C. E. PETERSON.

PIANO PLAYER.

APPLICATION FILED JUNE 22, 1917.

1,295,198 Patented Feb. 25, 1919.

Fig. 1.

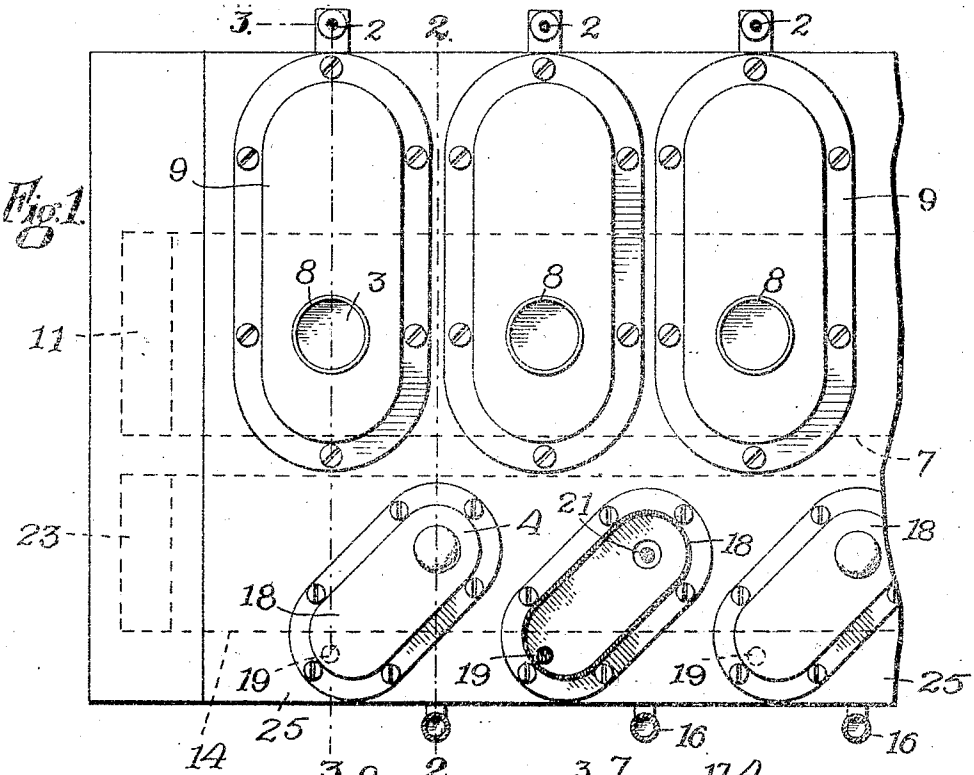


Fig. 2.

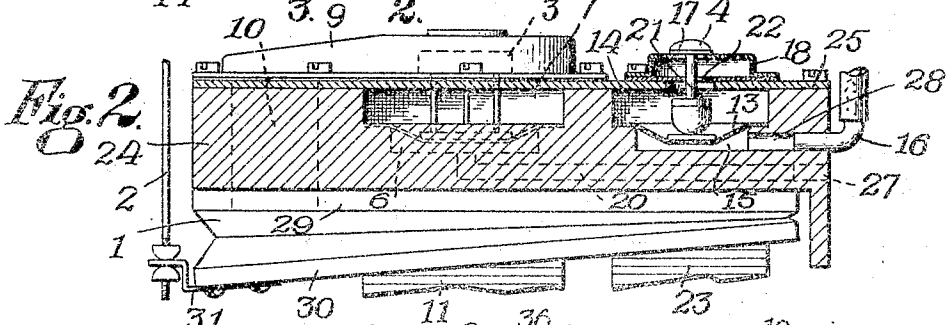


Fig. 3.

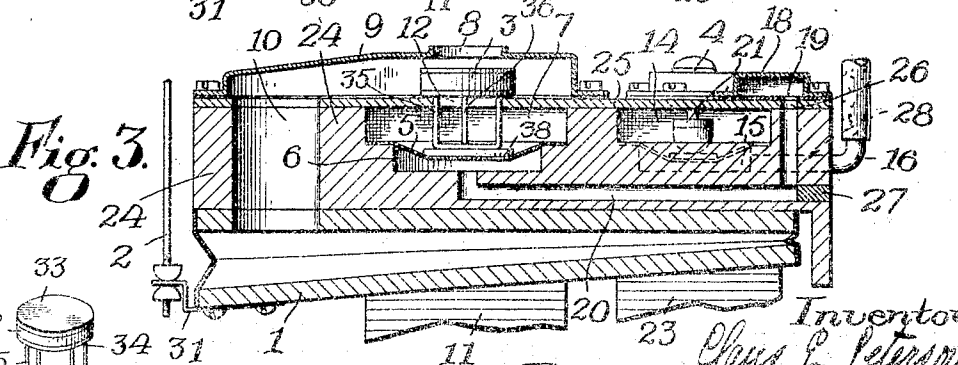
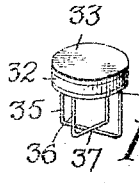


Fig. 4.



