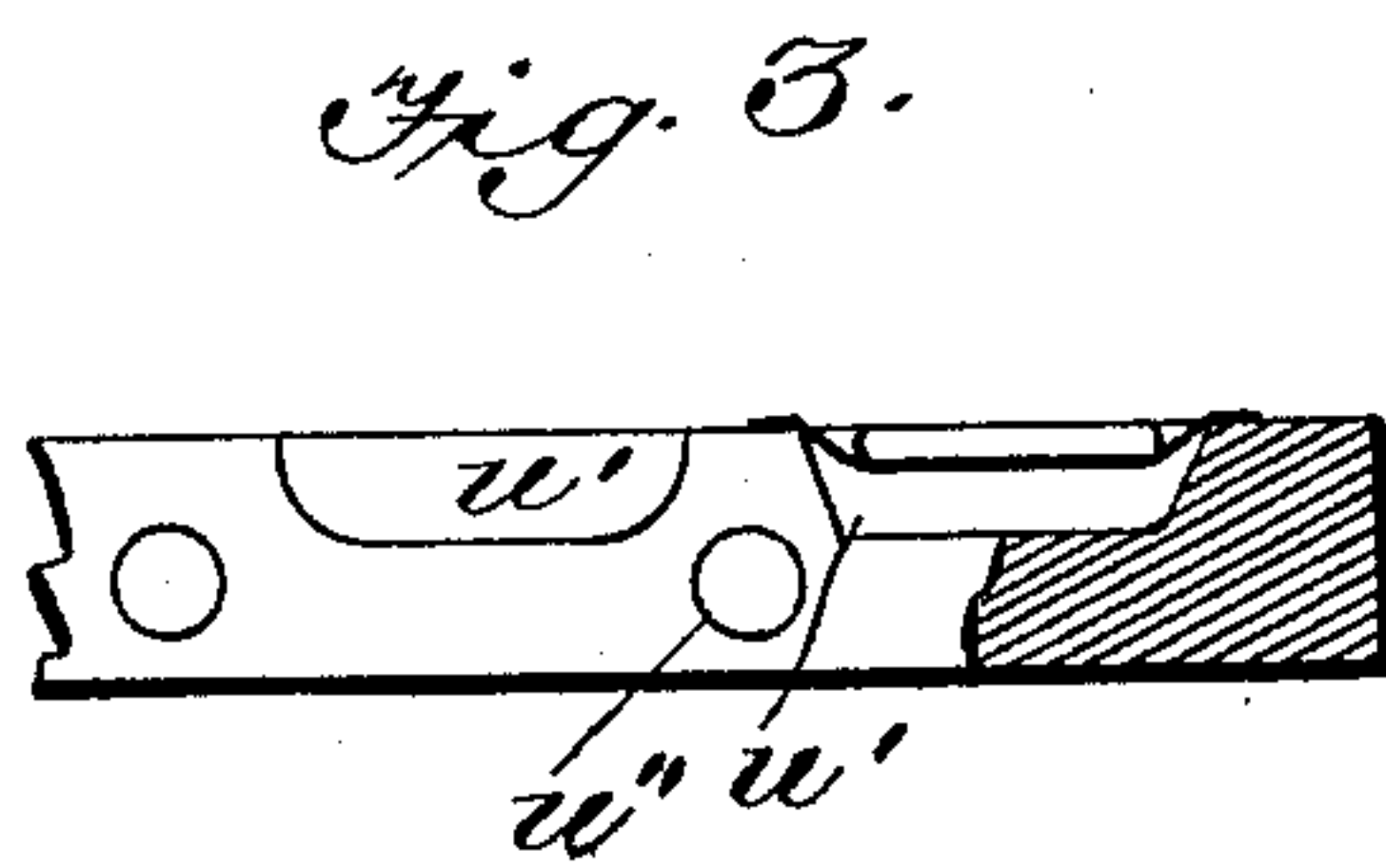
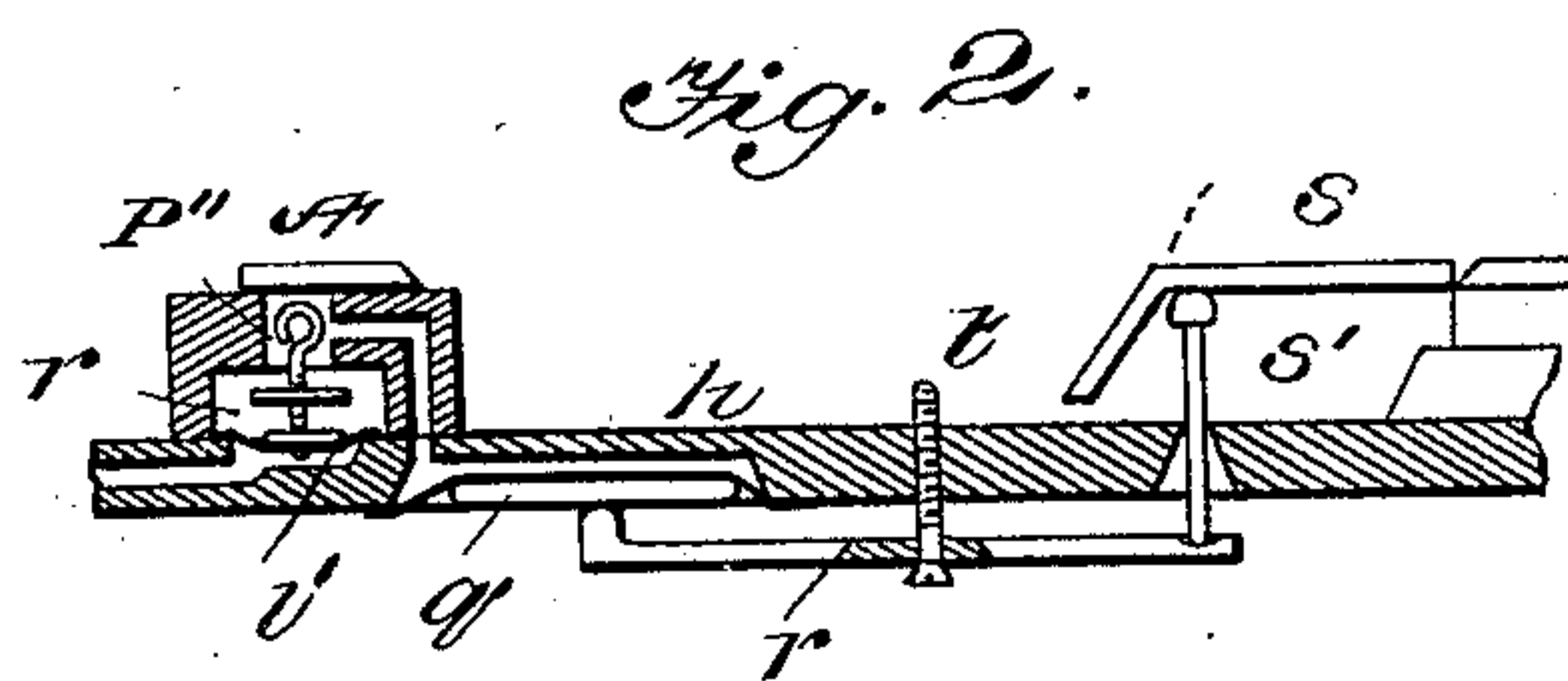
