6 Sheets—Sheet 1.

E. K. MILLIKEN.

Transposition Keyboard for Pianos and Organs.

No. 206,345. **Patented July 23, 1878.**

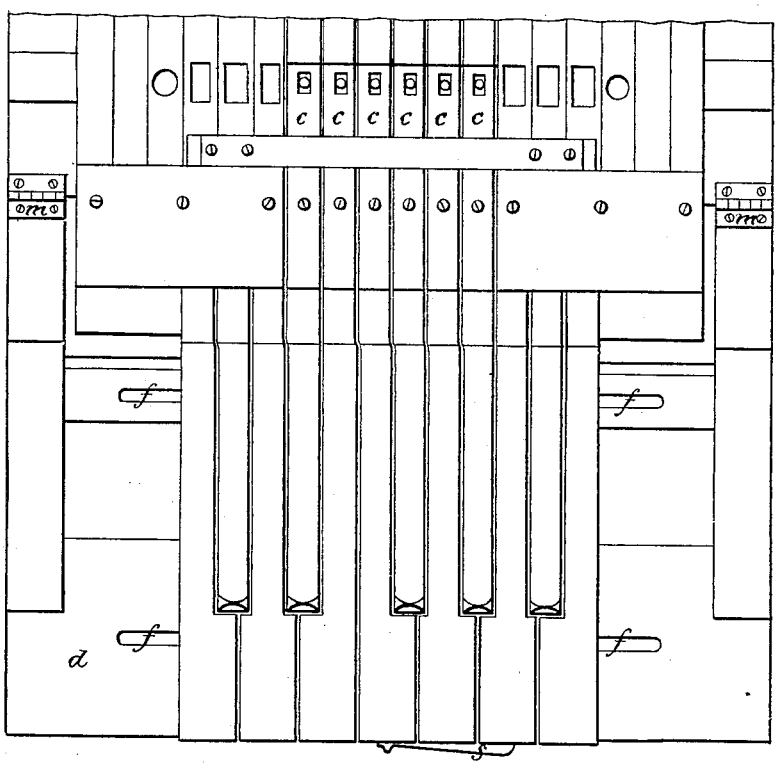

FIG. 1.

WITNESSES:

Chas. H. Kimball.

Charles E. Clifford

INVENTOR:

Edward K. Milliken

E. K. MILLIKEN.

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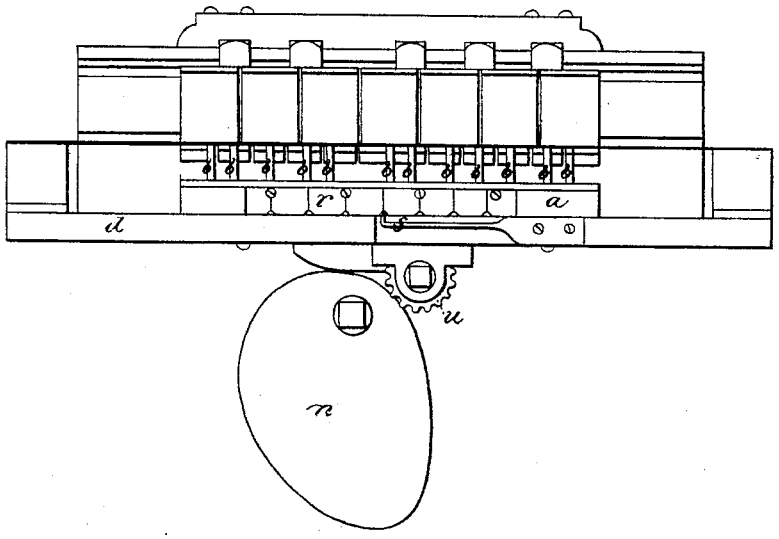

FIG. 2.

