No. 634,872. Patented Oct. 17, 1899.

T. P. BROWN.

SELF PLAYING ATTACHMENT FOR MUSICAL INSTRUMENTS.

(Application filed Feb. 13, 1899.)

(No Model.) 3 Sheets—Sheet 1.

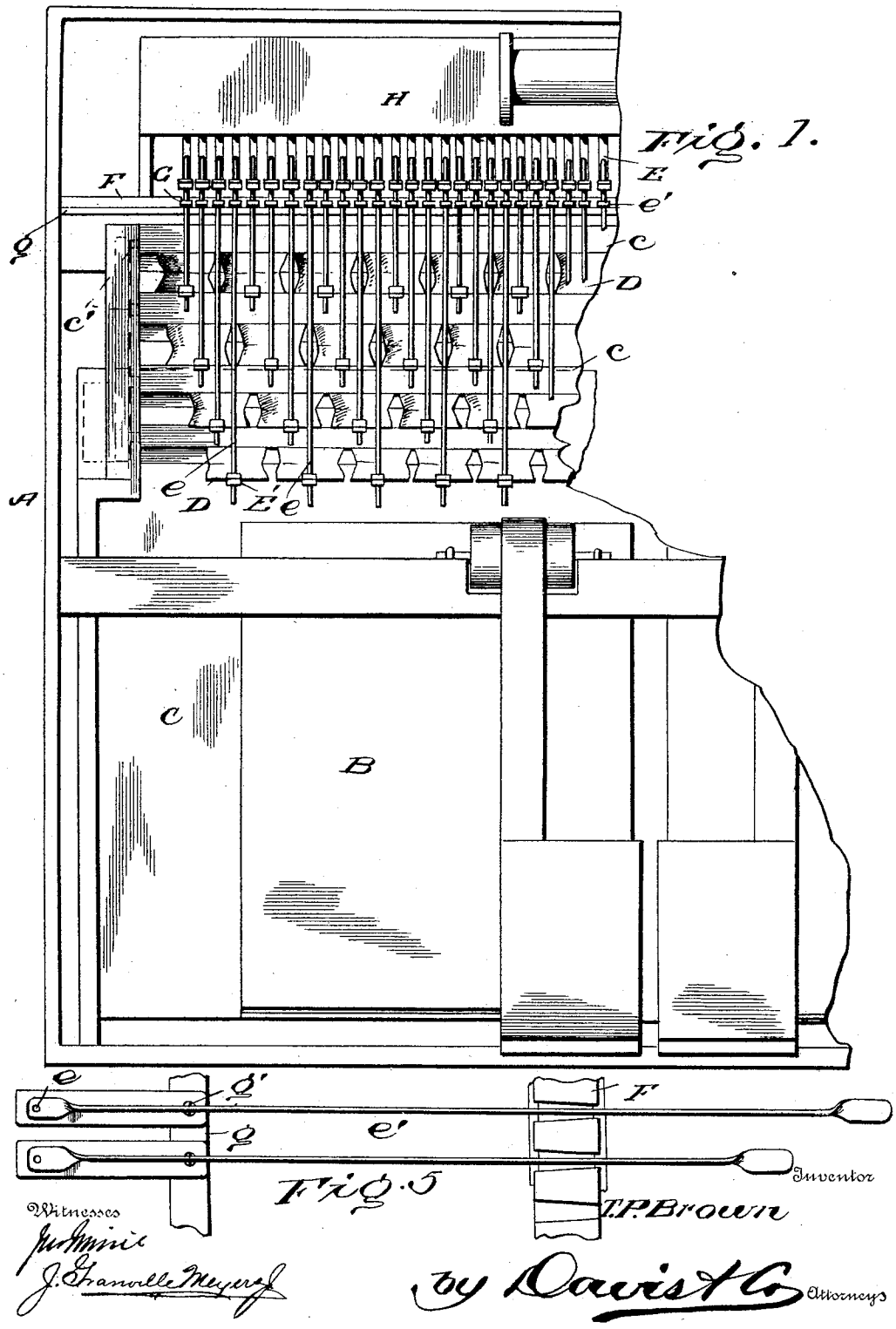

FIG. 1.

FIG. 5

Witnesses
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(No Model.) 3 Sheets—Sheet 2.

