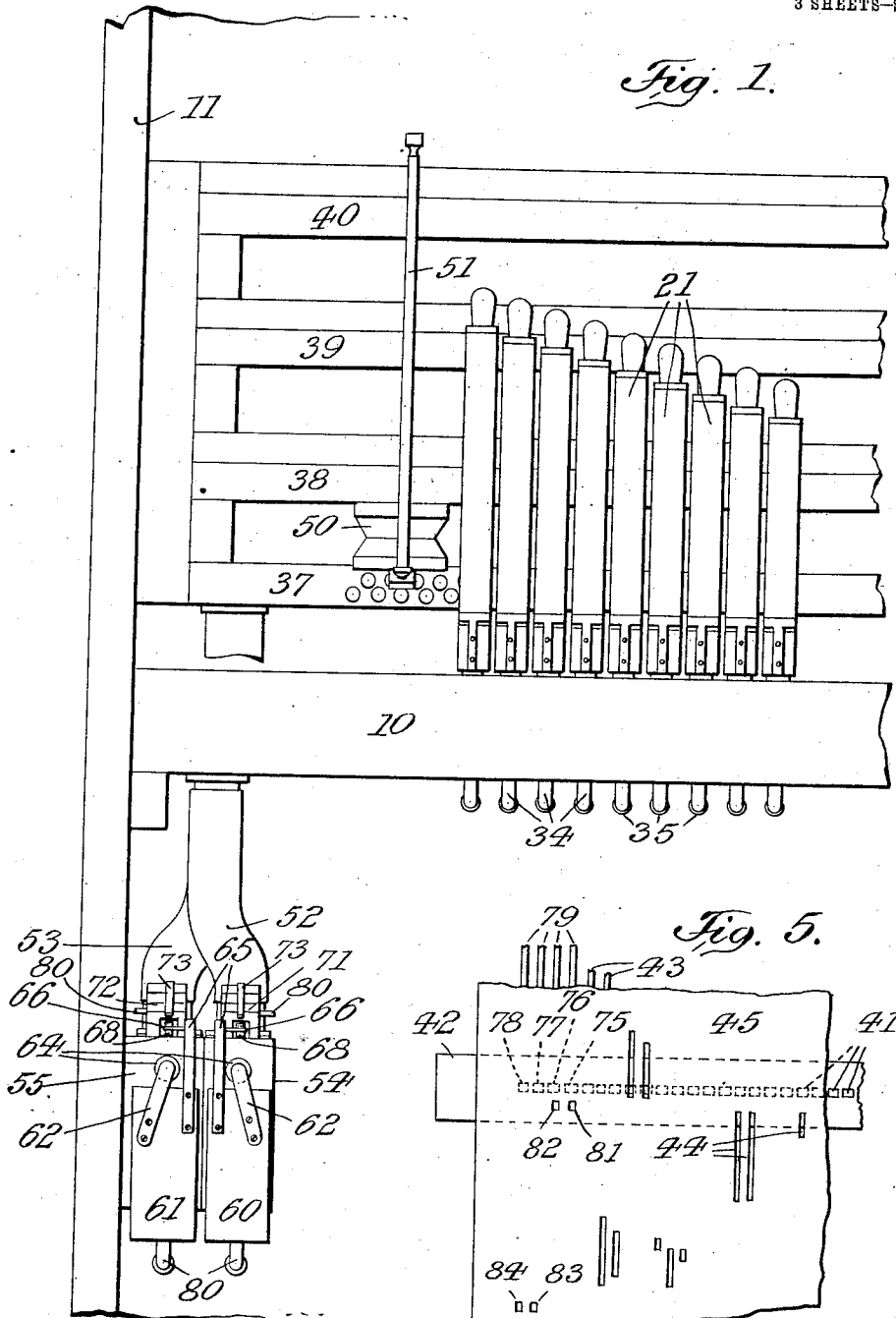


W. A. KUPP.
 ORGAN PIPE ATTACHMENT FOR AUTOPNEUMATIC PIANOS.
 APPLICATION FILED JUNE 22, 1912.

1,046,610.

Patented Dec. 10, 1912.

3 SHEETS—SHEET 1.



Witnesses:
[Signature]
 Daniel Holmgren.

Inventor
 William Amet Kupp
 By his Attorneys
[Signature]

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3 SHEETS—SHEET 2.

