(No Model.) 4 Sheets—Sheet 1.

M. GALLY.

MECHANICAL MUSICAL INSTRUMENT.

No. 343,900. Patented June 15, 1886.

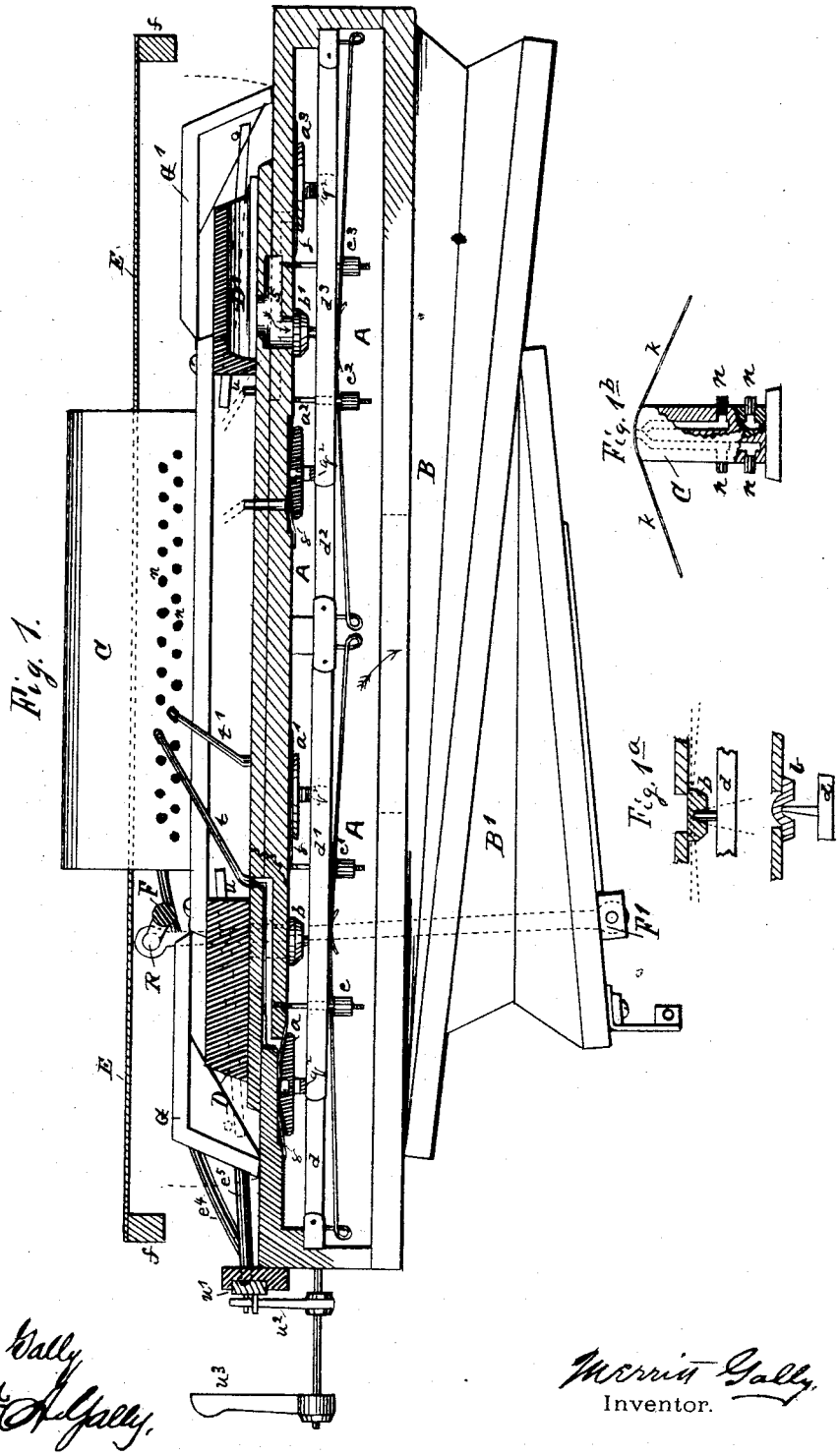


Fig. 1.