Inventor
Claus E. Peterson
By Fowler & Kennedy
Attorneys

UNITED STATES PATENT OFFICE.

CLAUS E. PETERSON, OF WORCESTER, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO IVERSON PIANO PLAYER COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PIANO-PLAYER.

1,295,198. Specification of Letters Patent. Patented Feb. 25, 1919.

Application filed June 22, 1917. Serial No. 176,435.

To all whom it may concern:

Be it known that I, CLAUS E. PETERSON, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Piano-Players, of which the following is a specification accompanied by drawings, forming a part of the same.

The object of my present invention is to simplify the construction of this class of instruments, to obviate to a large extent the use of rubber tubing, and to secure a metal contact for the pneumatic valve mechanisms, thereby avoiding the liability of the valve actions becoming impaired by reason of checks or shrinkage incident to pneumatic valve mechanisms when made of wood. These objects I accomplish by the arrangement and construction of parts as hereinafter described and set forth in the accompanying drawings, in which—

Figure 1 is a top view of a portion of the player mechanism sufficient to illustrate the character of my present invention.

Fig. 2 is a transverse sectional view on the plane of the broken line 2—2, Fig. 1.

Fig. 3 is a transverse sectional view on the plane of the broken line 3—3, Fig. 1.

Fig. 4 is a detached perspective view of the secondary valve on a somewhat smaller scale than shown in Fig. 3.

Similar reference characters refer to similar parts in the different figures.

The player mechanism forming the subject of this invention is similar in its general characteristics to those now in common use, and it comprises a motor pneumatic or bellows 1, operatively connected by a rod 2 with the piano action to swing the hammer against a string of the piano. The motor pneumatic is controlled by a secondary valve 3, which in turn is controlled by a primary valve 4. The function and operation of the primary and secondary valves are precisely the same as in player actions now in common use. The secondary valve 3 is mounted upon a flexible diaphragm 5 which closes the space between an air chamber 6 and a longitudinal wind chest 7. As the secondary valve is raised by air pressure beneath the diaphragm 5 it closes an opening 8 in the metal shell or cap 9, thereby connecting the motor bellows with the wind chest 7 through a channel 10. The wind chest 7 is connected at its ends by pipes 11 leading to an exhaust bellows or similar apparatus, by which the air is exhausted from the wind chest 7. As the secondary valve rises it opens a passage 12, thereby connecting the interior of the motor bellows with the wind chest 7, and causing the sudden collapse of the motor bellows, which through its connection with the piano action through the rod 2 swings the hammer against a string of the piano in the usual manner in instruments of this class. When the air pressure is removed from the chamber 6, the secondary valve 3 falls by its own weight, thereby closing the passage 12, and admitting air through the opening 8 in order to distend the motor bellows.

The above described action of the secondary valve is controlled by the primary valve 4 which is actuated by a flexible diaphragm 13 which closes the space between a longitudinal wind chest 14 and a recessed air chamber 15, to which air is admitted through a pipe 16 from an opening in the tracker bar whenever the latter is uncovered by the perforation of the music sheet. The raising of the primary valve 4 uncovers an opening 17 in the inverted cup shaped shell 18. The shell 18 is oval in shape in order to inclose a vertical channel 19 which communicates with a horizontal passage 20 leading to the air chamber 6. The stem of the primary valve 4 carries a second valve 21, which, as the primary valve rises, closes an opening 22 communicating with the chamber inclosed by the inverted cup shaped shell 18. The wind chest 14 communicates at its ends through pipes 23 with a wind exhaust bellows or other similar apparatus.

As soon as the perforation in the tracker bar is closed by the music sheet the pressure of the air in the air chamber 15 is reduced by means of a small bleed opening connecting the pipe 16, at some convenient point, not shown, with the chamber from which the air has been exhausted. As the air pressure is reduced in the chamber 15 the primary valve falls by its own weight, thereby closing the opening 17 and uncovering the opening 22.

The parts already described, are constructed as follows:—The two longitudinal wind chests 7 and 14 are formed in the

upper surface of a block of wood 24. Recesses 6 and 15 are then formed below the wind chests and properly spaced according to the distance between the hammers of the piano, and a channel 10 is then formed through the block 24, connecting the interior of the motor bellows with the chamber inclosed by the shell or cap 9. A thin metallic plate 25, preferably of sheet steel or aluminum, and of the same width and length as the block 24, having an opening therethrough in alinement with the passage 10, is placed upon the top of the block, thereby closing the wind chests 7 and 14. A horizontal passage 20 is then bored from the rear edge of the block to communicate with the air chamber 6, and a vertical passage is bored in the block 24 to communicate through a small opening 26 in the metal plate, with the interior of the inverted metallic cup shaped shell 18. The outer end of the horizontal passage 20 is then closed by a plug 27. The lower end of the pipe 16 is bent at right angles and inserted in the block 24 in alinement with the passage 28 communicating with the air chamber 15.

