Feb. 1, 1944. F. H. MAGNUS 2,340,333

HARMONICA

Filed July 25, 1942

Fig. 1

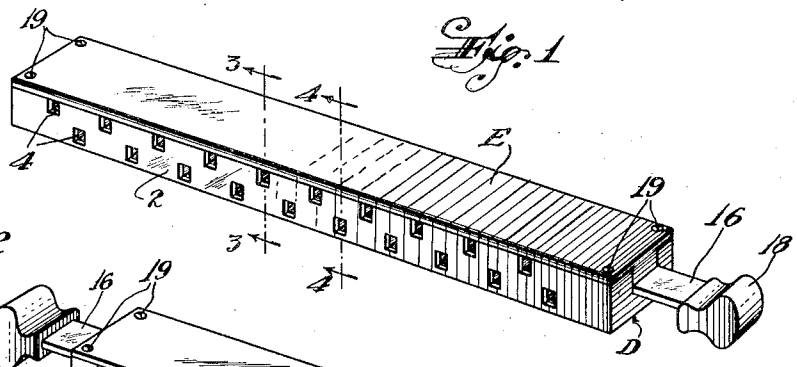


Fig. 2

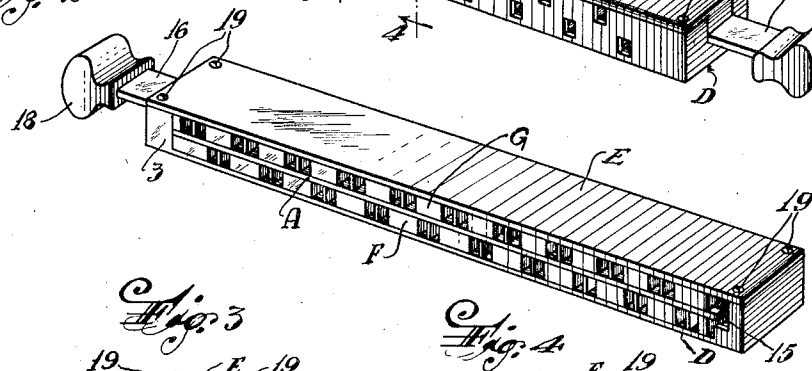


Fig. 3

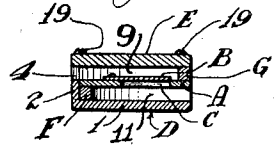


Fig. 4

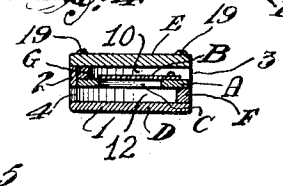


Fig. 5

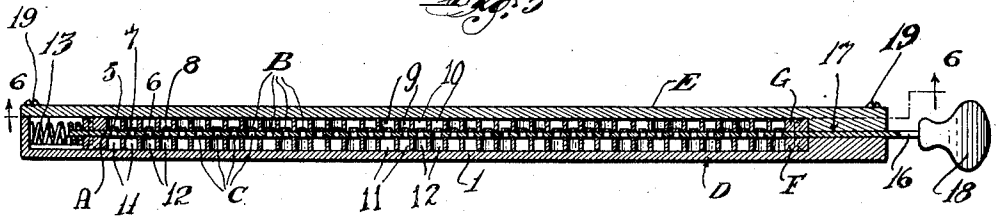
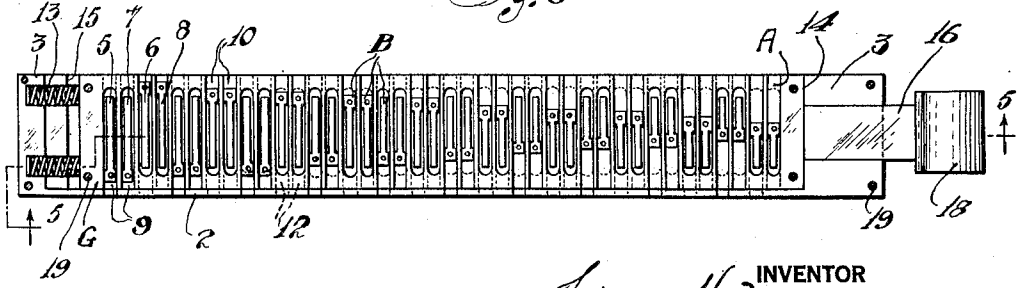


Fig. 6



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Patented Feb. 1, 1944

2,340,333

UNITED STATES PATENT OFFICE

2,340,333

HARMONICA

Finn H. Magnus, West Caldwell, N. J.

Application July 25, 1942, Serial No. 452,289

14 Claims. (Cl. 84—377)

This invention relates in general to wind instruments of the reed type and more particularly to a harmonica by which a chromatic scale can be played, and this application is a continuation in part of my copending application Serial No. 426,829 filed January 15, 1942.

