

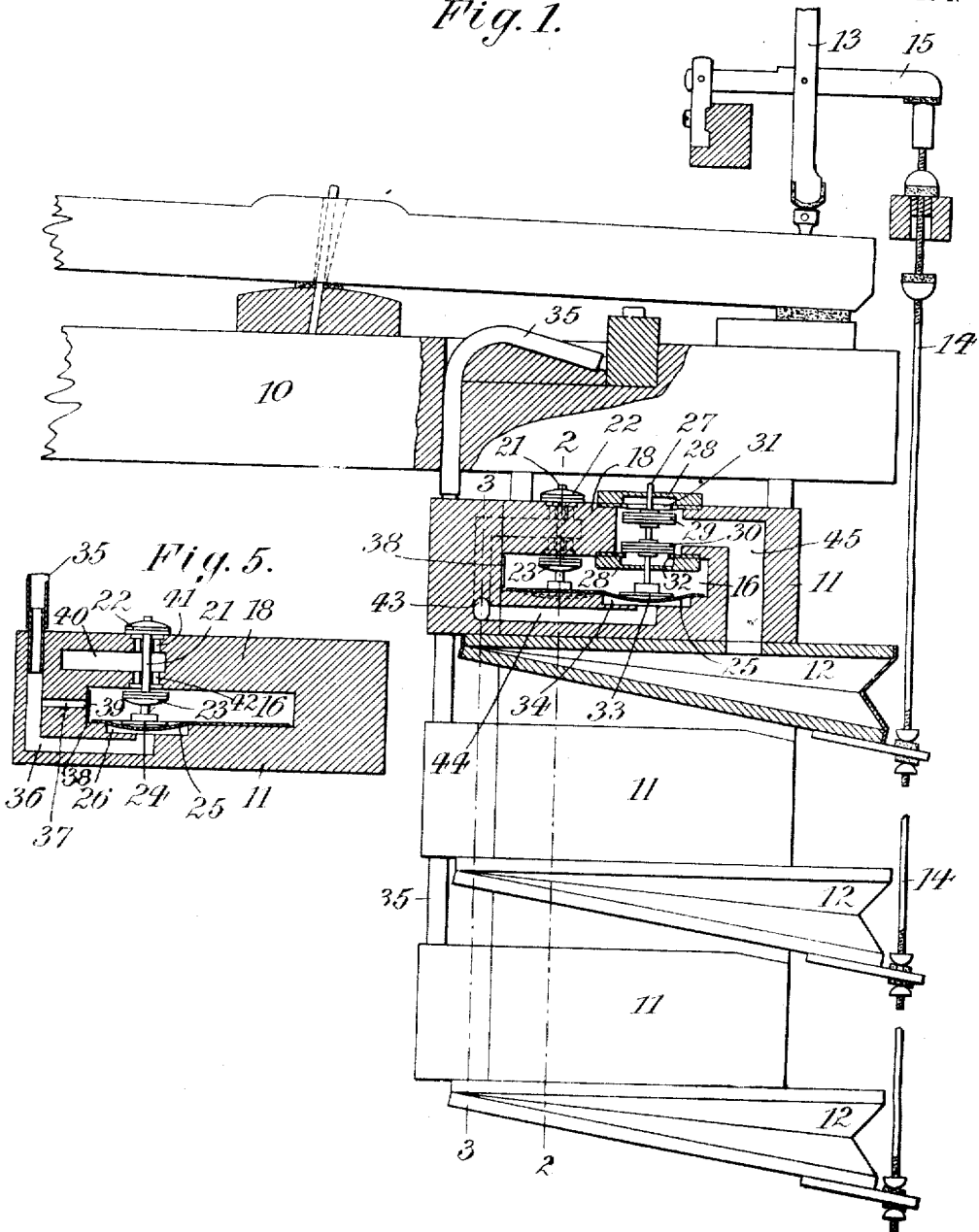
J. SKUBIS.  
 VALVE MECHANISM FOR AUTOPNEUMATIC PIANOS.  
 APPLICATION FILED JUNE 19, 1908.

909,242.