The primary valves 4 are placed in staggered relation to the secondary valves 3, so a line passing transversely through the center of a valve 4 will pass midway between two of the valves 3, while the vertical channels 19 are in line with the valves 3. The cup shaped shells 9 are disposed transversely to the wooden block 24 and the cup shaped shells 18 are disposed obliquely to a line passing transversely through the block 24 and at right angles to its edges, in order that the shell 18 may cover both the valve 4 and the passage 19. This arrangement of the valves 3 and 4 and the shells 9 and 18 permit the horizontal passages 20 and 28 to be parallel and to be bored from the rear edge of the block 24, and at right angles thereto, to the recesses 6 and 15 respectively.

By the above described construction I avoid the use of metallic or rubber tubing to establish connections between the primary and secondary valves, and as these passages are formed in the wooden block 24, which is of considerable thickness, and when made of a close texture there is little liability of a leak occurring between the primary and the secondary valves. The block 24 is also reinforced by the metal plate 25 upon which the cup shaped shells 9 and 18 are mounted. The stationary leaf 29 of the motor bellows extends substantially the entire width of the block 24 and is attached throughout its length to the block 24, thereby giving a firm and secure support for the motor bellows. The movable leaf 30 of the bellows is provided with an extension bracket 31 having an adjustable connection with the rod 2. The secondary valve operates between the steel plate 25 and the metal shell 9, while the valves 4 and 1 carried by the primary valve stem contacts with the under side of the steel plate and with the upper side of the metal shell 18. All the valve seats therefore are of metal and are independent of any shrinking or checking action incident to the wooden block 24. I thereby secure all the advantages of a metal action with a great reduction in the expense, and to establish suitable connection between the primary and secondary valves I simply elongate the shell 18 so as to include the valve opening 17 and the air passage 26, and I place the elongated shell 18 obliquely to the caps 9 which inclose the secondary valve, thereby allowing all the passages formed in wood between the primary and secondary valves to be straight passages.

The construction of the secondary valve, best shown in perspective view in Fig. 4, is extremely simple and inexpensive, and at the same time insuring absolute accuracy of movement. The valve proper, consists of the disk 32 preferably of wood and provided with a packing of felt or leather 33 on its upper side and a similar packing 34 on its under side. Driven into the disk 32 the proper distance are two light wire staples 35 and 36. The crowns of the staples cross each other at right angles at the center at 37 and rest upon the washer 38, Fig. 3. The staples are bent at right angles to bring their sides parallel and the sides of the staples contact with the edge of the opening 12 in the steel plate 25, and thereby serve as guides for the up and down movement of the valve.

I claim:

1. In an instrument of the character described, a block containing a series of primary valves and a series of secondary valves placed in staggered relation to each other, flexible diaphragms for actuating said valves, air recesses beneath said diaphragms, a series of horizontal air passages extending transversely from the edge of said block, and at right angles thereto, to the recesses beneath the secondary valve diaphragms, means for closing the ends of said passages at the edge of said block, vertical air channels communicating with said horizontal air passages and open at the top of the block, and oval elongated cup-shaped shells mounted on said block obliquely thereto, said shells receiving the primary valves and covering the open ends of said vertical air channels.

2. In an instrument of the character described, a block having a longitudinal channel forming a wind chest, a series of inverted cup shaped shells mounted on said block transversely thereto, a series of secondary valves inclosed by said shells, horizontal air passages leading from one edge of said block, and transversely thereto, to said secondary valves, means for closing the outer

ends of said air passages, vertical air channels open at the top of said block and communicating with said horizontal air passages, a series of primary valves placed in staggered relation to said secondary valves, and a series of oval elongated inverted cup-shaped shells mounted on said block and placed obliquely thereto to receive said primary valves and cover the open ends of said air channels.

3. In an instrument of the character described, a block having longitudinal channels forming wind chests, primary and secondary valves, primary and secondary pneumatics for actuating said valves, with said pneumatics in staggered relation to each other, elongated secondary and primary cup shaped shells mounted on said block and inclosing said secondary and said primary valves, with said secondary shells disposed transversely to said block and with said primary shells disposed in oblique relation to said secondary shells, said primary shells receiving said primary valves at one end and covering an air channel at the opposite end leading to said secondary valves.

CLAUS E. PETERSON.

Witnesses:
NELLIE WHALEN,
PENELOPE COMBERBACH.