

M. J. MATTHEWS.

Reed-Organs.

No. 148,479.

Patented March 10, 1874.

Fig. 1.

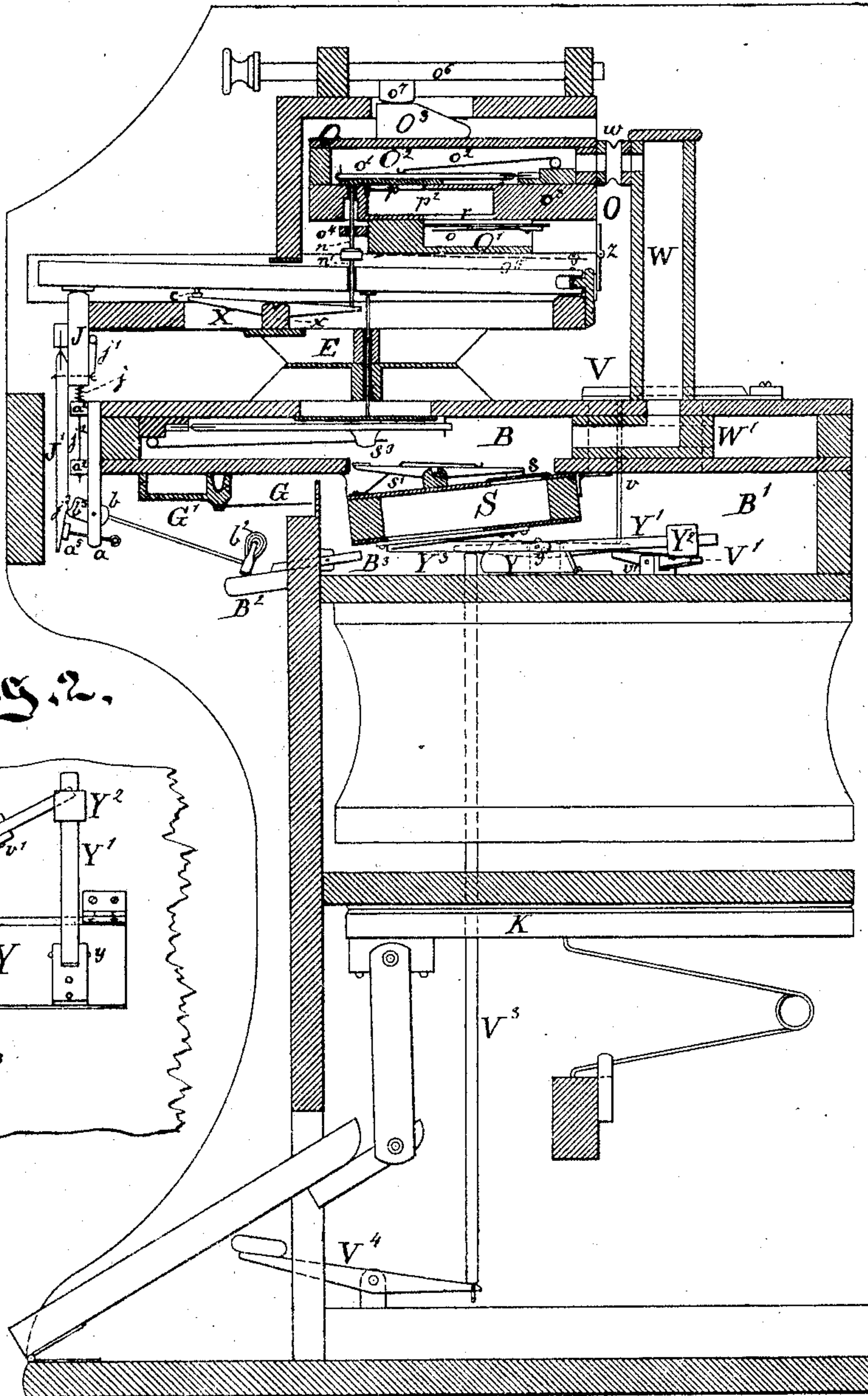
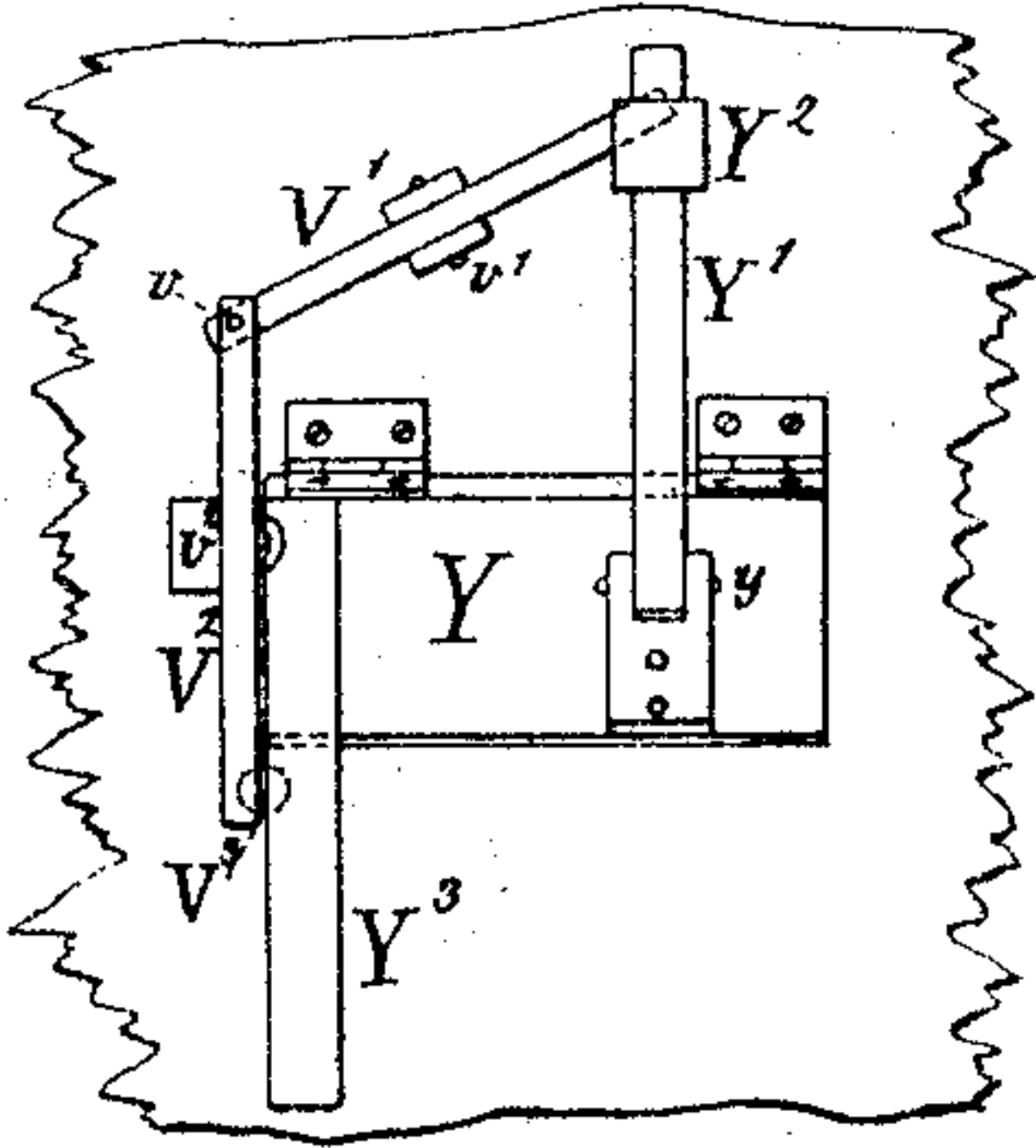


