

No. 889,029.

PATENTED MAY 26, 1908.

P. J. MEAHL.
MECHANICAL MUSICAL INSTRUMENT.

APPLICATION FILED OCT. 6, 1906.

2 SHEETS—SHEET 1.

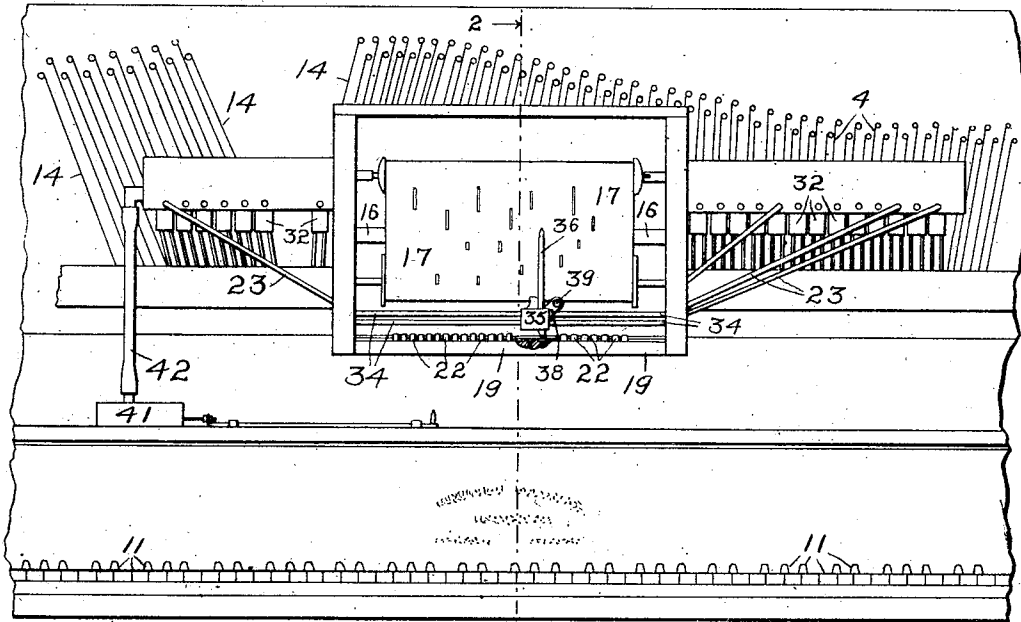


Fig. 1.

