

J. WIESER.

PNEUMATIC SELF PLAYING ATTACHMENT FOR PIANOS.

APPLICATION FILED DEC. 6, 1900.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.

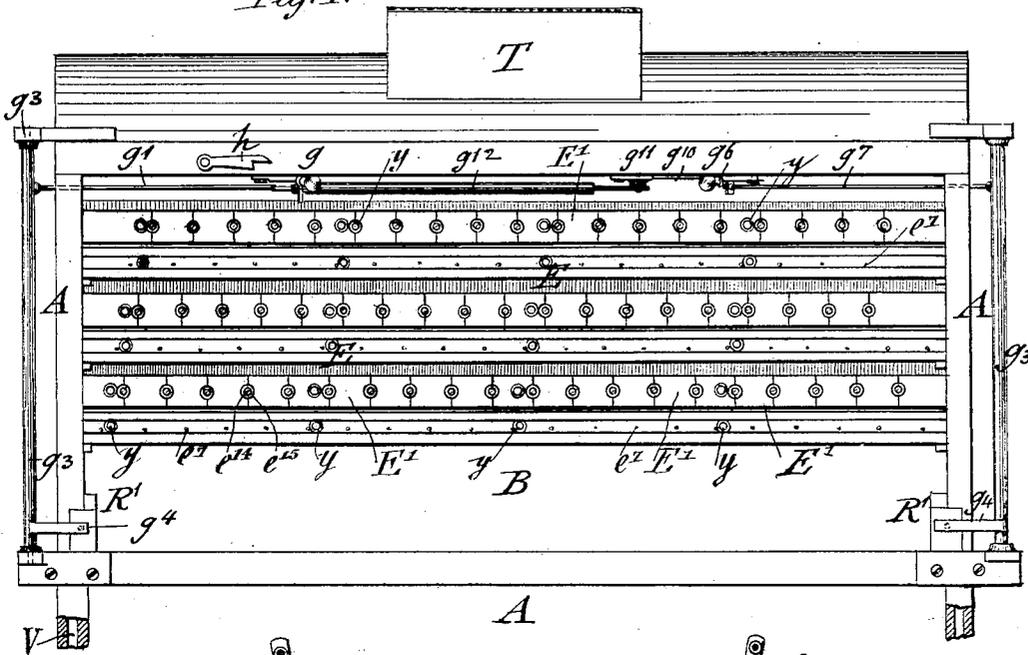


Fig. 2.

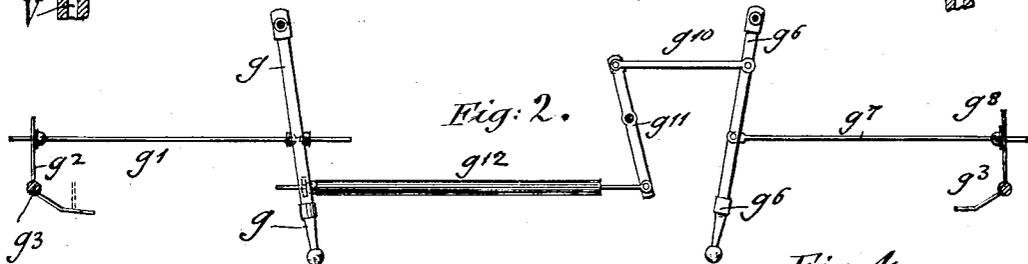


Fig. 3.

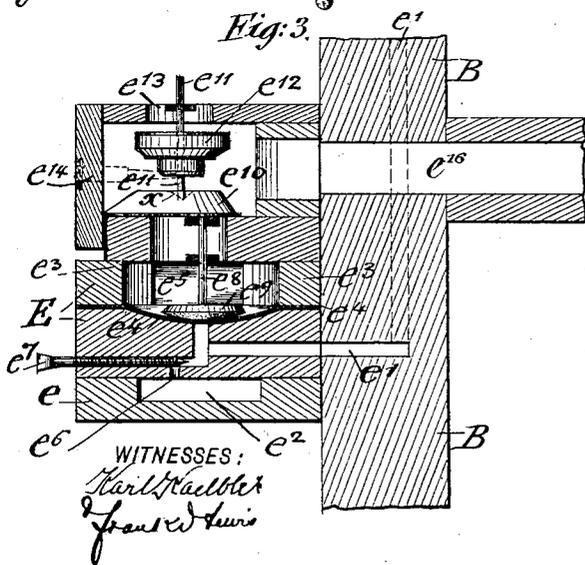
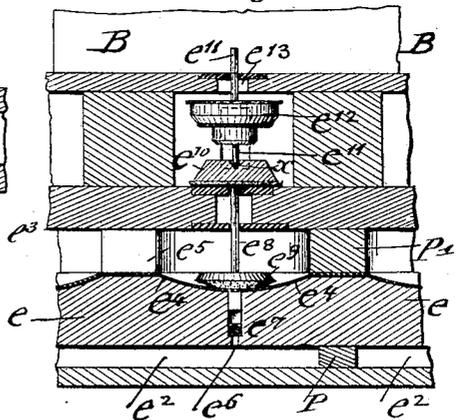


