

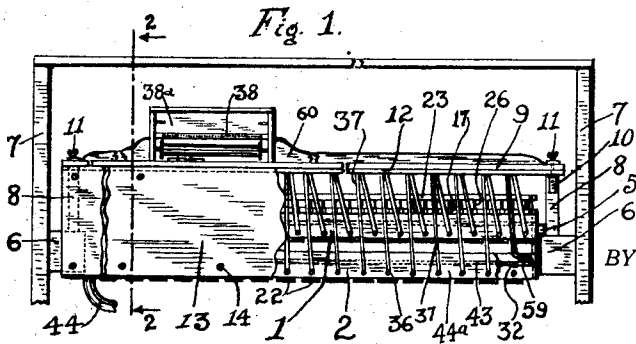
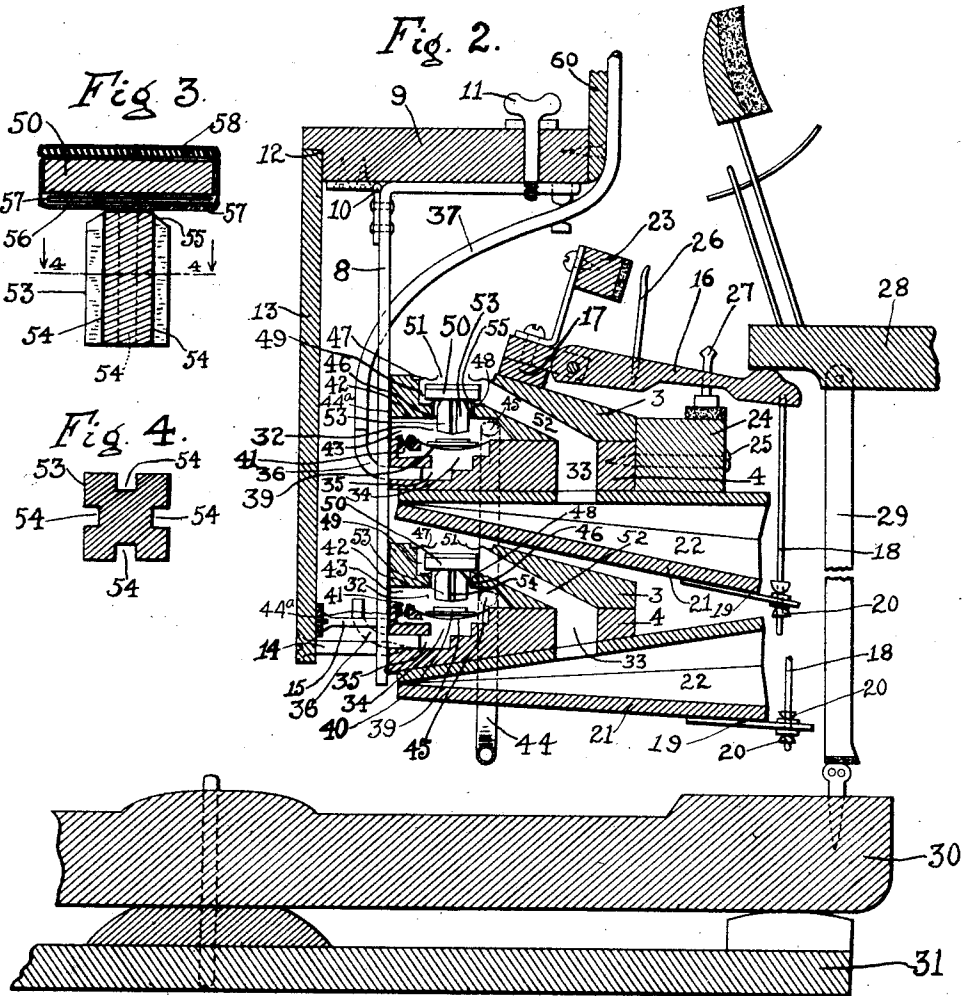
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PLAYER ACTION

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PLAYER ACTION.

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This invention relates to player actions for automatic musical instruments and more particularly to a player action of the single valve type in which the valves are operated directly from the tracker bar without the interposition of primary or other valves.

The primary object of the invention is to simplify the construction of the player action, reduce the cost of its manufacture, reduce the size and number of its parts and generally improve its operation, insuring air-tightness, power, positiveness of action, facility and rapidity of repetition, and the ability to operate under all conditions, particularly with low playing tensions, without sluggishness.

A further object is to enable the action to be freely accessible from the front of the instrument, and from the top as well, without removal therefrom, for purposes of regulation, cleaning, adjustment or repairs.

A still further object is to construct the valves so that they will be extremely light in weight, tight in seating, flexible in their movement and easily operated.

Another object is to provide a tiltable spool-box for facilitating access to the parts of the player located at the interior of the musical instrument.