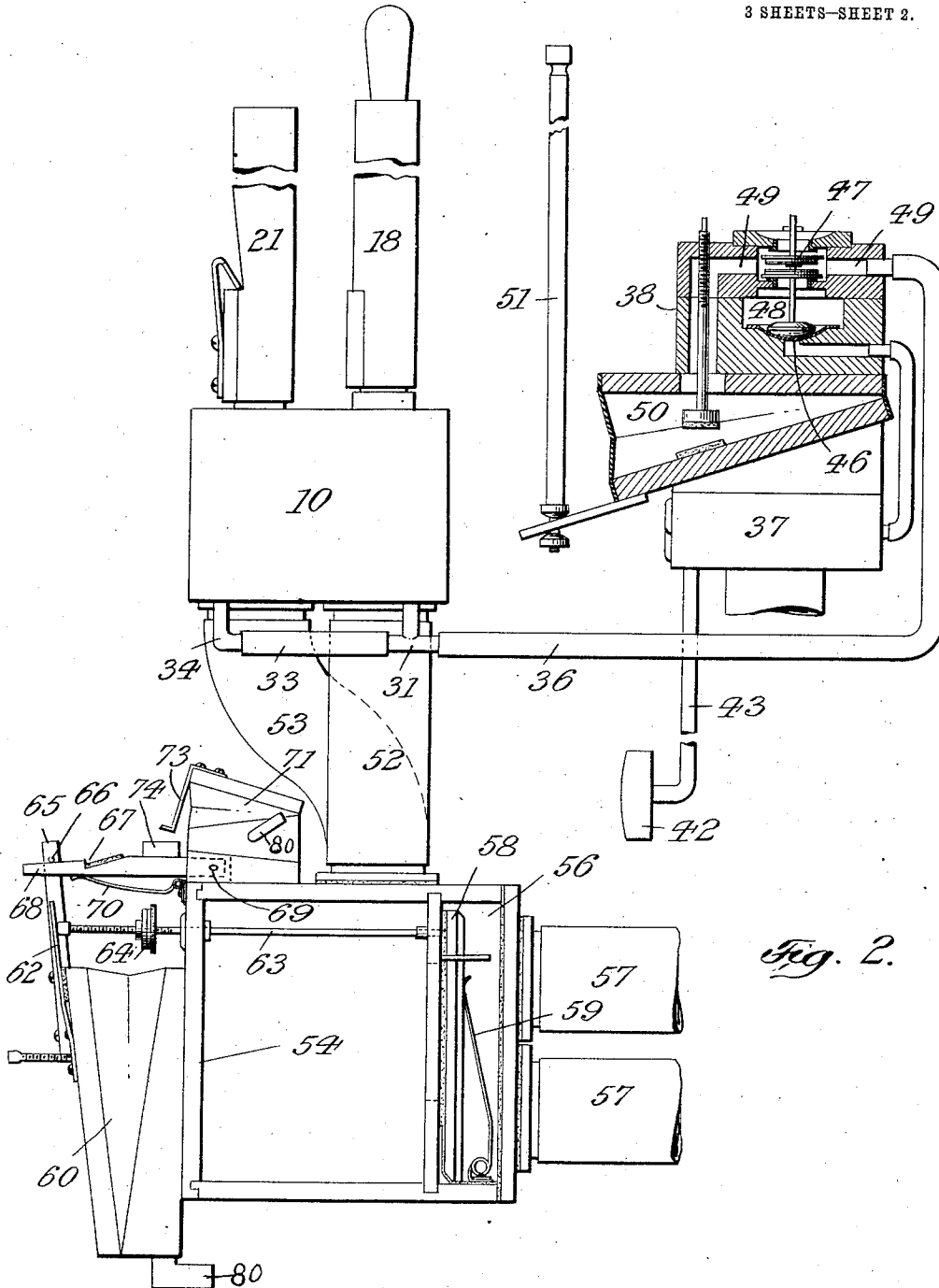


Fig. 2.