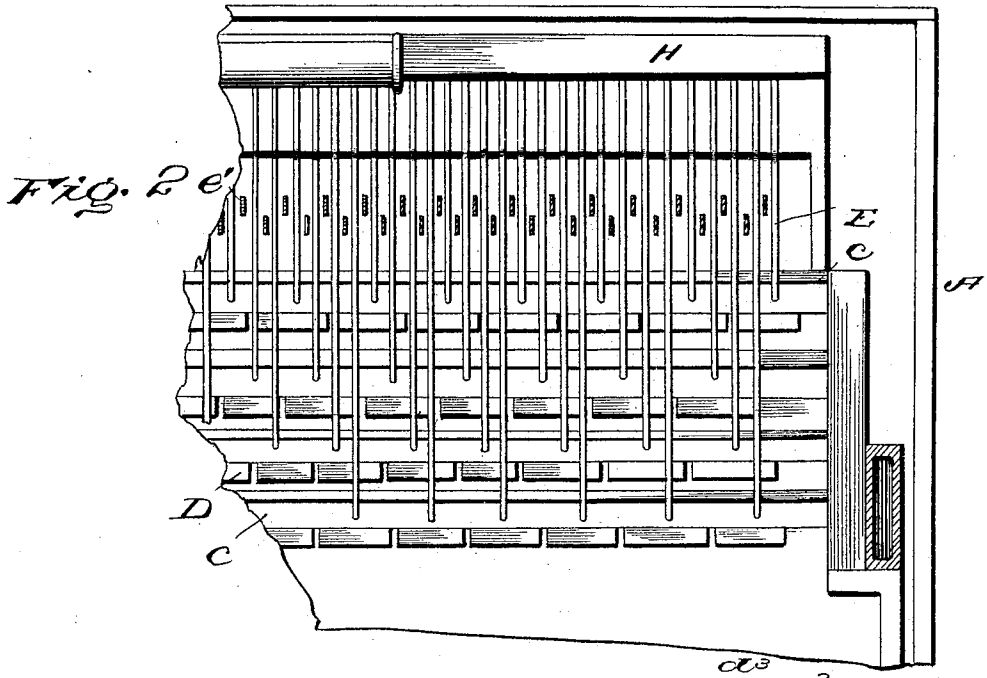

Fig. 2

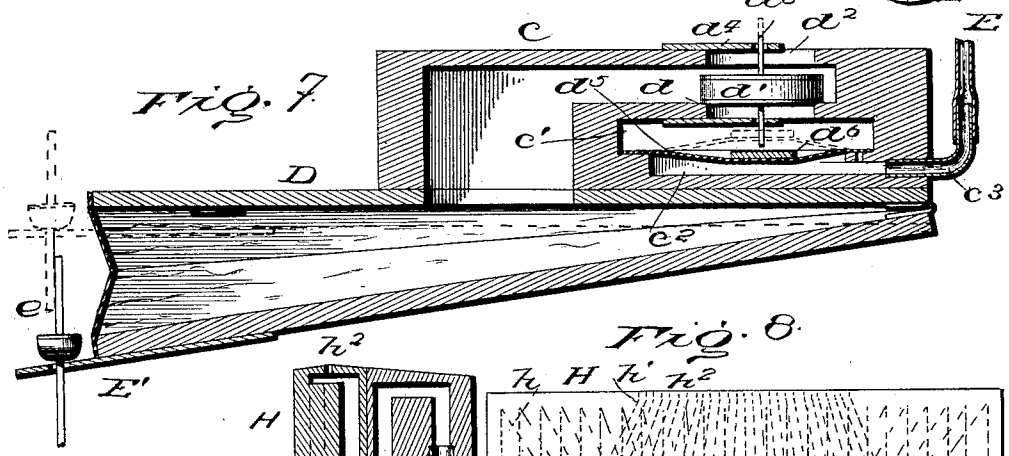

Fig. 7.

