

UNITED STATES PATENT OFFICE.

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PLAYER-PIANO.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, FRANK A. LEE, ROBERT W. COOPER, and RAY J. MEYER, all citizens of the United States, the said FRANK A. LEE being a resident of Cincinnati, Hamilton county, Ohio, the said ROBERT W. COOPER being a resident of Dayton, Campbell county, Kentucky, and the said RAY J. MEYER being a resident of Pineville, Bell county, Kentucky, 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.

In the transposition of the music roll in a player piano from one key to another in the musical scale, the mechanical operation necessary is to shift either the tracker bar or the receiving and storage rolls, so that the perforations in the music roll contact with different tracker slots than before the shifting.

In sheets of perforated paper which are not wider than the slotted portion of the tracker bar, there is liable to be an exposure of the extreme end slots on the tracker bar. When a transposition is made a slight roughness in the edge of the paper is liable to arise, and if the edge is so near as to rise up from the end slots for the bottom or top notes of the musical range of the player, these notes will strike, causing a discord in the music.

It is the object of our invention to provide such a construction and arrangement of parts as will be hereinafter pointed out and claimed, whereby the transposition of the music in a player piano from one key to another will automatically close the end slots in the tracker bar against access of air and thereby prevent them from playing.

In the drawings, Figure 1 is a front elevation of a tracker case with the tracker bar partly removed. Fig. 2 is a horizontal section on the lines 2, 2, of Fig. 1. Fig. 3 is an enlarged sectional view of one of the valves. Fig. 4 is a plan view of the lever and rack and pinion shifting device. Fig. 5 is a vertical sectional view of the said lever, rack and pinion.

1 and 2 are respectively the storage and receiving rolls of a player piano. A long strip 3 of perforated paper, or other mate-

rial, is wound from the storage roll onto the receiving roll, over a tracker bar 4. The casing for these parts has a top 5, sides 6 and 7 and a bottom 8. The storage and receiving rolls have shafts 9 and 10, properly journaled in the sides 6 and 7 of the case and extending outwardly from each side.

In the structure shown, the right side has been chosen for the transmission and gear mechanism and also for the mechanism which shifts the storage and receiving rolls. The transmission and gearing shown do not form a part of this invention, and consist of a driving shaft 11, reverse sprocket and chain 12, forward or "wind" spur wheel and pinion 13, clutch 14 on the receiving roll shaft, clutch 15 on the driving shaft and clutch lever 16. These parts are mounted in a frame 17, attached to the tracker case.

The roll shifting mechanism which, also in its details, is no part of this invention, comprises a rock shaft 18, with arms 19, 19. In the forked ends of these arms are pivoted the fingers 20, 20, which bear on caps 21, 22, on the shafts 9 and 10. The rock shaft is carried on brackets 23, 23, on the frame 17.

A connecting rod 24 is pivoted at 25 on an arm 26, which is firmly attached to the rock shaft. A lever and a rack and pinion device mounted on its upper surface moves the connecting rod, and it shifts the rock shaft which moves the shafts of the storage and receiving rolls. The lever 27 is mounted on the base 8 of the tracker case. A pin 28, having on its outer end a knurled head 29 for operating, is mounted in upwardly extending lugs 30, 31 on the lever arm. It carries a pinion 32, which meshes with a rack 33. The rack 33 is on a link 34 which is pivoted to the connecting rod 24. The pin 28 outside of the lugs is spring-pressed against a notched segment 35 in front of the tracker case by means of a spring 137 attached to the lever at the base and pressing the head 29 away from the tracker case base 8, and thus forcing the pin against the segment. When the knurled head is turned the rack 33 is moved, and its link 34 connected to the rod 24, and the connection of the rod 24 with the arm 26, cause the rock shaft to move, to shift the rolls by slight degrees. This is the operation of tracking. When it is desired to transpose, the lever itself is swung, by first pushing down against the spring 137 to pass

the teeth of the segment 35. The connections of the lever by means of the rack, link, rod and arm to the rock shaft are the same as in the first operation, but the movement from notch to notch of the segment is enough for a complete transposition, as more fully appears in our patent application Serial Number 791,930, filed September 26, 1913. This construction is the preferred one for shifting the storage and receiving rolls. We also prefer to operate our puppet valves (Figs. 2 and 3) which close the end tracker bar slots, by a lever coupled to the receiving roll shaft.

Instead of coupling the shafts 9 and 10 to the rock arm which shifts them, we prefer to have them spring-pressed against the finger on the rock arm from their (the shafts') other ends. The storage roll shaft at its end at the side 6 of the tracker case, is provided with a housing 36. In this housing is a spring 37 pressing on the end of the shaft. The receiving roll shaft has also a housing 38, in which a spring 39 presses on the shaft. The shaft in this case, however, has a narrower extension 40 which extends through the spring and out of the housing to be coupled with the lever which works the valves.