Witnesses:
Julius Kent
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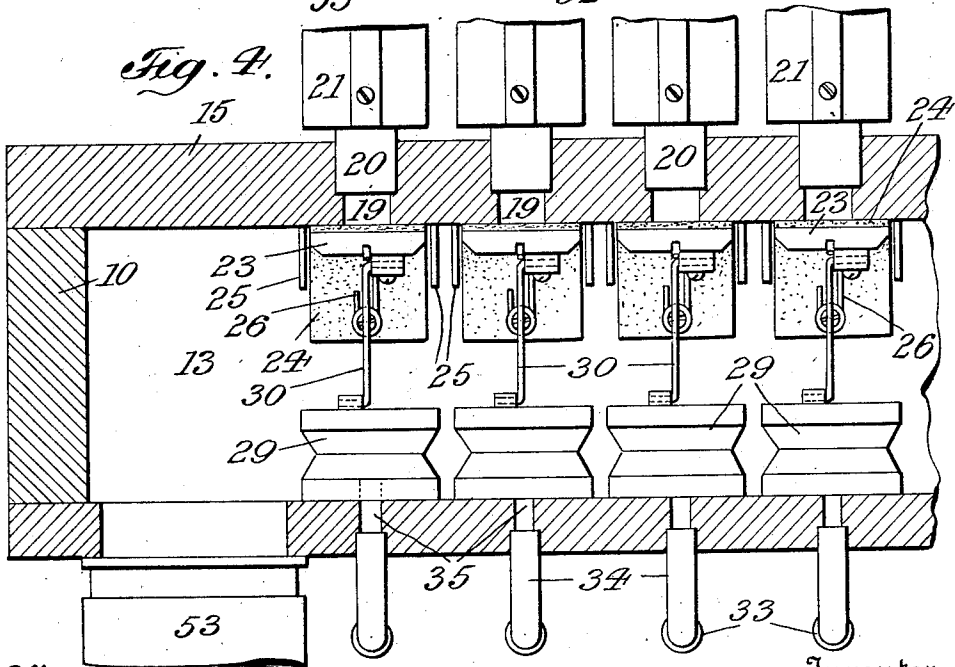
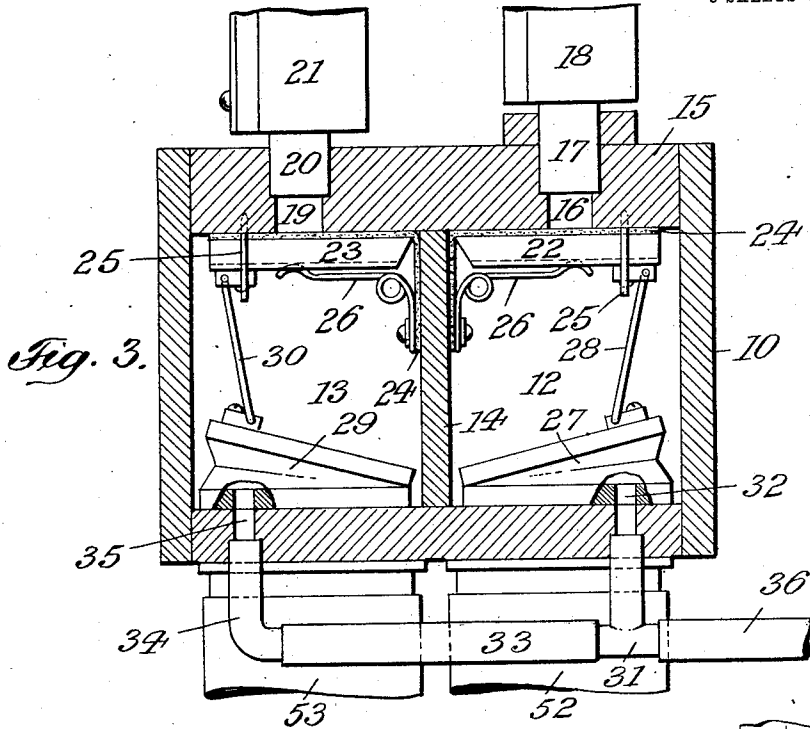
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3 SHEETS—SHEET 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM ARNETT KUPP, OF ST. JOHNSVILLE, NEW YORK, ASSIGNOR TO F. ENGELHARDT & SONS, OF ST. JOHNSVILLE, NEW YORK.

ORGAN-PIPE ATTACHMENT FOR AUTOPNEUMATIC PIANOS.

1,046,610.

Specification of Letters Patent.

Patented Dec. 10, 1912.

