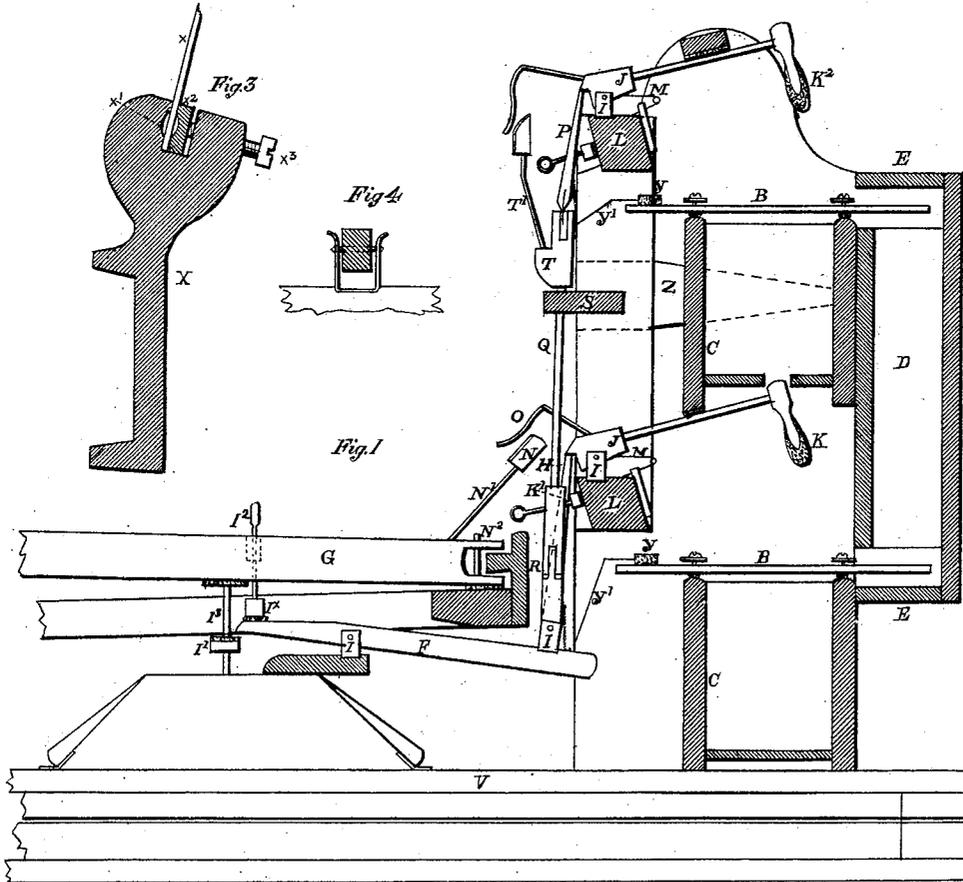
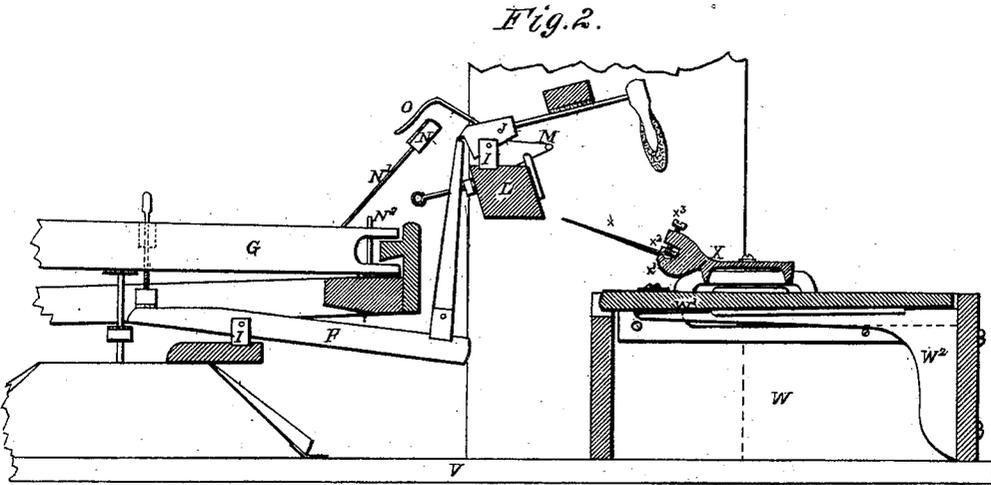


M. J. MATTHEWS.
REED-ORGAN ATTACHMENT.

No. 177,412.

Patented May 16, 1876.