Fig. 2.



Witnesses,

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN REED-ORGANS.

Specification forming part of Letters Patent No. **148,479**, dated March 10, 1874; application filed July 12, 1873.

To all whom it may concern:

Be it known that I, MASON J. MATTHEWS, of New York city, State of New York, have invented certain Improvements relating to Musical Instruments, of which the following is a specification:

I combine with a reed-organ vibrating tongues, acted on by hammers operated by the keys in a manner analogous to what is sometimes known as a bell-piano. I employ peculiar coupling means and peculiar wind connections, and variously modify and improve the mounting of certain sets of reeds and their connections, so that useful and important effects are induced.

The following is a description of what I consider the best means of carrying out all the parts of the invention. The accompanying drawings form a part of this specification.

Figure 1 is a vertical section through the entire instrument. Fig. 2 is a horizontal plane, showing the arrangement of a series of levers adjacent to the reed-pan below the main wind-chest.

Similar letters of reference indicate like parts in both the figures.

The steel vibrators or tongues G are placed beneath the wind-chest B , so that the lower board of said chest shall form the sound-board for the vibrators. It is necessary that this board should be much thicker toward the treble portion of the instrument than at the base—a graduation from two-eighths to five-eighths of an inch or more. It is important that the metal casting G^1 should be so placed on the sound-board that a straight row of hammers may strike each tongue at the proper point. The hammers b^2 are centered at their butts b in forked pieces a . These pieces a reach to the upper surface of the wind-chest, and to each are glued guide-pieces a^2 a^2 . Through the lower end of the forked pieces a the regulating-screws a^5 pass. On the end of each screw is fixed a wooden or leather nut, properly faced with cloth. The tail of the hopper J^1 is gently pressed against this nut by the spring j^1 , which passes through a loop of thread knotted at the front and toward the

heel of the hopper. On the hammer-butt b is a projecting-lip, b^3 , and engaging therewith is an acute shoulder, j^3 . When the key C is depressed a corresponding depression is made on the hopper, and the hammer b^2 is driven to the steel tongue G , from which it falls back to its bed B^2 instantaneously. This is effected by the escapement of the shoulder j^3 from the lip b^3 , caused by the movement of the sloped tail J^1 of the hopper J on the regulating-nut a^5 . The hopper is caused to rise and re-engage with the lip b^3 by the spiral spring j . The pin j^2 , passing through pieces a^2 , serves to keep the hopper in its proper position, and to guide its upward and downward movements. The holes through which this guide-pin j^2 passes are bushed with cloth. The hammer-drop B^2 has an arm, B^3 , attached to it, reaching through the case. This arm is centered in the inside of the case-front. A tracker-pin connects this arm with a suitable stop-action, so that the hammer-drop B^2 may be raised or lowered. When all the hammers b^2 are, by the adjustment of the stop and the consequent elevation of the hammer-drop, raised to the tongues G , the several hopper-shoulders j^3 will not, when the corresponding key is depressed, touch the lip on the hammer-butt. In other words, the percussion-action will be out of gear. The chest O , above and in front of the fulcrum-rail of the keys, is peculiarly constructed. The lower part O^1 is a tube-board, similar to the ordinary tube-board. The upper part o^3 is a chamber-board. Over the opening r is a chamber or channel, p^2 , with an opening, p , at a proper distance from the opening r . The object of these chambers is to confine the air, so that the sound from the reed may vibrate therein. This gives roundness and pipe-like quality to the tone. The roundness, smoothness, and pipe-like quality of tone, and absence of reediness, depend upon the length and capacity of the chambers. This chest has great solidity and firmness. The chamber-board o^3 is thick at the bass and thin at the treble end, and the sizes of the chambers cut therein are graduated according to the pitches of the reeds.

The upper openings p into the wind-chest O^2 are covered by pallets o^1 . These are attached to levers, and are bedded by springs o^2 , the levers being parchment-jointed, as shown. It may be often expedient to make the lever and pallet in one piece. To throw the upper reed-chest and its attachments out of use, I allow these parts to rise a little within the casing of the upper work, which latter will require to be raised only at long intervals. I make the tracker-pins operating these upper pallets in two sets, acting one upon the other. Half tracker-pins n extend from the pallets o^1 down through the chamber-board o^3 and the guide-rail o^4 , and rest on the heads of the corresponding half tracker-pins n^1 below. A guide-rail (not shown) may be used for steadying these last. The lower half tracker-pins n^1 pass through their respective keys C to the harmonium-levers X , which lie in the ordinary lever-rail x , resting on the upper side of the tube-board E . The front end of each lever X is in contact with the screw e in the corresponding key C , so that the depressing of a key, C , causes the corresponding pallet o^1 to rise, and the reed to speak. The upper reed-chest O with its connections is hinged at the back of the instrument by hinges z . A strong spring, o^5 , at each end, shown by dotted lines, serves, when the chest is released from its fastenings, to raise it upward, so as to break the connection between the tracker-pins n n^1 . The upper chest O is caused to move slightly up and down in the casing by means of a wedge-shaped piece, O^3 , which, standing in an opening in the rail-base above, is pressed upon by the stop-draw o^6 , so that when drawn forward, the reed-chest is held down firmly against the resistance of the springs o^5 , and a coupling effected. When the stop-draw o^6 is again pushed in, the wedge-piece O^3 and the stud o^7 of the stop-draw o^6 are disengaged, and the chest rises by the force of the springs o^5 , and uncoupling is effected. It is manifest that no mutes are necessary in this chest. Other stop means might be used, or the chest might be raised and lowered by a treadle.