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To all whom it may concern:

Be it known that I, WILLIAM ARNETT KUPP, a citizen of the United States, residing at St. Johnsville, county of Montgomery, and State of New York, have invented a new and Improved Organ-Pipe Attachment for Autopneumatic Pianos, of which the following is a specification.

This invention relates to an organ pipe attachment for autopneumatic pianos and more particularly for such instruments in which a perforated tune-sheet controls a plurality of primary and secondary valves, each pair of primary and secondary valves in turn controlling the corresponding hammer actuating bellows. According to my invention, these primary and secondary valves are also used for controlling the organ pipes, while additional rows of perforations in the tune sheet serve for sounding said pipes in addition to the sounding of the piano-strings whenever so desired.

In the accompanying drawing: Figure 1 is a front view of part of a piano action embodying my invention with some of the parts omitted; Fig. 2 a side view partly broken away and partly in section of Fig. 1; Fig. 3 a cross section through the valve box carrying the pipes; Fig. 4 a longitudinal section thereof, and Fig. 5 a front view of part of the tracker bar and tune sheet.

In front of the piano action there extends across the piano a valve box 10 secured to the piano case 11 in any suitable manner and provided with a pair of longitudinally extending parallel pressure chambers 12, 13 separated by a partition 14. The top plate 15 of box 10 is provided above chamber 12 with a row of openings 16 into which are fitted the necks 17 of ordinary organ pipes 18, the top plate being likewise provided above chamber 13 with a row of openings 19 adapted for the reception of the necks 20 of "violin" organ pipes 21. Openings 16 and 19 are controlled by valves 22, 23 which are identical in construction, so that the description of one set of valves equally applies to the other set. Each valve 22 is glued or otherwise secured to a piece of felt or cloth 24 which is in turn pasted to partition 14. Guide pins 25 depending from plate 15 pre-

vent the valves, during their operation, from being laterally deflected, while springs 26 secured to partition 14 maintain the valves closed. Each valve 22 is operated by means of bellows 27 mounted in chamber 12 upon the bottom plate thereof, said valve and bellows being connected by a link 28. In like manner, there are mounted within chamber 13 below each valve 23, bellows 29, the movable board of which is by link 30 connected to said valve. Each pair of transversely alined bellows 27, 29 communicates with a T-shaped coupling 31 by duct 32 and by tube 33, elbow 34, and duct 35 respectively. Coupling 31 is by tube 36 connected to the pneumatic action of the piano, said action comprising a plurality of primary valves which are all contained within a valve chest 37, and a plurality of cooperating secondary valves which are contained in valve chests 38, 39, 40 respectively.

The primary valves are not shown in detail because not forming part of the present invention, such valves being for instance shown in Patent #986,288 granted to A. J. Hobart, March 7th, 1911. It may suffice to state that each of the ducts 41 of the tracker bar 42 is by a tube 43 connected to the primary valve in such a manner that upon the uncovering of said duct by a perforation 44 in the tune sheet 45, air is admitted to said primary valve, thereby in turn causing air to be admitted underneath the diaphragm 46 of the secondary valve 47. The vacuum permanently maintained in chamber 48 will thus raise valve 47 to cut off duct 49 from the atmosphere and at the same time connect said duct to vacuum chamber 48. In this way bellows 50 which communicate with duct 49 are collapsed to raise lifter 51 which in turn actuates the hammer (not shown) to sound the note desired.

The duct 49 of each secondary valve 47 is by one of the tubes 36 hereinabove referred to connected to the cooperating pair of bellows 27 and 29, so that upon the uncovering of any duct 41 of the tracker bar 42, air will be simultaneously withdrawn from the corresponding bellows 50, 27 and 29. Under normal conditions however, bellows 50 only will be collapsed, the springs 26 of valves 22, 23 being of such a strength as to then

not permit the collapse of bellows 27 and 29, so that the hammers alone will be actuated to render the music. If however air under pressure is admitted into chambers 12 and 13, the combined effect of the vacuum produced within bellows 27, 29 and of the air pressure acting upon the exterior of said bellows will be sufficient to overcome the strength of springs 26. In this way, the bellows 27, 29 will also be collapsed to open valves 22, 23 whereby the air under pressure supplied in manner hereinafter described will sound the pipes 18 and 21 in addition to the sounding of the piano strings by the hammers.

