(No Model.) 2 Sheets—Sheet 1.

A. NEWELL.

KEY BOARD.

No. 423,076. Patented Mar. 11, 1890.

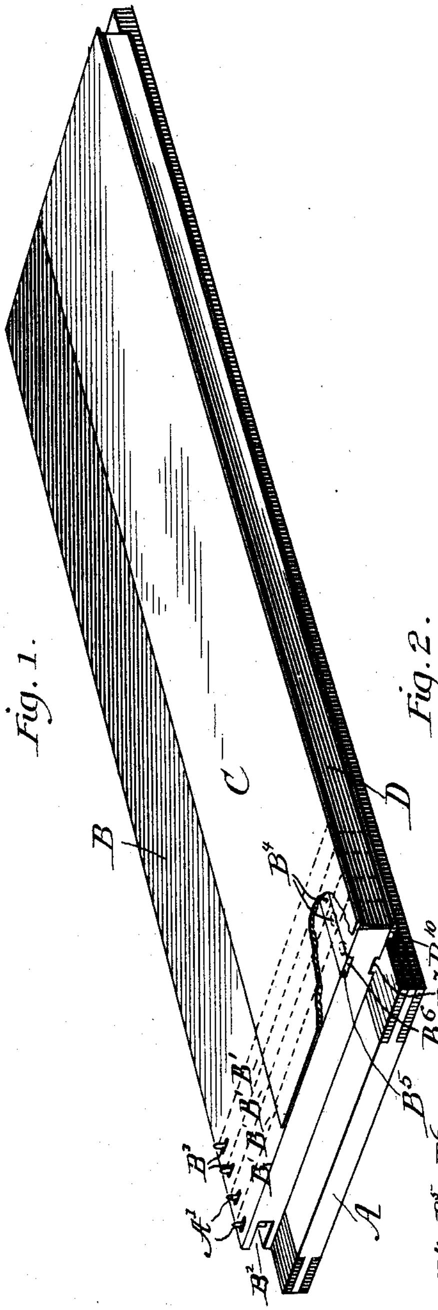

Fig. 1.

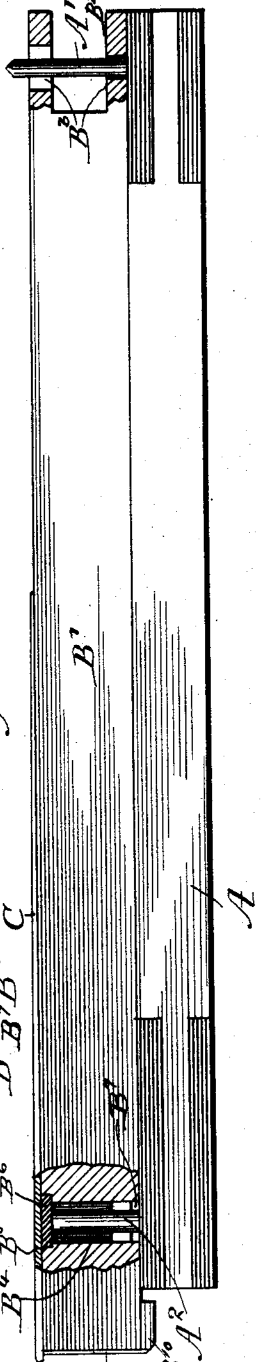

Fig. 2.

Witnesses:

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Frank L Stevens.

Inventor:

Augustus Newell

By Cyrus Kehr

Attorney.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

2 Sheets—Sheet 2.

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KEY BOARD.