Fig. 1b.

Fig. 1a.

Witnesses:

D. B. Gally

Wm. H. Gally.

Morris Gally,

Inventor.

(No Model.)

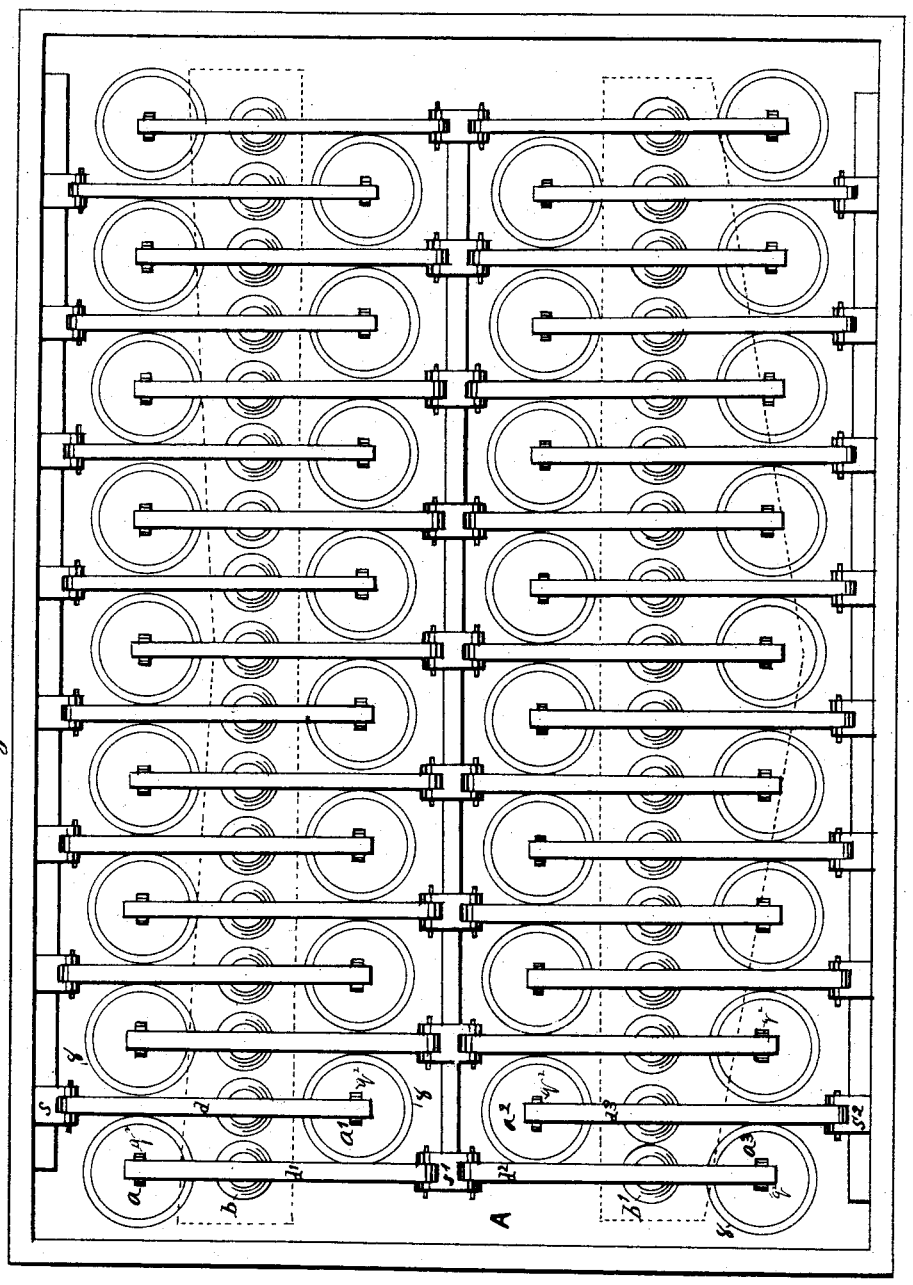
4 Sheets—Sheet 2.