The air under pressure is supplied to chambers 12, 13 by means of a pair of tubes 52, 53 that in turn communicate with the interior of boxes 54, 55 secured to the interior of the piano case in suitable manner. Boxes 54, 55 are adapted to communicate with a valve chamber 56 to which air under pressure is continuously supplied through tubes 57, the compressed air being generated in any suitable manner. Communication between each of the boxes 54, 55 and chamber 56 is controlled by a valve 58 of which the valve for box 54 only has been shown in Fig. 2, it being understood that the valve for box 55 is a duplicate of the valve illustrated. Each valve 58 is normally closed by a spring 59, so that air under pressure cannot be admitted into chambers 12 and 13.

The means for operating the valves 58 consist of a pair of bellows 60, 61 secured to boxes 54, 55 respectively. The movable board of each bellows is provided with a finger 62 engaging the front end of a screw rod 63, the rear end of which impinges against the corresponding valve 58. The rearward stroke of rod 63 may be regulated by a cushioned nut 64 threaded on said rod and engaging the front plate of box 54 and 55 respectively. The movable boards of bellows 60, 61 furthermore carry arms 65 that are provided with laterally extending pins 66. Each pin 66 is adapted to engage an upper notch 67 of a lever 68 pivoted at 69 and influenced by a spring 70. It will be seen that when either of the bellows 60, 61 is collapsed, the corresponding pin 66 will engage notch 67 of the cooperating lever 68, so as to be temporarily locked in its collapsed state.

For releasing bellows 60, 61 trip bellows 71, 72 respectively are furnished, the movable board of each of which is provided with an arm 73 adapted to engage a seat 74 mounted on lever 68. As soon as either of the bellows 71, 72 is collapsed, the corresponding lever 68 is depressed to withdraw notch 67 from pin 66 and thus permit spring 59 to close valve 58 and to simultaneously ex-

pand the cooperating bellows 60, 61 respectively.

For controlling bellows 60, 61 a pair of organ accompaniment ducts 75, 76 are provided in tracker bar 42, while a pair of additional ducts 77, 78 control the trip bellows 71, 72 respectively. Ducts 75, 76, 77, 78 are by tubes 79 connected to a like number of primary valves of chest 37, the cooperating secondary valves 47 being connected by tubes 80 to the respective bellows 60, 61, 71, 72.

Whenever both sets of pipes are to accompany the piano, a pair of perforations 81, 82 are provided in tune sheet 45, which when uncovering ducts 75, 76 of tracker bar 42 will admit air through tubes 79 into the cooperating primary valves of chest 37, thereby actuating their secondary valves 47 to collapse bellows 60, 61. In this way the valves 58 of both boxes 54 and 55 are opened to admit air under pressure into chambers 12, 13. The subsequent uncovering of any one of the playing ducts 41 of tracker bar 42 by the music sheet will thus not only cause the collapse of the hammer-actuating bellows 50 but also the collapse of the corresponding pipe-bellows 27, 29, the combined action of the air withdrawn from bellows 27, 29 and of the air pressure within chambers 12, 13 being sufficient to cause the collapse of said last named bellows as above explained.

When the organ accompaniment is to be silenced, a pair of additional perforations 83, 84 of the tune sheet are made to register with tracker-bar-ducts 77, 78 to collapse trip bellows 71, 72 and withdraw levers 68 from pins 66. Springs 59 will thus be permitted to expand bellows 60, 61 and close valves 59, thereby interrupting the supply of compressed air to chambers 12 and 13. As the vacuum established within bellows 27, 29 upon the subsequent uncovering of the playing ducts 41 by the tune sheet-perforations 44 is insufficient to collapse said bellows, the hammer-actuating bellows alone will be collapsed.

It is obvious that in lieu of causing both sets of pipes 18, 21 to be simultaneously sounded, but one of the perforations 81, 82 may be provided in the tune sheet, so as to effect an accompaniment either by pipes 18 or by pipes 21.

I claim:

1. An organ pipe attachment for auto-pneumatic pianos, comprising a box, bellows inclosed therein, a spring influencing said bellows, an organ pipe adapted to communicate with the box and controlled by said bellows, means for producing a vacuum within the bellows which is insufficient to overcome the tension of the spring, and means for ad-

mitting compressed air into the box and to the exterior of the bellows.

