the invention may assume in practice is illustrated in the accompanying drawing, in which Fig. 1 is a side elevation, parts being broken away to more clearly show the construction.

Fig. 2 is a vertical cross sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical cross sectional view taken on the line 3—3 of Fig. 1.

Referring now to the drawings in detail, the reference numeral 1 indicates a frame which comprises a metal sheet bent into the form of a U having a long leg 2 and a short leg 3. On the leg 2 are mounted a plurality of switch spring units of which 4, 5 and 6 are typical. Through the upper portion of the frame 1 project key plungers 7, 8 and 9. Each of the plungers 7, 8 and 9 comprises a square shank 10, a cam 11 and a rod 12. The square shank 10 of each plunger fits through a corresponding aperture in the upper portion of the frame 1 allowing the plunger to be moved longitudinally parallel to the leg 2 thereof. On the rod 12 is mounted a pair of rollers 13 which cooperate with the master springs of the spring units 4, 5, and 6 to produce the desired circuit change. The rod 12, toward its lower end, slides through a guide 14 which is mounted on the leg 2 of the frame 1. A coil spring 15 is mounted on the rod 12 and presses against the guide 14 and makes the normal tendency in each plunger to return to its elevated or non-operated position.

The locking means comprises a pair of flat strips 16 joined at the ends and inserted between the legs 2 and 3 of the frame 1. The strips 16 lie on each side of the cams 11 and are provided with transverse pins 17 each supporting a sleeve 21 adjacent each of the cams. The framework formed by the strips 16 is supported by long vertical flat springs 18 and 19, one end of each spring being fastened at the end of the locking frame and the other end being supported by leg 2 of the frame 1.

Upon depression of a plunger, as for instance plunger 9, the frame is forced to the left until the top of the cam has passed beyond the sleeve 21. Under the influence of the springs 18 and 19, the frame then moves to the right, locking the key in its depressed position as shown in Fig. 1.

By the depression of any other key, such as 7 or 8, the locking frame is forced to the left by another cam thus removing the sleeve 21 as an obstruction to the formerly depressed plunger 9 and the plunger returns to its normal position under the influence of the spring 15, the depressed key being then locked in its depressed position.

A pair of contact springs 20 are provided which are operated by the longitudinal motion of the locking frame 16. The master spring of the spring combination 20 bears against the spring 19 and makes and breaks contact with its contact spring as the spring 19 moves to the right and left controlled by the plungers 7, 8 and 9 as previously described.

It is obvious that the above described construction has decidedly important advan-
tages over key structures heretofore employed, inasmuch as the only points where friction can occur in the interlocking means are at the bearings between the cams 11 and the sleeves 21, and these members are so formed that all possibility of trouble resulting from frictional wear or sticking is avoided.

What is claimed is:

1. In combination, a row of switching keys, each having an operated position and a non-operated position, a locking bar, comprising a frame surrounding the stems of said keys, said frame being movable longitudinally of the row of keys and carrying transverse members for holding the keys in the operated position and automatically releasing them from such position, and spring means for supporting and actuating said bar.

2. In combination, a plurality of switching keys each having an operated position and a non-operated position, a locking bar comprising a frame surrounding the stems of the keys and carrying transverse members to hold the keys in the operated position, and to automatically release them from such position and spring means attached to said locking bar for supporting and actuating said bar.

3. In combination, a plurality of switching keys each having an operated position and a non-operated position, a locking bar comprising a frame surrounding the stem of the keys and carrying transverse members to lock any key in its depressed position and to release a depressed key upon the depression of any other key, and spring means attached to the sides of said frame for supporting and actuating said locking bar.

4. In combination, a plurality of switching keys each having an operated and a non-operated position, a locking bar comprising a rectangular frame surrounding the stems of the keys and carrying transverse rollers to cooperate with cams on the key stems to lock any key in its depressed position and to release a depressed key upon the depression of any other key, a spring member for supporting each end of said locking bar and for actuating said locking bar and a switch member directly actuated by one of said spring members.

5. In combination, a row of switching keys, each having an operated position and a non-operated position, inverted truncated cone shaped cams upon the stems of said keys, a locking bar surrounding the stems of said keys, said bar being movable longitudinally of the row of keys and carrying transverse rollers for cooperating with said cams, whereby the keys are locked in the operated position and automatically released from such position, and spring means for supporting and actuating said bar.

In witness whereof, I hereunto subscribe my name this 23rd day of August A. D., 1921.

AUGUSTUS D. HARGAN.