WITNESSES
Geo. F. Stone
George F. Cusum

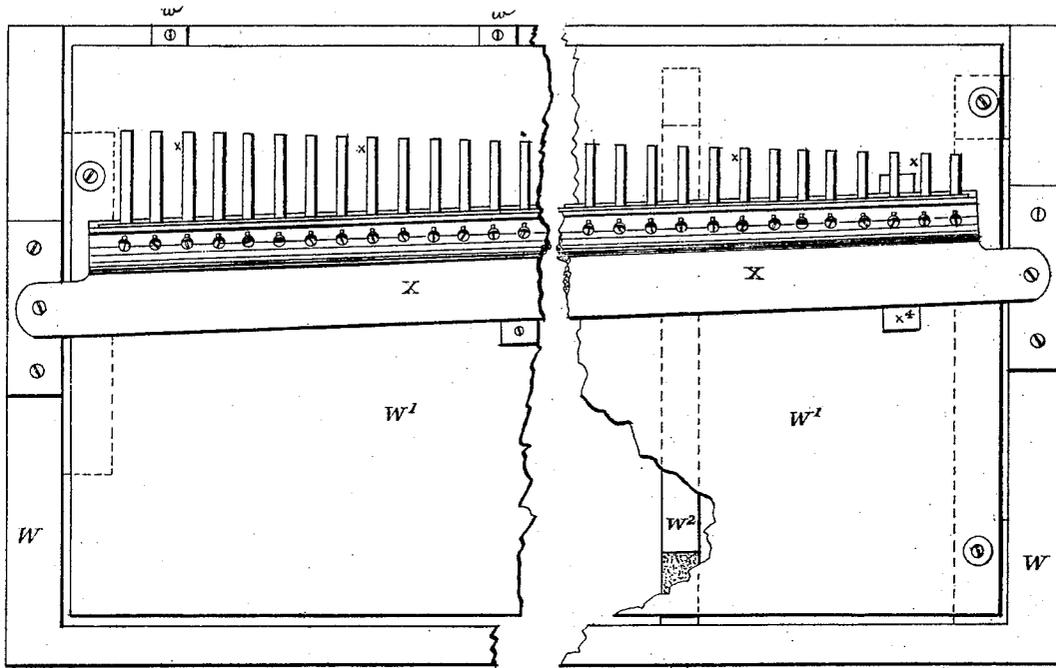
INVENTOR
Mason J. Matthews

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Fig. 5



WITNESSES

Geo. H. Stone
Edw. F. Curran

INVENTOR

Mason J. Matthews

UNITED STATES PATENT OFFICE.

MASON J. MATTHEWS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN REED-ORGAN ATTACHMENTS.

Specification forming part of Letters Patent No. **177,412**, dated May 16, 1876; application filed August 14, 1875.

To all whom it may concern:

Be it known that I, MASON J. MATTHEWS, of Boston, in the State of Massachusetts, have invented a certain Improvement in Reed-Organs, of which the following is a specification:

My invention relates to instruments of the harmonicon or bellanette class, having sonorous bars of metal, glass, or wood for sound-generators. It also further relates to the reed-organ attachment, now known as piano-harp. Both these formed the subject of patents recently granted to me. It consists of a novel arrangement of the harmonicon-bars over peculiar resonant chambers, and of a new, simple, reliable, and effective action to operate them. It is designed, mainly, as an attachment to reed-organs, but, by slight and (to any good mechanic) easily-conceived variations of construction, it may also be made a very desirable and effective independent instrument, in which case it would simply be a combination of modifications of the bellanette and piano-harp. When so combined, whether as an attachment to a reed-organ or as a separate instrument, the sonorous bars will form the treble portion of the instrument, and the steel tongue of the piano-harp will form the bass portion. The object of such an arrangement is suggested by the distinctive character in tone of the respective sound-producing agents. The character of the tone of the harmonicon-bar resembles that educed from a smooth-toned bell, while the tone of the steel tongue resembles that of the harp, which is by far the most favorable for left-hand accompaniment. Moreover, the tongue is more favorable for the purpose named, because of its being so much smaller than the bar of corresponding pitch.

The object of my invention is to provide means whereby a much more powerful and better quality of tone may be produced than has been obtained hitherto from the agents alluded to. Another object is to make an attachment of such peculiar parts and combinations as will form, in connection with a reed-organ, an instrument capable of producing a variety of pleasing and novel effects hitherto unknown.

The manner in which my invention is constructed is fully shown in the following speci-

fication, of which the accompanying drawings form a part.

Figure 1 represents the bellanette or treble portion of the instrument. Fig. 2 shows the bass or piano-harp portion of the instrument. Both these figures are sectional elevations. Fig. 3 is a section of the piano-harp plate. Fig. 4 represents, in full size, a flange-joint, forming a part of the action to be described. Fig. 5 is a plan view of the harp-box, showing the manner in which the sound-board is mounted; both the box and the board are represented as broken through.