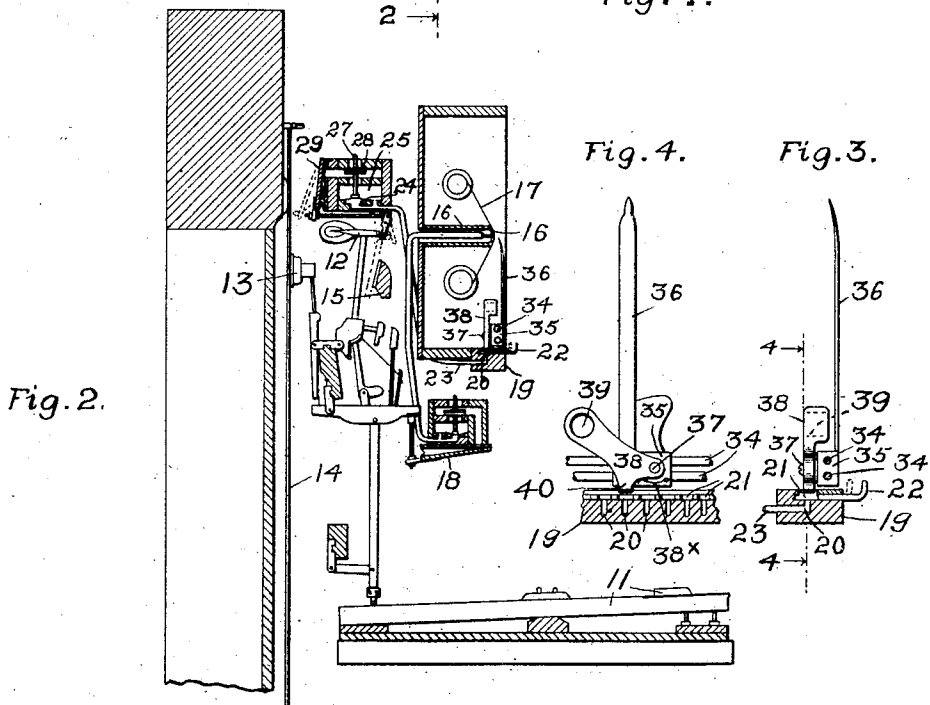


Fig. 2.

Fig. 4.

Fig. 3.

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Walter H. Washburn

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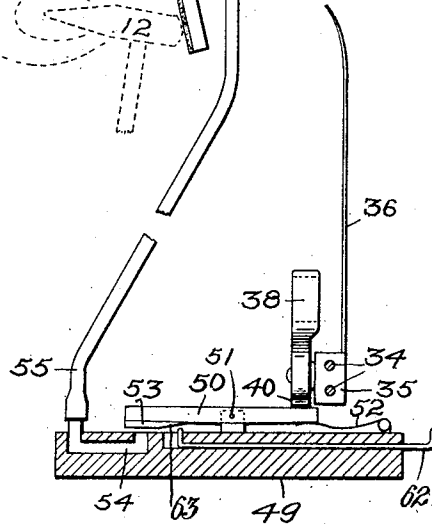
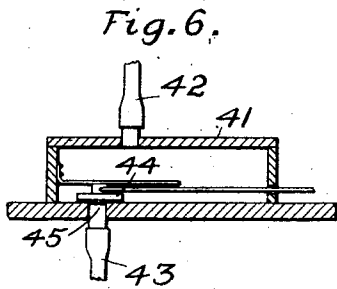
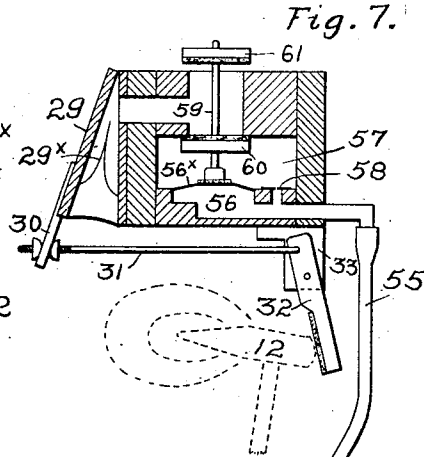
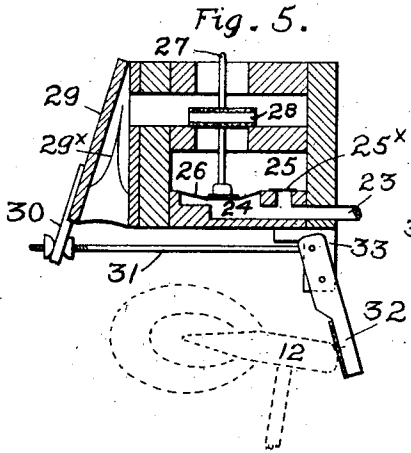
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P. J. MEAHL.
MECHANICAL MUSICAL INSTRUMENT.

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2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

PHILIP JACOB MEAHL, OF BAYONNE, NEW JERSEY.

MECHANICAL MUSICAL INSTRUMENT.

No. 889,029.

Specification of Letters Patent.

Patented May 26, 1906.

Application filed October 6, 1906. Serial No. 337,692.

To all whom it may concern:

Be it known that I, PHILIP J. MEAHL, a citizen of the United States, and a resident of Bayonne, county of Hudson, and State of New Jersey, have invented certain new and useful Improvements in Mechanical Musical Instruments, of which the following is a specification.