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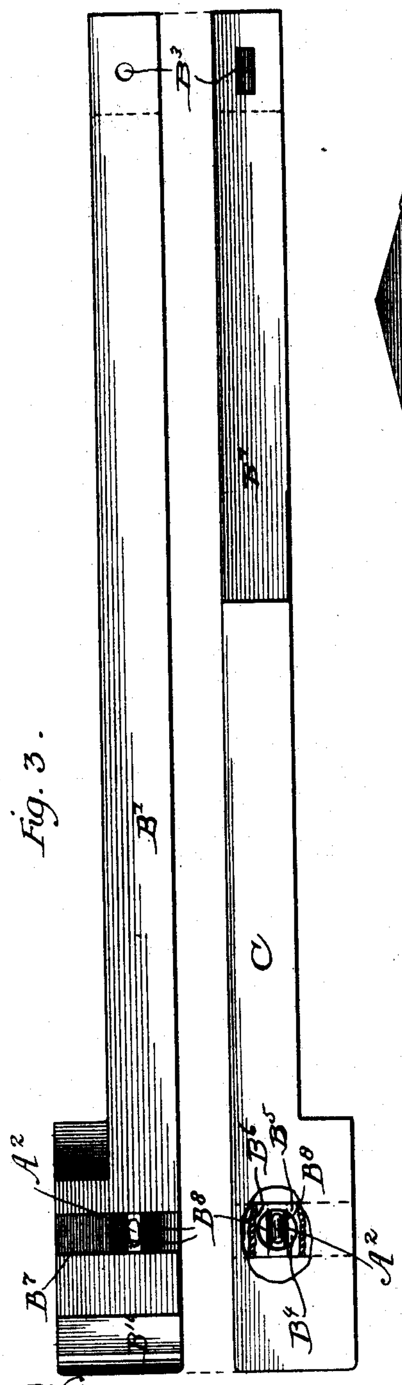

Fig. 3.

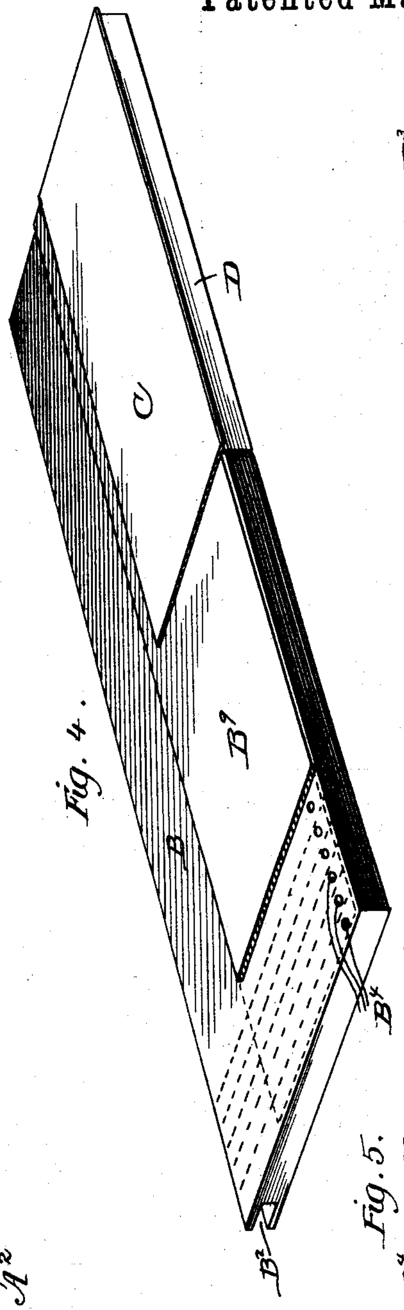

Fig. 4.

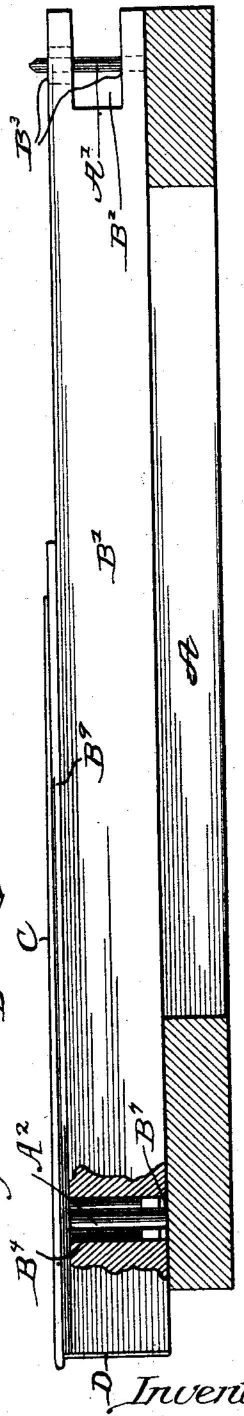

Fig. 5.

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UNITED STATES PATENT OFFICE.

AUGUSTUS NEWELL, OF CHICAGO, ILLINOIS.

KEY-BOARD.

SPECIFICATION forming part of Letters Patent No. 423,076, dated March 11, 1890.

Application filed September 9, 1889. Serial No. 323,389. (No model.) Patented in Canada October 28, 1889, No. 32,630.

