

B. R. VAN VALKENBURG.
PIANO PLAYER OPERATING MECHANISM.
APPLICATION FILED MAR. 20, 1912.

1,054,806.

Patented Mar. 4, 1913.

4 SHEETS—SHEET 1.

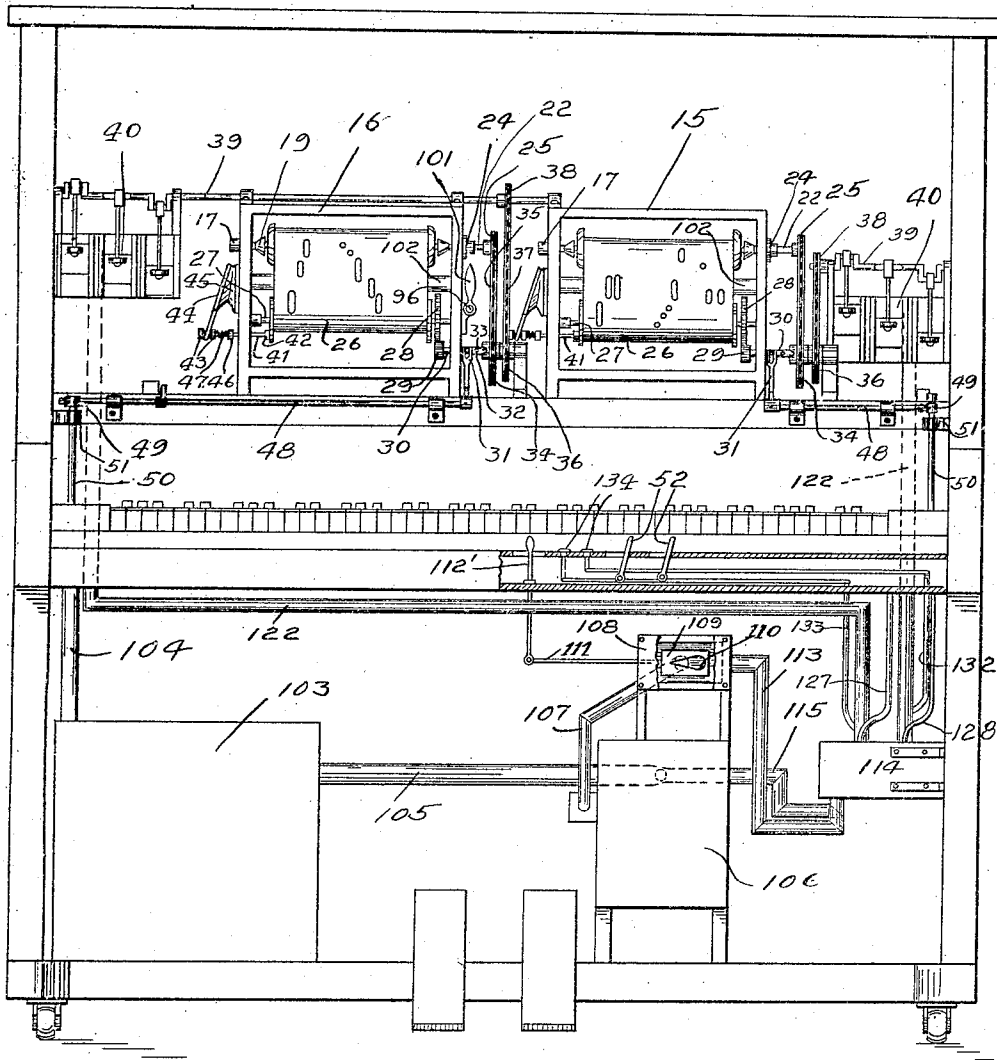


Fig. 1.

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4 SHEETS—SHEET 2.