M. GALLY.

MECHANICAL MUSICAL INSTRUMENT.

No. 343,900. Patented June 15, 1886.

Fig. 2.



Witnesses:

D. B. Gally

Wm. H. Gally.

Merrin Gally.

Inventor.

(No Model.)

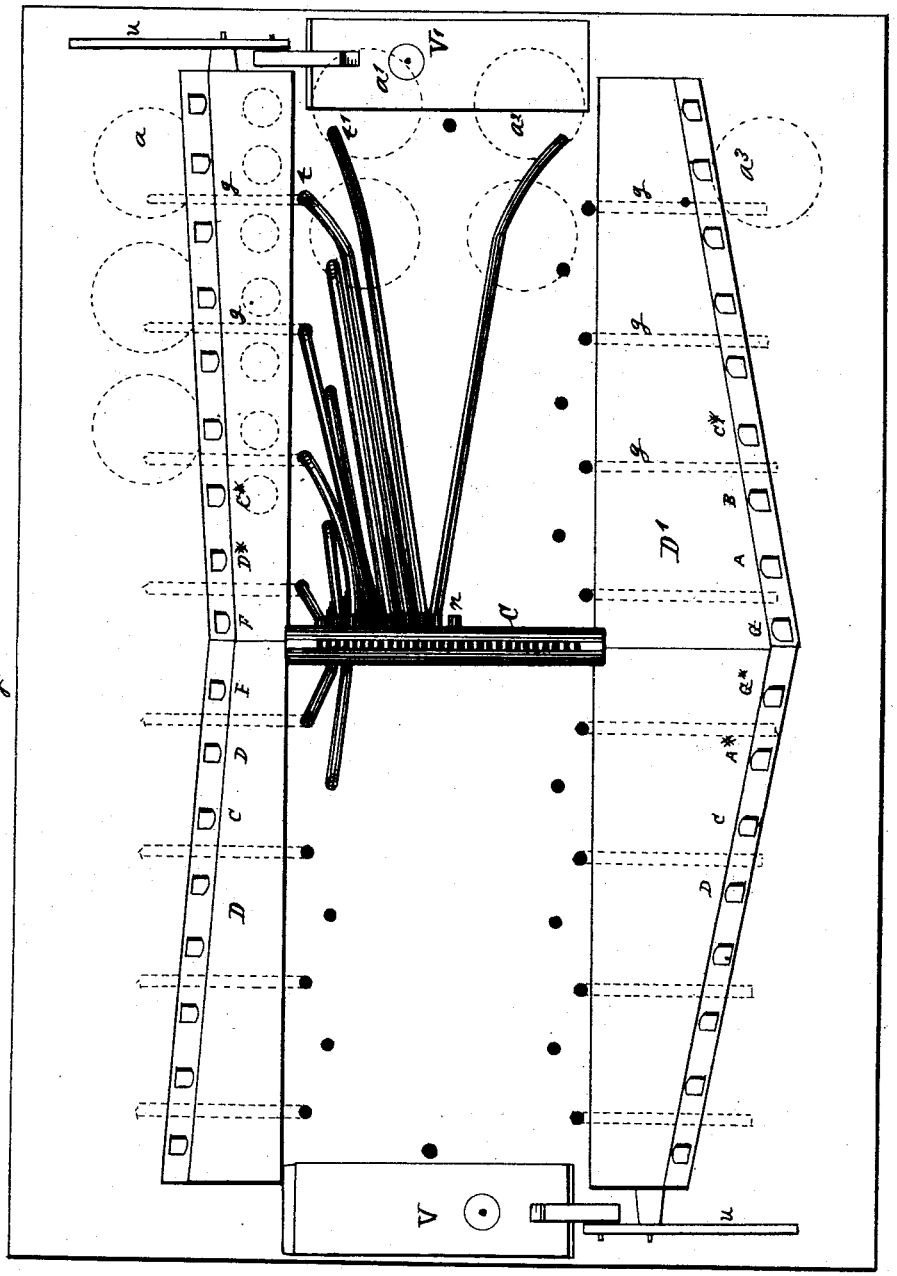
4 Sheets—Sheet 3.