Patented Jan. 12, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



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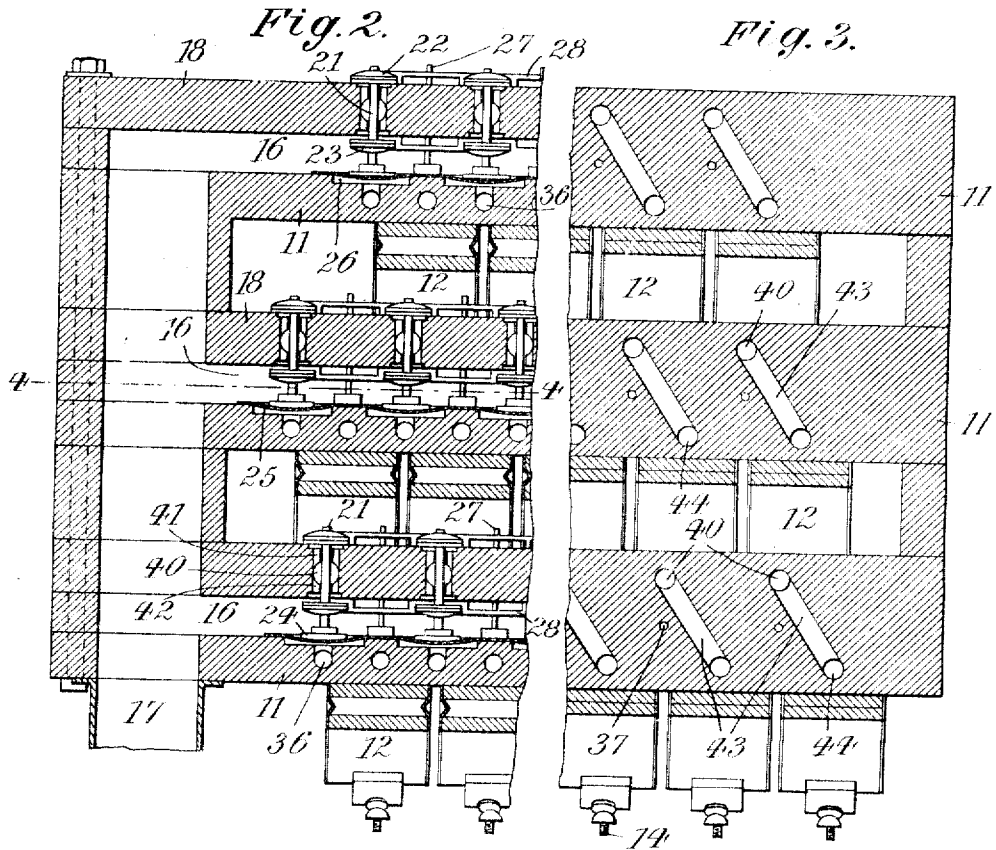
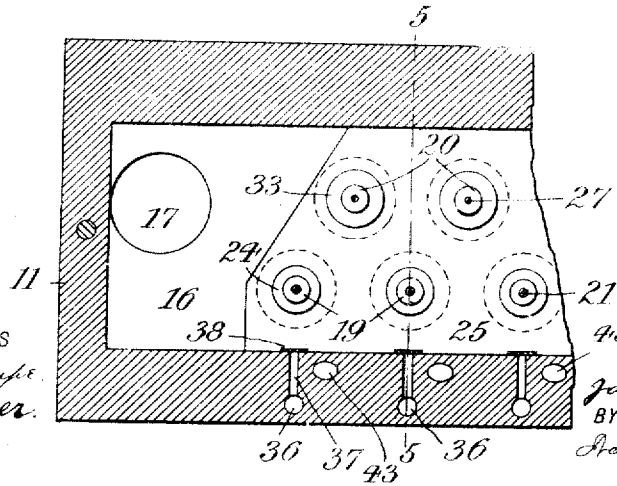


Fig. 4.



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# UNITED STATES PATENT OFFICE.

JACOB SKUBIS, OF NEW YORK, N. Y.

## VALVE MECHANISM FOR AUTOPNEUMATIC PIANOS.

No. 909,242.

Specification of Letters Patent.

Patented Jan. 12, 1909.

Application filed June 19, 1908. Serial No. 439,450.

*To all whom it may concern:*

Be it known that I, JACOB SKUBIS, a citizen of Germany, residing at New York city, Bronx, county and State of New York, have invented new and useful Improvements in Valve Mechanism for Autopneumatic Pianos, of which the following is a specification.

This invention relates to an improved valve mechanism controlled by a perforated music record and actuating the hammers of an auto-pneumatic piano.

The invention resides more particularly in a simplified construction of the vacuum boxes containing the primary and secondary valves, so that the weight, as well as the space occupied by the valve mechanism, is considerably reduced.

In the accompanying drawings: Figure 1 is a vertical transverse section, partly in elevation, of part of a piano embodying my invention; Fig. 2 a vertical longitudinal section, partly broken away, on line 2—2, Fig. 1; Fig. 3 a similar section on line 3—3, Fig. 1, with some of the parts omitted; Fig. 4 a horizontal section on line 4—4, Fig. 2, and Fig. 5 a vertical section on line 5—5, Fig. 4, showing a primary valve and adjoining parts.

To the bottom of key-board 10 are secured a number of vertically alined longitudinal blocks or valve boxes 11, the drawing showing three of such blocks. To the bottom of each block is secured a series of pneumatics 12 adapted to actuate the lifters or abstracts 13 of the piano-action by adjustable rods 14 and levers 15 pivotally connected to said lifters. Blocks 11 are made hollow to form vacuum chambers 16 which extend through the entire lengths of the blocks and communicate with a common suction pipe 17 from which the air is permanently exhausted in the usual manner. In the top board 18 of each block 11 is mounted a series of primary valves 19 and secondary valves 20, the number of valves of each series equaling the number of pneumatics 12 carried by the block. Valves 19 and 20 are arranged in staggering relation, (Fig. 4), each primary valve being adapted to cooperate with a secondary valve.