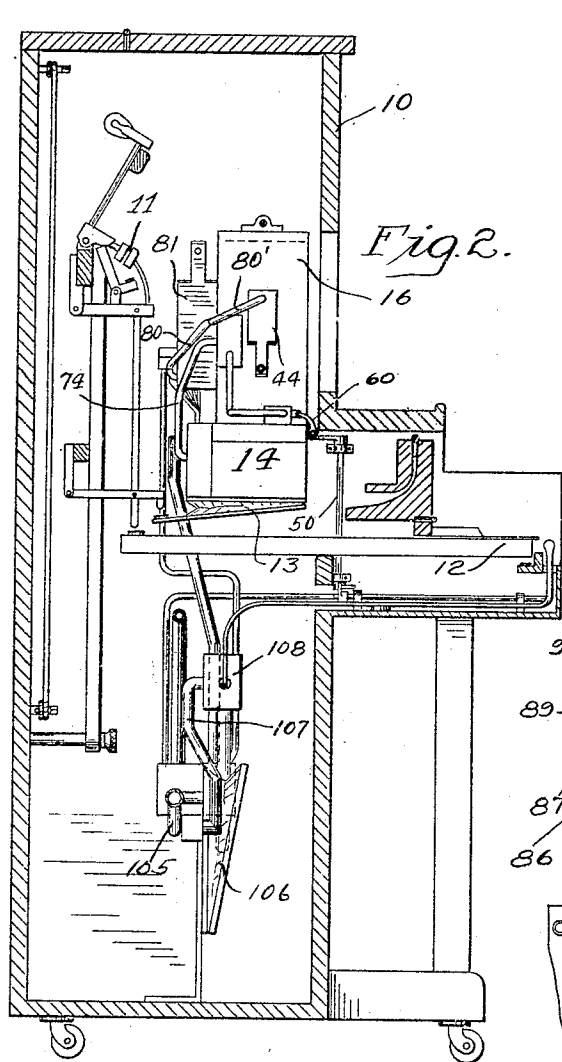


Fig. 2.

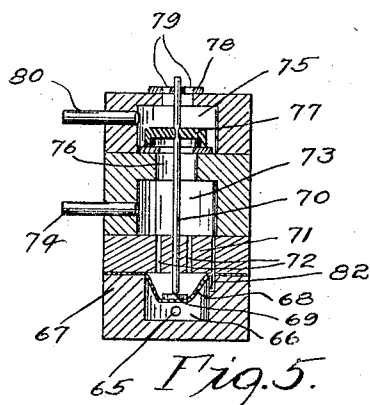


Fig. 5.

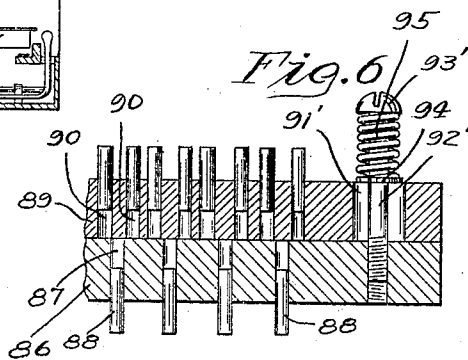


Fig. 6.

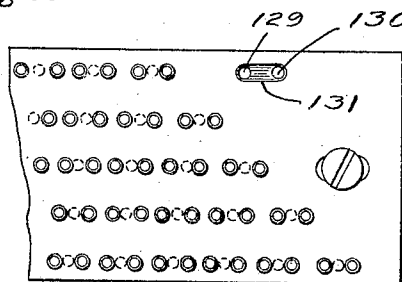


Fig. 7.

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4 SHEETS-SHEET 3.