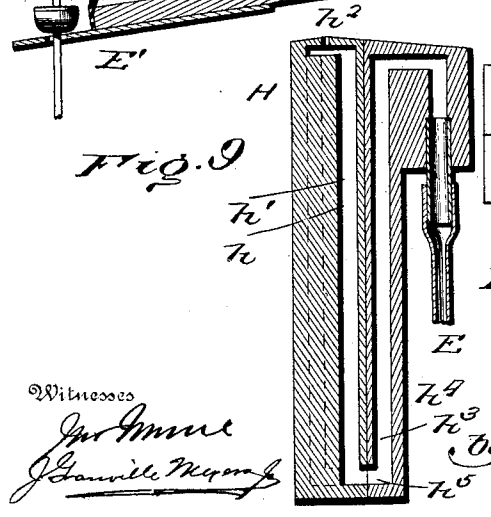

Fig. 9.

Fig. 8.

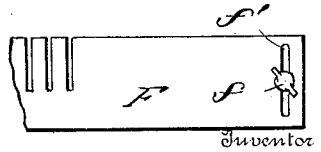

Fig. 6.

Witnesses

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(No Model.) 3 Sheets—Sheet 3.

Fig. 3

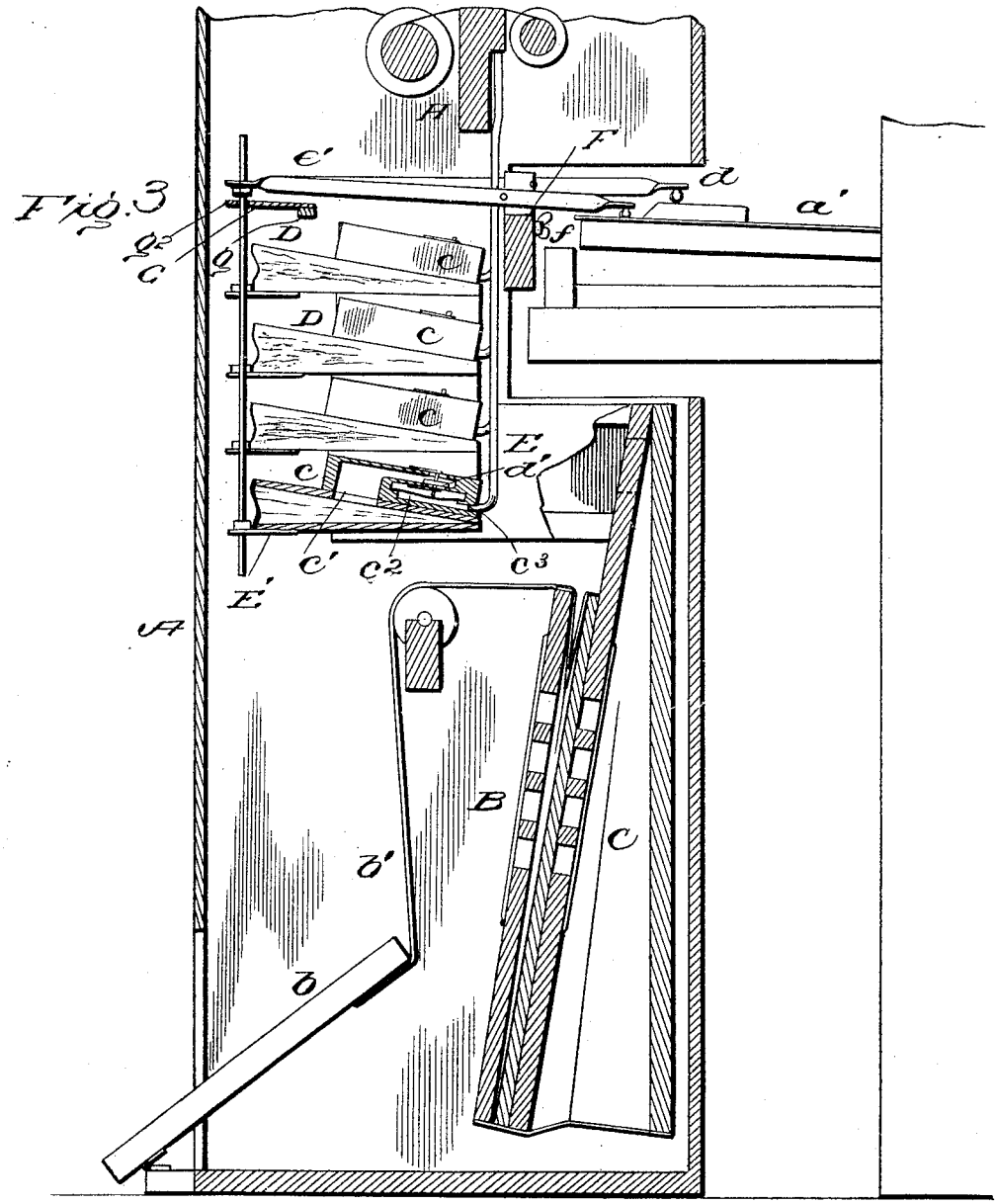
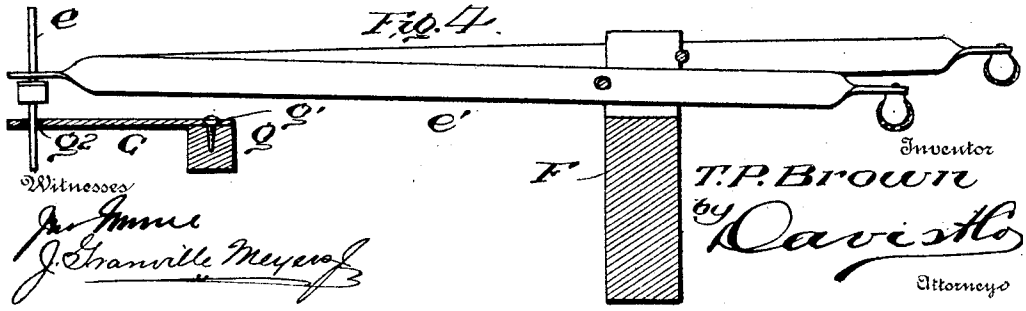