M. GALLY.

MECHANICAL MUSICAL INSTRUMENT.

No. 343,900. Patented June 15, 1886.

Fig. 3.



Witnesses:

D. B. Gally

Mary A. Gally,

Merritt Gally,

Inventor.

(No Model.)

4 Sheets—Sheet 4.

M. GALLY.

MECHANICAL MUSICAL INSTRUMENT.

No. 343,900. Patented June 15, 1886.

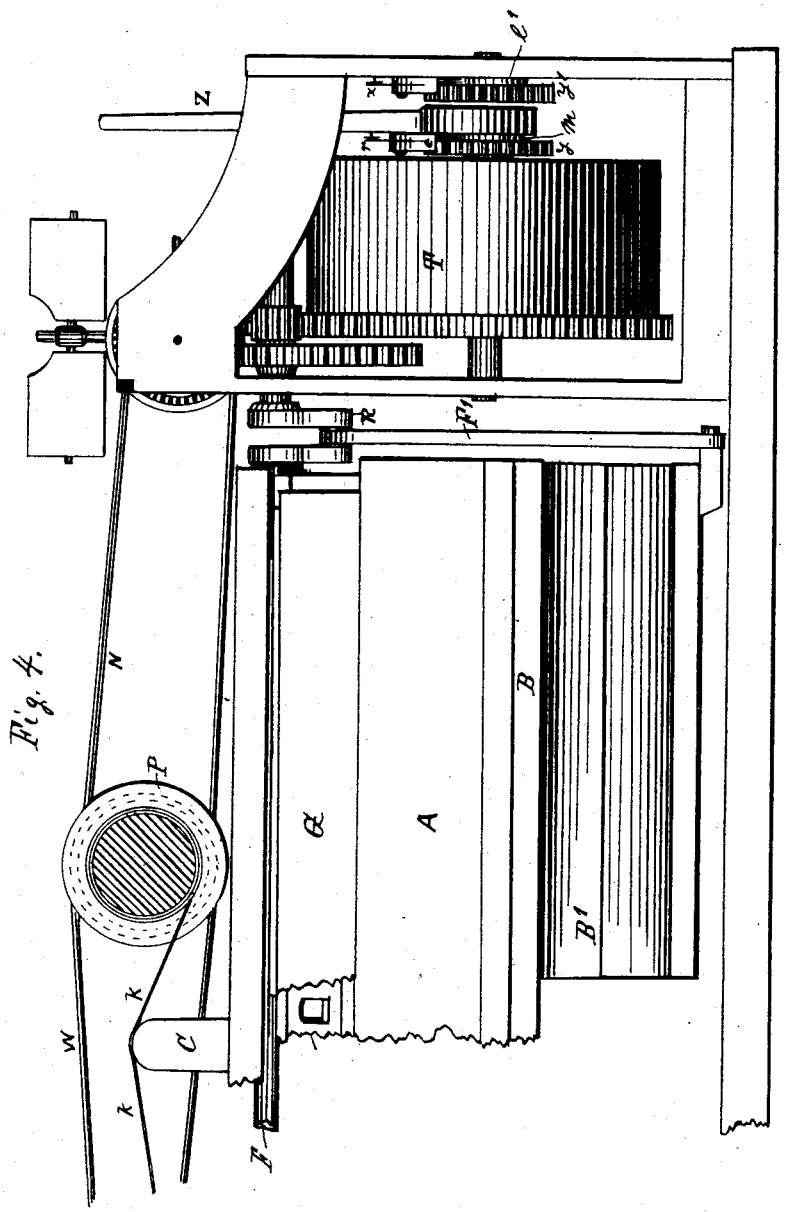


Fig. 4.