My invention relates to mechanical musical instruments, and particularly to means in such instruments for accenting certain notes or groups of notes, *i. e.*, controlling the force applied to sound such notes. Accenting devices for this general purpose are already known, but in these the difference in the volume of sounds is produced by causing the striking pneumatic to be operated upon alternatively by "high" and "low" wind, *i. e.*, air under different tensions or pressures is supplied from different wind chests or the like. In the player piano which I have chosen as an illustration of the application of my invention, and to which it is particularly applicable, it is at least difficult to find room for these two wind chests of sufficient capacity.

My invention has for its object the providing of novel means, *e. g.*, for the accentuation of solo notes in a theme or melody at the will of the player.

Further objects of the invention will appear in the specification and be pointed out in the claims.

In the drawings, Figure 1 is a front elevation of so much of a player piano as is necessary to illustrate my invention. Fig. 2 is a vertical section through the plane 2—2, Fig. 1. Fig. 3 is a partial vertical section on an enlarged scale through the same plane. Fig. 4 is a vertical section on the plane 4—4, Fig. 3. Fig. 5 is a partial view on an enlarged scale of a suction chamber and connected parts shown in Fig. 2. Fig. 6 is a longitudinal vertical section of a valve box shown in Fig. 1. Fig. 7 is a partial vertical section similar to that of Fig. 2, but on an enlarged scale and showing a modification.

Referring to Figs. 1 to 6 of the drawings, certain usual and well known parts of a piano or like combined mechanical and manual instrument are designated as follows: 11 the keys, 12 the hammers, 13 the dampers, 14 the strings, 15 the bar moved by the soft pedal, not shown, for raising the hammers toward the strings for piano effects in manual playing, 16 the tracker over which the music

sheet 17 is moved in a well known manner, 18 striking pneumatics connected to actuate the hammers 12. In the embodiment of my invention shown I provide beneath the sheet moving means a board 19 formed with a longitudinally disposed series of ducts 20, each of which has a widened open mouth 21, which may be closed by a slide 22. From each duct 20 leads a tube 23 to a diaphragm chamber 24 in a suction chamber 25, which extends in front of the strings 14 above the hammers 12, (see Fig. 5). Each diaphragm chamber 24 is closed by a diaphragm 26, to which is secured a valve stem 27 carrying a valve 28 operative to connect a pneumatic 29 alternatively with the suction chamber 25 or with atmosphere. It is of course understood that the chamber 25 may be unitary and connected with the entire series of diaphragm chambers 24 and pneumatics 29. The usual bleed hole 25^x is provided between the suction chamber 25 and the diaphragm chamber 24. Each pneumatic 29 has a finger 30 connected by a rod 31 to the upper end of a lever 32, which is pivoted midway of its length to a bracket 33 and has its lower end in position to be placed against the rear end of the head of the hammer 12.

While it is perfectly competent to provide a diaphragm, valve, pneumatic and lever for each of the hammers controlled by the perforated music sheet, I have shown in the present instance as a preferable and economical construction one of each of these connected parts for each two adjacent hammers. This is for the reason that the two consecutive semitones are not found in the same chord so that the release movement of two adjacent hammers will be unobjectionable.

Sliding freely on guide bars 34 immediately above the board 19 is a block 35 carrying a pointer 36, which passes in front of the music sheet 17. Pivoted at 37 to the block 35 is a lever 38 normally raised by a spring 38^x and having a finger aperture 39 and a lug 40 adapted to enter the mouths 21 of the ducts 20 and to close the ducts.

As a means of cutting off the suction from the chamber 25, I have shown a valve box 41, to which a tube 42 leads from the chamber 25 and from which a tube 43 leads to a wind chest, not shown. In the box 41 is a slide valve 44 adapted to close the duct 45 to which the tube 43 is connected, (see Fig. 6).