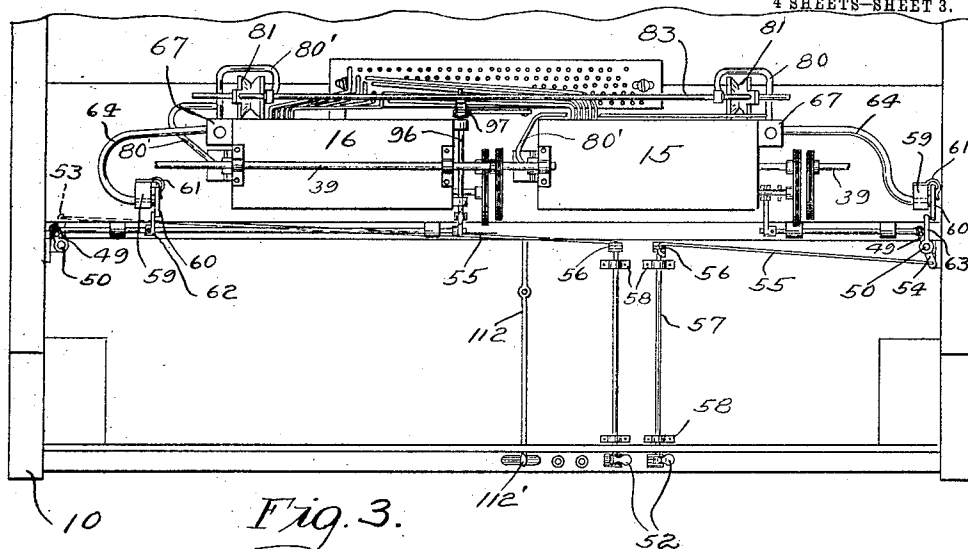
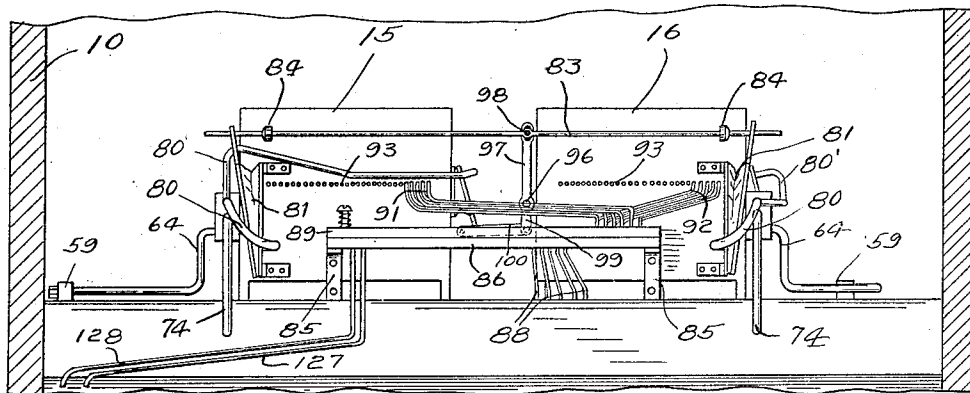


Fig. 3.

Fig. 4.



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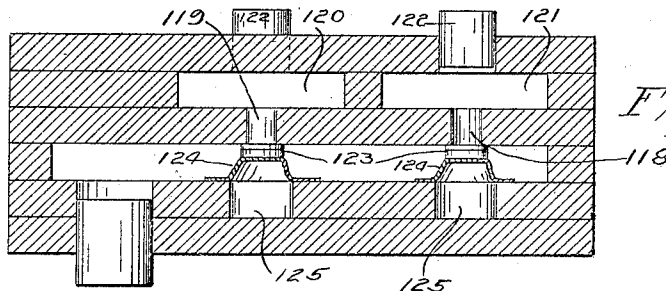


Fig. 8.

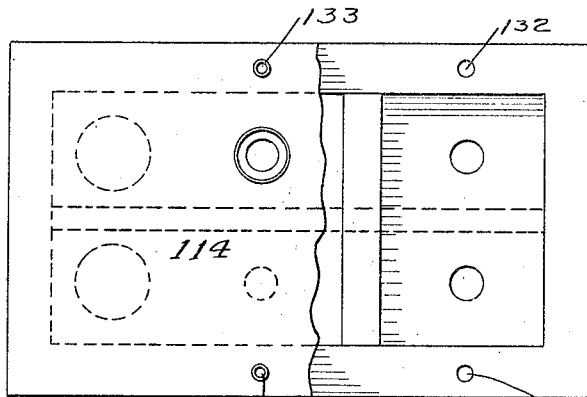


Fig. 9.

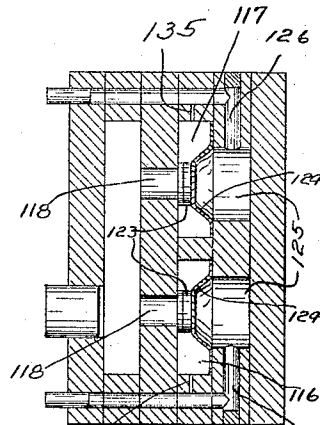


Fig. 10.

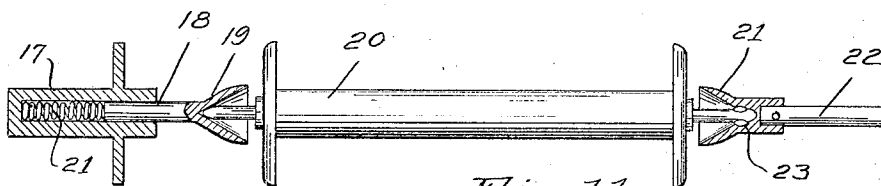


Fig. 11.

