

May 13, 1947.

F. SONNEN

2,420,450

HARMONICA

Filed May 14, 1943

2 Sheets-Sheet 1

Fig. 1.

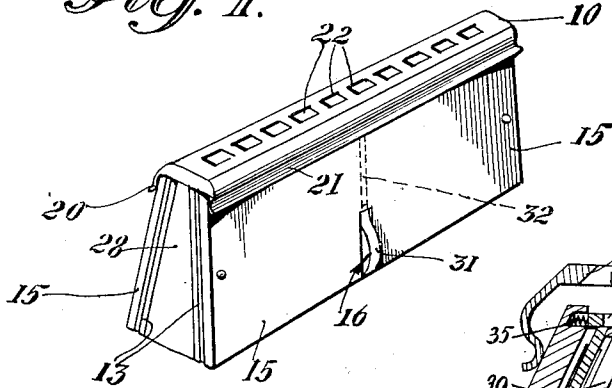


Fig. 10.

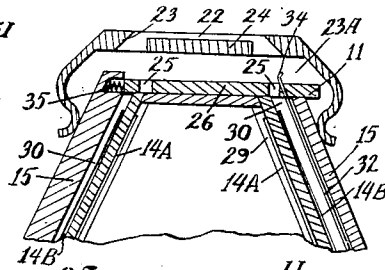


Fig. 2.

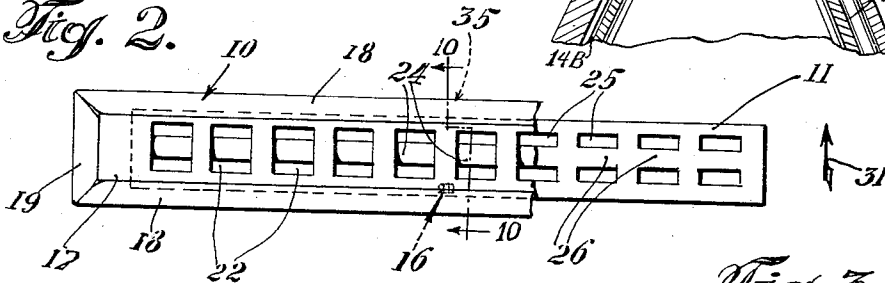


Fig. 3.

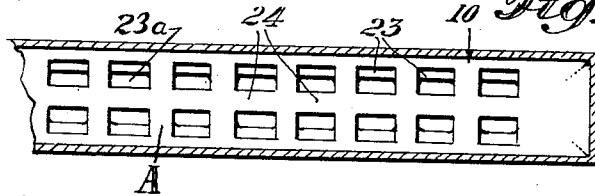


Fig. 4.

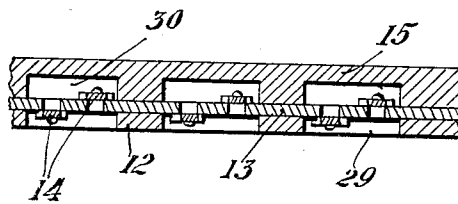
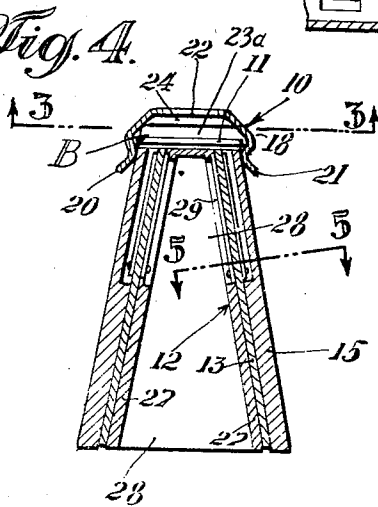


Fig. 5.

INVENTOR.
Fred Sonnen
BY *Richard & Geier*
ATTORNEYS

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Fig. 6.