Witnesses:

D. B. Gally

Wm. A. Gally.

Morris Gally

Inventor.

UNITED STATES PATENT OFFICE.

MERRITT GALLY, OF NEW YORK, N. Y.

MECHANICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 343,900, dated June 15, 1886.

Application filed May 15, 1884. Serial No. 131,550. (No model.) Patented in England July 11, 1882, No. 3,291.

To all whom it may concern:

Be it known that I, MERRITT GALLY, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Musical Instruments, of which the following is a specification.

The subject-matter of claim 9 of this application has been patented in England to M. Gally, July 11, 1882, No. 3,291.

In the accompanying drawings, Figure 1 is a transverse sectional view showing the internal construction of the instrument. Fig. 1^a is a sectional view of valve. Fig. 1^b is a transverse sectional view of the tracker-range. Fig. 2 is a plan view of the interior of the air-chest, showing the arrangement of the valves and pneumatic motors. Fig. 3 is a plan view looking down upon the reed-boards and tracker-range. Fig. 4 is a front view of a part of the action, showing the automatic motor connected to the bellows, and also the music-sheet-winding mechanism, and Fig. 4^a is a side view of the noiseless ratchet and ratchet-lever.

In my patent of October 7, 1879, I describe and claim pneumatic motors for operating the valves of the sounding devices of musical instruments, the motors being arranged spread out in two or more lines, alternating in their arrangement to accommodate the arrangement of the sounding devices and secure room for suitable-sized pneumatic motors. In the present case I arrange the motors $a\ a'\ a^2\ a^3$, Figs. 1 and 2, in four lines, duplicating the two lines of alternating motors and divide the range of sounding devices D D′, giving a part of the range to each of the two sets of alternating motors. I make a still further division of the range, if desired, by adding still further lines of single or alternating motors.

In the drawings are shown two lines of sounding devices and four lines of motors.

In ordinary reed-organs the reed-cells of the reed-boards D D′ are arranged closely side by side, so that their valves shall correspond in position and lie in line with the finger-keys of the manual. This is not necessary to my construction, and in order to accommodate the best size of pneumatic motors and their best arrangement I separate the reed-cells, as shown in Fig. 3, to correspond with the position of the motors. This construction also allows me to cut channels g in the body of the reed-board or valve-board between the valve-openings to the reeds as ducts for the construction of tubes t leading to the outer lines of pneumatic motors $a\ a^3$, thus confining my leader-tubes t to the space between the reed-boards D D′, making a very compact and convenient arrangement of parts.

The pneumatic motors $a\ a'\ a^2\ a^3$ for operating the sounding-valves are placed within the air-chest A, and are constructed as follows: I attach the edges of a thin flexible diaphragm, 8, to the internal wall of the air-chest A, either covering a slight depression in the wall, or make the diaphragm sufficiently baggy to allow a sufficient movement of the diaphragm from the plane surface of the wall without the depression. After placing a sufficient number of these diaphragms within the ordinary exhaust-chest of the organ to correspond with the number of sounding-valves I connect with each of the valve-levers $d\ d'\ v\ c$ a presser, as $a\ a'$, in contact with the diaphragm 8. The pressers $a\ a'$ resemble buttons in form, and are sustained at a little distance from the valve-lever by a support, q^2. This permits the pressers $a\ a'$, &c., to be perforated without weakening the valve-lever by a perforation therein.

The valve-levers are held in position by means of ordinary valve-springs, as shown, holding the valves $b\ b'$ to their seats when in normal position.

I extend air-ducts from the tracker-range C to the surface of the diaphragm 8, which is opposite that within the air-chest A, and while these tubes are open to the external atmosphere during the exhaust of the air-chest A air-pressure from without forces the diaphragm 8 against the pressure on the valve-levers and opens the valves. While no air-pressure is allowed to act through the tubes, the valves remain in their seats and close off the sounding devices.