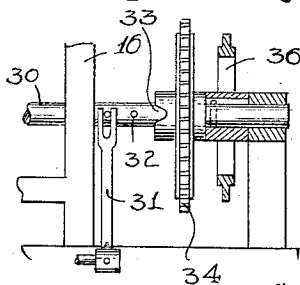


Fig. 13.

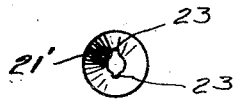


Fig. 12.

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UNITED STATES PATENT OFFICE.

BURT R. VAN VALKENBURG, OF OAKLAND, CALIFORNIA.

PIANO-PLAYER-OPERATING MECHANISM.

1,054,806.

Specification of Letters Patent.

Patented Mar. 4, 1913.

Application filed March 20, 1912. Serial No. 684,944.

To all whom it may concern:

Be it known that I, BURT R. VAN VALKENBURG, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Piano-Player-Operating Mechanism, of which the following is a specification.

This invention relates to player pianos and has special reference to pianos of the type wherein perforated rolls are used to control the production of music.

The principal object of this invention is to provide a player piano having duplicate tracker boards and roll-actuating mechanisms of a novel and improved character, either of the mechanisms being adapted for operation independent of the other, thus particularly adapting the instrument for use in moving picture shows and other like places.

A second object of the invention is to provide an improved controlling apparatus for regulating the tempo and rewinding devices.

A third object of the invention is to provide improved means by which the suction is automatically cut off from the tracker board when rewinding the roll pertaining to that board.

A fourth object of the invention is to provide means of an improved character by which the motor of either roll actuating mechanism is automatically started when the corresponding tracker board is placed in communication with the suction chamber.

With the above and other objects in view, the invention consists in general of certain novel constructions, combinations and arrangements of parts as will be hereinafter fully described in the specification, illustrated in the drawings, and specifically claimed.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:—Figure 1 is a front elevation of the mechanism showing the same installed in a piano casing, the front boards of the casing being removed the better to disclose the invention. Fig. 2 is a transverse section of the piano equipped with this invention. Fig. 3 is a top plan view of the mechanism as installed in the piano, the cover of the piano being removed. Fig. 4 is a detail elevation of the rear of that part of the mechanism adjacent the tracker

boards. Fig. 5 is a sectional view through a valve used in connection with the automatic tracker cut off. Fig. 6 is a section through one end of a device which is used to connect either tracker board to the player pneumatics. Fig. 7 is a plan view thereof. Fig. 8 is a longitudinal section through the speed controlling arrangement. Fig. 9 is a plan view thereof with the top partly broken away to show the interior. Fig. 10 is a transverse section through the device shown in Fig. 8. Fig. 11 is a view of the improved music roll holding device. Fig. 12 is an end view of the driving cup shown in Fig. 11. Fig. 13 is an enlarged longitudinal sectional view through one of the sprocket wheels and its support.

In the present embodiment of the invention there is provided the usual piano casing wherein is a piano action of the ordinary type which is operated manually by the keys 12 or automatically through the medium of the pneumatic bellows 13 which are secured beneath the vacuum trunk indicated at 14 and communicate therewith in the ordinary manner, not deemed necessary here to be shown as the same is well-known and any of the ordinary forms of pneumatics may be used.

Vacuum is maintained in the trunk 14 by the use of an ordinary bellows connected thereto by suitable pipes, neither of which it is deemed necessary here to show as they are the usual kind employed and would tend simply to confuse the showing of the parts pertaining to the present invention.

Mounted on the vacuum chest 14 are housings 15 and 16 arranged to receive the music rolls and actuating mechanisms therefor. In each of these housings there is provided a socket 17 wherein is held the stem 18 of a cup 19 adapted to receive one of the journals of a music roll 20. Within the socket 17 there is provided a spring 21 so that the cup may be moved in it. The other journal of the music roll 20 is received in a cup 21' carried on the end of a rewinding shaft 22, the cup being provided with suitable notches to receive the lugs formed on the driving journal of the roll. These two cups are carried at the upper part of the respective housing and the shaft 22 is journaled in a bearing 24 being provided on the end opposite the cup with a sprocket 25.

