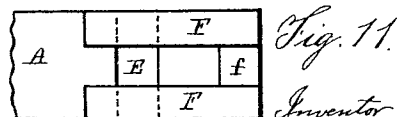
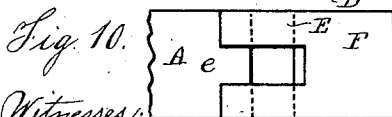
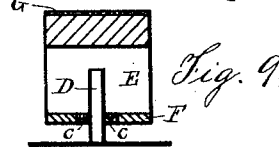
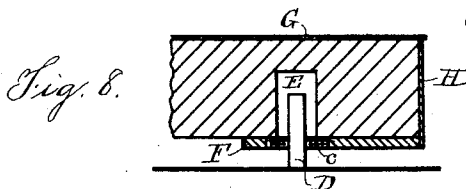
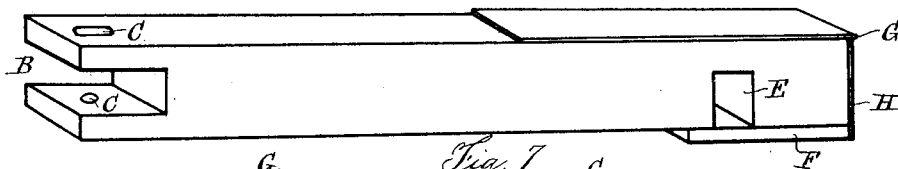
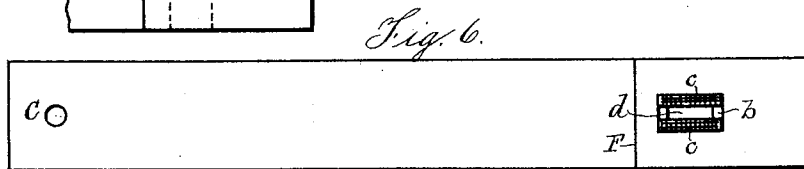
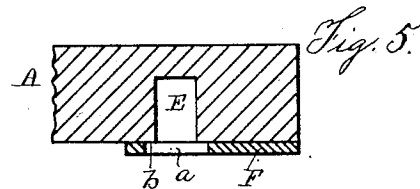
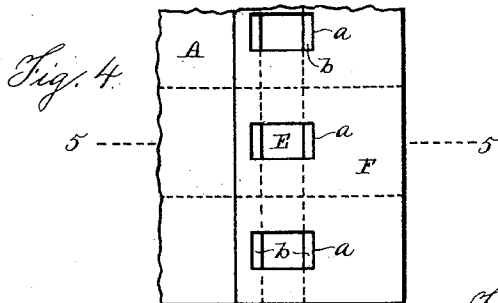
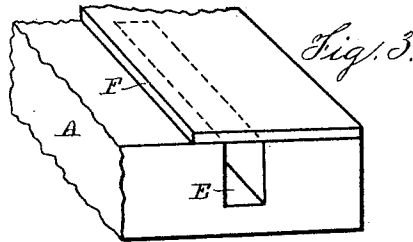
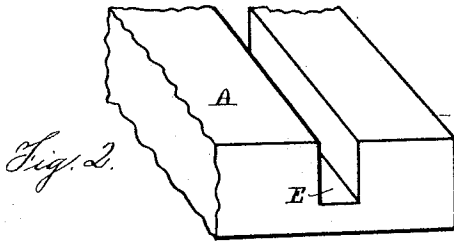
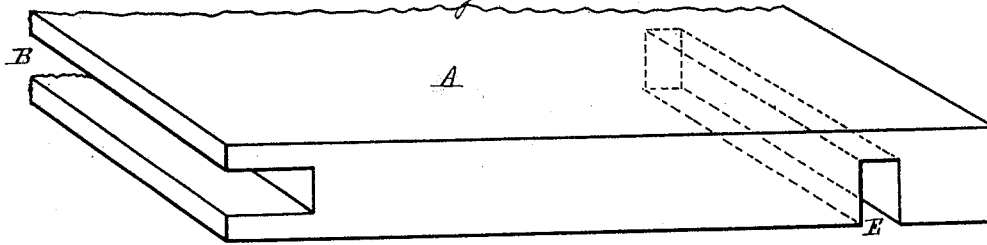


(No Model.)

L. K. FULLER.
KEY FOR MUSICAL INSTRUMENTS.

No. 463,986.

Fig. 1. Patented Nov. 24, 1891.



Witnesses:
Charles E. Snell,
Walter A. Brown, C.

Inventor
L. K. Fuller
by *Arthur Brown*
his attorney

UNITED STATES PATENT OFFICE.

LEVI K. FULLER, OF BRATTLEBOROUGH, VERMONT, ASSIGNOR TO THE ESTEY ORGAN COMPANY, OF SAME PLACE.

KEY FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 463,986, dated November 24, 1891.

Application filed May 4, 1891. Serial No. 391,529. (No model.)

