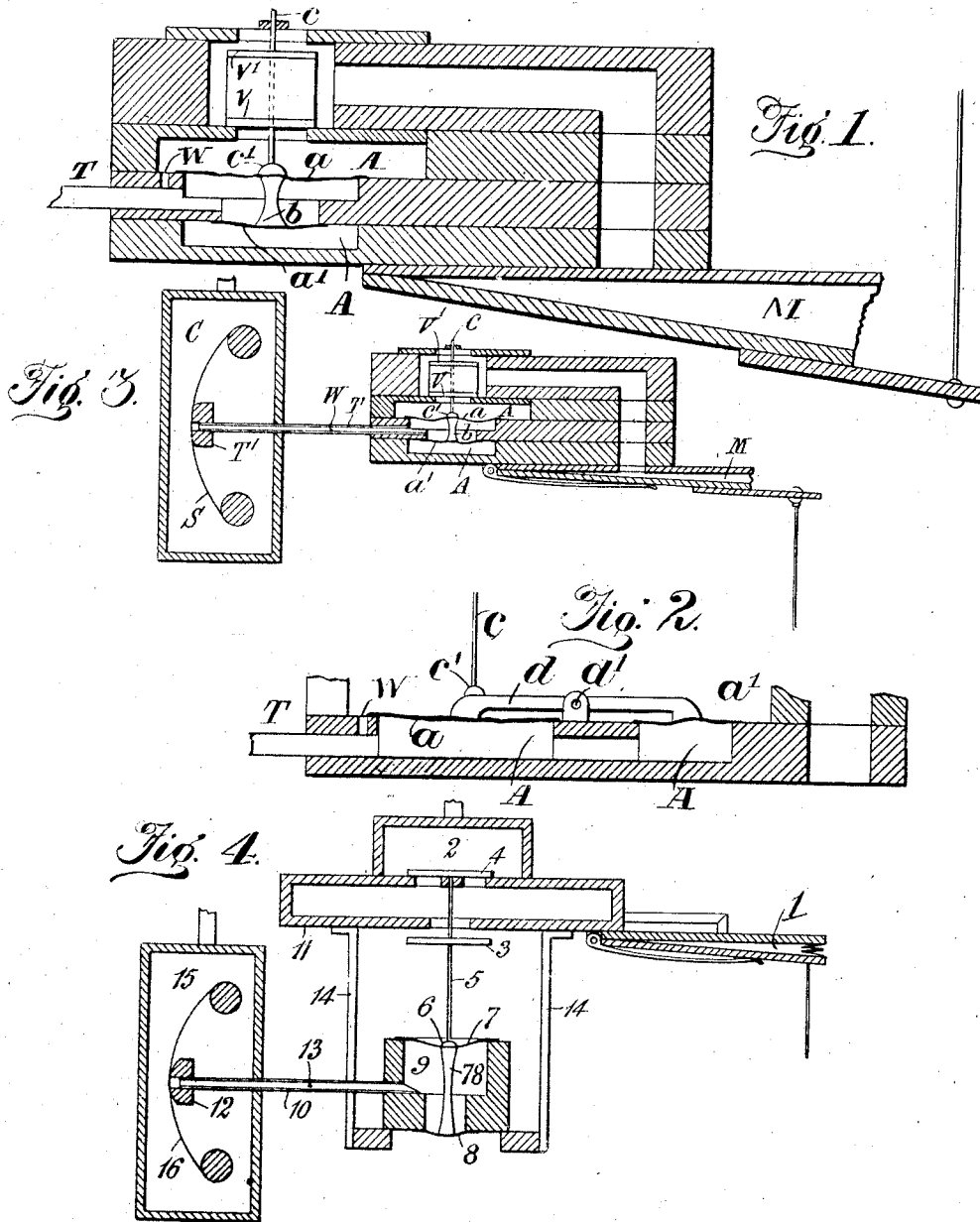


979,470.

Patented Dec. 27, 1910.



Witnesses
 M. E. Russell
 C. B. Franconi

Inventor
 Charles Edward Gittins,
 By his Attorney,
 Baldwin Wright

UNITED STATES PATENT OFFICE.

CHARLES EDWARD GITTINS, OF TWICKENHAM, ENGLAND.

AUTOMATIC PIANO-PLAYER.

979,470.

Specification of Letters Patent.

Patented Dec. 27, 1910.

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To all whom it may concern:

Be it known that I, CHARLES EDWARD GITTINS, engineer, a subject of the King of Great Britain, residing at "Bayden", London Road, Twickenham, in the county of Middlesex, England, have invented new and useful Automatic Piano-Players, of which the following is a specification.

This invention relates to means by which the strength of tone of each individual sound-producing device of a piano is controlled by the aid of holes of varying area in the tune sheet. This is effected according to this invention by actuating the valve which controls the pneumatic or the like by means of members of different sizes acting in opposition to each other and so adapted that both sides of both members are subjected to one and the same pressure of air or one side of each member to the one pressure and the other side of each member to a second pressure.

