

J. G. SMITH.
HARMONICA.

No. 581,313.

Patented Apr. 27, 1897.

Fig. 1.

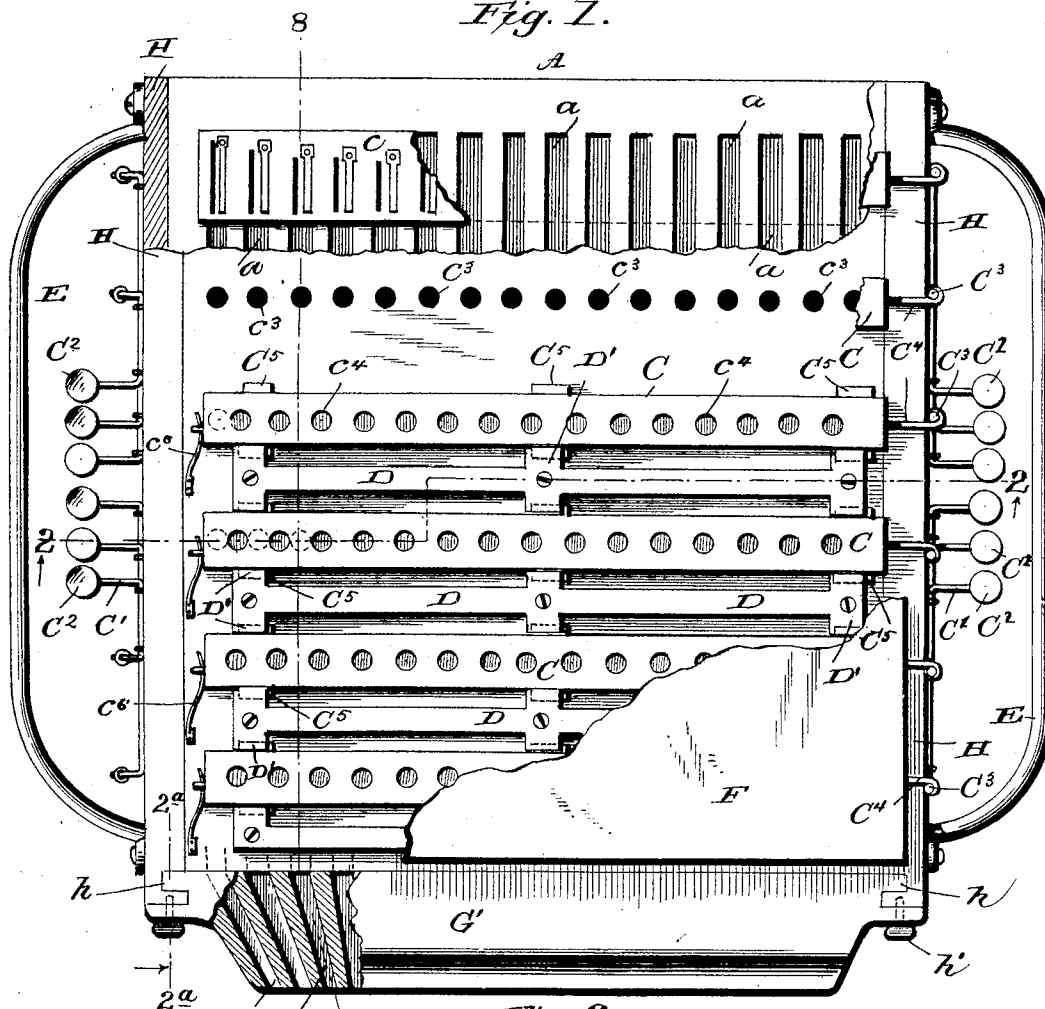
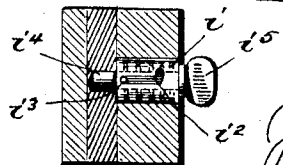
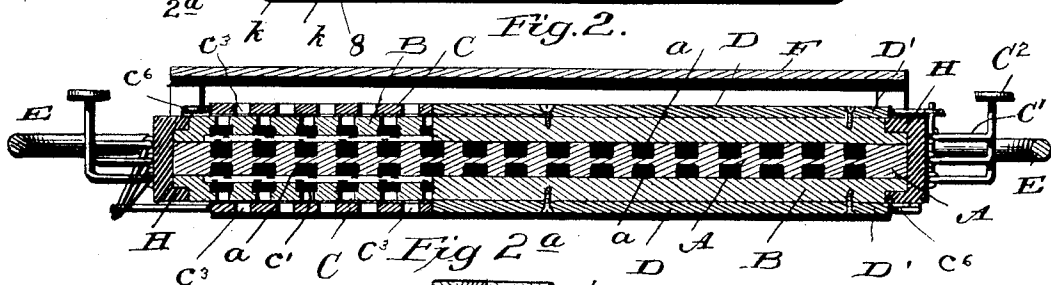


Fig. 2.



