

J. LEISCH.

PLAYER PIANO.

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2 SHEETS—SHEET 2.

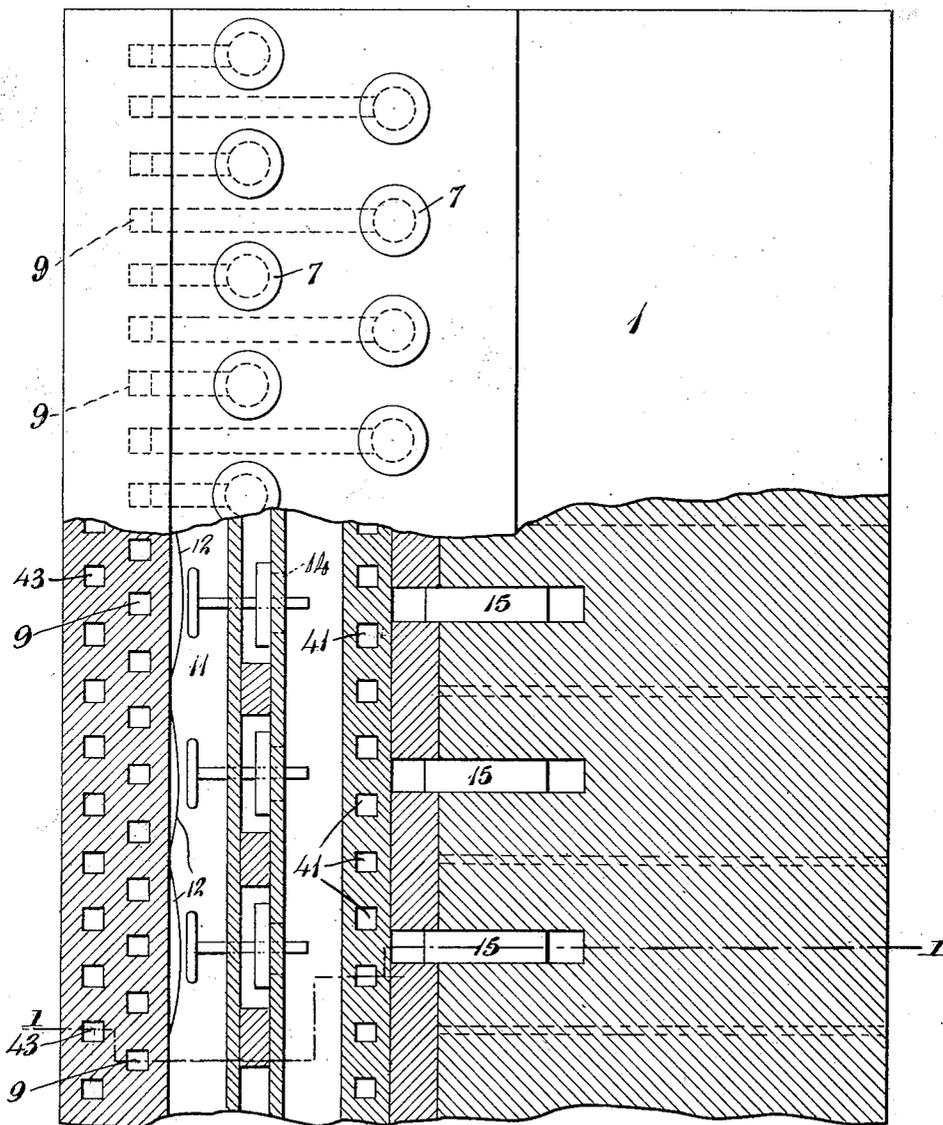


Fig. 2

Witnesses

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PLAYER-PIANO.

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To all whom it may concern:

Be it known that I, JOSEPH LEISCH, a citizen of the United States, and a resident of Tryon, in the county of Polk and State of North Carolina, have invented certain new and useful Improvements in Player-Pianos, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to player pianos in which the piano keys are connected with a series of power pneumatics, which are operated mechanically by pneumatic power, released by the exposure of openings in a tracker board by the movement of specially prepared slotted or perforated sheets of music, which are propelled over the tracker board to actuate the pneumatic devices.

The object of my invention is to provide a construction for such player pianos whereby selected notes may be accented, or a solo part carried in the playing of the instrument simultaneously with the playing of other notes in the score and thus by mechanical means the melody may be carried and emphasized with the harmonic tones, or any other desired notes accented.

The invention consists of that certain novel construction and arrangement of parts to be hereinafter particularly pointed out and claimed whereby a duplex action is effected on the movable member of the pneumatic under uniform conditions of pneumatic pressure by the simultaneous application of vacuum suction on one side and air pressure on the other side of the movable member of the pneumatic at the same time that by means of a special set of tracker tubes and means for releasing them the compressed air shall only be released for the particular notes to be accented, without disturbing the normal action of the instrument for unaccented notes simultaneously played.

In the drawings, Figure 1 is a vertical section of the pneumatic chest of the player piano taken through one of the pneumatics as shown in line 1, 1, in Fig. 3. Fig. 2 is a horizontal section of the same taken on the lines 2, 2, of Fig. 1.