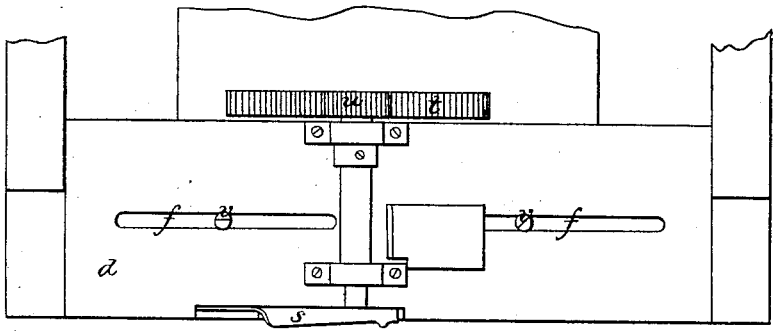

FIG. 3.

WITNESSES:

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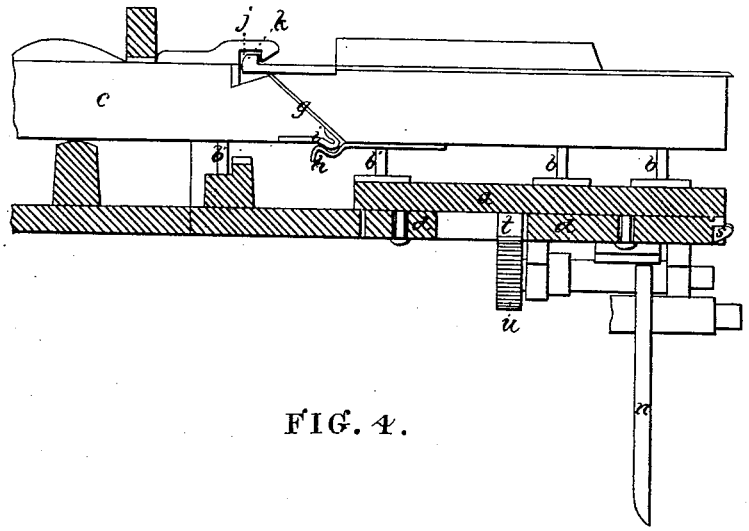

FIG. 4.

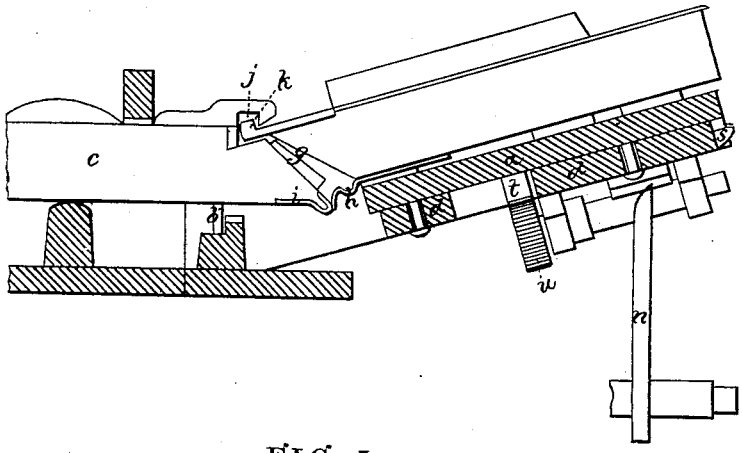

FIG. 5.

WITNESSES:

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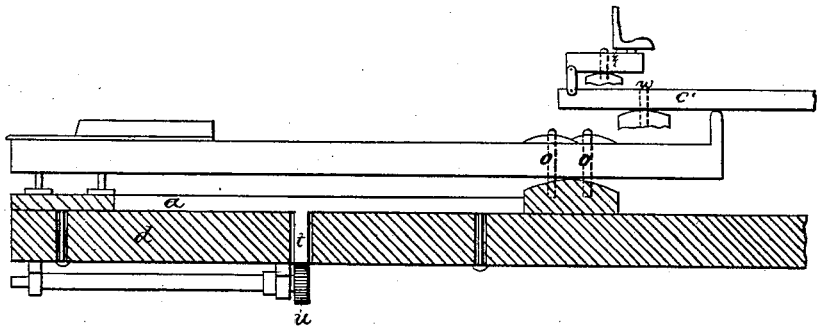

FIG. 6.