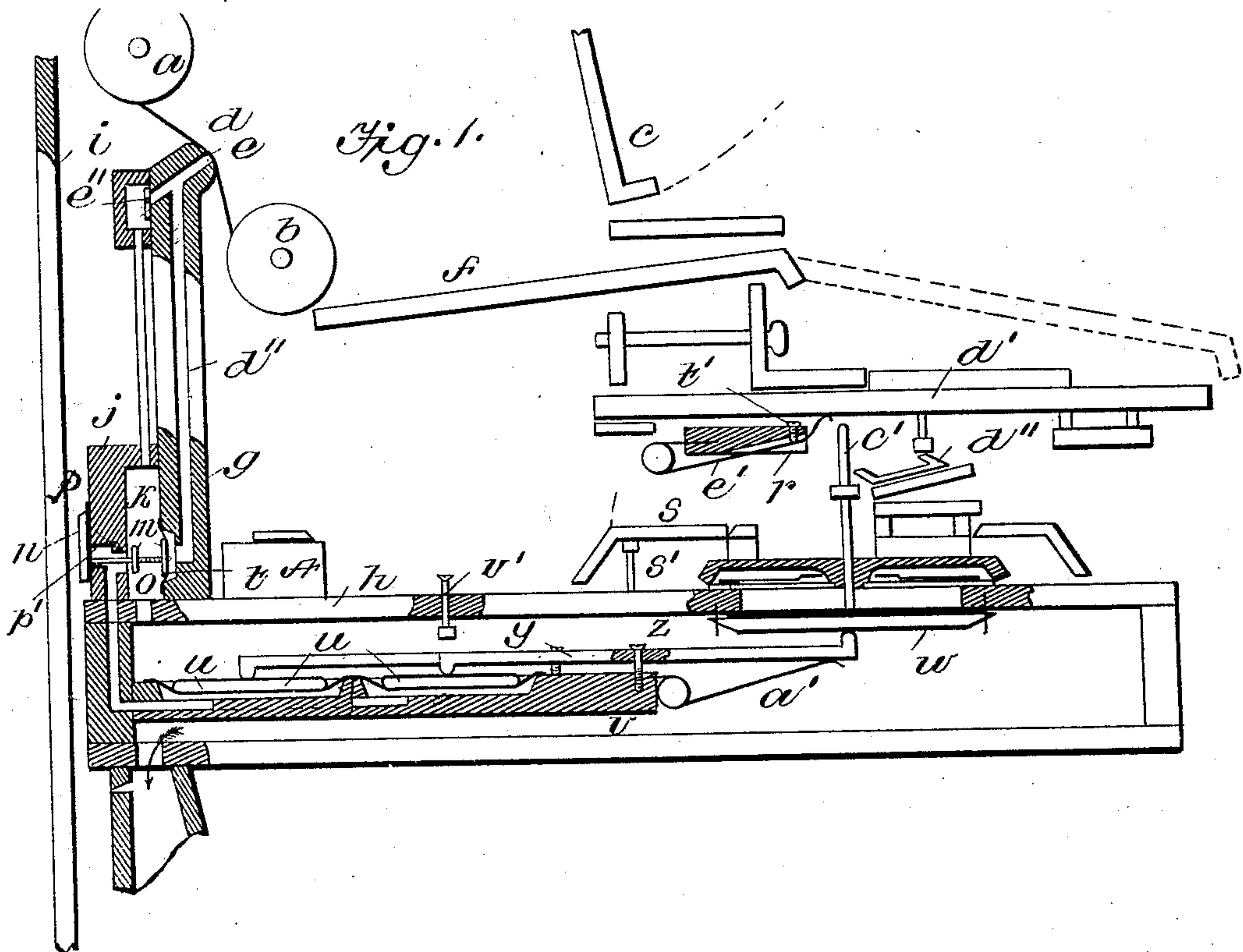