I have not thought it necessary to illustrate the complete player piano construction, just as it is not necessary to illustrate a complete piano. It would be understood that the ordinary pneumatic player chest is provided with vacuum chambers, with suitable

means for creating a vacuum, and the usual tracker board and tracker tubes forming the necessary passages over which the perforated music sheet passes for releasing the vacuum to operate the selected pneumatics which are coupled with the piano action. The primary and secondary pouches and valves and the power pneumatics are alike for each note, and the player chest is divided into two parts as usual, one half of the chest for the bass and the other half for the treble notes on the piano, and the several power pneumatics, one for each note, are arranged in pairs of three in staggered relation to each other to economize space.

The body of the pneumatic chest is represented by 1, and in the upper portion of the chest the primary vacuum chamber 2 is located, a common chamber for all of the tracker tubes for each half of the player piano. The several tracker tubes are connected with this common vacuum chamber by passages 3 which connect with the primary pouches 4, 4, located along the bottom of the vacuum chamber. Each tracker tube is also provided with a bleed opening 5 from the vacuum chamber, so that the vacuum of the chest is maintained in the tracker tubes. The pouches 4 operate the valves 6, provided with the valve disks 7, 8, to close or open the passageways 9 to the vacuum chamber 2, or the outer air, in the well known way. In their normal position, when the player piano is out of action, the pouches 4 are deflated and the passages 9 are open into the vacuum chamber and closed to the outer air. These passages 9 extend to their respective ports 10 in the secondary vacuum chamber 11, in which are located the secondary pouches 12, which operate the double seated valves 13, opening and closing the ports 14 to the outer air, provided for each of the passages 15 leading to and opening into its respective power pneumatic 16, and at the same time opening or closing the ports 17 between the vacuum chamber 11 and the passageways 15. In their normal non-working position, the pouches 12 are deflated, the ports 14 opened and the ports 17 closed, so that the pneumatics are in inoperative position.

The construction above described is the normal and usual one for the double valve construction. As any of the tracker tubes are opened by reason of the perforations in the music sheet passing over the openings

in the tracker board, the vacuum is released in the particular tube 3, which opens the valve 7, inflates the particular pouch 12 and closes the particular port 14, opening the selected passageway 15 to vacuum chamber 11 and subjecting the power pneumatic to the suction of the vacuum and raising the movable member 18 of the pneumatic, which brings the extension 19 from the movable member in contact with its respective lug 20 on the abstract 21 of the piano action to actuate the selected piano strings.

In order that any desired notes may be accented, and that this power of accentuation may be realized for single notes of a chord, or for one particular note, when a large number are at the same time being played, I provide as follows: The passages 9 are extended toward the base of the pneumatic chest and provided with ports 22, opening into a supplemental vacuum chamber 23, and for each of these ports a float valve 24 is provided, having the valve disks 25, 26, to close or open the ports 22 at either end, but free to move in either direction. Connected to each of the ports 22, intermediate the opening into the supplemental vacuum chamber and its respective passage 9, is a passage 27, which leads to a pouch 28 in a second supplemental vacuum chamber 29, common to all of the pouches. A series of valves 30 are mounted in the top of this vacuum chamber, provided with a lower disk 31, resting on its pouch 28 and adapted to be raised by the raising of the pouch. The heads 32 of these valves engage the valves 33, which are located in the ports 34 opening into a compressed air chamber 35. These valves 33 are provided with the disks 36, 37, the upper one of which controls the port into the compression chamber, while the lower disk normally opens the port 34 to the outer air. Connected with these ports 34 are the passageways 38, each one of which leads to its respective pouch 39, which are located under the movable member 18 each of its respective pneumatic 16. As these passages 38 are normally opened to the outer air, the pouches 39 are deflated.

Located in the secondary supplemental chamber 23 are a series of pouches 40, which pouches are connected by the passageways 41, each with a supplemental tracker tube 42, and each of the passages 41 is provided with a bleed opening into a vacuum chamber 23, so as to normally maintain the vacuum in the supplemental tracker tubes. Each of the main tracker tube passages 3 is provided with extensions 43, extending downwardly to the same location as the ports 22, and these passages 43 have ports 44 into the open air each normally closed by a flap valve 45. Each of these flap valves is coupled to a connecting rod 46, which extends into the supplemental vacuum cham-

ber 23, and which is provided with a head 47 bearing under a plate 48 hinged at one end in the vacuum chamber 23, and bearing between the pouch 40 and the head on the valve disk 36 of its respective float valve. As the passages 3 and extensions 43 are under vacuum, normally the flap valves 45 will be closed and the pistons 46 will raise their respective plates 48, so as to bear against the deflated pouch 40, leaving the float valves 24 free. The opening of a supplemental tracker tube and passage 41 to the outer air, however, will inflate the pouch 40, shift the plate 48 to close the port 22 into the vacuum chamber and open the passageways 27 to the passageways 9, and also to open the valves 45 and the passageways 43 to the outer air. It will thus be seen that the opening of a supplemental tube by the passage of a supplemental perforation in the music sheet over the corresponding supplemental opening in the tracker board will also, through the passages 43, open the corresponding primary tracker tube to the outer air. At the same time that this result is attained, the valve 25 will open the particular passageway 9 to the passageway 27, which will cause the proper pouch 28 to be inflated to open the compressed air valve 36 and allow compressed air to pass from the chamber 35 into the passage 38 to inflate the particular pouch 39, and for this particular note a duplex actuation will be provided for the selected pneumatic to increase the stroke of the piano action.