Fig. 4.



INVENTOR  
*José Luis Wieser*  
 BY *James H. Rogers*  
 ATTORNEYS



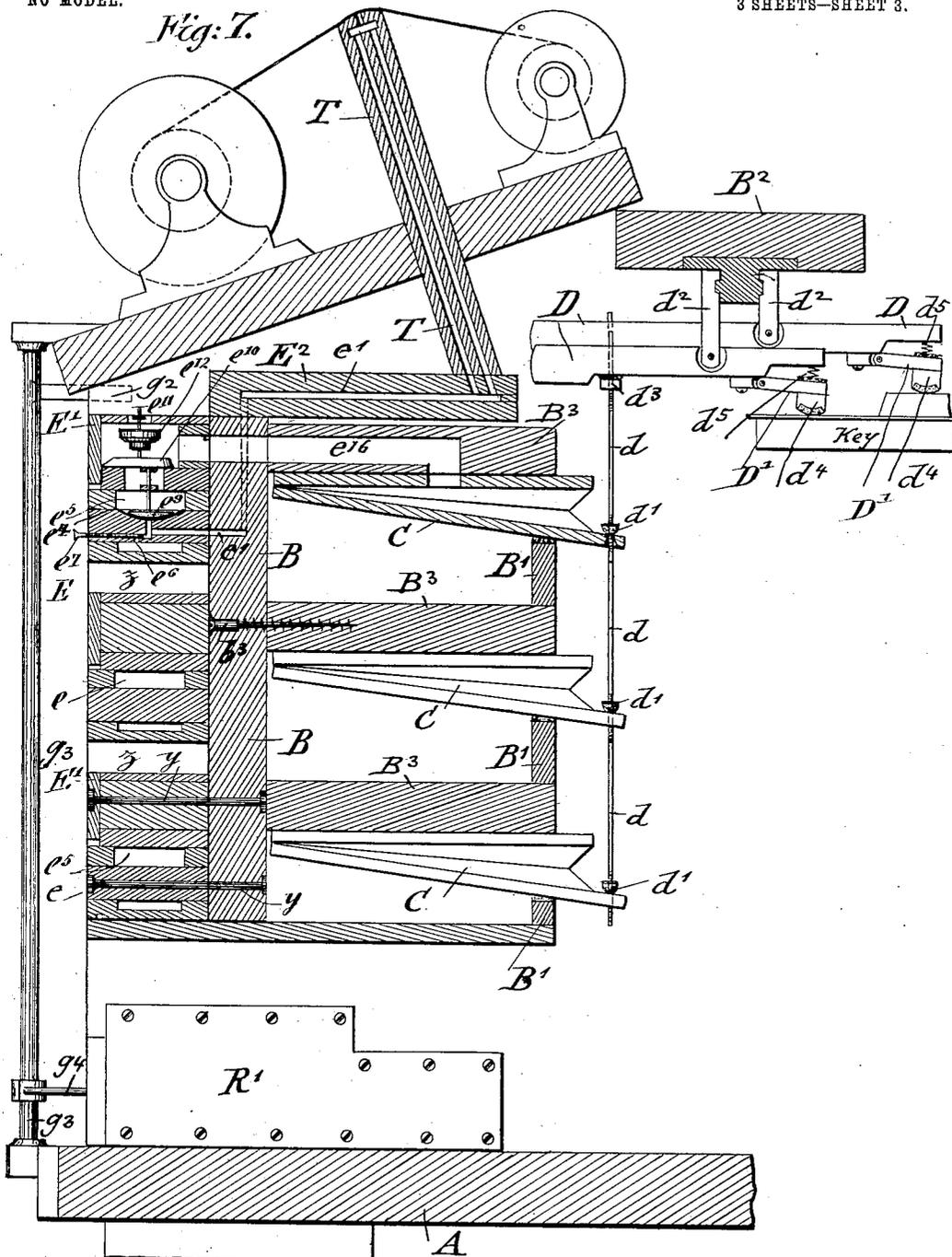
J. WIESER.