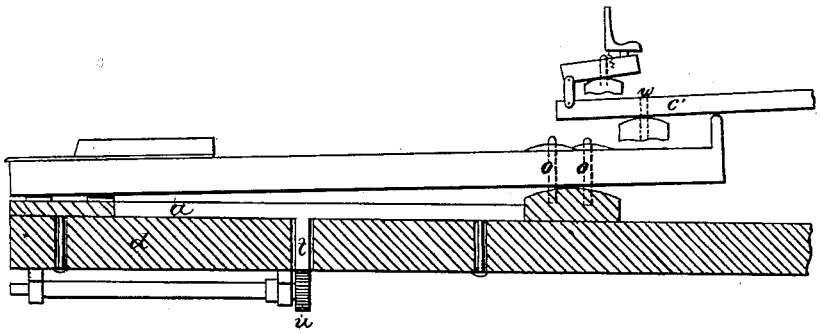

FIG. 7.

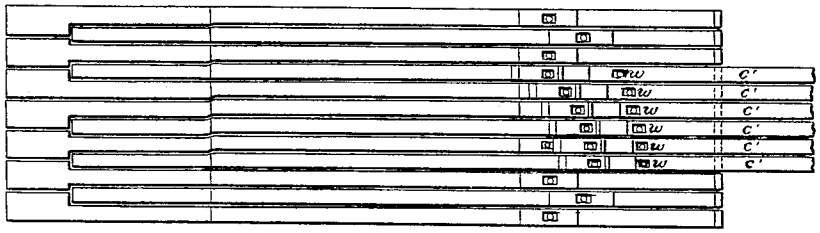

FIG. 8.

WITNESSES:

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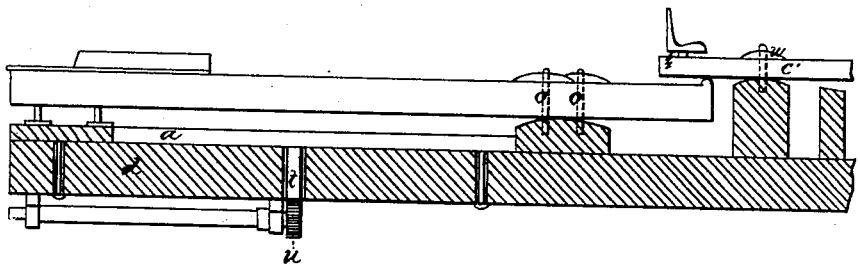

FIG. 9.

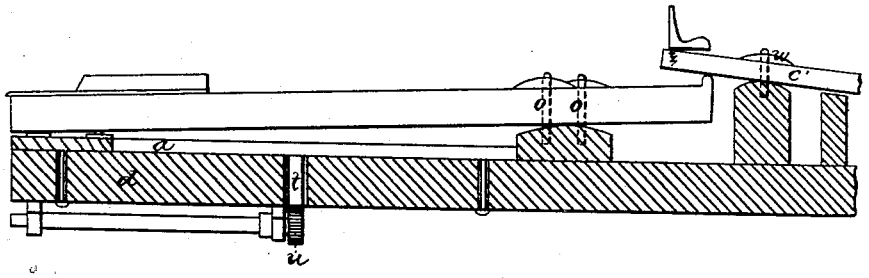

FIG. 10.