(No Model.)

R. A. GALLY.
PNEUMATIC MUSICAL INSTRUMENT.

No. 545,156.

Patented Aug. 27, 1895.



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ROBERT A. GALLY, OF BROOKLYN, NEW YORK.

PNEUMATIC MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 545,156, dated August 27, 1895.

Application filed February 12, 1895. Serial No. 538,122. (No model.)

To all whom it may concern:

Be it known that I, ROBERT A. GALLY, a citizen of the United States, residing at Brooklyn, in the county of Kings, State of New York, have invented certain new and useful Improvements in Pneumatic Musical Instruments, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a transverse section of the organ. Fig. 2 is a transverse section at end of action, showing detail of portion A of Fig. 1, and Fig. 3 is a detail of pneumatic socket board.

My object is to construct a low-cost combined self-playing and keyboard reed-organ, and I therefore conform as nearly as possible to the regular style of "horizontal" action and its usual stopwork, keywork, case, and bellows, and construct the necessary additional parts in as simple form as is efficient, allowing the usual easy access to the reeds and other parts, and also to all parts and adjustments of my additional mechanism.

I place my music-rolls *a b* behind the sheet-music desk *c* of the ordinary style case. These rolls pass the music-sheet *d* over the vent-openings *e* of the grooved board *g* to operate the self-playing pneumatic apparatus. I attach this grooved board at or near the rear line of the action and rising therefrom, this arrangement allowing room for access to the reeds and for the movement of the ordinary style fall-board *f*, and the grooved board, being attached near the back edge of sounding-board *h*, does not affect the free vibration of the sounding-board. I turn the top of the grooved board *g* toward the front of case to allow the roll *a* to clear the case-panel *i*, and also bringing rolls *a* and *b* into convenient view and reach through the desk-opening.