Air communication from the upper wind-chest is made through the trunk W , opening into the main wind-chest B , and having an opening in front near its top. There is a short flexible connection, w , made like an accordion-bellows, between this trunk W and the upper wind-chest O^2 , in the form shown. This makes a tight connection, and offers no obstructions to the above-described slight rising and falling of the upper work.

The upper framing, carrying the stop-rails, is fastened down on blocks at each end of the instrument, so that it can be removed when necessary; but the top reeds are accessible from the back without lifting the top. There is a wide block, W^1 , in the main wind-chest B , running its entire inside length, with a few

large vertical holes through both it and the wind-chest, shown in dotted lines, which, properly controlled by the swell-lids V , lets out the sounds produced in the lower chest B^1 . Between these vertical holes are bored horizontal holes, also shown in dotted lines, which communicate between the front and back parts of the wind-chest B . All the reeds below the keys C have the advantage of the resonance of the whole chest. The holes shown in strong lines provide air communication between the wind-chest B and the trunk W . When the ordinary vertical bellows are used, the horizontal passages through the block are useful for air communication between them and the reeds.

On the under side of the main wind-chest B I mount a harmonium reed-pan, S , so as to form a species of flexible or yielding bottom to the reed-chest. This pan is tightly but flexibly connected or hinged at its back edge. It is flexibly connected all around to the under side of the wind-chest B , by means of rubber cloth or leather, the latter being preferable, so that the front edge can sink a little, as shown. About half an inch will be usually sufficient. On the upper side of this reed-pan S is a row of harmonium-pallets, s , and levers s^1 . The front ends of these levers s^1 are directly below a row of studs, s^3 , on the ordinary valve-pallets above them.

When the reed-pan S is forced upward by any means, and held firmly up, each lever is so near to the corresponding stud B^1 , that the depression of the key C affects both; but when the reed-pan S is down in the position represented, the levers s^1 are too far from the studs to be touched.

I make such provision in my instrument for the automatic control of the swell-lids V , as renders their movement independent of any connection with the reservoirs. By my device, effects much superior to the "automatic swell" in cabinet-organs, and "piano-swell" in harmoniums, can be produced in conjunction with the stop called "expression."

The following is a description of the provision above alluded to: On the hinged piece Y is secured an arm, Y^1 , on the outer end of which is a weight, Y^2 , which serves as a partial counter-balance to the reed-pan S . Where, by extra-vigorous working of the bellows K , exhaust force is produced in the wind-chest B , the pan S will be sucked upward, and a coupling effected between the levers s^1 on the pan S , and the studs s^3 in the main wind-chest B , at such a point as will give a crescendo effect. The partial balance-weight Y^2 on the arm Y^1 , acts on one end of the lever V^1 . On the other end of this is a sticker or tracker rod, v , which reaches to the under side of the swell-valve V . The coupling of the levers s^1 and studs s^3 , and the opening of the swell-lids V , occur simultaneously, and so that a most perfect swell can be produced. It is not de-

pendent upon the mechanical action of the reservoir, but upon the force of the air in the wind-chest.

When the pan S is sucked upward, the weight Y^2 causes the depression of one end of the lever V^1 , and the consequent rising of the other end, together with the end of the lever V^2 , on which the tracker-pin v rests, and thus the swell-valves V are caused to open. This opening is at about the same time as the coupling is effected. It is desirable that the action should be so regulated that the coupling will take place a very little ahead of the opening of the swell-lid.

I can employ, at will, another means of opening the reed-pan. This is the foot-lever, which is mounted alongside of the main treadle, and provided with a catch, not represented, for holding it in the depressed position as long as may be desired. When the player desires to throw the reeds in the reed-pan S into action without a necessity for inducing the strong suction above described, he depresses the foot-lever V^4 , and thereby raises the sticker-rod V^3 , which acts on the lever Y^3 , just below the reed-pan, and also on the lever V^2 . These levers and their connections are shown quite fully in plan view in Fig. 2.

One effect of thus tilting the foot-lever V^4 is to elevate the reed-pan S. Another is to move the adjoining lever V^2 , which turns on a fulcrum, v^2 , and thereby depresses the connected end of the oblique lever V^1 , which turns on the fulcrum v^1 , and, when thus operated, lifts the weighted arm Y^1 . The connection of this arm Y^1 to the hinged piece Y and lever Y^3 is made by a hinge at y .