The operation of the device is as follows: When the device is to be used the slides 22

are pulled out to the position shown in Fig. 3 of the drawings. It is obvious that when the slides 22 are opened the corresponding diaphragm chambers 24 will be filled with air passing through the ducts 20 and tubes leading therefrom so that the valves 28 will be raised to the position shown in Fig. 2 of the drawings. In this case the pneumatics 29 are connected with the suction chamber 25, with the result that the pneumatics will be drawn to their closed position against the action of the ordinary spring 29^x, shown in Fig. 5 of the drawings. Each pneumatic when closed will act through its rod 31 to press the lever 32 to the position shown in Fig. 2 of the drawings, by which means the hammer 12 is raised from its rearward position, in which it rests against the bar 15. The result of this operation is of course to lessen the range of motion of the hammer 12 and consequently to reduce the force of the blow struck by it against the string 14. In following the music the operator grasps the block 35, preferably inserting either the first finger or the little finger of the right hand through the aperture 39 in the lever 38. In this way he slides the block 35 along the rods 34, the pointer 36 acting to follow any indications of the solo or other note to be accented which may be marked upon the music sheet. It is obvious that each depression of the lever 38 will act to close one of the ducts 20 and to shut off atmospheric connection with the diaphragm chamber 24. This chamber will then be exhausted through the bleed hole 25^x and the valve 28 will fall to the position shown in Fig. 5 of the drawings, thus opening the pneumatic 29 to atmosphere and permitting its expansion. The expansion of the pneumatic acts to throw the lever 32 to the position shown in Fig. 5 of the drawings and to permit the hammer to drop back to its full stroke position, thereby increasing its range of motion and the consequent force with which it strikes the string 14.

In this form of construction air is continually passing through such of the ducts 20 as are not closed by the operator by means of the lever 38, so that a small amount of additional force is required in operating the pedal bellows of the instrument. In the form of the device shown in Fig. 7 of the drawings this possible objection is obviated. In this form of the device the guide bars 34, block 35, pointer 36 and lever 38 are similar to those already described. The block 49 in this case carries a lever 50 pivoted at 51 midway of its length, on the forward end of which lever the lug 40 of the lever 38 presses. The lever 50 may preferably be raised at its forward end by a spring 52. At the rear end of the lever 50 is a valve 53 adapted to close the mouth of the duct 54, which is connected, as before, by a tube 55 to the diaphragm chamber 56 forming part of a long suction cham-

ber 57 and connected therewith by a bleed hole 58. The diaphragm 56^x carries a valve stem 59, on which are two puppet valves 60, 61, acting, as before, to open the pneumatic 29 either to suction from the chamber 57 or to atmosphere. The finger 30, rod 31, lever 32 and bracket 33 may be as above described. Slides 62 are provided in the block 49, which act on cam surfaces 63 on the valves 53 to raise the valves and open the respective ducts 54 to atmosphere at the will of the operator. In the operation of this device the slides 62 are withdrawn, as shown, and each diaphragm chamber 56 is normally exposed to suction through the bleed hole 58. In this case the valves 60, 61 drop by gravity so as to connect the pneumatic 29 with the suction chamber 57, thereby collapsing it and pressing forward the hammer 12 by the means already described to lessen its range of motion. When the operator by means of the lever 38 tilts the lever 50 and raises the valve 53 from its closed position, air passes through the duct 54 and tube 55 to the chamber 56, whereby the diaphragm 56^x and the valves 60 and 61 are raised to the position shown in Fig. 7 of the drawings. The pneumatic 29 is then cut off from connection with the suction chamber 57 and open to atmosphere, in which case it will be expanded by its internal spring 29^x and will, through the rod 31, move the lever 32 to the position which permits the hammer to drop back to its full stroke.