The operation of the music-sheet perforation is to admit air through vent *e* to inflate pneumatic *l*, closing valve *m* and opening valve *n*, so that the secondary pneumatic *u* is inflated to move lever *y* and permit valve *w* to open. The movements of these parts being reversed the unperforated part of sheet closes operating-vent *e*, the return-vent *e''* then allowing pneumatic *l* to collapse by exhausting duct *d''*, and thus establishing equilibrium of pressure on both sides of pneumatic diaphragm *l*.

It has always been the practice to place the return-vent near the pneumatic, but I locate my return-vent *e''* near to the operating-vent *e*, and by so doing give to both vents an approximately equal resistance of the duct *d''* when either operating or returning the pneumatic *l*. The return-vent, being near the operating-vent, is very promptly overcome by the latter, and the duct is required to be only sufficiently large to pass enough air at one time to operate the pneumatic and at another time to return the pneumatic, while in the case of the common form of placing the return-vent near the pneumatic the duct is required to be enough larger to pass, through its entire length, not only sufficient air to operate the pneumatic, but also enough more at the same time to overcome the return-vent.

With return-vent near operating-vent I am able in practice to use one-half the size of bore of leader on a given distance than with return-vent at end with pneumatic, thereby saving space and material.

It is immaterial whether the operating-vent is controlled by a music-sheet or by a key-valve or other valve, and I do not limit myself in this, but claim the arrangement of the vents in their relative positions, as described, whether used on self-playing or manual apparatus, and whether for reed-organ, pipe-organ, piano-player, or other musical instrument having pneumatics. Nor do I limit myself to any particular kind of musical instrument in the application of any of the several features of pneumatic and other mechanism herein set forth, my purpose being to use such devices in whatever kinds of musical instruments they may be desirable.

To save in number of parts usual in a pneumatic action and the consequent trouble of matching and packing the many parts, I form in or place on the grooved board *g* my primary pneumatics *l* and fasten the valve-board *j* to the grooved board, so that they together form a complete removable section, containing air-chest *k*.

I construct my primary pneumatics as follows: The valve-rod *o* is screwed into center of pneumatic *l* and the inside valve *m* is run onto the same screw-thread. The outside valve *n* is free from the valve-rod and so placed on the board *j* that the valve-rod may

be reached and turned to adjust the relative positions of the rod, inside valve, and pneumatic without opening the chest. To guide the valve-rod and hold the inside valve to properly cover the inside port p , I bore the inner port p lower than the outer port p' , so that the valve-rod, resting by its weight at bottom of port p' , will center the inside valve m with the port p , the curve of the outer port p' keeping the valve-rod horizontally centered. When the double valve-board is attached to the rear face of grooved board, as shown in Fig. 1, the valves and adjustments are easy of access from rear of instrument, which is very convenient.

The secondary pneumatic at A in Fig. 1 is shown in detail in Fig. 2. It is worked from one of the primary pneumatics to serve a large quantity of air to the main pneumatic q . This secondary pneumatic v' is placed on the sounding-board h and conveniently connected to the power-pneumatic q , which in this instance operates the swell lid s by sticker s' . The valve-rod r being vertical, it is necessary to use a different form of guiding it than when horizontal, as in board j . The valve-hole p'' is bored straight through the board, and the rod r is adapted in its shape to guide itself in the valve-hole. The particular form of rod here shown—an eye—is very convenient to make and use and facilitates the turning of the rod when adjusting. This method of guiding the rod may be used when the rod is not perpendicular.

The power-pneumatic q operates lever r to open swell lid s by sticker s' , working through sounding-board h , the lever r being fulcrumed on an adjustment-screw wire t , which extends through the sounding-board h and allows setting of the position of the lever without opening the action.

I place all my power pneumatics u , Fig. 1, on one face of a single board v inside the main wind-chest, the pneumatics being on the side toward the valve-board h and alternated in two or more lines. The pneumatic u operates the valve w by means of lever y , having its fulcrum z between the pneumatic and the valve. These fulera z may be attached to sounding-board h . The valve-springs a' and the levers y and their fulera z may all be attached to board v , the entire main pneumatic system then being complete in one removable section, as shown in Fig. 1. The board v attaches to rear of the action to communicate to the primary pneumatic valves, thus leaving the sounding-board h free to vibrate.