Figure 1 is a section of a portion of an automatic piano player showing one method of controlling the valve when the pneumatic is actuated by means of a vacuum apparatus. Fig. 2 shows a modification of the same method. Fig. 3 is a section of a portion of an automatic piano player showing another method of controlling the valve when the pneumatic is actuated by means of compressed air. Fig. 4 shows a modified arrangement also actuated by compressed air.

The automatic piano player shown in Fig. 1 comprises as is usual an operating chamber consisting of a vacuum box A, a valve V V', a pneumatic M which is as shown normally open to the atmosphere, a tube T leading to the tracker board, and a bleed W placing the pipe T in communication with A.

In Fig. 1 *a* is a large diaphragm and *a'* a small diaphragm placed within the vacuum box A in such a manner that they form a continuation of the pipe T. *b* is a stem connecting *a* and *a'* together. *c* is a wire terminating in a button *c'* which rests upon the diaphragm *a* in order that the movement of the diaphragms may operate the valve V.

Normally both sides of the diaphragms *a* and *a'* will be at one and the same pressure viz: that of the vacuum box A but when air passes in through T the pressure acting on one side of *a* and *a'* will be as before that of A but on the other side a greater pressure. The diaphragm *a'* has a retarding effect

upon the movement of *a* and it is found that with tune sheets perforated with holes of different area the valve V V' will move more slowly when a small perforation passes over a hole in the tracker board than when a larger perforation passes over; this has for effect that a greater or less quantity of air will pass around the valve V V' into the box A which by destroying the partial vacuum in A more or less will cause the motor M to strike a softer blow.

In Fig. 2 in which the same parts are marked with the same letters the diaphragms are connected together by a lever *d* pivoted at *d'*, the diaphragm *a'* retarding the movement of *a* as before.

Fig. 3 shows to a smaller scale an arrangement similar to Fig. 1 but in which the operating chamber A is connected to a source of pressure and the bleed W is made to leak into the atmosphere. In addition to these parts T' is a tracker board which is contained within a closed chamber C maintained under pressure and S is a perforated tune sheet.

Normally one side of each diaphragm is at one pressure and the other side at a second pressure viz: that of the atmosphere. When compressed air is led through the holes in the tune sheet to the pipe T both sides of each diaphragm will be at one and the same pressure (or substantially so) and this pressure is sufficiently greater than or above atmospheric pressure as to lift valve V against air pressure above it plus gravity of the members *a*, *a'*, *b*, *c*, *c'*, and V, and the valve V V' will be lifted at a speed dependent on the area of the hole in the perforated tune sheet and compressed air will pass to the pneumatic M which of course in this case would be inflated.

In Fig. 4, 1 is the pneumatic carried by a frame 11, 2 the operating chamber maintained under pressure, 3, 4 is a valve placing the pneumatic 1 in communication with the chamber 2 or with the atmosphere. 5 is the valve spindle terminating in a head 6 which bears upon a large diaphragm 7 which by means of a stem 78 is connected to a smaller diaphragm 8 which together with a box 9 form an inclosed space connected to the pipe 10 leading to the tracker board 12. 13 is a bleed in the tracker pipe 10. The diaphragm box 9 is suspended from the frame 11 by brackets 14. The tracker board 12 is contained within a closed cham-

ber 15 maintained under pressure and 16 is a perforated tune sheet.

Normally each side of the diaphragms 7 and 8 will be at atmospheric pressure and the valve 4 will prevent compressed air from 2 passing to the pneumatic 1; when however compressed air passes into the pipe 10 through holes of varying area in the tune sheet the pressure acting on one side of 7 and 8 will be greater than the pressure acting on their other sides and the valve 3, 4 will move upward thereby causing the pneumatic 1 to be inflated.

As before the diaphragm 8 has a retarding effect upon the movement of *a* and it is found that with tune sheets perforated with holes of different area the valve 3, 4 will move more slowly when a small perforation passes over the hole in the tracker board than when a larger perforation passes over.

What I claim is:—

1. In an automatic piano player, the combination of a pneumatic, a tracker board, a pipe communicating therewith, a valve for controlling said pneumatic, and a valve controlling device, comprising two members of different sizes acting in opposition to each

other, one side of each member being in communication with the tracker board 30 through said pipe.

2. In an automatic piano player, the combination of a pneumatic, a tracker board, a pipe communicating therewith, a valve for controlling said pneumatic, and a valve controlling device, comprising two members of different sizes acting in opposition to each other, one side of both members being acted upon by the same pressure while the other side of each member is in communication 40 with the tracker board through said pipe.

3. In an automatic piano player, the combination of a pneumatic, a tracker board, a pipe communicating therewith, a valve for controlling said pneumatic, an operating 45 chamber, and a valve controlling device located within said chamber, comprising two members of different sizes acting in opposition to each other, one side of each member being in communication with the tracker 50 board through said pipe.

CHARLES EDWARD GITTINS.

Witnesses:

WILFRED CARPMAEL,

JOHN HENDERSON WHITEHEAD.