Below the cups above noted there is provided a winding roll 26 having a shaft 27,

the ends whereof are journaled in the sides of the respective housing. On the shaft 27 is furthermore provided a gear wheel 28 which meshes with a gear 29 carried on a shaft 30 which is slidably and rotatably mounted in the side of the respective frame. In order to slide this shaft 30 the same is provided with a shipper collar 31 and through the shaft extend pins 32 which are adapted to fit into notches 33 formed in a sprocket 34 which is connected by means of a chain 35 to the sprocket 25. This shaft 30 is splined to a sprocket 36 which is connected by a sprocket chain 37 to a sprocket 38 on the crank shaft 39 of an engine 40, there being, of course, separate engines and crank shafts for each of the roll winding mechanisms. In the alternative position of the shaft 30, when the pins 32 are in engagement with the notches 33, then the gear 29 will be disengaged from the gear 28 while at the same time this will lock the sprocket 34 to the shaft so that as the latter rotates under the action of the engine 40 the shaft 22 will be rotated and cause the rewinding of the roll. Of course, when the gears 28 and 29 are in mesh and the pin 32 out of engagement the roll will be wound on to the winding roll 26. Now as the sprocket 34 is larger than the sprocket 25 while the gear 29 is smaller than the gear 28 it will be obvious that if the device is run at a suitable speed for winding on the roller 26 the rewinding will be done at a much more rapid speed and in order to provide a brake for the free running of the roll 26 each of these rolls is provided in its housing with a rod 41 whereon is a brake shoe 42 which bears against one of the flanges of the roll 26. On the outer end of this rod 41 are collars 43 between which is located the movable end of a bellows board 44 controlled by the bellows 45, the latter being subject to pneumatic control, as will be hereinafter described.

Between the inner collar 43 and collar 46 on the rod 41 is a spring 47 for the purpose of applying the pressure to shoe 42, it being understood that the inner collar 43 is loose on the rod 41 so that the rod is forced in by pressure on the collar 46.

In order to control the movement of the respective gears 29 into and out of mesh with their respective mating gears 28 the respective shipper forks 31 are carried on rods 48, the ends whereof are connected to arms 49 carried on shafts 50 which extend vertically up through bearings 51. At the front of the instrument there is provided a pair of levers 52 one of which is connected to an arm 53 on one of the shafts 50, the said arm extending substantially in the direction of the arm 49 on that shaft. The other of the levers 52 is connected to an arm 54 which extends substantially in the opposite direction from the remaining arm 49,

said arms 53 and 54 both being fixed to respective shafts.

Connection between the levers 52 and the arms is made in each instance through the medium of a link 55 which connects the respective arm 53 or 54 with a rock arm 56 on a shaft 57 journaled in suitable bearings 58 and on the front end of this shaft is carried the respective lever 52. Thus by moving these levers in one direction or another either of the instruments may be thrown into playing position. These rods 48 also control the admission of air to certain tubes in the following manner:—At 59 are valve boxes, each of which has a suitable opening there-through which is closed by a cover 60 pressed tightly against the opening by means of a spring 61. On one of the rods 48 there is provided a finger 62 which engages the forward projecting edge of the respective cover 60 so that as the rod is moved to throw the rewinding mechanism into operation the valve will be opened by reason of the raising of the said cover. In like manner on the other shaft 50 at the right end of the machine there is provided an arm 63 which bears against the forwardly extending edge of the cover 60 which it controls so that when the right hand mechanism is thrown into rewinding position this cover will be raised and air admitted. From each of these valve boxes 59 extends a tube 64 which communicates through an opening 65 with a chamber 66 formed in a valve casing 67. Above this chamber there is provided a diaphragm 68 of flexible material and on this diaphragm rests a disk 69 whereon rests the lower end of a rod 70 which extends upward through a partition 71 forming a closure in the chamber 66. The partition 71 is further provided with air escape passages 72 through which the air above the diaphragm may escape to a chamber 73. From this chamber 73 a tube 74 extends to a chest or trunk 14 so that under proper conditions vacuum may be obtained. Above the chamber 73 is a chamber 75 which is in communication with the chamber 73 through a port 76, the latter being controlled by a valve 77 carried on the rod 70. The upper end of the rod 70 passes through a suitable guide 78 having openings 79 communicating with the air. From the chamber 75 leads a pipe 80 which affords communication with a respective bellows 81, the purpose of which will be hereinafter described. The chambers 66 and 73 furthermore are in constant communication by means of a bleed hole 82. In the operation of the device if one of the covers or valves 60 be opened air will pass through the respective tube 64 into the chamber 66, thus permitting the lifting of the diaphragm 68 since the pressure on the lower side of the diaphragm will be greater than the pressure on the upper side due to partial vacu-