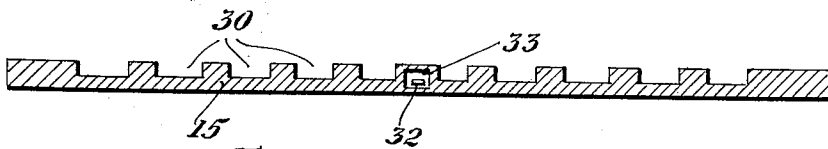
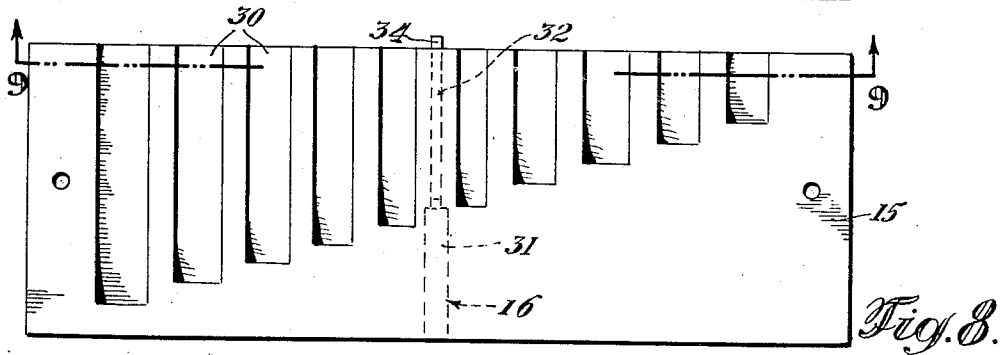
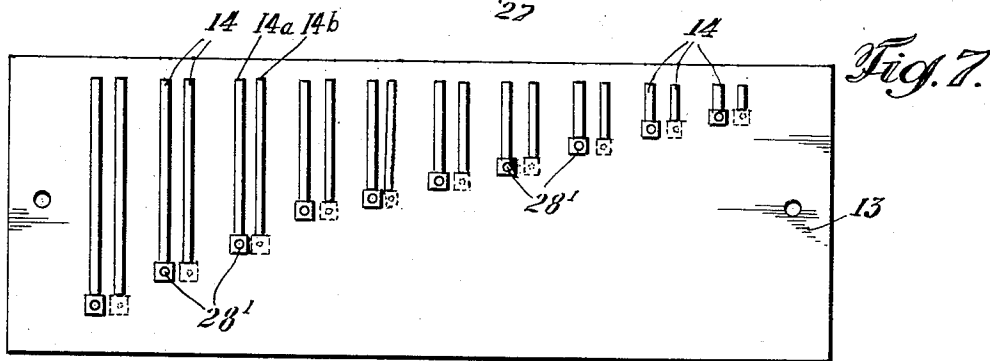
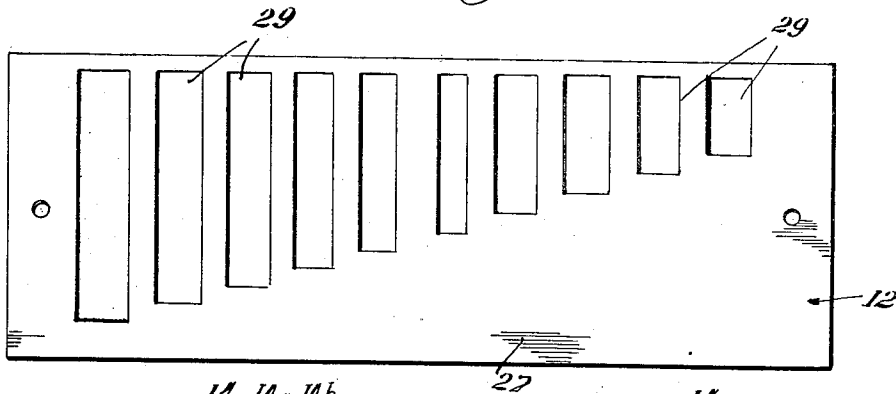


Fig. 9.

INVENTOR.
Fred Sonnen
BY *Richard & Geier*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,420,450

HARMONICA

Fred Sonnen, Newark, N. J.

Application May 14, 1943, Serial No. 486,955

1 Claim. (Cl. 84—377)

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This invention relates to improvements in musical instruments and refers more particularly to a harmonica.