To all whom it may concern:

Be it known that I, LEVI K. FULLER, of Brattleborough, in the county of Windham and State of Vermont, have invented certain new and useful Improvements in Keys for Musical Instruments and the Method of Making the Same, of which the following is a specification.

The present invention relates to the method of making and the construction of the keys of organs, pianos, and similar musical instruments.

The present invention consists particularly in the method of forming the front ends of the keys so that the same may co-operate with the front guide-pins and in the construction of the keys so formed; and the objects of the invention are to reduce the cost of manufacturing the keys, to insure the keys being properly guided on the front pins, and to provide an unbroken uniform surface on the tops of the keys for the reception of the usual ivory or celluloid coverings.

The present improvements are illustrated in the accompanying drawings, wherein—

Figure 1 is a perspective view of a portion of a partially-completed key-blank, looking at the upper side thereof. Fig. 2 is a perspective view of the same, looking at the bottom of the key-blank. Fig. 3 is a view similar to Fig. 2, showing the key-blank in a further stage of completion with a covering-strip applied thereto. Fig. 4 is a bottom view of a portion of the key-blank, showing mortises in the covering-strip. Fig. 5 is a vertical section in a plane indicated by the line 5 5 in Fig. 4. Fig. 6 is a bottom view of a key with the bushing-felts in position. Fig. 7 is a perspective view of a completed key. Fig. 8 is a partial longitudinal section of the completed key. Fig. 9 is a cross-section of the completed key. Figs. 10 and 11 are bottom views of the front ends of partly-finished keys, illustrating modifications.

Referring to the drawings, A is a portion of a key-blank from which a set of keys is to be made. As in the ordinary method of manufacturing keys, the key-blank is of the proper width for the lengths of the keys and is long enough to make a set of keys. The rear edge of the key-blank is completed in the usual

way with a longitudinal groove B, and with pin-holes C (see Fig. 7) for the reception of the usual rear pivot-pins of the several keys. The function of the rear end of the key constitutes no part of the present improvements, and a usual well-known construction is therefore here referred to.

The guides and guide-spaces or front pin-holes for the front guide-pins D are formed as follows: A deep groove or channel E is formed in the bottom of the key-blank, extending the entire length thereof. This groove or channel extends parallel with the front edge of the key-blank and a sufficient distance back therefrom to register with the front guide-pins. The channel is formed in the bottom of the key-blank and extends through about two-thirds of the thickness of the key-blank, the top surface of the key-blank being thus unaffected by the formation of the channel. The key-blank as thus formed with the channel E is shown in Figs. 1 and 2. After the channel E has been thus formed, a covering-strip F of wood is applied to the bottom of the key-blank. This strip of wood is of the same length as the key-blank, and is of a sufficient width to extend from the front edge of the key-blank back beyond the channel E. This covering-strip F is secured to the bottom of the key-blank by glue or cement. The covering-strip when thus applied entirely covers and incloses the open bottom of the channel E. The key-blank with the covering-strip applied is shown in Fig. 3. An important function of this covering-strip is that it bridges the channel and connects at the bottom the two portions of the key-blank which are separated by the channel. The covering-strip thus prevents the part of each key-body in front of the channel from being broken off. The next step in the method consists in forming apertures in the covering-strip F, which is done by cutting mortises *a* therein. Each mortise *a* is preferably rectangular, and is so cut as to communicate with the channel E and to be in line therewith. The several mortises *a* in the covering-strip F are formed in such positions lengthwise of the strip that when the several keys are cut from the key-blank the mortises will register with the front guide-pins. Each aperture or

mortise is (preferably) longer than the channel E is wide, so that shoulders or seats *b* are formed by the under surface of the key-body at the bottom of the mortise. Figs. 4 and 5 show the key-blank after the mortises *a* have been formed in the covering-strip F.

The next step in the manufacture of the keys consists in bushing the pin-apertures by applying the bushing-felts *c c* to the sides of each mortise. These felts *c c* are applied, by means of glue or cement, on opposite sides of and within each mortise. When secured in position, they extend across the channel E, and do not extend below the bottom face of the covering-strip F. These felts, when inserted in the mortise, rest against the seats or shoulders *b*, which offer supports for the felts, and these assist in maintaining them in proper position. The straight sides of the mortise insure the parallelism of the felts, so that a rectilinear slot *d*, parallel with the length of the key, is formed for the reception of the front guide-pin D. Fig. 6 shows the key with the felts in place in the mortise. The keys are then finished in the usual way by sawing the key-blank and by gluing or cementing to the keys (or to the key-blank) the usual celluloid or ivory veneers G H. The front veneer H conceals the joint between the covering-strip F and the key-body, the front veneer H being secured to the strip as well as to the key-body. A completed key is shown in Figs. 7, 8, and 9.