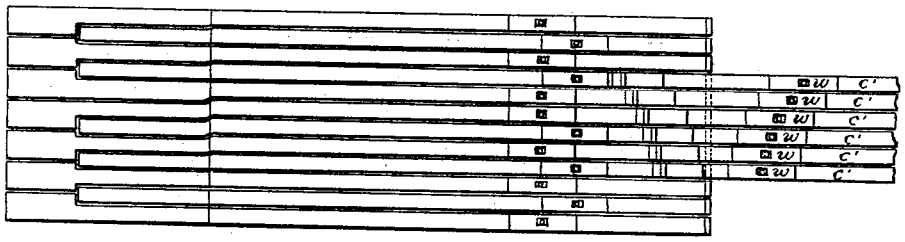

FIG. 11.

WITNESSES:

Chas. H. Kimball.

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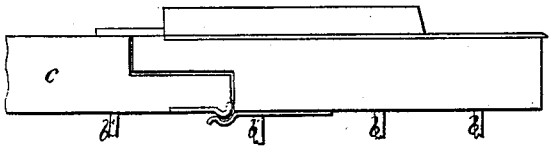

FIG. 12.

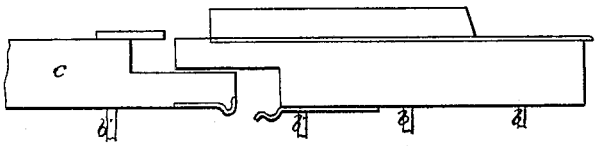

FIG. 13.

WITNESSES:

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Charles E. Clifford

INVENTOR:

Edward K. Milliken

UNITED STATES PATENT OFFICE.

EDWARD K. MILLIKEN, OF PORTLAND, MAINE.

IMPROVEMENT IN TRANSPOSITION KEY-BOARDS FOR PIANOS AND ORGANS.

Specification forming part of Letters Patent No. **206,345**, dated July 23, 1878; application filed May 20, 1878.

To all whom it may concern:

Be it known that I, EDWARD K. MILLIKEN, of Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Pianos, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a top plan of the key-board. Fig. 2 is a front-edge view, showing the cam *n*. Fig. 3 is a bottom plan, showing the rack and pinion to move the sliding bed. Fig. 4 is a side elevation and part section, showing the position of the key with the beveled joint when the joint is closed. Fig. 5 is the same with the key elevated or the joint open. Fig. 6 is a side elevation and part section when the whole long key is used, and the supplemental tracker. Fig. 7 is the same in action. Fig. 8 is a top plan of a series of keys under this arrangement, showing the position of the pivots. Figs. 9, 10, and 11 are side and top-plan views of a modification of Fig. 6, in which the whole long key merely strikes the supplemental tracker at a different point. Figs. 12 and 13 are modifications of the joint and section seen in Fig. 4.

Same letters show like parts.

The object of my invention is to produce such modifications in the key-boards of pianos, organs, &c., that the transposition of the scale can be effected by such altered position of the keys of the key-board relatively to the levers, hammers, or valves as that music may be played in different keys while the fingers of the player operate upon the same keys of the key-board.

It consists in providing the keys of the key-board in one form of my invention with joints or sections, and also with a sliding bed, so that the keys of the key-board may be unjointed from and reunited with, at pleasure, the other part of the key, called the "tracker." Thus unjointed, the keys of the key-board are moved along the outer ends of the trackers, as hereinafter described.

It also consists in the combination of the long key, a sliding bed, and supplemental trackers, as hereinafter described. The long key or lever in this case slides under the supplemental tracker to effect the transposition.

With a view to the right or left movement of the keys of the key-board, I place the keys over and upon a sliding bed or carriage, *a*, or any other movable device like *a*, which, with the aid of the pins *b* and *b'*, or any other like device, is capable, in one form of my invention, by its motion, of guiding the keys of the key-board into any desired relation to the trackers *c* or the levers, hammers, or valves.

In another form of my invention the keys are guided into a new relation to the trackers placed over the inner end of the keys. The key, in this case, is made to include the entire length of the lever from the point where the hand of the player is put to the point where the end of the lever makes its joint with the supplementary tracker. The supplementary trackers are seen at *c'*. In this form, also, the pins *b* will be dispensed with, leaving only those pins which are usually employed to steady the keys.