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(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

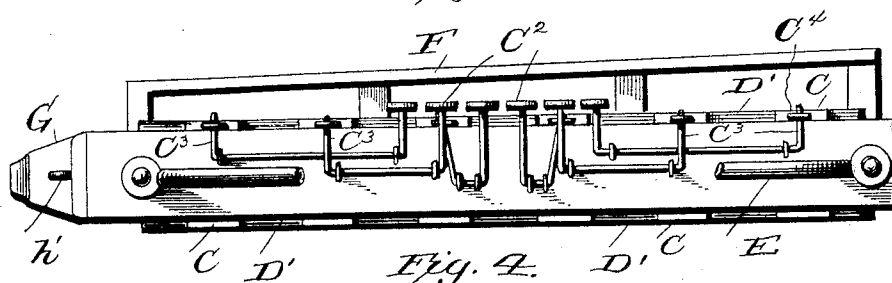


Fig. 4.

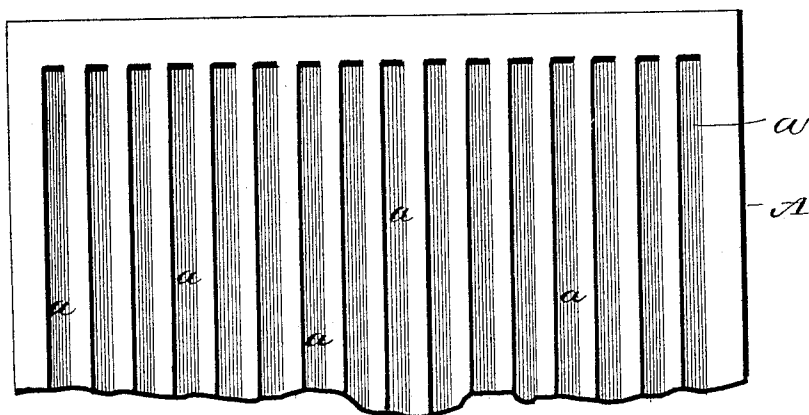
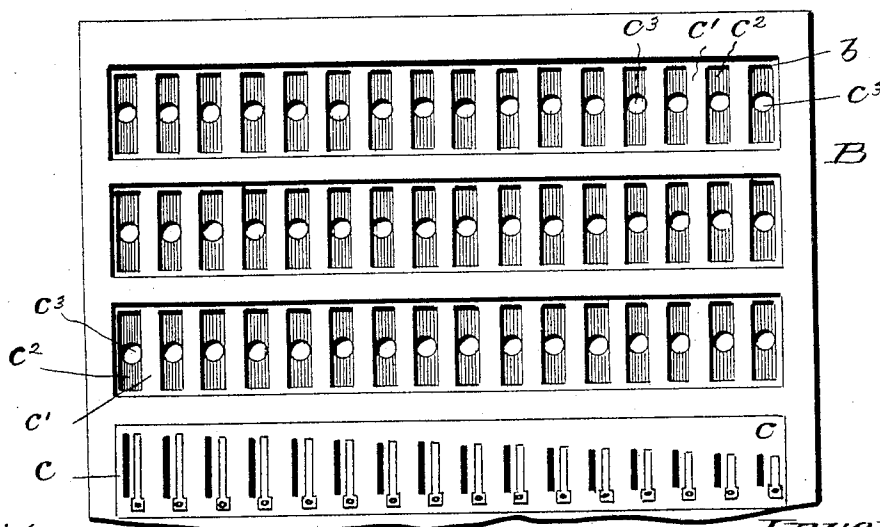


Fig. 5.



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(No Model.)

3 Sheets—Sheet 3.

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Fig. 6.