PNEUMATIC SELF PLAYING ATTACHMENT FOR PIANOS.

APPLICATION FILED DEC. 8, 1900.

NO MODEL.

3 SHEETS—SHEET 3.



WITNESSES:  
*W. H. Haubly*  
*Francis Lewis*

INVENTOR  
*Joseph Wieser*  
 BY *James R. Rogers*  
 ATTORNEYS

# UNITED STATES PATENT OFFICE.

JOSEPH WIESER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO  
KARL FINK, OF NEW YORK, N. Y.

## PNEUMATIC SELF-PLAYING ATTACHMENT FOR PIANOS.

SPECIFICATION forming part of Letters Patent No. 762,013, dated June 7, 1904.

Applicator filed December 6, 1900. Serial No. 38,881. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH WIESER, a citizen of the United States, residing in New York, in the borough of Brooklyn and State of New York, have invented certain new and useful Improvements in Pneumatic Self-Playing Attachments for Pianos, of which the following is a specification.

This invention relates to an improved self-playing attachment for pianos of that type which is independent of the piano and moved up to the same so that it extends over the keyboard of the piano for playing it, and which attachment is operated in connection with a perforated music-sheet and pneumatic actions operated by foot-power, an electric motor, or otherwise, the attachment being so arranged that the expression of the piece of music to be played can be regulated at will, and thereby a superior rendering of the piece produced; and the invention consists in the combination, with a main board, of a series of pneumatic valve-actions arranged in rows on said board, fastening-screws passing through the said rows and into the main board, horizontal partitions extending across the back of the main board, rows of pneumatics arranged on said partitions, said rows of valve-actions being independently mounted on the main board, so that each row is individually removable without disturbing the rows of pneumatics, a series of channels connecting the valve-actions with the pneumatics, and a series of channels connecting the valve-actions with the channels of the tracker.

The invention consists, further, in the special construction of finger-levers employed and, lastly, in the construction of improved expression devices, as will be fully described hereinafter and pointed out in the claims.

In the accompanying drawings, Figure 1 represents a front elevation of my improved pneumatic self-playing attachment for pianos. Fig. 2 is a detail plan view of the expression devices. Figs. 3 and 4 are respectively a vertical transverse section and a vertical longitudinal section of one of the pneumatic valve-actions employed in my attachment, said figures being drawn on a larger scale. Fig. 5

is a front elevation of a portion of the attachment, showing numbers of pneumatic valve-actions and an expression-regulating device, said figure being drawn on a larger scale than Fig. 1 and so arranged as to show some of the valve-actions in section and others broken off so as to show the rear wall of the action-frame. Fig. 6 is a detail elevation of the expression device drawn on a larger scale, its cover being removed and parts of the main casing of the attachment being shown in section; and Fig. 7 is a vertical transverse section through the pneumatic valve-action and finger-levers operated thereby, showing the connection with the tracker and perforated music-sheet.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the casing of my improved pneumatic self-playing attachment for pianos. The casing A supports an upright main plate or board B, on which the pneumatic valve-actions are arranged in tiers one row above the other, as many valve-actions being necessary as there are keys of the piano to be actuated. A second upright supporting-board B' is arranged parallel with the main plate for supporting as many pneumatics as there are pneumatic valve-actions, each pneumatic being connected with its corresponding action, while the movable members of each pneumatic are connected by a lifter-rod *d* with a finger-lever D, of which as many are arranged as there are keys of the keyboard to be actuated. The entire system of finger-levers D is supported on a horizontal board B<sup>2</sup>, which is located at the rear of the vertical supporting-boards B B' of the pneumatic actions and pneumatics and projects sufficiently to the rear of the same for permitting the motion of the entire attachment toward the keyboard of the piano until the key-levers are in position vertically above the keys of the keyboard, so as to engage the white and black keys of the same, as shown in Fig. 7.