Still another object is to provide a novel spoon check for cushioning the upward throw of the striking fingers.

Other objects will hereinafter appear, and to all these ends I have devised the player action a practical embodiment of which is represented in the accompanying drawings, in which

Figure 1 is a front view, partly broken away, showing the player action installed in a musical instrument, in this instance a piano;

Figure 2, a sectional view taken substantially on the line 2—2 of Figure 1;

Figure 3, an enlarged detail sectional view of the valve construction per se; and

Figure 4, a sectional view on the line 4—4 of Figure 3, looking in the direction of the arrows.

Referring to the drawings, I have illustrated the essential parts of my invention, other parts of the mechanism being of conventional character and well understood. In this instance the pneumatic stacks 1 and 2 are arranged in two rows, in superimposed relationship, one termed the "top stack" and the other the "bottom stack". Each stack in-

cludes a top board 3 and a bottom board 4, suitably secured together, and the two stacks are also secured together so as to constitute a unit.

The unit is preferably mounted within the instrument in the manner illustrated in Figure 1, the opposite side lugs 5 resting upon blocks 6 or other desired convenient parts at the sides 7 of the instrument. Opposite standards, of any convenient form, rest upon the blocks 6 and the spool box shelf 9 is adapted to rest upon the standards 8. Standards may also be provided intermediate the ends of the player unit at convenient points.

The spool box shelf is hinged to the standards at opposite sides of the instrument in this instance, as seen at 10, so that the shelf may be tilted forward, and thumb screws 11 are provided at any convenient location for securing the shelf in place. The spool box shelf is preferably provided with a groove 12 at its outer end for convenient reception of the panel board 13 and the panel board 13 is suitably secured in place, as by the screws 14, a suitable spacer 15 being interposed between the panel board and pneumatic stack unit.

The operating pneumatics are secured to the bottoms of the bottom boards 4 and are arranged in staggered relationship. Striking fingers 16, one corresponding to each operative pneumatic, are suitably mounted on the top board of the top stack as seen at 17 and the striker wires 18 depending from the free ends of the striking fingers are adjustably secured to the striking hinges or flanges 19, as by the threaded nuts 20. The striking hinges also possess features of adjustment not referred to herein, however, and are secured to the ends of the movable leaves 21 of the pneumatics 22 of both stacks.

A suitable check rail 23 is located above the top stack and striking fingers and a regulating rail 24 is preferably secured at one side of the top stack below the striking fingers by suitable screws 25. The striking fingers are provided with means for regulating and cushioning their upward and downward travel. In the present instance I employ novel spoon checks 26, the term explaining their configuration. These spoon checks are preferably constructed of resilient material, such as relatively soft metal, and are secured to the tops of the striking fingers. The spoon checks are adapted to react against the check rail 23 for cushioning the throw of the

fingers and also have the capacity of being bent to the proper regulatory adjustment.

Regulating screws 27 extend vertically through the striking fingers in position to come to rest on the regulating rail 24. Access to both the spoon checks and regulating screws it will be seen is afforded from the front and from above as well.

The striking fingers 16 are adapted to engage and actuate the units of the musical instrument action, in this case the wippens 28 pivotally mounted on the usual abstracts 29, which, in the case of manual operation of the instrument, are adapted to be actuated by the usual playing keys 30 located above the key bed 31.

The wind chests 32 of the pneumatic stacks, as well as the valves and their operating parts, are constructed in novel form. The bottom boards 4 have individual downwardly directed ports 33 at one side leading into the individual corresponding pneumatics 22. At the opposite side corresponding individual pouch chambers 34 are formed, these pouch chambers having ports 35 leading to individual nipple connections 36 at the front of the respective stacks. The usual individual tubes 37 are adapted to connect the nipples 36 with the corresponding apertures of the tracker bar 38 located at the spool box 38^a. These tubes 37 are all exposed at the front of the player action when the panel board has been removed, and extend upward beneath the shelf 9 and behind the upper panel 60, all coming together behind the tracker bar in the usual manner.

The pouch chambers 34 are enclosed by suitable pouches 39 and have suitable centre disks 40, as well as bleed vents 41 leading to the under sides of the pouches so as to normally maintain the pouches in retracted position by the air tension in the wind chest 32.

The top boards 3 are each formed with a longitudinal channel or groove 42 at their under sides, these channels 42 defining the volume of the respective wind chests. The top boards are preferably constructed so that the channels 42 are spaced from the bottom boards 4 at the front of the stacks, leaving an opening as seen at 43. This opening is preferably enclosed by suitable impervious covering material 44^a, such, for instance, as so-called penumatic cloth, or even paper. The wind chests 32 are supplied with air tension supplied from a suitable reservoir (not shown) through a conduit 44 which leads up through the ends of the stacks at one side of the action unit and communicates with the wind chests 32 through suitable ports or channels 45.