It will be understood that the extension passages 43 and the flap valves 45 are provided, in order that the operation of the supplemental tracker tube may at the same time release the corresponding primary tracker tube, and thus on the perforated music sheet but one perforation will be employed for the solo or single notes.

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

1. In a pneumatic player piano, a series of pneumatics adapted when operated to operate the keys of the piano, and means for increasing the operating force of the pneumatic by combining the force of suction on one side and air pressure on the other side of the movable member thereof, one of said forces utilized for primary and one for supplementary operation of the pneumatics, means whereby the primary force may be utilized alone, and means whereby the application of the secondary force automatically applies the primary force.

2. In a pneumatic player piano, a series of pneumatics adapted when operated to operate the keys of the piano, and means for increasing the operating force of the pneumatic by combining the force of suction on one side and air pressure on the other side

of the movable member thereof, one of said forces utilized for primary and one for supplementary operation of the pneumatics, with supplemental tracker tubes, pouches and valves to control the application of one of said forces to selected pneumatics, and means whereby the opening of the supplemental tubes will automatically apply the other of said forces to the said selected pneumatics.

3. In a pneumatic player piano, a series of pneumatics, adapted when operated to operate the keys of the piano, and means for increasing the operating force of the pneumatic by combining the forces of suction on one side and air pressure on the other side of the movable member thereof, primary tracker tubes to control the application of the vacuum for normal playing, with supplemental tracker tubes to control the application of the compressed air to selected pneumatics, and connecting devices from said supplemental tubes to the corresponding primary tubes to open them upon the operation of the supplemental tubes.

4. In a pneumatic player piano, a series of pneumatics, adapted when operated to operate the keys of the piano, and means for increasing the operating force of the pneumatic by combining the forces of suction on one side and air pressure on the other side of the movable member thereof, primary tracker tubes to control the application of the vacuum for normal playing, with supplemental tracker tubes and pouches and valves operated thereby to control the application of the compressed air to selected pneumatics, with valves for the primary tracker tubes and a connection therefor with the supplemental tube valves whereby the two valves will be operated simultaneously.

5. In a player piano, a series of pneumatics, with vacuum chambers and pouches and valves for controlling the suction in the pneumatics, with a supplemental vacuum chamber and a series of pouches therein, connections therefrom to a compressed air chamber, and a compressed air chamber, connections from the pneumatics to the said chamber with means for actuating selected ones of the latter pouches and valves to apply the compressed air to said pneumatics, to increase the strength of the stroke thereof, with means to limit the application of the compressed air to selected pneumatics and means whereby the opening of the compressed air series opens the suction series.

6. In a pneumatic player piano, a series of pneumatics, with a vacuum chamber, and a direct series of pouches and valves for controlling the suction in the pneumatics, with a compressed air chamber and a supplemental vacuum chamber, a series of

pouches in the supplemental chamber and valves mounted thereon and adapted to reciprocate in the compression chamber for controlling the compressed air in said pneumatics, connections to the pneumatics from the compressed air chamber, and tubes common to the direct and the supplemental series for admitting air at atmospheric pressure simultaneously to both series to apply the suction and compressed air to selected pneumatics, and independent means for opening or closing the common tubes to the supplementary series for selected pneumatics.

7. In a player piano, a series of pneumatics, with vacuum chambers and pouches and valves for controlling the suction in the pneumatics, with a supplemental vacuum chamber and a series of pouches therein, connections therefrom to a compressed air chamber, and a compressed air chamber, connections from the pneumatics to the said chamber, means for actuating selected ones of the latter pouches and means mounted on said pouches upon actuation thereof to apply the compressed air to said pneumatics, to increase the strength of the stroke thereof, primary tracker tubes to put into operation the vacuum for normal playing, with supplemental tracker tubes to control the application of the compressed air to selected pneumatics, and connecting devices to open up the corresponding primary tubes with the operation of the supplemental tubes.

8. In a player piano, a series of pneumatics, with vacuum chambers and pouches and valves for controlling the suction in the pneumatics, with a supplemental vacuum chamber and a series of pouches therein, connections therefrom to a compressed air chamber, and a compressed air chamber, connections from the pneumatics to the said chamber, means for actuating selected ones of the latter pouches and means mounted on said pouches upon actuation thereof to apply the compressed air to said pneumatics, to increase the strength of the stroke thereof, primary tracker tubes to control the application of the vacuum for normal playing, with supplemental tracker tubes and pouches and valves operated thereby to limit the application of the compressed air to selected pneumatics, with valves for the primary tracker tubes and connection therefor with the supplemental tube valves whereby the two valves will be operated simultaneously.

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