The stem of fulcrum z is threaded and is screwed into board v , a simple means for attaching, adjusting, and removing the pneumatic lever y . I make the lever y to work loosely on the stem of the fulcrum z and bearing against the fulcrum when worked by the pneumatic, but bearing away from the fulcrum and moving freely on it when worked by the key push-pin o' . This is desirable, as it is dif-

ficult to adjust the manual key and pneumatic to make exactly the same strokes.

For easy adjustment of amount of throw of levers y , which are inside a chest, I use checks v' , extending through the wall h of the chest, that the throw of the levers may be regulated without opening the chest.

To reduce thickness of a pneumatic board, such as v , and obviate danger of leakage between pneumatics and ducts, I cut the pneumatic sockets u' with slanted or curved sides, as shown in Fig. 3, front sectional view. This allows the full size of the socket at surface of board and room for ample leather to sag into socket and secure sufficient power, while increasing the stock of wood between sockets and between sockets and alternate ducts u'' leading to the other line of sockets, and permitting the alternate ducts u'' to be placed between the lower parts of the adjacent sockets u' .

The reed-valve w is opened by movement of lever y , when actuated by the pneumatic u , and is also opened by push-pin c' when operated by the key d' . To give the proper touch to the key and yet have the coupling easy and the pneumatics as small as possible, I make the spring a' only strong enough to close the valve w and raise the push-pin c' and coupler-wire d'' and add another spring e' under the key d' , but not effecting the push-pin or coupler-wire. When the key is depressed and the coupler is on, the coupler-wire works the octave push-pin and valve with only the added resistance of the octave valve-spring a' , but not working the octave-key and octave-spring e' . Keys d' are leveled by resting on springs e' , which are guided in sawkerfs in rail r' . Screws t' , added, facilitate leveling. A compensation is often required for the increased tension of the spring in addition to varied area or position of fold, and in some cases the spring alone needs compensating, the fold being otherwise equalized.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A horizontal reed-organ action having a grooved-board placed at or near the rear line of, and rising from the sounding-board, for the purpose set forth.

2. A horizontal reed-organ action having a grooved-board placed at or near the rear line of, and rising from the action, the grooved-board being turned forward at the top to facilitate the placing of the rolling parts.

3. An upright grooved-board rising at or near the rear line of a horizontal sounding-board, and the double-valve board attached to the rear face of the grooved-board to allow easy access to the double-valves from the rear of instrument.

4. A two-port pneumatic valve with a horizontal valve-rod guided by having the one port perpendicularly out of center with the other.

5. A valve-rod having its portion which is

within the valve-hole bent into an eye to touch at one time two opposite points on the circumference of the valve-hole and thereby guide the rod and its valve or valves to their positions to control the port or ports.

6. An external valve free from the valve-rod, the valve-rod adjustably connected to the inner valve and pneumatic and adjustable from the outside.

7. A return-vent connected with the duct nearer to the operating-vent than to the pneumatic.

8. A return-vent placed in line with or adjacent to operating-vent and accessible through operating-vent.

9. A pneumatic board having several lines of pneumatics alternated on the face of the board toward the valve-board, the pneumatics operating the valves by levers having fulcrums between the pneumatics and the valves.

10. A pneumatic board inside the main wind-chest to operate the sounding valves, the pneumatic board communicating at the edge of main wind-chest to primary valves outside the chest.

11. An action-lever inside a chest, having its fulcrum extending through the wall of the chest to allow adjustment from outside.

12. A valve-lever operated by a key-tracker

at one end and by a pneumatic at the other, a fulcrum placed between, the lever bearing against the fulcrum when worked by the pneumatic, but bearing away from fulcrum when worked by key, to allow free movement of the key.

13. An adjustable check to limit the throw of a lever inside a chest, the check extending through the wall of the chest for adjustment from the outside.

14. A sounding valve operated by a pneumatic and seated by a spring, the same valve also worked by a pushpin and key, an extra spring to uphold the key from pushpin, and the coupler working from the key to the octave pushpin and valve without moving octave key and its spring.

15. A spring placed to directly uphold a manual-key, the spring being checked in its rise, and the key resting on the spring and held to its normal level thereby.

16. A spring placed to uphold a manual-key, the spring being checked in its rise by an adjusting-screw, and the key being held to its normal level thereby.

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Witnesses:

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