For reasons that will be evident, I sometimes use the singular number in describing parts that are duplicates of each other.

The parts marked B represent the harmonicon-bars. These are arranged in two rows, both of which are alike, excepting that one row is pitched a half a tone above or below the other row—that is to say, if the organ should be a five-octave instrument of F-scale, and middle C should be the first note of the bellanette on the lower row, the first note on the upper row would be C-sharp, so that they would be arranged as follows: Lower row, C, D, E, F-sharp, G-sharp, A-sharp, C, &c.; higher row, C-sharp, B-sharp, F, G, A, B, C-sharp, &c. The object of this arrangement is to bring the bars B—each of which should not be less than seven-eighths of an inch wide, making in the aggregate about twenty-seven inches—within the compass of about seventeen inches, or two and a half octaves. The boxes or resonant chambers C, upon which the bars B are mounted on their nodal points, are shaped and constructed like the ordinary harmonicon-box, wide and deep at the end toward the bass, and narrow and shallow at the treble end, according to the size and pitch of the notes resting thereon. The tones educed from the bars B are intensified by these boxes C. Additional resonating power is provided by another box, D, which is attached to the back of the boxes C. This supplementary box D is partitioned perpendicularly, so as to form such a number of pipes as will afford all synchronizing properties necessary for the variety of tone-pitch of this portion of the instrument. Reflectors E are placed, one over the upper row of bars and one under the lower row. These reflectors

E are attached to the overlapping back of the box D, and serve the double purpose of directing the sound-waves into the box D and reflecting the tone.

It is well known that harmonicon-bars sound best when free from any binding contact with other agents. The usual method employed to keep them in position on the cords is to pass a headed screw or pin through each hole in the bar into the sides of the box. These holes are made large enough to avoid any serious contact with the pins, but not so large that the heads of the pins will pass through them. This method for the ordinary harmonicon is good enough; but when the instrument is intended to be used as an attachment to a reed-organ, or to be operated by keys like those of the piano-forte, it is necessary that some more effective means should be employed to prevent the possibility of such contact as will produce disagreeable effects. I therefore adopt the following method: The neck of each headed pin or screw which passes through each hole into the sides of the box C, is wrapped with thread. Between the head of the screws and the bar is a cloth-washer. The screw is driven into the box far enough to bring the cloth-washer referred to almost in contact with the bar B, so as to prevent excessive jumping when struck by the hammer which operates it. The action employed for causing the vibration of the bars B is shown mainly in Fig. 1. A row of levers, F, is arranged below the keys G. On the back of each alternate lever F is a jack, H, differing from ordinary jacks only in respect to the joint I. This joint I is formed of a brass flange and a double-pointed center-pin. (See Fig. 3.)

The advantages of this flange-joint over the ordinary cloth-joint lie in the following facts: First, it cannot be influenced by ordinary atmospheric changes; second, its frictional bearing is very small; third, it can easily be twisted or set into any position required. Each flange-joint I is inserted and held in a groove in the lever F by means of a screw. The front end of the lever F passes between two wooden nuts, $I^x I^1$. The nut I^x is on the regulating-screw I^2 , and acts upon the upper face of the lever F to depress it. The nut I^1 is on the push-pin I^3 of the organ, and acts on the lower face of the lever F to raise it to its normal position without the use of lead balance-weights employed in pianofortes for a similar purpose. The jack H acts on the under side of the knuckle of the hammer-butt J, so that when the key G is depressed the hammer K is driven against the bar B, when escapement is effected, which is done by the contact of the regulating-nut K^1 with the sloping face of the hammer-rail L. The grasshopper-spring M forces the hammer K to as near its normal position as the check N O will permit. The check-wire N^1 is inserted in the key G in front of the fulcrum-pins N^2 . The manner of the operation of

checks has been so often described by applicants for patents, besides it is so well known and understood by piano-forte and other musical-instrument makers, that further description is unnecessary.