*The pneumatic valve-actions.*—The valve-actions E are shown in detail in Figs. 3 and 4. Each consists of a lower portion *e*, which is

connected by a channel  $e'$  with the corresponding channel of the tracker T, the tracker being arranged at the central portion of the attachment vertically above the pneumatic valve-actions, as shown in Figs. 1 and 7. Said channels  $e'$  are made in a horizontal board  $E^2$ , which extends over all the valve-actions. The lower part  $e$  of the pneumatic valve-actions E is connected with the suction-port of the wind-chest by a suitable channel  $e^2$ , while the middle part  $e^3$  of each valve-action is likewise connected with the suction-port of the wind-chest by a channel  $e^5$ , which is separated from the lower part  $e$  of the valve-action by a diaphragm  $e^4$ , of leather or other suitable material, interposed between the lower part of the upper and the upper part of the lower valve-sections. The space below the diaphragm  $e^4$  communicates with the channel  $e'$  leading to the tracker, and with a channel  $e^6$  communicating with the suction part of the wind-chest. The channel  $e^6$ , which connects the suction-channel  $e^2$  with the space below the diaphragm, is opened more or less by a screw  $e^7$  for regulating the escape of the air through the suction-channel  $e^2$  and retard or expedite thereby the return of the diaphragm into its normal position after the pneumatic valve-action has been operated. The diaphragm  $e^4$  operates a valve-spindle  $e^8$ , which is guided in a suitable manner in the middle part  $e^3$  of the valve-action, said spindle carrying immediately above the diaphragm  $e^4$  a disk  $e^9$ , while the upper end of the spindle  $e^8$  acts on a hinged flap-valve  $e^{10}$ , which separates the middle and upper portions of the valve-action from each other. When the flap-valve  $e^{10}$  is closed, atmospheric air can pass to the space above the diaphragm and the action will be in its normal position. As soon, however, as one of the openings in the perforated music-sheet passing over the tracker arrives over a duct in the tracker the atmospheric air passes in under the flexible diaphragm  $e^4$ , and the suction through the lower duct  $e^6$ , regulated by set-screw  $e^7$  to hold down diaphragm  $e^4$ , is reduced enough to release the latter, thereby permitting the air at atmospheric pressure to raise said diaphragm, so as to produce the lifting of the spindle  $e^8$  and flap-valve  $e^{10}$ , whereby a suction is established through the upper parts of the valve-action and in the pneumatics, so as to actuate the key-operating devices to be hereinafter described. The flap-valve  $e^{10}$  is provided with a conical recess  $w$  in its upper surface, in which recess rests a second valve-spindle  $e^{11}$ , which is guided in any suitable manner in the uppermost part of the valve-casing, said spindle carrying a disk-shaped valve  $e^{12}$ , which whenever the suction-action is established closes an opening  $e^{13}$  in the top of the valve-casing, so as to prevent the ingress of atmospheric air. When the tracker-duct is closed by the music-sheet, the flap-valve and diaphragm are returned to normal position, the fast or slow return of the

parts into normal position being regulated by the amount of suction through the narrow suction-channel  $e^6$ , which suction can be regulated at will by set-screw  $e^7$ . For convenience the valve-actions are arranged in tiers one row above the other and built up in front of the upright main board B. This has the advantage that each row of valve-actions is attached independently of the adjacent row to the supporting main board, the front walls  $E'$  of each separate valve-action of a row being retained by means of headed screws  $e^{14}$ , which pass through washers  $e^{15}$ . This arrangement has the great advantage that every individual valve-action can be independently examined and repaired without removing the entire row or rows of actions, so that repairs can easily be made and any defect in the valve-action be remedied. The fastening-screws  $e^{14}$  of the front walls of the valve-casings are so arranged that each washer engages recesses of two adjacent front walls, while the main screws  $y$  are employed for attaching one entire row of valve-actions to the main board B. Above each row of valve-actions a narrow horizontal space  $z$  is provided, so as to permit the free play of the projecting spindles of the valves  $e^{12}$ . To the rear of the upright main board B are attached parallel horizontal partitions  $B^3$ , which are connected therewith by means of screws  $b^3$ . At the under side of the horizontal partitions are arranged a number of pneumatics  $c$ , which communicate, by means of channels  $e^{16}$  in the partitions  $B^3$ , with the upper parts of the valve-casings E, the lower movable members of the pneumatics being extended backwardly and connected with the lifter-rods  $d$ , resting by means of buttons  $d'$  on the same, while the rods themselves pass through openings in the same, as shown in Fig. 7. A piece of cushioning-felt is interposed between the rear board  $B'$  and the movable members of the pneumatics C, so as to permit a noiseless return of the movable members into their normal position after the valve-actions have been actuated.