Fig. 4.



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UNITED STATES PATENT OFFICE.

THEODORE PARKER BROWN, OF WORCESTER, MASSACHUSETTS.

SELF-PLAYING ATTACHMENT FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 634,872, dated October 17, 1899.

Application filed February 13, 1899. Serial No. 705,424. (No model.)

To all whom it may concern:

Be it known that I, THEODORE PARKER BROWN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Self-Playing Attachments for Musical Instruments; 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.

My invention relates to attachments for pianos, commonly called "automatic piano-players," in which a series of mechanical fingers or key-levers is arranged in proximity to the keyboard, which key-levers, through suitable actuating devices, are caused to strike the keys of the piano and produce a musical composition, the movements of the key-levers and their selection being determined by means of a perforated note-sheet, said sheet controlling the small bellows known as "pneumatics," which constitute part of the actuating mechanism and are the immediate means for imparting movement to the key-levers, said pneumatics in turn being operated by suitable exhaust apparatus. It is with a view of improving upon devices of this character that I have evolved the present invention, which relates in part to a novel type and arrangement of key-levers which admits of the connections between the pneumatics and tracker-board being more advantageously made. I have also provided means for securing an adjustment of the key-levers to pianos of different heights, as well as those having keyboards of different range. Furthermore, the tracker-board exhibits certain valuable features of novelty which will be described in detail hereinafter, which enables the connections between the said tracker and the pneumatics to be readily and conveniently made.

In the drawings herewith, Figure 1 is a front view of the player, the front board of the case being removed. Fig. 2 is a rear view of a portion of the player, duplication of like parts being considered unnecessary. Fig. 3 is a vertical section showing the several parts of the player in operative relation. Fig. 4 is an enlarged side view of the key-levers and their supports. Fig. 5 is a detail plan view of the means for securing lateral adjustment of a key-lever. Fig. 6 is a view showing the construction whereby vertical adjustment of the series of key-levers is secured. Fig. 7 is a sectional view, enlarged, of one of the pneumatics, its valve mechanism, and air-channels. Fig. 8 is a side view of the tracker-board. Fig. 9 is a vertical sectional view of the tracker shown in Fig. 8.

Referring to the figures by letter, A denotes a rectangular case closed on all sides except for the treadle-opening at its front and the recess d at its back for the reception of the keyboard a' of the piano, Fig. 3. Within said case are a pair of bellows B of ordinary construction, which are operated by treadles b, connected with the flaps of the bellows by straps b'. Each of said bellows is connected with a vertically-placed exhaust-chamber C at opposite ends of the player, said chamber C being connected by a series of horizontal exhaust-trunks c, running the entire length of the case A. It will be seen, therefore, that the bellows B, chambers C, and trunks c form the main exhaust apparatus of the player and that continued operation of the bellows B will exhaust the air from chambers C and trunks c.

