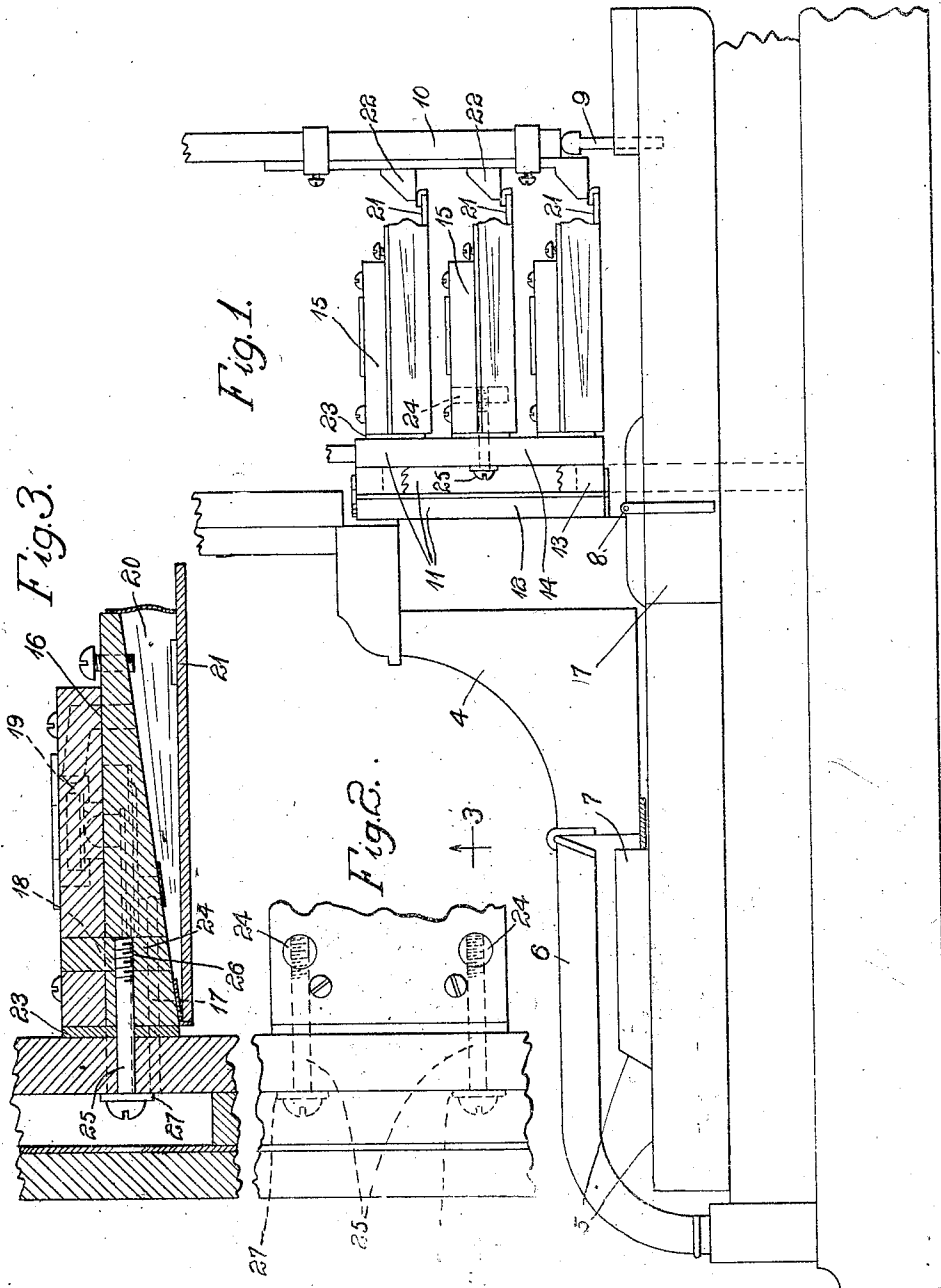


A. G. GULBRANSEN.
PNEUMATIC PIANO ACTION.
APPLICATION FILED JAN. 3, 1910.

991,718.

Patented May 9, 1911.



Witnesses

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PNEUMATIC PIANO-ACTION.

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Specification of Letters Patent.

Patented May 9, 1911.

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To all whom it may concern:

Be it known that I, AXEL G. GULBRANSEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Pneumatic Piano-Actions, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to pneumatic pianos and other pneumatic instruments, and its object is the production of a structure wherein the parts may be rigidly secured together in an improved manner and wherein air leakage may be reduced to a minimum, the efficiency of the instrument being thereby correspondingly increased.

As is well known in the art, pneumatic pianos or pneumatic piano-playing mechanisms comprise, among other parts, a channel board, and a considerable number of pneumatic actions or action members, one of the latter being provided for each of the keys of the piano which it is desired to use. Each of these pneumatic actions or action members comprises valve mechanism and a bellows, the movable member of which is connected, in some suitable manner, with one of the abstract rods of the piano proper. The channels provided in the channel board, which is usually made three-ply so as to facilitate construction, provide means for properly connecting the pneumatic actions or the parts thereof with the feeder bellows, or the atmosphere by way of the tracker board, whichever the case may be. It is of course apparent that there should be an absolutely tight joint between the pneumatic actions and the channel-board, and it has been attempted to secure this result in many different ways. The usual practice of the art, and probably the most efficient one, is to place a layer of soft material, such as leather or rubber, between the back of the pneumatic action and the channel board, and to secure the action in place by means of wood screws passing through part of the board and into the frame of the action. It is of course apparent that the joint can be made tight by tightening the wood screws, but it has been found that the wood of the pneumatic frame yields to the action of the wood screw before the intermediate leather or rubber has been compressed to the desired

extent. My invention is directed toward the elimination of this difficulty and provides means whereby a machine screw may be used, and whereby the strain on the frame of the pneumatic action is distributed over a greater area than when a wood screw is employed, and, specifically, over an area quite transverse to the pull exerted when the screw is manipulated.