*The finger-levers.*—The finger-levers D are suspended from the horizontal board  $B^2$  and fulcrumed to stationary hangers  $d^2$  on said board. The finger-levers D are provided in their front ends with perforations for the lifter-rods  $d$ , the lifter-rods being provided with collars  $d^3$  for lifting the front ends of the finger-levers D whenever their pneumatic valve-actions are actuated. To the rear end of each finger-lever D is attached a hinged knuckle  $D'$ , which is provided with a felt-covered head  $d^4$ , a helical cushioning-spring  $d^5$  being interposed between each pivoted knuckle-lever and the rear end of the finger-lever, so that a very sensitive action of the finger-levers is obtained. The construction of the knuckle on each finger-lever is made in imitation of the finger of the human hand, so that a better touch of the keys is obtained.

The finger-levers are arranged in two sets, the lower one for playing the white keys and the upper set for playing the black keys of the keyboard, the upper set being longer than the lower set, so as to extend back over the black keys. By the construction of the finger-levers with their spring-actuated knuckles the objection heretofore made to the touch of self-playing attachments—namely, the mechanical or hammering touch of the same—is done away with and the actuation of the keys produced by the knuckle in close imitation of the action of the fingers on the keys or the so-called “touch” of the same. This feature forms an important point of novelty in my construction and in the practical working of the attachment. In Fig. 7 the connection of the two sets of finger-levers with the keys is clearly shown.

*The expression devices.*—The expression devices consist of two independent mechanisms, one for regulating the fortes and one for regulating pianos of a music-piece according to the well-known indicatory lines printed on the music-sheet, while the tempi of the music-piece are regulated by the variations in speed which are imparted to the music-sheet by the motor. The forte and piano expression devices are operated by a system of levers which are arranged above the uppermost tier of valve-actions and respectively at each side of the music-sheet and tracker, said lever system being so arranged that the bass keys can be actuated independently from the treble keys by the left-hand lever, while the treble and base keys are jointly influenced by a second lever at the right-hand side, so that the expression of all the keys is controlled. For this purpose the left-hand expression-lever  $g$  is pivoted at its rear end to the top part of the attachment and connected at an intermediate point by a rod  $g'$  with an arm  $g''$  of a vertical pivot-rod  $g^3$ . This pivot-rod is provided at its lower end with another arm  $g^4$ , that is connected with a sliding and spring-actuated regulator  $R$  at the lower part of the frame, by which the rarefaction of the air in the exhaust apparatus is increased or decreased as compared with the atmospheric pressure which is opposed. This regulator is shown in the lower part of Fig. 5 and in Fig. 6. The vertical pivot-rod  $g^3$  is supported in step and neck bearings of the top and bottom parts of the supporting-frame  $A$ , as shown in Fig. 5. The regulator  $R$  is inclosed by a U-shaped casing  $R'$ , that is attached to the hollow side wall of the frame  $A$ , in which the vertical channels  $V$  are arranged that connect the suction-channels  $e^2$  of the different tiers of pneumatic valve-actions with the main suction-chest. Each tier of valves is connected by separate channels with a U-shaped channel  $v$  of the regulator-casing, so as to pass through the casing and the corresponding openings in the regulator-slide  $R$  to the channel  $V$ , connected with