The exhaust-trunks c form the shelves or supports for the pneumatics D, which are secured to the bottom boards of said trunks and communicate with the exhaust-passages c' of the trunks c through a port d, which is normally closed by means of a loosely-mounted puppet-valve d'. The pneumatics D are in communication with the open air through a second port d^2, which is so placed (see Fig. 7) as to be controlled by the said valve d', which normally closes the port d, said valve having a central spindle d^3, which slides freely through two supports d^4. From this it will be apparent that the single valve d' in its lower normal position controls the port d, which gives communication between the pneumatic D and its exhaust-trunk c, and in its upper raised position closes the port d^2, which gives communication with the open air. It will be seen that said puppet-valve d' is free to move and is hung or supported so that it naturally assumes its normal position, closing the port to compartment c'. In the bottom of the

trunk c is a series of compartments c^2, which are separated from the main air-passages c' by means of a flexible diaphragm d^5, having a disk d^6 at its middle. Said compartment c^2 is closed with the exception of an air passage or channel consisting of a pipe c^3, which connects it with one of the air-ducts of a tracker-board, (to be presently described,) there being a pipe E for each of the compartments c^3, leading to different air-ducts in the tracker. Normally the diaphragm d^5 is in the position shown in full lines in Fig. 7 and the valve d' is in its lowest position, (full lines, Fig. 7,) being held to its seat by reason of the partial vacuum existing in the compartment c^2, owing to the fact that the tracker-board duct with which pipe E communicates is closed by the note-sheet. The diaphragm d^5 will remain in the position indicated by full lines until a perforation in the note-sheet passes over the particular air-duct in the tracker which is in communication with the pipe c^3, which leads to a compartment c^2, when the partial vacuum which existed in the compartment c^2 and prevented the diaphragm d^5 from being drawn upwardly by the exhaust in passage c will be broken by the air rushing down pipe c^3, and the diaphragm d^5, moving to the position shown in dotted lines, Fig. 7, will cause the disk d^4 to strike the spindle d^3 and, raising the valve d', open port d and close the port d^2. This action of the valve puts the pneumatic D in communication with the exhaust-passage c' and cuts off its communication with the outer air, which will cause an immediate collapse of the pneumatic and an elevation of its flap to the position shown in dotted lines, Fig. 7.

To the rear end of the flap of each pneumatic D is secured a plate E', which engages a lifter-rod e, connected at its upper end to the rear end of one of the key-levers e', which strike the keys on the keyboard a' of the piano, Fig. 3. Said key-levers e', equal in number to the keys of the piano and of different lengths for the white and black keys, are formed of relatively thin strips, preferably of metal, and are pivoted edgewise on a bar F, as shown in Fig. 4. Said bar F is adjustably secured to the sides of the case A by means of thumb-screws f, passing through slots f' in the ends of the said bar, so as that the bar F and its key-levers e' may be raised or lowered to suit keyboards of different heights. Said key-levers e' are pivoted on the bar F so as to have a slight lateral movement, Fig. 5, in order that the striking ends of the levers may be spread to enable the series to be adjusted to keyboards of different ranges, the various makes of pianos varying slightly in this respect. In order to secure and maintain the desired adjustment of key-levers, I provide a series of adjusting-plates G, said plates being secured to a bar g, running the full length of the player, by means of screws g', which may be loosened to allow the said plates to be swung to the right or left. Said plates G are provided with holes or slots g^2, through which the lifters e, which connect the rear ends of key-levers e' with the pneumatics D, pass. It is obvious, then, that when it is desired to move the forward or striking end of a key-lever e' to the right or left to secure the requisite spread the plate G will be swung to the left or right, as the case may be, and secured in its adjusted position by the screw g'. Said key-levers e', as clearly shown in Fig. 4, have their ends twisted at right angles to their body portion, so as to form convenient connections for the lifters e at the rear ends of said levers and provide means for supporting the key-pads at the forward ends.

The key-levers e', formed as shown and arranged in the manner described, enable me to lead the pipes c^3, which connect the pneumatics D with the tracker between the levers e' without twisting, directly to the tracker, as clearly shown in Fig. 2, and the tortuous channels and pipes which have been used heretofore are dispensed with.