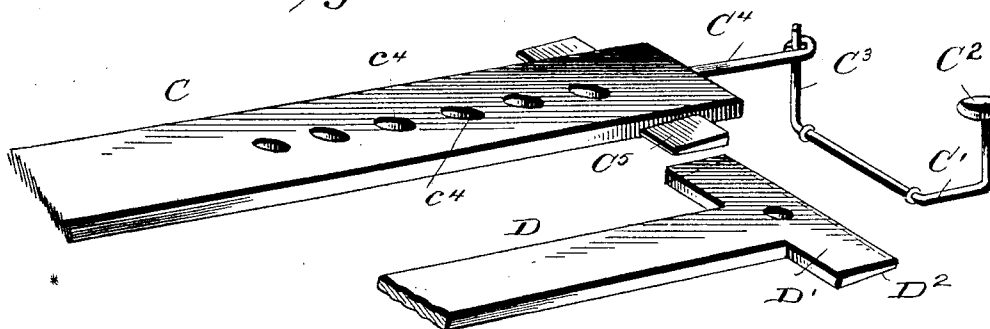
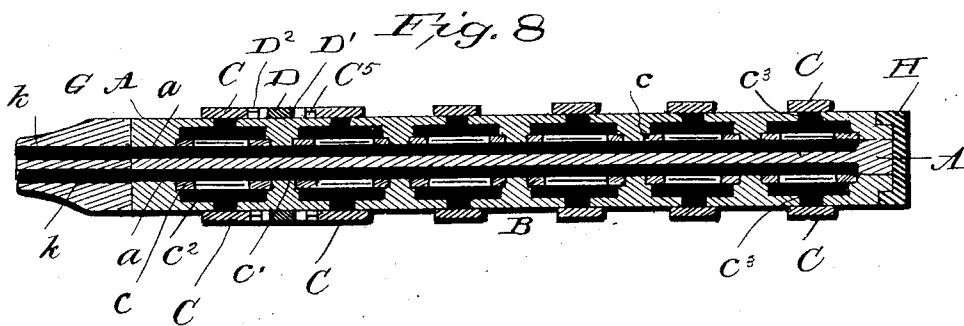
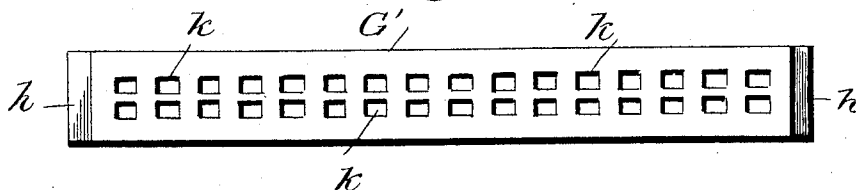


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

JACOB G. SMITH, OF CIRCLEVILLE, OHIO.

HARMONICA.

SPECIFICATION forming part of Letters Patent No. 581,313, dated April 27, 1897.

Application filed July 28, 1894. Renewed October 2, 1896. Serial No. 607,721. (No model.)

To all whom it may concern:

Be it known that I, JACOB G. SMITH, a citizen of the United States, residing at Circleville, in the county of Pickaway and State of Ohio, have invented certain new and useful Improvements in Harmonicas; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in musical instruments; and it relates more particularly to that class of instruments which are commonly known as "harmonicas" or "mouth-organs."

Heretofore instruments of this character have been constructed with a plate of reeds arranged in continuous series, together comprising the notes in the single key in the diatonic scale. Instruments of this character have also been provided in which two or more banks or series of reeds have been employed, the several banks of reeds being arranged upon opposite sides of the instrument and entirely separate from one another. By this construction two independent instruments are conveniently united in a single case, but in so far as I am aware it has never heretofore been proposed to unite in a single instrument several distinct banks or series of reeds, each comprising the notes included within a single key of the diatonic scale, the whole being so arranged with reference to the mouthpiece and connecting air-passages that the air in passing through the instrument may be so communicated by means of keys as to be caused to engage the vibratory reeds included in any one of the several reed-banks, so as to produce any desired tones of the chromatic scale included in any of the several keys.

The object of the present invention is to provide an instrument embodying the features above mentioned, providing within a suitable casing a harmonica or mouth-organ having a capacity of producing all the tones of the chromatic scale by the use of two or more banks of reeds, and air-passages connecting the same, the said passages being controlled by valves adapted to be readily operated by the

depression of the keys, and in combining with the instrument suitable sounding-boards.