2. An organ pipe attachment for auto-pneumatic pianos, comprising a valve box, an organ pipe, a valve controlling communication between said box and pipe, a spring engaging said valve, bellows inclosed within the valve box and operatively connected to the valve, means for producing a vacuum within the bellows which is insufficient to overcome the tension of the spring, and means for admitting compressed air into the box and to the exterior of the bellows.

3. An organ pipe attachment for auto-pneumatic pianos, comprising a valve box, an organ pipe, a valve controlling communication between said box and pipe, a spring engaging said valve, bellows inclosed within the valve box and operatively connected to the valve, tune-sheet-controlled means for producing a vacuum in said bellows, and tune-sheet-controlled means for admitting compressed air into the valve box and to the exterior of said bellows.

4. An organ pipe attachment for auto-pneumatic pianos, comprising a valve box having a first and a second chamber, a first and a second organ pipe, first bellows controlling communication between the first chamber and the first organ pipe, second bellows controlling communication between the second chamber and the second organ pipe, means for simultaneously producing a vacuum in both of said bellows which is insufficient to overcome the tension of the springs influencing the same, means for admitting compressed air into the first chamber and to the exterior of the first bellows, and means independent of said last named means for admitting compressed air into the second chamber and to the exterior of the second bellows.

5. An organ pipe attachment for auto-pneumatic pianos, comprising a valve box having a first and a second chamber, a first and a second organ pipe, spring-influenced first bellows controlling communication between the first chamber and the first organ pipe, spring-influenced second bellows controlling communication between the second chamber and the second organ pipe, tune sheet-controlled means for simultaneously producing a vacuum in both of said bellows, tune sheet controlled means for admitting compressed air into the first chamber and to the exterior of the first bellows, and additional tune sheet-controlled means for admitting compressed air into the second chamber and to the exterior of the second bellows.

6. An organ pipe attachment for auto-pneumatic pianos, comprising hammer-actuating first bellows, a box, an organ pipe,

spring-influenced second bellows inclosed within said box and controlling communication between the box and the organ pipe, means for simultaneously establishing a vacuum within both of said bellows, said vacuum being sufficient to collapse the first bellows but insufficient to collapse the second bellows, and means for admitting compressed air into the valve box and to the exterior of the second bellows, the joint action of the vacuum within the second bellows and of the compressed air without thereof being sufficient to collapse said second bellows.

7. An organ pipe attachment for auto-pneumatic pianos, comprising hammer-actuating first bellows, a box, an organ pipe, spring-influenced second bellows inclosed within said box and controlling communication between the box and the organ pipe, a tune sheet, means controlled thereby for simultaneously establishing a vacuum within both of said bellows, said vacuum being sufficient to collapse the first bellows, but insufficient to collapse the second bellows, and means also controlled by the tune sheet for admitting compressed air into the valve box and to the exterior of the second bellows, the joint action of the vacuum within the second bellows and of the compressed air without thereof being sufficient to collapse said second bellows.

8. An organ pipe attachment for auto-pneumatic pianos, comprising hammer-actuating first bellows, a box, an organ pipe, spring-influenced second bellows inclosed within said box and controlling communication between the box and organ pipe, a compressed air supply pipe, a valve controlling communication between said box and pipe, a tune sheet, means controlled thereby for simultaneously establishing a vacuum within both of said bellows, said vacuum being sufficient to collapse the first bellows, but insufficient to collapse the second bellows, and means also controlled by the tune sheet for admitting compressed air into the valve box and to the exterior of the second bellows, the joint action of the vacuum within the second bellows and of the compressed air without thereof being sufficient to collapse said second bellows.

9. An organ pipe attachment for auto-pneumatic pianos, comprising a tracker bar having a playing duct and an organ-accompaniment-duct, a perforated tune sheet controlling said ducts, hammer-actuating first bellows, a box, an organ pipe, spring-influenced second bellows inclosed within said box and controlling communication between the box and organ pipe, means operable upon an uncovering of the playing duct by a tune sheet-perforation for simultaneously

establishing a vacuum within both of said bellows, said vacuum being sufficient to collapse the first bellows, but insufficient to collapse the second bellows, and means operable upon an uncovering of the organ-accompaniment-duct by a tune sheet-perforation for admitting compressed air into the valve box and to the exterior of the second bellows, the joint action of the vacuum within the second bellows and of the compressed air without thereof being sufficient to collapse said second bellows.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