In order that the diaphragm may have a quick return movement, I puncture the diaphragm with a very small perforation, either opposite an opening in the presser or in any other convenient position.

For convenience in manufacture I attach the center of the diaphragm to the presser, and make an opening through both diaphragm

and presser at their point of attachment. The presser *a a'*, being of a material not subject to much contraction or expansion, is perforated, and at the side away from the diaphragm this perforation is of small size. While the perforation in the elastic diaphragm may stretch and vary, the perforation in the presser, which determines the passage of air, will remain practically constant. The presser *a a'*, being placed within the air-chest A, is not necessarily attached to the diaphragm.

The pneumatic motors and valves for the sounding devices being both contained in the exhaust air-chest A, the same exhaust both sounds the reeds and provides for the operation of the valves.

I construct the valves *b*, which operate the sounding devices, in a manner that they will readily adjust themselves to the valve-seat. I make the valve preferably circular, so it may turn on its axis without disarrangement. It may, however, be of other shape; but if a long valve, must have some flexible attachment, either to the valve-lever or valve seat, for controlling its position.

In order that the valve *b* may readily adjust itself to its seat, I make a recess or socket in its body, as shown in Fig. 1ª, which socket extends nearly through the valve to a point very near its face. I make this socket slightly tapering or a little larger than the pin of the valve-lever *d*, as shown. I place the valve on the pin of the lever, the socket being loose on the pin. This allows the valve to have a rocking movement without changing materially the position of its face, as shown by the dotted lines. By making the valve a little thicker in the part where the pin is located than where it rests on the valve-seat the socket may be extended through to a point exactly in line with the valve-seat, in which case there will be no sliding movement whatever in the adjustment of the valve to its seat.

Between the reed-cell D' and the valve *b'*, I cut, at the side of the air-passage which leads from the reed to the valve, a recess, 5. This recess modifies the tension of the current of air in its passage from the reed to the valve, and greatly improves the tone of the reed.

In order to limit the movement of the valve-levers in opening the valves, I use adjusting hangers *c c' c² c³*, Fig. 1. These are formed of wire, having a screw-thread cut on each end, one end being screwed firmly into the valve-board. The wire passes loosely through the valve-lever, and has an adjusting-nut under the lever, with which the movement of the valve is adjusted by limiting the movement of the lever.

In order to make the tracker-range C as short as possible, to accommodate a narrow music-sheet, and at the same time allow the connection of leader-tubes *t* of sufficient size for successful operation, I construct the tracker-range as shown in Figs. 1 and 1ᵇ.

In my patent of October 7, 1879, I describe a tracker-range having ducts leading to either or both sides of the main line of openings to facilitate the attachment of leader-tubes. In the present case I show two lines of alternating tubes for each side of the tracker-range.

From the openings in the upper face of the tracker-range C, Fig. 1ᵇ, I lead alternately to two lines of vertical ducts, as shown. From each of these lines of vertical ducts I lead to two lines of alternating horizontal ducts, *n n*, for the attachment of tubes *t*. This gives me four times the space occupied by each opening in the face of the tracker for the connection of tubes *t*, which greatly facilitates the attachment of the tubes, and also the construction of the tracker-range.

In Fig. 3 it will be seen that the letters on the reed-boards representing the notes commence at the central line at the position of the tracker-range, alternating toward the extremes for the board D', and take a reverse order for the board D. I make this arrangement of the reed-cells in order to preserve the regular order of the musical scale to the openings in the face of the tracker-range, and be able to lead directly to right and left by the leader-tubes *t* to the operating motors for the several reeds.

The large external pneumatic motors V V', Fig. 3, connect with the levers *u u* for operating the swells or stops.