um in the chamber 73. As this lifting takes place the valve 77 will raise, thus placing the tubes 74 and 80 in communication since the valve 77 will close the opening to the free air. Thereupon a partial vacuum will be created and the respective bellows 81 will be exhausted. These bellows have their moving sides provided each with a suitable opening wherethrough passes a rod 83 having thereon tappets 84 so that as one or the other of the bellows 81 is deflated the rod 83 will be moved to the right or left as the case may be.

Carried by suitable brackets 85 is a valve board 86 which is provided with a series of openings 87 from whence lead tubes 88 which communicate with the respective pneumatics of the bellows 13. Above the board 86 is a second valve board 89 provided with a series of openings 90 which communicate by means of flexible tubes 91 and 92 with the respective tracker boards 102 through openings 93 formed in the back of the respective casings or housings 15 and 16. These openings 87 and 90 are so arranged that when one set of the openings 90 is brought into alinement with the openings 87 all the tubes leading from the housing 15 will be connected while when moved in another direction the tubes leading from the housing 16 will be connected with the tubes 88, thus permitting the roll in either of the housings to be played. Furthermore, when valve board 89 is in its central position openings 87 are closed, and are not in communication with either set of openings 90, thus neither roll can be played.

In order to hold the two members 86 and 89 together the member 89 is provided with slots 91' adjacent its ends through which pass screws 92' having enlarged heads 93'. On these screws are washers 94 and between the respective screw head and washer is a spring 95 which serves to hold the two parts 86 and 89 closely together.

Suitably journaled to the exterior of one of the housings is a shaft 96 whereon is an arm 97 provided with a slot at its upper end and through this slot extends a pin 98 which connects the arm with the rod 83. Extending downward from the shaft 96 is an arm 99 which is connected by a link 100 with the board 89 so that as the rod 83 is moved to the right or to the left the board will be moved in a corresponding direction. Thus by the movement of one of the levers 52 the valve board 89 is shifted to the right or left of its central position and at the same time opens a branch pipe 80' to the bellows 45. On shaft 96 is an operating lever 101 by which the valve board is moved either to the right or to the left and the corresponding tracker placed in operative connection with the playing mechanism. Furthermore, if either mechanism is in the rewinding po-

sition the corresponding bellows 81 will be collapsed bringing the movable side of the same against the tappet 84. Hence, if by mistake an attempt is made to move lever 101 in that direction, such movement will be resisted by the bellows 81 which thus prevents the rewinding of the roll with the same connected to the playing mechanism.

In the bottom of the casing 10 there is provided a vacuum box 103 which is connected by a tube 104 with the vacuum chest. This box is also connected by a tube 105 with an equalizing bellows 106. From the bellows 106 a pipe 107 leads to the tempo control box 108, and within this tempo control box is a valve plate 109 having therein a V-shaped slot 110 which controls the degree of opening of the mouth of the pipe 107. This valve plate 109 is provided with a stem 111 which extends out of the box and this stem 111 is connected to the rear end of a lever 112 which is pivoted intermediate its ends and is provided at its forward end with an upturned end 112' which projects upward through the key slip of the piano casing so as to be convenient of access to the operator. Thus by the proper operation of the lever 112 greater or less degree of opening may be given between the pipe 107 and the tempo control box 108.