When the reed-pan S is elevated by means of the foot-lever V^4 , the motion, instead of, as before, opening the swell-lids, leaves them entirely unaffected. Thus conditioned, the reeds in the reed-pan S are in full play, but the swell-lids, which affect the issue of the sound, remain shut, except as they are opened by an ordinary knee-swell action, not represented.

Many of the parts may be varied, within wide limits, by any good mechanic, without sacrificing the advantages of the invention.

Sides may be added to the reed-pan S, but space is saved by dispensing with them.

The top chest O may be raised and lowered by other stop-actions, or by a foot-lever, instead of the stop-draw represented. Even the springs o^5 may be dispensed with, and the reed-chest may be held down by its gravity, with or without additional means, and may be lifted by the stop-action to uncouple.

Some of the advantages due to certain features of the invention may be separately enumerated, as follows:

First, by reason of the fact that the upper reed-chest O and its connections is capable of rising and sinking, and that the tracker-pins

are divided in their lengths and adapted to act the one part upon the other, I am able to conveniently put the upper reeds into and out of play by a simple movement of the whole chest.

Second, by reason of the flexible connection w , I maintain a tight wind communication without interfering with the desired vertical motion of the upper reed-chest.

Third, by reason of the union of the lower reed-pan S with the wind-chest B, by a flexible connection, as shown, I am able to employ one or more sets of reeds below the wind-chest and to conveniently throw them into and out of play.

Fourth, by reason of the fact that the reed-chest S tends to sink away from the wind-chest B, but can be drawn toward it by extra-vigorous working of the bellows, I am able to couple and uncouple the reeds therein at will, by simply changing the wind-pressure.

Fifth, by reason of the fact that the foot-lever V^4 and its connections are arranged as shown, I am able to throw the reed-chest S into the coupled position at will, independently of any changes in the pressure of the air.

Sixth, by reason of the fact that the levers Y^1 V^1 V^2 Y^3 and weight Y^2 are arranged, as shown, relatively to the foot-lever V^4 , movable reed-chest S, and swell-lids V, I am able to throw the reed-chest into the coupled position, at will, while leaving the swell-lids V closed and subject to be controlled entirely by other means.

Seventh, by reason of the tongues G, with their operating means, arranged as shown, I am able to obtain, through the hammer-action, the soft harp-sounds due to properly-adjusted tongues, and to render available as a sound-board for the tongues the lower or reflection board of the wind-chest B.

Eighth, by reason of the fact that the hammers are mounted in the same piece which carries the adjusting-screws a^5 , and is an extension of or attachment to the guide-piece or pieces a^2 , I am able to mount the hammers firmly and operate them efficiently and delicately with very simple mechanism.

I claim as my invention—

1. The combination and arrangement of the set or sets of reeds o , divided tracker-pins n n' , with a movable reed-chest, so as to couple and uncouple the same by the movement of the chest, as herein specified.

2. The flexible tube w , in combination with the movable reed-chest O and a trunk or passage, W, connecting with the wind-chest B, as herein specified.

3. The movable reed-pan S, with reeds and connections flexibly joined to the wind-chest B, substantially as and for the purposes herein specified.

4. The levers S^1 and pallets S, in combination with the studs S^3 , movable reed-pan S, and wind-chest B, substantially as specified.

5. The foot-lever V^4 and connected sticker-rod V^3 , arranged, as shown, relatively to the movable wind-chest S, for the purposes herein specified.

6. The arrangement of the weight Y^2 and levers Y^1 V^1 V^2 Y^3 relatively to the swell-lids V and movable reed-chest S and its operative mechanism V^4 V^3 , as and for the purposes herein specified.

7. The tongues G, fixed to the under side of the wind-chest B, in combination with a hammer-action operated from the keys, so that the wind-chest shall serve as a sound-board therefor, for the purposes herein specified.

8. The combination and arrangement of the guide-pieces A^2 , hammers b^2 , regulating-screws a^5 , and jacks J J^1 , as and for the purposes herein specified.

In testimony whereof I have hereunto set my hand this 5th day of July, 1873, in the presence of two subscribing witnesses.

MASON J. MATTHEWS.

Witnesses:

WM. C. DEY,
ARNOLD HÖRMANN.