In Fig. 1 the levers *u u* are shown connected with the swells G G'. The leader-tubes which lead from the tracker-range to these motors have a cut-off valve, as shown in Fig. 1, at *u'*. One part of the tube, as *e⁴*, leads through the seat of the sliding valve *u'* at one end of a groove in the valve, and *e⁵* leads to the other end of the groove, the groove forming the connection of the duct. When the valve *u'* is moved by means of lever *u³* so that the groove does not connect the two parts of the tube *e⁴ e⁵*, the swell will be cut off from the action of the music-sheet. This construction allows the operator at his option to produce the expression with the music-sheet or in the ordinary manner with the knee-swells and manual stops of the organ. I have described and claimed this matter broadly in previous patents. I only show in this connection specifically a simple and improved device.

Above the sounding devices, as shown in Fig. 1, I place a membranous vibrating reflector E E, which is stretched on the frame *f f*. This differs materially in effect from a sounding-board, not only increasing the volume and power of the tones, but giving them a peculiar characteristic quality, very desirable for some stops, and quite unlike that produced in any other way.

Fig. 4 shows the music-sheet *k* in connection with the tracker-range. The roller P is the winding or take-up roller for the music-sheet, and is shown as connected by belt N to a clock-motor, which clock-motor also drives

the bellows B B′ through the connecting-pitman F′ and crank R. This clock-work I operate either by spring or weights, as the case may require. In order to wind this clock-work without producing a conflicting noise while the music is being performed, I use a peculiar noiseless ratchet.

What I claim as my invention is—

1. A musical instrument having two or more lines of sounding devices, each line being provided with two lines of alternating pneumatic valve-motors, substantially as specified.

2. The combination, with two lines of alternating valve-levers, of four lines of pneumatic motors arranged substantially as specified.

3. The combination, with the sounding devices and two lines of operating-valves, of two lines of valve-levers, alternate levers being pivoted at opposite ends, substantially as specified.

4. The combination, with the tracker-range C and leader-tubes *t*, of ducts *g*, passing between the valve-openings to the outside lines of pneumatic motors, substantially as and for the purpose specified.

5. The combination, with the sounding device and an exhaust-air chest, of operating-valves and valve-levers contained within the chest, each valve-lever provided with a button forming a presser, against which a flexible diaphragm is forced by external air-pressure to open the valve, as set forth.

6. The combination, with the reed and its operating-valve, of the presser sustained a little away from the valve-lever, said presser being perforated, and a perforated flexible diaphragm within the valve-chest, against which said presser bears, as set forth.

7. The combination, with a reed-valve, of a valve-lever having a disk-presser and a diaphragm acting on said presser, all being within the exhaust-chest, as set forth.

8. The combination, with the valve-lever, of the self-adjusting valve with socket and pin, constructed substantially as and for the purpose specified.

9. The air-duct leading from the reed to the operating-valve, provided with the recess 5, substantially as and for the purpose specified.

10. The combination, with the valve-levers, of the adjusting hangers, substantially as and for the purpose specified.

11. The single tracker-range provided with two lines of ducts, each line terminating in two alternating lines of leader-tubes, substantially as and for the purpose specified.

12. The tracker-range having ducts leading alternately from its face to two lines of ducts, each line terminating in alternating lines of leader-tubes, substantially as specified.

13. A reed-board having the reeds corresponding to the notes of the scale alternating and in reverse order at each side of the tracker-range, substantially as and for the purposes set forth.

14. The combination, with the leader-tubes of the pneumatic expression-motors, of the grooved cut-off valve, substantially as and for the purpose specified.

15. The combination, with the reeds of a reed-board, of a membranous vibrating reflector placed parallel with and at a little distance from said reeds.

16. The combination, with the reed-valve, of a valve-lever and a pneumatic motor, the valve being placed between the fulcrum of the lever and the motor.

17. A series of pneumatic motors and a series of valve-levers alternately arranged, the lever from one motor crossing the motor of the adjacent lever at a sufficient distance to allow the free movement of each, substantially as described.

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Witnesses:
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WM. A. GALLY.