To all whom it may concern:

Be it known that I, AUGUSTUS NEWELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Key-Boards, (for which I have procured a patent in the Dominion of Canada, which patent is dated October 28, 1889, and bears the number 32,630;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as 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.

This invention relates more particularly to key-boards for pianos and organs. Nearly all key-boards for pianos and organs are now faced at their exposed portions with celluloid, the latter being used as a substitute for ivory. The celluloid is applied to the surface of the wood by means of an adhesive.

My improvement relates chiefly to the preparation of the board prior to the application of the celluloid.

In the accompanying drawings, Figure 1 is a perspective view illustrating the construction of a key-board blank as heretofore used. Fig. 2 is a side elevation of a completed key as it appears upon the frame supporting it. Fig. 3 is a bottom and a top view of one of the keys cut from the blank shown in Fig. 1. Fig. 4 is a perspective of my improved key-board partially finished. Fig. 5 shows a vertical section of the same completed.

Referring first to Figs. 1, 2, and 3, A is the frame of the key-board.

B is the blank from which the keys B′ are made.

C is the top strip of celluloid, and D is the front strip of celluloid. The blank is of sufficient size to be cut into a set of keys. It is dressed, mortised, grooved, and faced with the celluloid and then sawed transversely into keys, as indicated by the dotted lines, and as hereinafter described.

B^2 is a groove cut lengthwise into the rear edge of the key-board blank B.

B^3 are mortises extending vertically through the rear end of each key B′.

A′ is the back pin rising from the frame A through the mortise B^3. By means of these mortises and pins the rear hinges of the keys are formed. Each key has a front mortise B^4. Each such mortise extends from the lower face of the key upward into the key a sufficient distance to receive the front pin A^2, which rises from the front portion of the frame A beneath the key. Said pin A^2 forms a guide-arm for the front portion of the key. To adapt it to perform this function, at least the lower portion of the said mortise must have straight sides, and said pin is preferably compressed or broadened, as shown in Fig. 3, so that the sides of said mortise and said pin will fit closely together and prevent lateral movement of the key. On account of the vertical range of movement of the key it is necessary to extend said pin a considerable distance upward into the key in order that the latter may not be lifted off said pin. Being of such depth and narrow below, it is not practicable to rapidly form said mortise by working only from the lower side of the blank. It is the custom to bore a hole, by means of an auger, from the top of the blank downward to within a short distance of the lower face of the board, and when this has been done through every key to turn the board and form the lower portions of the mortise with parallel sides by means of a chisel. Thus the horizontal section of the lower portion of the mortise is in the form of a parallelogram, while the horizontal section of the upper portion is circular. When this has been done, the upper surface of the blank has a round hole at the upper end of each mortise B^4. It has been found that it is impracticable to apply the sheet of celluloid over said openings directly without having the outlines of said openings show in the surface of the celluloid after the work is finished. This is particularly true when the sheet of celluloid is applied to the surface of the blank by means of a heated press. In such case the heat softens the celluloid and allows it to sag into the holes. It has been the custom to plane a channel B^5 into the upper surface of the blank B over the mortises B^4, and to fill said channel with a strip of wood B^6, said strip of wood being cut transversely to the grain and glued into said channel. It will be seen that a distinct depression could be cut around each mortise, and such depression filled or bridged with a small piece of wood; but the continuous channel B^5 can be cut and filled more rapidly. A groove B^7 is usually cut into the lower face of the blank B across the mortises B^4 to receive felt muffling B^8 at each side of said mortises. (See Fig. 3.)

Experience has proven that while the strip B^6 covers the mortises B^4 and prevents the latter from affecting the surface of the top strip of celluloid, the strip B^6 itself affects the surface of the top strip of celluloid. In order to make the strip B^6 fit properly into the groove B^5, said strip must be pressed into said groove. In this operation said strip is more or less compressed, and whenever there has been any compression of the said strip it will in time expand more or less and rise above the surface of the adjacent wood. Sometimes the wood adjacent to said strip is also compressed, so that it will, owing to its different cell structure, subsequently rise above the edges of the strip B^6, making the joints between said strip and the adjacent wood apparent. The glue used in securing the strip B^6 also affects the surface of the celluloid after a lapse of time. While, perhaps, the glue does not itself expand after the work is finished, it is my belief that the glue is raised by the expansion of the adjacent wood. Whatever the real action involved, the fact is that after the work is finished with the best care the line of the strip B^6 is more or less apparent and the goods are to that extent defective and criticized by the trade. This defect is all the more prominent because the direction of said strip is lengthwise of the key-board, and because the celluloid is highly polished. After long-continued labor and annoyance I have discovered a way for avoiding the difficulty. This involves the elimination of the groove B^5 and the strip B^6 and the joints made by the latter.