The sliding bed or carriage *a* moves over a bed, *d*, and the direction of its movement is controlled and rendered accurate by a slot or slots in the bed *d*, in conjunction with guide-pins or other devices working in slot or slots. (Indicated by *f*.) The direction of the movement of the bed *d* follows the direction of the slot or slots, and this direction can be either as illustrated in the drawings, or in a direction at right angles thereto, as illustrated at Figs. 12 and 13. The keys are moved toward the player, to separate them from the supplementary trackers, so as to be able to transpose.

In one form of my invention I separate the keys from that part called the "trackers" by making a section, which, while it permits of the keys of the key-board being separated from the trackers, at the same time holds them in firm and rigid union, when the keys of the key-board are in a correct position for playing upon the instrument. The essential features of this section and joint are, as above indicated, that the keys of the key-board may be easily and quickly unjointed from what in this form I call the "trackers," and at the same time, when not so unjointed, are united with sufficient rigidity to the so-called "trackers" for the operations of the instrument.

In the accompanying drawings, at *g*, I have shown a beveled joint or section, with the spring *h* clasping the point *i* of the trackers, and holding the keys of the key-board in a horizontal position. At the top of the keys of the key-board, where they unite with the so-called "trackers," there is a groove, *j*, with a bead, *k*, working in the same.

It is manifest, however, that the mere form of the section or joint is not a matter of invention; but it is essential that the joint should be so made as to permit the characteristics above enumerated in this form of joint, namely, firmness of union and ease of separation, also the power of separation in the direction desired—that is to say, up and down the length of the instrument or in a forward direction toward the player. But when the supplemental tracker is employed, as exhibited in Figs. 6, 7, 8, 9, 10, and 11, the long key or lever, when the scale is transposed, simply slides under the supplemental tracker *c'*, and the joint is formed by the top face of the long lever or key pressing up against the under side of the supplemental tracker.

In either form of my invention various forms of joint may be used; but for the purpose of my invention they are the same, so long as the keys of the key-board are at some point so united to the trackers as to operate as indicated.

It is not essential that the joint or section in my invention be made at the point indicated in the drawings at Figs. 4 and 5; but such joint or section may be made nearer to or farther from the end of the so-called "trackers."

In the accompanying drawings I have shown in Figs. 4 and 5 a form of joint or section above referred to; but I desire to specify that there are others which will readily occur to the mechanic, and that I do not limit my invention to that form. Whenever such joint is capable of being readily and firmly made and easily separated, for the purpose of sliding the keys of the key-board along the outer ends of the so-called "trackers" of either kind herein described, so that the keys of the key-board may operate upon the hammers as desired, the purpose of the invention will be attained.

For the purpose of sliding the keys of the key-board along the so-called "trackers," where the two unite, the keys of the key-board must, during that operation, be wholly or partially so disunited from the so-called "trackers." This applies either to the form of the joint or section shown at Figs. 4 and 5, or to that shown at Figs. 6, 7, 9, 10. All that is necessary is that the keys of the key-board, whether considered as including the entire lever or tracker, as shown at Figs. 9 and 10, 6 and 7, or considered as including that part in front of section or joint, as shown in Figs. 4 and 5, may be moved without too much friction.

As shown at Fig. 5, the movement of the keys of the key-board is produced by slightly elevating the bed *d*. This unclasps the springs *h* and permits of the movement of the keys of the key-board along the outer end of the so-called "trackers." The upper parts of the keys of the key-board, with their beads, then slide easily and without friction in the grooves *j* of the so-called "trackers," and so permit of the desired transposition of the scale to a higher or lower pitch.