From the tempo control box 108 a pipe 113 leads to the engine control box 114 and to this box 114 there is also led a pipe 115 which communicates with the pipe 105. This engine control box is shown in detail in Figs. 8, 9, and 10, and, as will be seen, consists, for convenience of a number of layers of wood superimposed. In this box there is provided a pair of vacuum chambers 116 and 117 which communicate by means of ports 118 and 119 with chambers 120 and 121. These chambers 120 and 121 communicate respectively by means of pipes 122 with the respective engines 40. The ports 118 and 119 are normally closed by means of valves 123 which are carried on flexible diaphragms 124 located over cells 125. These cells 125 communicate by means of passages 126 with tubes 127 and 128 which pass upward and terminate in openings 129 and 130 in the board 86. The board 89 is also provided with a slot 131 which, when the board is in one position it will cover one of said openings while in the other position it will cover the other opening. The remaining cells communicate by means of the passages 126 with tubes 132 and 133 which terminate in bushings 134 on the key slip of the piano. Suitable bleed openings 135 afford communication between the vacuum chambers 116 and 117 and the passages 126 leading to the cells. Now, if by the operation previously described the board 89 be moved in one direction the opening 129 will be closed. This, through the tube 127, will

deflate the cell governing the vacuum chamber 116 so that the respective port 11 will be opened. This will place the vacuum chamber in communication with the respective engine 40 and start the same.

It is to be noted that if either of the levers 52 is shifted by mistake while the roll is playing the playing mechanism is disengaged and at the same time the proper valve 59 is opened so that the board 89 is shifted to its central position.

It frequently is desirable to omit certain portions of music when playing for moving pictures and if one of the rolls is playing and it is desirable to play a part of the other roll near the end of the same, by throwing the proper lever to the right the winding mechanism is thrown into engagement and if the finger be placed on the proper bushing 134 direct suction from the suction box 103 is admitted to the engine 40 through the tubes 105, 115 and the engine control box 114. At the same time no sound will be produced as the openings in the tracker are out of communication with the playing mechanism.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that many minor changes may be made in the form and construction thereof without departing from the material principles thereof, and it is therefore not wished to confine the invention to the exact form herein shown and described but it is wished to include all such as properly come within the scope claimed.

Having thus described the invention, what is claimed as new, is:—

1. In a player piano of the class described, a plurality of roll winding and rewinding mechanisms, each of said mechanisms including a pair of gears and a shaft slidably mounted and arranged to selectively drive either of said gears, an operating engine for each of said mechanisms arranged to drive the sliding shaft of the mechanism, a valve box containing a plurality of valves each controlling one of said engines, a set of player pneumatics, a valve plate having a set of openings therein, a series of tubes connecting said openings with the player pneumatics, a second valve plate slidably mounted upon the first valve plate and provided with a plurality of sets of openings, a plurality of sets of tubes connecting the respective sets of openings in the movable valve plate with the tracker boards respectively, and means for simultaneously controlling the valves in the valve box and moving the valve plate, and a sliding shaft.

2. In a player piano of the class described,

a plurality of roll winding and rewinding mechanisms, an operating engine for each of said mechanisms, an engine control valve box provided with a plurality of valves, each governing one of said engines, pneumatic means for controlling said valves, a tracker board for each of said mechanisms, a set of player pneumatics, a fixed valve plate provided with a series of openings therein and a plurality of other openings, tubes connecting the player pneumatics with the series of openings, other tubes connecting the remaining openings with the pneumatic control for the valves, a sliding valve plate mounted on the fixed plate and provided with a plurality of series of openings and with an opening arranged to coact with the openings in the fixed plate which are connected to the valve control box, a plurality of sets of tubes each connecting one series of openings in the movable valve plate with a respective tracker board, and means to simultaneously control the movement of a shaft and said movable valve plate.

3. In a player piano of the class described, a plurality of roll winding and rewinding mechanisms, an operating engine for each of said mechanisms, an engine control valve box provided with a plurality of valves, each governing one of said engines, pneumatic means for controlling said valves, a tracker board for each of said mechanisms, a set of player pneumatics, a fixed valve plate provided with a series of openings therein and a plurality of other openings, tubes connecting the player pneumatics with the series of openings, other tubes connecting the remaining openings with the pneumatic control for the valves, a sliding valve plate mounted on the fixed plate and provided with a plurality of series of openings and with an opening arranged to coact with the openings in the fixed plate which are connected to the valve control box, a plurality of sets of tubes each connecting one series of openings in the movable valve plate with a respective tracker board, a sliding rod, an operating connection between said rod and the movable valve plate, a pair of normally inflated pneumatics controlling the movement of said rod in opposite directions, a pair of valves each controlling one of said pneumatics, and means to simultaneously throw a winding mechanism into operation and open one of the last mentioned valves.

In testimony whereof I affix my signature in presence of two witnesses.

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Witnesses:

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