Several of the steps in the mode of manufacture as thus described are not essential, and the order in which certain of the steps are taken is quite immaterial. It is not absolutely essential that the operations should be performed on a key-blank, since the operations might (though much less conveniently) be carried out on separate keys. The formation of a single channel in a key-blank from which a plurality of keys are subsequently cut, whereby the pin-holes for all the keys are simultaneously formed, and the applying to said key-blank of a single covering-strip bridging said channel, whereby said covering-strip strengthens the completed keys and affords the necessary guides and support for the bushing-felts, constitute the preferred method of manufacture, and the one which, for reasons of economy and facility, is practiced and recommended. It is not necessary that the covering-strip F should be applied to the key before the mortises *a a* are cut and the bushing-felts applied thereto. In some respects, indeed, it is more convenient to cut the mortises in the covering-strip F before securing said strip to the key or key-blank. It is preferable to apply the felts after the covering-strip has been secured to the key or key-blank, since they can then be properly positioned upon the shoulders or seats *b*. The essential features of the invention are that the hole in each key for the reception of the front guide-pin is cut entirely across the bottom of the key, and that the channel thus

formed is closed by a covering or bridging strip, which carries the guide-bushing felts.

In Figs. 10 and 11 are illustrated less desirable but possible methods of making the guide-pin apertures *a*. Instead of forming a rectangular aperture or mortise *a* entirely within the strip F, as in the method already described, an open slot is formed, which is open at the rear edge of the strip, as shown at *e* in Fig. 10. Again, instead of using a single covering-strip, each key may be provided with two separate bridging-strips crossing the channel, as shown in Fig. 11, the space between the two separate strips constituting the front pin-aperture. This modification is less desirable, however, since it necessitates the insertion of a block *f* between the front ends of the bridging-strips in case celluloid is used for covering the ends of the keys. These two modifications are referred to more particularly as illustrations of how the general principle of the invention is susceptible of variation, and to prevent a possible construction of the invention which would permit its evasion by inferior but possible modifications.

The advantages of the present improved method of manufacture and of the resulting construction of keys are as follows: The keys are formed with an unbroken imperforate upper surface, to which the celluloid or ivory covering is applied, so that there is no chance or liability of the covering being displaced by the front guide-pins and a smooth, uniform, and perfect exposed surface to the celluloid or ivory covering is insured. The formation of a single cross-channel extending the entire length of the key-blank possesses numerous advantages over the usual methods of boring separate pin-holes in each key. Only a single operation is required to form the channel in all of the keys, whereas a separate operation is required in boring each separate hole, and by the formation of the channel in the entire key-blank uniformity in depth of the channels in the several completed keys is insured. By applying the covering-strip to the bottom of the keys all necessity of forming recesses in the different key-bodies for the guide-felts is obviated.

The improved method of forming the mortises for the felts in the strips instead of in the key-bodies economizes the manufacture of the keys and at the same time insures the firm retention and the parallelism of the felts.

I do not claim in this application anything claimed in my application for Letters Patent of the United States filed May 2, 1891, Serial No. 391,417. In said application I have claimed, broadly, a key for a musical instrument having its front pin-hole extending upwardly from the bottom of the key, said pin-hole not extending through the top of the key, so that its presence does not affect the ivory or celluloid covering of the key, and said key being provided with bushing-felts for the front pin-hole, which are applied to a strip or strips secured to the bottom of the key.

I claim as my invention—

1. A key for a musical instrument, having a channel extending entirely across the lower part of the body of the key, said channel constituting the front pin-hole, and said key having a covering-strip applied to its bottom and covering said channel, substantially as set forth.

2. A key for a musical instrument, having a channel extending entirely across the lower part of the body of the key, said channel constituting the front pin-hole, and said key having a covering-strip applied to its bottom and covering said channel, said strip being apertured for the passage therethrough of the front guide-pin, substantially as set forth.

3. A key for a musical instrument, having a channel extending entirely across the lower part of the body of the key, said channel constituting the front pin-hole, and said key having a covering-strip applied to its bottom and covering said channel, said strip being apertured for the passage therethrough of the front guide-pin, the sides of said aperture being provided with guide-felts, substantially as set forth.

4. A key for a musical instrument, having a channel extending entirely across the lower part of the body of the key and constituting the front pin-hole, and said key having a covering-strip applied to its bottom and covering said channel, said strip having a mortise cut

therethrough, said mortise communicating with said channel, the length of said mortise exceeding the width of said channel, whereby shoulders or seats are formed by the body of the key on each side of the channel at the bottom of the mortise, and said key having guide-felts, which are located in said mortise along the sides thereof, said felts extending across said channel and resting on said shoulders or seats, substantially as set forth.

5. A key having channel E, shoulders or seats *b*, covering-strip F, provided with mortise *a*, and felts *c*, substantially as set forth.

6. In the manufacture of a set of keys for a musical instrument, the method of forming the front ends thereof, which consists in forming a single channel in a key-blank, from which a plurality of keys may subsequently be cut, applying a single covering-strip to the bottom of said key-blank, which covers said channel, forming apertures in said strip, so that the same shall be in line with said channel, and bushing the sides of said apertures, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

LEVI K. FULLER.

Witnesses:

W. H. CHILDS,
J. E. HALL.