To these ends and to such others as the invention may pertain the same consists in the novel features of construction, and the peculiar combination, arrangement, and adaptation of parts, all as more fully hereinafter described, shown in the accompanying drawings, and then specifically defined in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, like letters of reference indicating the same parts throughout the several views, and in which drawings—

Figure 1 is a top plan view of an instrument constructed in accordance with my invention, the same being shown with parts broken away and partly in section. Fig. 2 is a vertical transverse section through the complete instrument, with the exception of the outer casing, the same being taken upon the lines 2 2 of Fig. 1. Fig. 2^a is an enlarged sectional detail of the mouth-securing mechanism. Fig. 3 is a side view of the instrument with the handle broken away in order to better illustrate the arrangement of the key-levers. Fig. 4 is an enlarged plan view of a portion of the middle plate of the instrument, showing the grooves which form the air passages. Fig. 5 is a like view of a portion of one of the plates carrying the reed-banks with one of the reed-plates shown in position. Fig. 6 is an enlarged detail in perspective of one of the slides, its operating-key and lever connection with the slide, and one of the wedge-plates employed in connection with the slide. Fig. 7 is an end view of the mouth-piece. Fig. 8 is a longitudinal section upon the line 8 8 of Fig. 1, a portion of the slides and guide-plates being omitted for the sake of clearness.

Reference now being had to the details of the drawings by letter, A is a central or inner plate of the instrument. This may be constructed of wood, metal, or any substance adapted to the purpose, and may be of any suitable size or thickness, it being provided with a series of longitudinally - arranged grooves *a* upon both its upper and lower faces.

B is a plate corresponding in size with the

plate A, said plate B being provided at intervals of its length with depressions b , within which are seated the reed-plates c , the spaces beneath the reed-plates being provided with a series of transverse partitions c' , thus separating the spaces into a series of small chambers c^2 , corresponding with the position of each successive pair of reeds included in the reed-banks, as is clearly shown in Fig. 5 of the drawings, and corresponding also with the air-passages a in the plate A, upon the face of which the plate B is secured in any suitable manner. The reed-plates c which I have described are in all respects similar to the reed-plates commonly employed in harmonicas, and each of the recesses or chambers c^2 is provided with an air-outlet c^3 . The banks of reeds are arranged according to the musical scale, one half being arranged upon one side of the instrument and the other half upon the other.

It will be understood that in the construction of the instrument two of the plates B, which are in every respect similar, are employed, one being secured upon each face of the grooved plate A, as is clearly shown in the sectional views of the drawings. For convenience in securing access to the several parts of the instrument, either for the purpose of inspection, repair, or for other reasons, it will of course be expedient to assemble in such a manner as to permit of the ready removal or separation of the plates. This may be done by having the said plates fitted within suitable guides and adapted to be slid out when desired, but I do not propose in this connection to limit myself to any specific means of accomplishing this result, as it is at once evident that the same is subject to variations, such as would suggest themselves to a person skilled in the art of constructing instruments of this character.

C represent suitable slides, which extend transversely across the instrument directly above the air-outlet c^3 , the said slides C being each provided with a series of openings c^4 , corresponding in size and relative arrangement with the openings c^3 . These slides are adapted to be moved longitudinally by means of a bell-crank lever C' , which is suitably journaled at the side edges of the instrument and having one of its arms extended vertically and passed through a loop in the outer end of a rod or wire connected with the end of the slide.

D is a metallic plate secured between the slides C. This plate is provided at intervals of its length with laterally-extending projections or arms D' , which arms are beveled at one of their edges, as shown at D^2 . With this beveled portion of the arm laterally-extended beveled lugs or projections C^5 , carried by the slide C, engage. By this construction it will be seen that the arms D' serve a double function—viz., that of guiding the slide C in its movements and also in holding the said slide securely in contact with the face of the plate

B over which it moves. It will be seen that this construction and movement of the slide by the depression of the operating-key C^2 will cause the openings c^4 to register with the openings c^3 in the plate B when thrown in one direction, the return of the slide to its normal position, so as to close the opening, being effected by means of a spring c^6 at the opposite end of the slide.

The slides upon opposite sides of the instrument are in every respect similar and similarly operated, excepting that for convenience in operating the slides by means of the bell-crank levers and keys employed I find it more convenient to reverse the action of the slides, so as to cause the registering of the air-openings by an outward instead of an inward movement upon one side of the instrument. In this case of course the action of the spring c^6 would necessarily be the reverse of that described and which I have shown in Fig. 1 of the drawings, as the action of the spring in this case would be to cause the slide to move inward or in the direction opposite to that of the operating-key, when the slide is automatically returned to its normal position.

The operating-keys are arranged in a continuous series upon each of the outer side edges of the instrument, as shown in Fig. 1 of the drawings, the length of the long arms of the bell-crank levers being varied, so as to bring the several keys in the series within convenient distance for operation by the fingers of the musician.