My invention is embodied in the structure illustrated in the accompanying drawings, in which—

Figure 1 illustrates a partial side view of a piano, the end of the casing being removed to disclose the channel board, the pneumatic actions and the associated abstract rods. Fig. 2 is a top view of a portion of the channel board and a portion of one of the pneumatics, showing the means whereby the two are securely connected, and Fig. 3 is a sectional view on the line 3—3 of Fig. 2.

Like reference characters are applied to the same parts throughout the various figures.

In Fig. 1 the piano casing is shown at 4, the keyboard being illustrated at 5, and the cover therefor at 6. The piano keys are shown at 7, 7, are pivotally hung at 8, and, by means of abutment members 9, are suitably connected with corresponding abstract rods 10. The channel board is shown at 11, being disposed immediately in front of the lower ends of the abstract rods, and is made up of the plies 12, 13 and 14, the ply 13 being a frame to form a chamber and the ply 14 being provided with various openings to connect with the pneumatic actions. The pneumatic actions are illustrated at 15, 15, are arranged in tiers or rows, and are staggered to correspond with the disposition of the abstract rods. As clearly shown in Fig. 3, each of the pneumatics comprises a frame 16, in which are provided the channels and valve chambers 17, 18 and 19, respectively, as indicated in dotted lines. The particular arrangement of channels and valve does not concern this invention, and specific reference will not be made thereto. The pneumatic action also comprises the action bellows 20, the movable member 21 of which is disposed to engage the abutment pieces 22, 22 on the abstract rods 10. It is apparent that when the air is exhausted from the action bellows 20,

the member 21 will rise to operate the associated abstract rod precisely as if the corresponding key had been depressed. In order to provide a tight joint between the pneumatic action and the channel board, a layer 23 of leather, rubber or similar compressible material is interposed between these parts, as clearly shown in the various figures. The pneumatic actions are held upon the channel board by means of screws passing directly through the ply 14 and into the pneumatic action frame. In the prior art it was the custom to employ wood screws, but, as has before been stated, it has been found that these wood screws could not be tightened to such an extent as to make the joint between the pneumatic action and the channel board as tight as might be desirable. As illustrated in the various figures, and Figs. 2 and 3 particularly, I provide a metallic member 24, conveniently in the form of a pin of substantial dimensions, disposed with a snug fit in a corresponding opening drilled vertically in the frame 16 of the pneumatic action. These pins are provided in such position that they do not interfere with the channels or valve chambers in the pneumatic action, and, as shown in Fig. 2, are provided at each side of the structure at a considerable distance from the end thereof, so that there will be no possibility of their breaking the frame. For each member 24, a machine screw 25 is provided, this machine screw passing through ply 14 of the board and through an opening in the frame 16, so that it may have threaded engagement with a transverse opening 26 in the member 24. A washer 27 is preferably interposed between the head of the machine screw 25 and the surface of the ply board for obvious purposes. It will now be seen that the threaded engagement is had with a metallic member properly machined for that purpose, and that the pull exerted thereon when the screw is turned is distributed over a considerable area, most of which is transverse to the direction of the pull. It is further apparent that tightening this machine screw 25 will result in the compression of the washer or gasket member 23, and in the consequent provision of a tight and efficient joint.

The particular construction of the channel board is not concerned in the present invention. However, it may be noted that in the embodiment shown the ply 14 really constituted the channel board, the other plies forming an associated chamber. The

plies 12 and 13 may be removed bodily from the ply 14, any suitable means of attachment being employed, so as to give access to the heads of all the screws 25.

I claim as new and desire to secure by Letters Patent:

1. In an automatic piano, a channel board, a pneumatic action, a metal rod securely carried by said pneumatic action, and a screw passing through said channel board and substantially at right angles to said rod and having threaded engagement with said rod to clamp said pneumatic action to said channel board.

2. In an automatic piano, a channel board, a pneumatic action frame, a metal rod embedded in said frame, and a machine screw passing through said channel board substantially at right angles to said rod and having threaded engagement with said rod to clamp said pneumatic action frame to said channel board.

3. In an automatic piano, a wooden channel board, a wooden pneumatic action frame, a metal rod securely embedded in said frame, and a machine screw passing through said channel board substantially at right angles to said rod and having threaded engagement with said rod whereby the pull of the screw is exerted over the front area of the rod to clamp said pneumatic action frame to said channel board.

4. In an automatic piano, a channel board, a wooden pneumatic action frame, a metal rod securely embedded in said frame near the front end thereof and parallel to the plane of said channel board, and a machine screw passing through said channel board substantially at right angles to said rod and having threaded engagement with said rod whereby the pull of the screw is exerted over the front area of said rod to clamp the pneumatic action frame to the channel board.

5. In an automatic piano, a wooden channel board, a wooden pneumatic action frame, a metal rod securely carried by said pneumatic action frame, and a screw passing through said channel board transversely of said rod and having threaded engagement with said rod to clamp said pneumatic action frame to said channel board.

In witness whereof, I hereunto subscribe my name this 29th day of December, A. D. 1909.

AXEL G. GULBRANSEN.

Witnesses:

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LEONARD W. NOVANDER.