The primary valve consists of a valve stem 21 guided in a corresponding bore of board 18 and carrying a pair of valve disks 22, 23. To the lower end of stem 21 is se-

cured a button 24 which rests upon a diaphragm 25 arranged on the bottom of vacuum chamber 16. Below button 24, block 11 is provided with a circular recess 26, so as to permit a slight depression or sagging of the diaphragm, as shown in Fig. 5.

The secondary valve 20 is composed of a stem 27 guided in a pair of perforated cross bars 28 secured, respectively, to the top and bottom of board 18. Stem 27 carries a pair of valve disks 29, 30, adapted to engage valve-seats 31, 32. To the lower end of stem 27 is secured a button 33 resting upon diaphragm 25 which is arranged above a recess 34 of block 11. As shown, all buttons 24 and 33 of one valve box play within a common vacuum chamber 16 and engage a common diaphragm 25 covering the bottom of vacuum chamber 16, but it is obvious that separate diaphragms may be used for each button, without departing from the spirit of my invention.

The perforated music record controls, in the usual or suitable manner, by means of a tracker bar, a flexible tube 35 for each of the piano hammers. Tube 35 communicates with a duct 36 in block 11, which duct opens into recess 26 below the cooperating primary valve. Duct 36 is, through branch 37 and disk 38 having a bleed-hole 39, connected to vacuum chamber 16, so that when tube 35 is closed by an imperforate section of the record, a vacuum will be established in duct 36 and recess 26. The valve 19 resting upon diaphragm 25 which is exposed to a uniform underpressure on both sides, will thus be caused to descend by gravity until disk 22 becomes seated. When, however, tube 35 communicates, through a perforation in the record, with the outer air, the latter will flow into recess 26 and raise valve 19 as against vacuum in chamber 16 until disk 23 contacts with the lower side of board 18. This movement of valve 19 is utilized for operating the secondary valve 20 in manner herein-after described.

Board 18 is provided for each primary valve 19, with a horizontal duct 40 communicating with bores 41, 42 which are controlled by valve disks 22, 23, respectively. Duct 40 is connected through an inclined duct 43 and a lower horizontal duct 44 with recess 34. When valve 19 is in its lowered position, *i. e.*, when tube 35 is closed, a vacuum will be established in recess 34, the air being

exhausted through vacuum chamber 16, bores 42 and ducts 40, 43 and 44. Each valve 20 is, by a duct 45, connected with the interior of the pneumatic 12 cooperating therewith. It will thus be seen that when valve 20 is in its lowered position, disk 30 will drop by gravity against its seat, while disk 29 will drop from its seat, and admit the atmospheric air into bellows 12 through duct 45. The weight of the piano action will thus expand such bellows to assume the position shown in Fig. 1. If, however, tube 35 communicates with the outer air, through a perforation in the record, its valve 19 will be raised as above described, to close bores 42 and open bores 41. Air will thus rush through bores 41, ducts 40, 43 and 44, into recess 34, to raise secondary valve 20. In this way the outer air is shut off from duct 45 and suction is immediately established within pneumatic 12 to cause its collapse and thereby operate the piano hammer. After tube 35 has again been closed by an imperforate section of the record, suction will be established in recess 26, the air being withdrawn through bleed-hole 39 and ducts 37, 36. The primary valve 19 will thus descend to permit the withdrawal of the air from recess 34, and to cause the descent of secondary valve 20. Air will thereby be admitted into pneumatics 12 to permit their expansion by the weight of the piano action.

It will be seen that by my construction the primary and secondary valves of one block are connected to a common vacuum chamber, and are arranged staggeringly in the top board of the block. In this way the structure is simplified and rendered more

compact, so that weight is reduced and space economized. 40

I claim:

1. A device of the character described, comprising a valve box, a series of primary valves mounted in the valve box and having lower buttons, a series of secondary valves also mounted in the valve box and having lower buttons, said secondary valves being arranged in staggering relation to the primary valves, and a single vacuum chamber extending through the entire length of the valve box and receiving the buttons of both said series of valves, substantially as specified. 45 50

2. A device of the character described, comprising a valve box having a top board, a series of primary valves mounted therein and having lower buttons, a series of secondary valves also mounted in the top board and having lower buttons, said secondary valves being arranged in staggering relation to the primary valves, a single vacuum chamber extending through the entire length of the valve box and receiving the buttons of both said series of valves, pneumatics secured to the bottom of said valve box, and ducts controlled by said secondary valves that connect the pneumatics either with the vacuum chamber or with the outer air, substantially as specified. 55 60 65

Signed by me at New York city, (Manhattan,) N. Y., this 18th day of June, 1908. 70

JACOB SKUBIS.

Witnesses:

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