An object of the present invention is the provision of a mouth harmonica of novel and improved construction which has a better and stronger tone.

Another object is the provision of a harmonica which is so constructed that the air currents produced by the player come into direct and immediate contact with the reeds and that the sound waves produced thereby are allowed to expand freely without interference from the adjacent parts of the harmonica.

Other objects of the present invention will become apparent in the course of the following specification.

The objects of the present invention may be realized through the provision of a harmonica which is provided with a comparatively large sound box, the walls of which converge in the direction of the mouth piece. The reeds are arranged on reed plates in alignment with suitable passages in the sound box in such manner that the vibrating ends are located close to the mouth piece. The reed plates are covered by reed plate covers which have passages formed therein so that a direct flow of air current can take place between the sound box and the mouth piece. The slide is arranged to reciprocate in a direction transverse to the length of the harmonica.

The invention will appear more clearly from the following description when taken in connection with the accompanying drawings, showing, by way of example, a preferred embodiment of the inventive idea.

In the drawings:

Figure 1 is a perspective view of a harmonica constructed in accordance with the principles of the present invention.

Figure 2 is a top view of the harmonica mouth piece, the mouth piece being partly broken away to illustrate the slide, on an enlarged scale from that shown in Fig. 1.

Figure 3 is a longitudinal sectional view taken on line 3—3 Fig. 4 the interior of the mouth piece, on an enlarged scale from that shown in Fig. 1.

Figure 4 is a cross section through the harmonica, on an enlarged scale from that shown in Fig. 1 and looking from left to right of Fig. 1.

Figure 5 is a section along the line 5—5 of Figure 4, on a further enlarged scale.

Figure 6 is a front view of a part of the sound box on an enlarged scale of that shown in Fig. 1.

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Figure 7 is a front view of the reed plate carrying the reeds on an enlarged scale of that shown in Fig. 1.

Figure 8 is a front view of a reed plate cover and illustrates the arrangement of the slide actuating spring on an enlarged scale of that shown in Fig. 1.

Figure 9 is a section along the line 9—9 of Figure 8, looking in the direction of the arrows on an enlarged scale of that shown in Fig. 1.

Figure 10 is a fragmental cross section taken on line 10—10, Fig. 2, looking in the direction of the arrows, at an enlarged scale from that shown in Fig. 2.

A chromatic harmonica, constructed in accordance with the principles of the present invention, comprises a mouth piece 10, a slide 11, a sound box 12, two reed plates 13, carrying reeds 14 of different sizes, and two reed plate covers 15 which contain the means 16 for actuating the slide 11.

The mouth piece 10 is illustrated in Figures 1 to 4, and has the form of an elongated plate 17, provided with slanting side surfaces 18, as well as end surfaces 19. The mouth piece 10 carries resilient somewhat curved skirt portions 20 and 21, depending from the side portions 18, and adapted to clamp the mouth piece 10 firmly upon the end of the reed plate covers 15.

The mouth piece 10 is provided with openings 22 which are the same size and disposed at equal distances one from the other. As shown in Figure 3, the inner surfaces of the mouth piece 10 may include converging portions 23 which lead to the edges of the openings 22. Furthermore, the webs A between the openings 22 may be joined by a central longitudinal bar or wall 24, and is located in the middle thereof, thereby dividing the opening into two halves. An air chamber 23A is formed between the longitudinal bar and slide 11.

As shown in Figure 4, the slide 11 is located on top of the sound box 12, and is positioned between recesses B formed between the sides 18 of the mouth piece 10. The slide 11 is provided with a number of openings 25, which are located in pairs, as illustrated in Figure 2. Each opening 25 may be aligned with an uncovered portion of an opening 22, extending between a longitudinal edge of the opening and the adjacent edge of the bar 24.

Figures 4 and 5 show the sound box 12 as comprising converging walls 27, as well as end walls 28. The walls 27 are provided with a series of openings 29, the size of which correspond to the size of the reeds 14. The openings 29 are so located that they are in alignment with the reeds 14. Furthermore, the openings 29 may be

brought into alignment with the channels 30 of the reed plate covers 15.