the same, and produce thereby, according to the larger or smaller cross-area of the connecting-channel, the proper actuation of the valve-actions, and thereby the expression—that is to say, the forte or piano playing of the instrument. An expression-regulating device is arranged in each side wall of the piano, the left-hand regulator regulating the expression of the pneumatics which actuate the bass keys of the piano, while the right-hand regulator regulates the expression of the treble and bass keys of the piano. The right-hand expression-lever  $g^6$  is connected in the same manner as the left-hand lever  $g$  by a connecting-rod  $g^7$  with an arm  $g^8$  of a vertical pivot-rod  $g^3$  at the right hand of the attachment by which the right-hand expression device is operated. The expression-levers  $g^6$  and  $g$  are connected with each other by intermediate connecting-rod  $g^{10}$ , lever  $g^{11}$ , and a connecting-rod  $g^{12}$ , the intermediate connecting-rod  $g^{10}$  being pivoted to the rear part of the expression-lever  $g^6$ , while the lever  $g^{11}$  is fulcrumed to the top part of the frame  $A$  and connected with the connecting-rods  $g^{10}$  and  $g^{12}$ , as shown in Fig. 2. The connecting-rod  $g^{12}$  is provided with a leather-covered pusher-head that forms contact with the expression-lever  $g$ , so that whenever the right-hand expression-lever  $g^6$  is operated both the treble and bass keys of the piano are jointly affected, while when the left-hand lever is operated only the bass keys of the piano and not the treble keys are influenced. Such action is permitted by reason of the fact that the lower channels  $e^2$  and the upper channels  $e^3$  are respectively divided by blocks or partitions  $P P'$ , so that the channels for the bass lie on the left and for the treble on the right. This permits the regulation of the bass keys independently of the regulation of the treble keys, which is in many cases of advantage, especially as it enables the player to vary the expression of the piece of music played and impart thereby a greater variety of execution to it, so as to overcome the mechanical character and disagreeable uniformity and monotony of mechanically-played music.

The tempi of the music-piece to be played are regulated by imparting to the music-sheet a greater or less speed as it passes over the tracker. This is accomplished by means of a separate lever or regulator by which the speed of the pneumatic motor, which is arranged in all instruments of this class, is changed. This feature, however, is well known in instruments of this class. The pneumatic motor supplies the power for moving the music-sheet from its roll to another roll and re-winds the perforated music-sheet onto its roll after the piece has been played. Any approved unwinding and rewinding mechanism may be used. During the rewinding of the music-sheet the suction action of the pneu-

matics of all the pneumatic actions is shut off and a clutch device operated by which the motor-belt is placed on the shaft of the winding-up mechanism in any well-known manner.

5 My improved pneumatic self-playing attachment for pianos has the following advantages: first, that the valve-actions are so constructed that every individual action can be readily inspected and repaired whenever required; second, that a very superior touch of the keys, and consequently a superior execution of the piece of music on the piano, is obtained; third, that the expression can be regulated at will by the player, so that there is an attraction in playing the piece according to the individual taste and capacity of the performer; fourth, that the attachment can have all its parts arranged in a very convenient and practical manner and can be built at a smaller cost than the self-playing attachments heretofore in use.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a self-playing attachment for pianos, the combination with a main board, of a series of pneumatic valve-actions arranged in rows on said board, fastening-screws passing through the said rows and into the main board, horizontal partitions extending across the back of the main board, rows of pneumatics arranged on said partitions, said rows or valve-actions being independently mounted on the main board, so that each row is individually removable without disturbing the rows of pneumatics, a series of channels connecting the valve-actions with the pneumatics, and a series of channels connecting the valve-actions with the channels of the tracker, substantially as set forth.

2. In a self-playing attachment for pianos, the combination of the pneumatics, a vertical

main board, a series of valve-actions supported in separate rows thereon, passages in the main board connecting the pneumatics and the valve-actions, the valve-actions of each row being each provided with an independent detachable front wall, and screws for attaching said front wall to the casing, substantially as set forth.

3. In a self-playing attachment for pianos, a system of suitable finger-levers arranged in two groups, said finger-levers being suitably connected at the front ends with valve-actions, suitable knuckles hinged at one end to the said levers and adapted to contact with the keys of the keyboard, and springs acting on the other ends of the knuckles, substantially as set forth.

4. In a self-playing attachment for pianos, a finger-lever provided at its rear end with a pivoted knuckle having a cushioned head, said knuckle being actuated by a spring confined between the same and the lever, substantially as set forth.

5. In a self-playing attachment for pianos, the combination of the suction-channels of pneumatic valve-actions, two expression-levers, one for the bass and the other for the treble and bass valve-actions, regulator-slides for the suction-channels of the bass and treble, casings for said slides, and a system of levers connecting the expression-levers and slides, so that the bass-controlling valve-actions can be actuated independently of the treble valve-actions, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOSEPH WIESER.

Witnesses:

PAUL GOEPEL,  
M. H. WURTZEL.