The tracker-board H, to which reference has been made incidentally hereinbefore, is of such construction as to enable the air-ducts h' which are controlled by the perforated note-sheet to be spread or radiated from the comparatively short mouth portion of the tracker over which the note-sheet passes to the extreme width of the player, so as to render the connections of the air-pipes c^3 with the air-ducts h' in the tracker less difficult than at present, when it is necessary to bend said pipes and converge them in closely-packed bunches to the lower end of the tracker-board. Said tracker-board H consists of two sections glued together, the front section h being provided with the air-ducts h', which radiate from the mouths h^2 in the top of the tracker H, over which the note-sheet passes, as clearly shown in Fig. 8. The radiation of the air-ducts h' spreads their lower ends considerably, as will be seen, and from the spread lower ends a second series of air-ducts h^3, formed in the other section h^4 of the tracker H, leads to the pipes c^3, which connect the tracker with the pneumatics, said ducts h' and h^3 being united by short horizontal passages h^5, Fig. 8. These last-mentioned air-ducts h^3 run in a reverse direction from that of the ducts h' and, being radiated, form substantially V-shaped air-ducts in connection with the first series, as shown, the width of the tracker H at the point where its ducts connect with the pneumatic-controlling pipes c^3 being greatly increased and the necessity of bunching said pipes or converging them to a comparatively narrow tracker is thus avoided.

As I have described the function and operation of each element of the structure in giving its detailed description, it is thought unnecessary to describe the operation of the player.

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

1. In an automatic piano-player, the com-

bination with suitable exhaust apparatus, of a series of pneumatics operatively connected with said exhaust apparatus, a series of relatively thin key-levers pivoted edgewise on a support, means for adjusting said series of key-levers vertically, means for adjusting each of said levers horizontally, and connections between said key-levers and said pneumatics.

2. In an automatic piano-player, the combination with suitable exhaust apparatus, of pneumatics operatively connected with said exhaust apparatus, key-levers of relatively thin material pivoted edgewise on their support, a vertically-adjustable key-lever support, means for adjusting said key-levers horizontally relative to the piano-keys, lifter-rods connecting said pneumatics and said key-levers, a tracker-board, and air-pipes connecting said tracker-board with said pneumatics.

3. In an automatic piano-player, the combination with suitable key-lever-operating devices, of a key-lever support, key-levers mounted thereon, and adjustable plates connected with the rear end of each of said key-levers whereby a horizontal adjustment of the said key-levers relative to the piano-keys may be obtained.

4. In an automatic piano-player, the combination with a series of key-levers, of a support on which said key-levers are pivoted, means for giving a vertical adjustment to said support and the series of key-levers carried thereby, means for giving an independent horizontal adjustment to each of said key-levers and means for operating said key-levers.

5. In an automatic piano-player, the combination with suitable exhaust apparatus, of a series of pneumatics operatively connected with said exhaust apparatus, a tracker-board, pneumatic connections between said tracker-board and said pneumatics, a key-lever support having vertical slots formed at each end, thumb-screws passing through said slots whereby said key-lever support may be adjusted vertically, key-levers pivoted on said support, lifter-rods connecting said key-levers with said pneumatics, and horizontally-adjustable plates through which said lifter-rods pass whereby an independent horizontal adjustment may be given to each of said key-levers.

6. A tracker-board for automatic piano-players having one series of air-ducts radiating from the top of the tracker to the bottom, and a second series of air-ducts, forming a continuation of the first series, radiating in a reverse direction to the point of connection with the pneumatic-pipes.

7. A tracker-board for automatic piano-players having two parallel series of air-ducts, one series radiating from the mouth of the tracker and the second series radiating from the ends of the first series to the point of connection with the pneumatics in a direction reverse to the radiation of the said first series.

8. A tracker-board for automatic piano-players formed of two sections, one of which is provided with a series of air-ducts radiating from the mouth of the tracker, the other of said sections being provided with a series of air-ducts communicating with said first series but radiating in a direction reverse to the radiation of the first series.

In testimony whereof I affix my signature in presence of two witnesses.

THEODORE PARKER BROWN.

Witnesses:

ARTHUR P. RUGG,

E. GERTRUDE PALMER.