The part of the action described so far relates to the lower row of bars B. Alternating with the jacks H is another set of jacks, P, all arranged with regard to the correspondence of the respective keys, levers, and bars. This upper action is a duplicate of the lower hammer action, except in such particulars as are hereinafter specified. The jacks P of this upper action are connected with their corresponding levers F through the medium of the tracker-rods Q. Each of these tracker-rods Q consists of a strip of wood with a plain mortise-joint, R, at right angles with the flange-joint I. The mortise-joint R prevents sideway binding in the guide-piece S. Toward the top of the tracker Q is a small block, T. The check-head wire T^1 is driven into this block T. Coupling and uncoupling are effected by raising and lowering the hammer-rails L, which are connected together by a rail at each end. Each rail has an arm, Z, attached to it. This arm Z reaches nearly to the back of the resonance-box C, to which it is secured by a screw which forms a joint or hinge. The flange-joint I is employed in connection with the lever F and hammer-butt J in preference to other and commonly-used joints because of the reasons given for its use in relation to the jacks H. The dampers Y are both simple and effective. They are made of wire and felt. One end of the wire of each upper damper is inserted in its corresponding tracker Q. The other end of the wire Y^1 carries the felt patch, which is raised from or lowered to the bars B by means of the movement of the tracker effected by the key G. The lower damper is inserted in the lever F. The action to each key G in Fig. 2 is a duplicate of the lower action to each alternate key in Fig. 1.

On the back of the platform V is mounted the piano-harp resonant box W. In this box W is mounted the sound-board W^1 in the following manner, reference being had to Figs. 2 and 5: A block is fastened to the inside of each end of the box W. About five inches from the treble end of the sound-board W^1 a spring-bar, W^2 , is fastened to one side of the box W. The free end of this spring-bar W^2 reaches across the box W. It is placed about a quarter of an inch forward of the plane of the blocks, so that when the sound-board is drawn to them its form is bent. In order that the spring-bar W^2 shall not check the free vibration of the sound-board W^1 it is placed over a node. The position of this node varies according to the length and nature of the wood of which the sound-board is made. The metal plate X, (see Figs. 2 and 3), in which the tongues x are fastened, differs from that of the piano-harp patent before alluded to, in the following particulars: At the back of the main groove in the plate X is a fluted groove,

x^1 . The metallic strip x^2 is also provided with a similar groove, so that when the pressure of the screws x^3 is brought to bear upon the strip x^2 , the tongues are held firmly at the extreme top of the bearing. This is a very material point that is indispensable in producing the best results. The plate X is held in position by a screw passing through it at each end into the rails of the box W. Three wooden feet are placed between the plate X and the sound-board W^1 . The plate X is pressed against these feet by means of the screws referred to, until the necessary strain is applied to the sound-board W^1 . The wooden foot x^4 , nearest the treble, reaches across the plate X, and thus has a double bearing. The middle foot is on the lower side of the plate, and the foot nearest the bass has only a bearing under the upper side of the plate. Two wedges, w , are inserted between the sound-board W^1 and the box W. These have the effect of increasing the power of the lower and middle notes of the compass. The position and number of these wedges w , or whether they shall be dispensed with, are to be determined by test. Some boards need them and others do not.

So far this specification describes fully only the method I deem best for the proper carrying out of my invention. It is evident that other materials and means might be adopted—for example, the sound-box W might be mounted on the case of a reed-organ, instead of on the wind-chest. Two spring-bars, W^2 , might be used. These may be made of wood or metal. Instead of the fluted groove in the plate X and the strip x^2 , the tongues themselves might be grooved.

I claim as my invention the following points:

1. In a musical instrument, having sonorous bars free at both ends, a hammer or percussion action, arranged in two rows, one above the other, as herein specified.

2. The two harmonicon-boxes, arranged one over the other, having sonorous bars resting thereon, in combination with keys to operate

them through the medium of a percussion action, substantially as and for the purpose specified.

3. The resonant-chambers D, with reflectors E, in combination with the harmonicon-boxes C, substantially as and for the purpose set forth.

4. The resonant-box W, having the sound-board W^1 , and mounted on the upper side of the wind-chest of a reed-organ, in combination with a percussion action giving a downward blow of the hammer, substantially as set forth.

5. The spring-bar V, or its equivalent, in combination with a sound-board, when employed in an instrument having steel tongues held at one end and operated by a percussion action, for the purpose specified.

6. The wedges w , inserted between and in combination with the sound-board W^1 and the box W, for the purpose specified.

7. The dampers Y, inserted in the trackers Q and in the lever F, in combination with the sonorous bars B, as set forth.

8. The screw and nut I^2 I^x of the key, together with the nut I^1 on the push-pin I^3 of a reed-organ, in combination with the lever F, for the purpose specified.

9. The check head-wire N^1 , when fastened forward of the pin-rail N^2 into the key G of a reed-organ, as herein specified.

10. The fluted groove x^1 in the side of the main groove of the plate X, substantially as and for the purpose set forth.

11. The fluted metal strip x^2 , in combination with the subject-matter of the above tenth clause of claim, as and for the purpose specified.

12. The flange-joint I, in combination with the lever F, jack H, tracker Q, and hammer-butt J, as set forth.

In testimony whereof I have hereunto set my hand.

MASON J. MATTHEWS.

Witnesses:

L. M. PALMER,
J. E. TROWBRIDGE.