The reeds 14 are mounted in pairs upon the plate 13. Each pair of reeds includes a blow reed 14A and 14B, respectively, located upon one side of the plate over the usual slot, and a draw reed 14A and 14B, respectively, located in a similar manner on the opposite side of the plate. The reeds 14 are attached to the plate 13 by small pins or pivots 28'.

As already stated, the reed plate covers 15 are provided with channels or cells 30, which are located in alignment with the openings 29 and provide ready access to the reeds 14.

As shown in Figures 6 and 8, the openings 29, and the cells 30, decrease progressively in length corresponding to the decrease in length of the reeds 14.

The slide 11 is reciprocated in the direction of the arrow 31 transversely of the longitudinal extension of the harmonica by means of a spring 16. The spring 16 has a wider curved portion 31 which is situated outside of a reed plate cover 15, and may fit into a recess formed therein. This portion 31 of the spring 16 is integral or firmly connected with a narrower portion 32 which extends through an inner channel 33 formed in the reed plate cover 15, and illustrated in Figure 9. The channel 33 should be so dimensioned that it will permit the spring 16 to reciprocate sufficiently in order to move the slide 11 to the desired extent. The upper end 34 of the spring 16 passes through and is firmly attached to the slide 11 by a bent-over portion. A small coil spring 35 (Figure 10) may be located directly opposite the end 34 of the spring 16 and may be used to maintain the slide 11 in a first operating position. In this first operating position, channels 30 in one cover 15 are open and in communication with openings 22 while the channels in the other cover are closed. When slide 11 is moved by spring 16 transversely of bar 24 to its second operating position, the channels 30 that were open are closed and similarly those that were closed are now open and in communication with openings 22.

The described harmonica is played in the usual manner by blowing or drawing air through the mouth piece openings 22. The player actuates the slide 11 by pressing against the exposed portion 31 of the spring 16, or by releasing this pressure. It is apparent that an air current created at the openings 22 of the mouth piece will reach directly the cells 30 of the reed plate covers 15, and will immediately produce the vibration of the reed or reeds located next to these cells. The sound waves produced by this vibration will be immediately expanded and amplified in the interior of the sound box 12.

The spring 16 is so located that the player does not have to change the position of his hand.

It is apparent that the described construction wherein there is immediate and direct contact and communication between the reeds on the one hand, and the sound box and the mouth piece openings on the other hand, is a considerable improvement over prior art wherein air currents had to traverse comparatively large distances through narrow cells, and had to flow along the entire length of the reeds before being able to

produce the vibration of the reeds; furthermore, no direct and immediate amplification and expansion of the sound waves was possible in prior art constructions, wherein reeds were enclosed on all sides by heavy parts.

It is apparent that the illustration shown above has been given solely by way of illustration and not by way of limitation, and that the described construction is subject to wide variations and modifications without departing from the scope or intent of the present invention. For instance, a chromatic harmonica may be replaced by a harmonica of the regular type.

What is claimed is:

1. A harmonica, comprising a mouthpiece having equal uniformly disposed openings formed therein, a bar extending across said openings and separating them into uncovered portions and portions closed by said bar, a slide having openings formed therein, said slide being transversely movable in said mouthpiece, a sound-box below said slide, said mouthpiece and said slide forming an air chamber therebetween, two reed plates having reed slots formed therein and each located on opposite sides of said sound-box, said sound-box having openings formed therein in alignment with said reeds and in communication therewith, covers located on each of said reed plates and connected with said mouthpiece, said covers having a plurality of inner air chambers in communication with said mouthpiece air chamber, each of said cover air chambers being aligned with a pair of said reed slots and in communication therewith, reeds mounted on opposite sides of each of said reed plates and in said reed slots and in each pair of reed slots one of said reeds being connected to one side of one of said reed plates and the other of said reeds being connected to the opposite side of said reed plate, said reeds being connected with said reed plates at their lower ends and their upper and vibrating ends being situated adjacent said air chamber, a leaf spring extending through and intermediate the ends of one of said covers and having an end connected with said slide, whereby said slide is reciprocally movable transversely to the direction of said bar, and resilient means connected to the other of said covers and pressing against said slide.

FRED SONNEN.

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