The unclasping of the spring *h* referred to is more easily attained by the raising or depression of the keys of the key-board. In order to accomplish this movement, I have hinged the bed *d* at *m*, so that it can be raised or lowered on said hinges by the cam *n*, or any other equivalent device, when the keys of the key-board are separated from their union with the hammers by the movement of the key-board toward the player.

The raising and lowering above described is not necessary; but in the form of joint shown at Figs. 6, 7, 9, 10, where the supplemental tracker is used, no raising or depression of the sliding bed is required, because in this modification the entire long lever, or what in this instance may properly be called a "key," is simply slid under or over supplemental tracker *c'*; but in either form of the joint above described transposition is effected by the movement of the keys of the key-board, whether longer or shorter, upon a sliding bed, *a*, such as is herein described, to which bed the keys are united by pivots or pins; and in either case, whether longer or shorter keys, they operate directly upon the trackers which raise the hammers.

In a piano the hammers must be left undisturbed, and during transposition, such as above described, they must maintain an unchanged relation to the strings of the harp; otherwise the instrument would be destroyed.

My invention contemplates such method of transposing the scale in instruments having key-boards as is applicable alike to pianos and organs. To accomplish this object, as above indicated, I impart to the keys of the key-board separability from the action, and the capability of being moved over or under the trackers which operate the levers which move the hammers, and I give to them the power of united action when any movement of the keys of the key-board has been made. This enables the keys of the key-board to be separated from the trackers *c* or supplementary trackers *c'* while this movement of the key-board takes place; and I also provide for a conjoint action of the two when the desired relative position has been obtained.

My invention contemplates transposition of the scale of music by the movement of either the longer or shorter keys, herein shown and described, along, over, or under the trackers, as shown in Figs. 4 and 5, 6 and 7, 9 and 10.

When the whole lever or key is moved to effect transposition the pivots of the keys constitute the pins which unite the levers to the

sliding bed or carriage, as illustrated at *o*, together with the steady-pins at or near the outer ends of the keys.

By this method the action of the piano is much improved. The pivots of the long levers or keys are so placed on the sliding bed that the arc through which the operating end of every key moves is exactly the same. I effect this improvement in the touch of pianos by uniform length of leverage, which produces uniformity in the dip of the keys.

By the arrangement of the supplemental trackers, as shown both at Figs. 6 and 7, 9 and 10, a compensative leverage is provided, by which the movement of the hammers is made uniform. (See *c*.) By this arrangement the swing of the hammers is made uniform.

r shows a scale moving over an index, *s*. This scale is so graduated as to show transposition to half or whole notes, or more than a note or tone, as the player may desire to make. This indicator enables the player easily and promptly to know whether he has made such a change in the pitch of the piece of music as he may happen to wish.

t shows a toothed rack on the sliding bed, and *u* a pinion, by which the bed is made to move by the meshing of the pinion with the rack. This arrangement slides the keys of the key-board, whether longer or shorter, as described.

v are pins let into the sliding bed, and working in slots *f*, so as to guide the movement of the sliding bed *d*.

The supplemental tracker may be made of the form shown in the drawings, or it may be connected with the hammer.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The joint and section between the key and tracker, in combination with the bead *k*, groove *j*, point *i*, and spring *h*, to operate as herein described.

2. The combination of the sliding bed *a* and pins *b* and *b'* with the keys of the key-board, when separable from the trackers *c* by means of the joint and section, as herein specified, and shown in Figs. 4 and 5.

3. The sliding bed *a*, having guide-pins, as described, in combination with the bed *d*, slotted as described, the said bed *a* being adapted to be raised or depressed or moved inwardly and outwardly, as herein set forth.

4. In combination with the sliding bed *a*, the long keys, their pivots, the supplemental trackers *c'*, and their pivots *w*, as shown and described.

In testimony that I claim the foregoing as my own I affix my signature in the presence of two witnesses.

EDWARD K. MILLIKEN.

Witnesses:

CHARLES E. CLIFFORD,

W. S. DYER.