An arm 41 extends outwardly from the tracker casing, and pivoted thereto is the lever of the first class 42. A grooved collar 43 is mounted on the extension 40, and the power is applied to the lever through a pin 44 thereon which engages the groove in the collar. The other end of the lever is pivotally attached to a link 45, which in turn is similarly attached to the valve rod 46.

When a slot in the tracker bar 4 is opened to the atmosphere, the atmosphere is admitted to the player parts through tracker tube 47. The two tubes at the left end of the tracker bar A and B, and the two at the right end C and D are the ones designed to be opened and closed by the novel valve construction. These tubes A and B, and C and D open into cylindrical valve chambers 48 and 49 respectively. These chambers are positioned so that the rod 46 may run through both of them. The rod is preferably supplied with a link 50 connected to the left hand and right hand portions thereof by any desired kind of joints, to take up jars. In the valve chambers 48 and 49, there is an outlet for each tube located substantially opposite to its opening into its chamber, and through these and the tubes A', B', C' and D' the atmosphere is admitted to the player parts.

The valve rod is made thicker in the chambers and provided in each chamber with a chamber closing piston 51, 51. There are located inside of the chambers closing off communication from openings A and B, and C and D, pistons *a* and *d* for

A, A' and D, D' respectively. On the inside of each chamber are pistons *b* and *c* for B, B' and C, C' respectively, closing off communication from the atmosphere at the inside end of the chambers. These puppets must be so positioned that when the transposing device is at the center, neither *a*, *b*, *c* nor *d* closes the communication between A, B, C or D and their respective primes. The six pistons now noted must be of a length and so positioned that upon a movement of one notch of the receiving roll shaft to the right and hence the valve rod to the left, then the piston *a*, alone, shall cut off the communication of atmosphere through the tubes. When two notches in this direction are moved, then piston *b* shall be advanced to cut off B, B', and *a* shall remain in "cut-off" position. During these movements, the piston *d* must not act to cut off, nor the puppet 51 in the chamber 49, and the piston *c* must not leave the chamber.

The moving of the valve rod to the right by a left movement of the receiving roll shaft must work vice versa the manner above detailed. That is to say, one notch to the left should move puppet *d* to cut-off position, and two notches piston *c* as well. Also during these movements the pistons *a* and 51 in chamber 48 must not reach cut-off position.

It may now be seen that the device described adequately accomplishes the purpose to be obtained, *i. e.* to cut out the possible playing of end notes upon transposition of a music sheet in a player piano. The number of valve puppets is of course not a requisite. The number chosen is enough to meet ordinary player piano conditions.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In combination with a transposition device for player pianos, tracker tubes, valves for selected tubes, means for automatically closing said valves and connections from said means to the transposition device, for the purpose described.

2. In combination with a transposition device for player pianos, tracker tubes, valves for selected tubes, means for closing selected valves, and connections from said means to the transposition device, for the purpose described.

3. In combination with a transposition device for player pianos, tracker tubes, a valve chamber for selected tubes, means for closing the tubes from the chamber, and connections from said means to the transposition device, for the purpose described.

4. In a player piano, a tracker bar, a music sheet, means for transposing the sheet on the bar, tracker tubes, slots for said tubes in the bar, means for closing the tubes

and connections from said means to the transposing means, for the purpose described.

5 In a player piano, a tracker bar, a music sheet, means for transposing the sheet, a series of tracker tubes, slots for said tubes in the bar, a valve chamber for the end ones of the series of tubes, a valve rod reciprocating therein, pistons on the rod and
10 connections from the transposing means to the rod, for the purpose described.

6. In a player piano, valves for closing selected tracker tubes, comprising a chamber intermediate said tubes, a rod in said chamber, and pistons on said rod positioned to close the tubes from the chamber consecutively.
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7. In a player piano, valves for closing selected tracker tubes, comprising a plurality of chambers intermediate said tubes, a rod common to the chambers and pistons on said rod positioned to close the tubes from the chambers consecutively in one chamber at a time.
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25 8. In a player piano, valves for closing the ends of a series of tracker tubes, com-

prising a valve chamber for each end, intermediate the tubes at said end, a rod common to the chambers, and pistons on said rod positioned to close the tubes from their chamber consecutively beginning at the outside, and so that the closing of the tubes in one chamber will not close the tubes in the other. 30

9. In combination with a transposition device for player pianos, a valve for closing selected tracker tubes in such pianos, comprising a chamber, intermediate said tubes, a rod in said chamber, connections from said rod to the transposing device, and pistons on the rod positioned to close the tubes from the chamber consecutively, for the purpose described. 35 40

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