The position of the slides 22 and 62 shown in the two forms of construction described is the same. By withdrawing a portion of these, as *e. g.*, those at the bass end of the instrument, leaving those at the treble end in their inward positions, the bass hammers will be moved inward to their lessened range of movement and the bass will be played piano. Obviously this operation is independent of and may not be used in connection with the manual device described. The slides take the place of the divided wind chest in former constructions to cause either end of the piano to be played louder or softer than the other, or any intermediate portion may, if desired, be so caused to play with a greater or less force than the other portions.

By the arrangement of the parts above described it will be apparent that it is possible to emphasize the notes of a melody or of a theme, even when the notes of such theme are associated with many other notes. Such emphasis is often desirable in playing piano arrangements of orchestral compositions, in which it is desirable to emphasize the theme which is played by some one instrument of the orchestra, this theme being thus brought out distinctly against the background of complex orchestration.

By the phrase "small group" as applied in the claims to the note sounding devices, &c., it is obvious that I include either a single

note sounding device or two adjacent note sounding devices, as shown and described, or any small number of such note sounding devices as may be advantageously united for modification of the volume of sound to be produced by means of a single opening, as a duct 20 and connected parts. In other words, each group must have in it so small a number of adjacent note-sounding devices as to permit the production of the solo or thematic effect above referred to.

It is obvious that the forms of construction given are preferred forms only, and may be varied mechanically as occasion requires.

What I claim is:

1. In a musical instrument, a plurality of note-sounding devices, mechanisms for varying the force applied to sound a note, each such mechanism controlling a group of adjacent note-sounding devices, each group being so small in number as to permit solo or thematic effects to be produced, and means for operating such mechanisms.

2. In a musical instrument, a plurality of note-sounding devices, mechanisms for varying the force applied to sound a note, each such mechanism controlling a group of adjacent note-sounding devices, each group being so small in number as to permit solo or thematic effects to be produced, and manually controlled means for operating such mechanisms.

3. In a musical instrument, a plurality of note-sounding devices, pneumatically actuated mechanisms for varying the force applied to sound a note, each such mechanism controlling a group of adjacent note-sounding devices, each group being so small in number as to permit solo or thematic effects to be produced, and means for operating such mechanisms.

4. In a mechanical piano or like musical instrument, strings, hammers, a plurality of pneumatically actuated means each constructed and fitted to reduce the range of movement of a small group of said hammers, and a plurality of ducts connected thereto, a suitably sliding block and a finger lever pivoted thereon for closing said ducts for controlling the passage of air through each of said ducts at will, substantially for the purpose specified.

5. In a mechanical piano or like musical instrument, strings, hammers, a tracker,

means for moving a music sheet over said tracker, a plurality of pneumatically actuated means each constructed and fitted to reduce the range of movement of a small group of said hammers, manually controlled sliding means for controlling each of said pneumatically actuated means, and an indicator secured to said sliding means and adapted to pass over a music sheet moved over said tracker, substantially for the purposes specified.

6. In a mechanical musical instrument, a plurality of note-sounding devices, pneumatically actuated mechanisms for varying the force applied to sound a note, each such mechanism controlling a group of adjacent note-sounding devices, each group being so small in number as to permit solo or thematic effects to be produced, and manually controlled means for preventing and permitting the operation of said pneumatic mechanisms at will.

7. In a mechanical musical instrument, a plurality of note-sounding devices, pneumatically actuated mechanisms for varying the force applied to sound a note, each such mechanism controlling a group of adjacent note-sounding devices, each group being so small in number as to permit solo or thematic effects to be produced, and independent manually controlled means for preventing and permitting the operation of said pneumatic mechanisms at will.

8. In a mechanical piano or like musical instrument, strings, hammers, a plurality of pneumatically actuated means each constructed and fitted to reduce the range of movement of a small group of said hammers, a plurality of controlling ducts leading to said pneumatic means, and independent manually controlled slides for closing said ducts, thereby preventing and permitting the operation of each of said pneumatically actuated means at will, substantially for the purposes specified.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

PHILIP JACOB MEAHL.

Witnesses:

A. W. SPENCE,
E. R. JOHNSON.