The top boards also have individual ports 46 leading from the wind chests 32 and these ports have upper and lower valve seats 47 and 48, respectively, preferably formed of thin metal. Individual valve chambers 49

are formed in the top boards 3 above the ports 46 and passage of fluid through these chambers is controlled by valves 50. The upper seats 47 have openings or ports 51 leading to atmosphere, and the individual valve chambers 49 have passages 52 communicating with the ports 33 leading to the pneumatics 22. The valves have stems 53 which traverse the ports 46.

The valves 50 are operated in a simple and positive manner by atmospheric impulses transmitted directly from the apertures of the tracker bar through the tubes 37 and to the pouch chambers 34. The pressure of the impulse being greater than the pressure in the wind chest and the bleed vent 41 being incapable of absorbing the same, the pouch 39 will be elevated, causing the spacing disk 30 to engage the valve stem 53 and raise the valve, holding it in raised position during the continuance of the impulse. The valve 50 will then seat over the atmospheric opening 51 and air tension from the wind chest 32 will be communicated through the port 46, passage 52 and to the pneumatic 22 which will thereupon be caused to collapse, thereby effecting upward movement of the striking finger. This upward movement of the striking finger will be transmitted to the wippen 28 and thence to the piano hammer, in the usual manner. Upon cessation of the atmospheric impulse the air tension in the wind chest acting through the bleed vent will cause the pouch to collapse, the suction also tending to draw the valve 50 down to its lower seat, this downward movement of the valve being facilitated by atmospheric pressure from above. This will shut off air tension from the passage 52 and will place the passage 52 in communication with atmosphere through the port 51, which will cause the pneumatic 22 to inflate, thus effecting a return of the striking finger to its rest position.

The construction of the valve itself is an important factor in its facile operation.

As seen in Figures 3 and 4 the valve 50 comprises a substantially flat cylindrical head. The stem 53 is preferably substantially square in cross section and the four sides are provided with longitudinal grooves 54. The top of the stem is chamfered or tapered at the point of connection with the valve, as seen at 55. The grooved and tapered construction is designed to afford a free passage through the port 46.

The construction of the valve also provides for tight seating, and to this particular end the under side of the valve head 50 is covered with suitable soft material 56, such as skin or leather, and one or more inner layers of impervious and non-adhesive or non-sticking material 57 are interposed between the outer material 56 and the under side of the valve head 50. This produces the effect that the outer material 56 is cushioned and has the ca-

capacity of movement independently of the valve head itself so that in seating the suction tends to draw the material 56 tightly against the valve seat. The stems 53 are preferably 5 glued to the material 56 and the stem is thus able to move slightly longitudinally with the material 56, independently of the valve head. The upper side of the valve head is also provided with suitable soft material 58, such as 10 leather, which is rigidly secured thereon, for facilitating a tight seating against the upper valve seat.

One important feature of the present player action construction is that the essential 15 parts are readily accessible from the front of the instrument in which it is installed without removal of any parts other than the panel board. When the panel board is removed the spoon checks and regulating screws, as well as 20 the tubes, may readily be manipulated for effecting or correcting adjustments in the regulation or otherwise.

Another important feature is that repairs may also be made to individual operating 25 units without removing the action. If, for instance, a valve is found to be operating in a faulty manner, due to collection of dust or lint, or for other reasons, the tube is disconnected from the nipple as seen at 59 and the 30 covering material 44^a is simply removed at that particular point, thus exposing the wind chest channel 32 through the opening 43, and affording access to the wind chest, valve chamber, bleed vent and pouch for inspection, 35 and any foreign matter which may have impeded the operation may be quickly and easily blown out. After completion of the repair a patch of impervious material is simply glued over the exposed portion of the opening

43 without in any way affecting the remainder 40 of the covering strip, the tube is again connected to the nipple and the repair is complete.

The spool box 38^a may also be tilted forward by loosening the thumb screws 11, thus 45 affording access to the rear of the player action from above.

It is to be understood that changes might be resorted to in the construction, form and arrangement of the several parts of the player 50 action without departing from the spirit and scope of the invention; hence I do not wish to be limited to the construction specifically shown herein, but what I claim is:

1. In a player action, a pneumatic stack 55 including pneumatics and striking fingers adapted to be actuated by said pneumatics, a check rail above the stack for limiting and cushioning the upward throw of the striking fingers and checks secured on said 60 striking fingers in position to engage said check rail upon the upward throw of the fingers, said checks comprising one-piece bendable spoon-shaped members.

2. In a player action, a pneumatic stack 65 including pneumatics and striking fingers adapted to be actuated by said pneumatics, a check rail above the stack for limiting and cushioning the upward throw of the striking 70 fingers and checks secured on said striking fingers in position to engage said check rail upon the upward throw of the fingers, said checks consisting of upstanding members bendable for adjustment.

In testimony whereof, I have signed this 75 specification.

TOLBERT F. CHEEK.