E is a suitable handle or support for the hand. This handle may be of any desired construction adapted to the purpose. In the present instance I have shown it as consisting of a curved rod or wire having its ends secured to the side edges of the instrument.

F is a sounding-board, one being placed upon either face of the instrument and separated from the reed-plates by a slight intervening space, as shown in Fig. 2 of the drawings. In said figure, however, I have shown but one side of the instrument as provided with a sounding-board.

It is at once evident that the use of the sounding-board may be dispensed with, if desired, as in some instances, especially in the cheaper grade of instruments, its use might not be desirable on account of the additional cost involved.

The mouthpiece G may be constructed of hard rubber, wood, metal, or other substance. It may be attached to the instrument in any suitable manner, and in the present instance I have shown a convenient and serviceable manner of securing the mouthpiece. I provide the ends with dovetailed recesses, within which are fitted the tongues provided upon the ends of the mouthpieces G. The said parts are secured together in the manner following, the construction being clearly shown in Fig. 2^a of the drawings in which i is an opening, within which is seated a metallic tube having

its sides provided with angular openings i^2 , with which engage lugs i^3 upon the rod i^4 , the outer end of which is provided with suitable handle i^5 , a spiral spring arranged within the tube and having one of its ends bearing against the shoulders at the outer ends of the opening i and its opposite end bearing against the lug i^3 . By this construction it will at once be seen that the tension of the spring within the case will serve to at all times hold the rod i^4 at its inner limit of movement, and it will also be seen that in order to withdraw the said rod from its seat it will be necessary to use sufficient force to overcome the tension of the spring when by slightly turning the handle the rod or key will be released from its engagement with the case and readily removed from its seat.

The mouthpiece is preferably somewhat shorter than the width of the instrument and is provided with a series of air-passages k , corresponding with the number and arrangement of the air-passages in the plate A.

While for the sake of clearness in illustration I have in the drawings omitted to show the outer casing of the instrument, it is at once evident that the use of such a case would be desirable, and it is my purpose to inclose the parts which I have described within a suitable casing of sheet metal or other substance adapted to the purpose.

From the foregoing description the operation of the instrument will be at once apparent and a detailed description of the operation is therefore deemed unnecessary in this connection. The several banks of reeds which I employ all having direct communication with the mouthpiece through air-passages described and the outlet air-passages being controlled by the slides which are actuated by the operating-levers, so as to permit the passage of air and be returned to their normal positions automatically by the springs connected therewith, it is at once obvious that a person skilled in the art of playing upon instruments of this character will be able to produce all of the notes comprised within the chromatic scale, and it is also evident that by my construction I have produced within a single instrument a device whereby the scope of a harmonica or mouth-organ is coincident with the scope of music.

The use of a mouthpiece such as I have described is important, as by this construction a short mouthpiece can be used upon a

very wide instrument, the inwardly-converging air-passages from the outer ends of the mouthpiece serving to compensate for the wide spaces which are sometimes employed between the longitudinal air-passages in the body of the instrument.

Having thus described my invention, what I claim to be new, and desire to secure by Letters Patent, is—

1. A slide for controlling the outlet air-passages communicating with a reed-bank, the same consisting of a strip of wood, or metal, having a series of openings corresponding in size and relative arrangement with said outlet-passages, mechanism substantially as described whereby the said slide will be automatically held in position to close said air-passages, a mechanism for moving the slide to open the passages, and wedge-shaped laterally-extended arms carried by the slide adapted to engage wedge-shaped recesses to hold the slide securely in place when in position to close the air-passages, substantially as shown and described.

2. In combination with the plate A, longitudinally grooved upon its opposite faces as described the plates B, one upon either side of the plate A, the reed-banks seated within transverse recesses formed in the inner faces of the plates B, and air-outlets in the outer faces of said plate, substantially as shown and described.

3. In combination with the plate A longitudinally grooved upon its opposite faces, the plates B, secured to the faces of said plate A, the reed-banks seated in the plate B, the air-outlets communicating with the reed-banks, the slides controlling said outlets, and lever mechanism for actuating the slides, substantially as shown and described.

4. In a harmonica of the character described, in combination with a series of reed-plates, the air-passages common to all of the said plates, the air-outlets upon opposite faces of the instrument, the slides controlling said outlets, and the keys for actuating said outlets arranged upon the opposite outer side edges of the instrument, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

JACOB G. SMITH.

Witnesses:

L. C. HILLS,

FRANKLIN H. HOUGH.