Reference is now made to Figs. 4 and 5. The front mortises B^4 are formed as by the old method, but the groove B^5 is not formed. The upper surface of the blank B is a continuous surface, excepting that the mortises B^4 are open. A broad sheet of wood B^9 is now mounted, by an adhesive or other suitable means, upon and over the portion of the blank B which is to support the top strip of celluloid C, the front of said sheet being even with the front of said blank. This sheet B^9 covers the mortises B^4 and forms a continuous foundation for the top strip C, and when the latter has been applied it is entirely free from the faults hereinbefore mentioned, the key-board is of high quality and favored by the trade.

The product is also improved in another respect. Heretofore the blank has always warped after the application of the celluloid by the contraction of the latter. By the use of the sheet B^9 this is almost wholly obviated.

In the old form of key-board it has been customary to apply a strip B^{10} to the front portion of the lower face of the key-board blank to give additional depth to the front end of the finished key. This is a step taken merely to improve the appearance of the board, and has nothing to do with the mechanical action. In my improved board sufficient thickness is given to the key by the application of the sheet B^9 to the upper surface of the board. The strip B^{10} may therefore be omitted.

In order to prevent the displacement of the key from the pin A^2 when the key is raised, it is necessary to have a high pin. By referring to Fig. 2 it will be seen that the height of said pin is limited by the height of the mortise B^4. When the strip B^6 is used, the height of the mortise is reduced by the thickness of said strip and said pin can extend upward only to said strip. In my improved key the height of the mortise B^4 is increased by a distance equal to the thickness of the strip B^6 previously used. Consequently the pin A^2 in the new key-board may be equally increased in height. This additional height is an important consideration. In many cases this additional height will be sufficient to retain the key, while without it the key would rise high enough to move laterally and then fail to descend. It will be understood that the sheet B^9 may be of material other than wood. For example, it may consist of pasteboard or other composition.

I claim as my invention—

1. In the manufacture of celluloid-covered key-boards, the method of preparing the blank to receive the top strip of celluloid without denting or creasing the latter, which method consists in forming the pin-mortises, which are large above and small below, through said blank, the upper portion of each of said mortises being cut from the upper side of said blank, then applying a sheet of wood or other suitable material over the upper openings of said mortises and the portion of the upper surface of the blank which is designed to receive the celluloid, whereby there is produced for the reception of the top strip of celluloid a foundation which is continuous and of even density, substantially as and for the purposes herein set forth.

2. In the manufacture of celluloid-covered key-boards, the method of constructing the key-board to prevent the top strip of celluloid from denting or creasing, which method consists in forming the pin-mortises, which are large above and small below, through said blank, the upper portion of each of said mortises being cut from the upper side of said blank, then applying a sheet of wood or other suitable material over the upper openings of said mortises and the portion of the upper surface of the blank which is designed to receive the celluloid, whereby there is produced for the reception of the top strip of celluloid a foundation which is continuous and of even density, then applying said sheet of celluloid to said foundation, then separating the blank

into keys, substantially as and for the purposes herein set forth.

3. A key-board blank having the front mortises extending upward through its surface, and a sheet of wood or similar material applied over said mortises and that portion of the upper surface of the blank which is to be covered by the celluloid, substantially as shown and described.

4. A key for a key-board having back and front mortises, the front mortise opening upward through the body of the key, a sheet of wood or similar material applied over said front mortise and that portion of the upper surface of the key which is covered by celluloid, and a strip of celluloid applied over the upper surface of said sheet, substantially as shown and described.

5. A key for a key-board having back and front mortises, the front mortise opening upward through the body of the key, a sheet of wood or similar material applied over said front mortise and that portion of the upper surface of the key which is covered by celluloid, a strip of celluloid applied over the upper surface of said sheet, and a front strip of celluloid applied over the outer ends of said key, substantially as shown and described.

In testimony whereof I affix my signature, in presence of two witnesses, this 3d day of September, in the year 1889.

AUGUSTUS NEWELL.

Witnesses:
CYRUS KEHR,
GEO. E. FOSS, Jr.