Harmonicas have been devised by which a chromatic scale may be played, comprising two or more sets, banks or rows of wind cells and reeds and one or more slide valves or dampers so arranged that the full or natural tone cells or reeds are normally open or undamped and the full tone and half tone or sharp or flat cells or reeds can be closed or damped, alternately. However, such harmonicas are complicated and difficult to play and leave much to be desired in tonal quality.

One object of my invention is to provide a novel and improved harmonica which shall comprise a plurality of sets of reeds that may be tuned to different scales and a set of wind passages common to both sets of reeds, and a single means for causing selectively said sets of reeds to be subject to vibration by wind in said set of wind passages, whereby the harmonica shall be simple in construction, easily can be played, and shall have excellent tonal quality.

Another object is to provide a harmonica that shall embody novel, and improved, simple and inexpensive features of construction whereby full tones can be played singly and alone or half tones can be played singly and alone with a minimum of difficulty and skill and without special "tonguing."

A further object is to provide a novel and improved construction and combination of a reed plate, wind cell blocks and a mouth-piece whereby vibration of the reeds of the different musical scales selectively can be controlled by simple reciprocation of the reed plate and wind cell blocks relatively to the mouthpiece.

Other objects, results and advantages of the invention will be brought out by the following description in conjunction with the accompanying drawing in which

Figure 1 is a perspective view of a harmonica embodying my invention, viewing the same from the front of the instrument.

Figure 2 is a similar view of the rear side of the instrument.

Figures 3 and 4 are transverse vertical sectional views on the lines 3—3 and 4—4 of Figure 1.

Figure 5 is a longitudinal vertical sectional view on the line 5—5 of Figure 6, and

Figure 6 is a plan view of the instrument with the cover removed along the line 6—6 of Figure 5.

Specifically describing the invention, the reference character A designates a reed plate which has a plurality of reeds B thereon each overlying a slot C. As shown, all of the reeds are mounted on the same side of the reed plate. The reed plate is mounted in a casing which includes a bottom section D and a top section E. The bottom section D includes a bottom wall 1, a front wall 2 and end walls 3, the front wall constituting the mouthpiece of the instrument and having a wind opening 4 for each two reeds B.

More specifically, the reeds are arranged in pairs, each pair including a "blow" or exhale reed 5 and a "draw" or inhale reed 6, and the wind opening 4 for each "blow" reed is arranged at one side of the reed plate while the wind opening 4 for each "draw" reed is disposed at the other side of the reed plate.

Where the instrument is intended to play the complete chromatic scale, the reeds are arranged in two sets, the reeds of each set being arranged in alternate and parallel relation to the reeds of the other set and the reeds of one set being tuned to the full tones while the reeds of the other set are tuned to the half tones.

More specifically, a half tone "blow" reed 7 is arranged alongside each full tone "blow" reed 5 and similarly a half tone "draw" reed 8 is arranged alongside each full tone "draw" reed 6.

Cooperating with the reed plate are two cell blocks F and G, one of which is secured to each side of the reed plate. Each cell block has slots each of which communicates with a reed slot in the reed plate and certain of which communicate with certain of said wind openings, while others open directly into the atmosphere. As shown, there is a slot 9 in the upper cell block G for each "blow" reed which is adapted to communicate with one of the wind openings 4 at the upper side of the reed plate. Also in said upper cell block G is a slot 10 for each "draw" reed which is adapted to communicate directly with the atmosphere at the rear side of the instrument. The lower cell block F has a slot 11 for each "blow" reed which is adapted to communicate with the atmosphere at the rear of the instrument; and said cell block also has a slot 12 for each "draw" reed, which is adapted to communicate with one of the wind openings 4 in the lower side of the reed plate.

The reed plate and the cell blocks F and G that are rigidly connected thereto are mounted to reciprocate together in the casing so as to permit the reeds corresponding to each wind opening selectively to be vibrated by wind passing through said wind opening. More particularly reciprocation of the reed plate and the cell blocks permits the sets of reeds selectively to be subject to vibration by wind in the wind passages formed by the wind openings 4 and the slots 9, 10, 11 and 12.

The reed plates and cell blocks normally are influenced to the right of the figures of the draw-

ings by compression springs 13 so that the slots corresponding to the full tone reeds will be in communication with the wind openings 4. Movement of the reed plate under influence of the springs is limited by engagement of the end of the reed plate with a shoulder 14 on one end wall 3 of the casing. Movement of the reed plate in the other direction is limited by engagement of the other end of the reed plate with a shoulder 15 on the other end of the casing. Desirably the reed plate has an extension 16 passing through an opening 17 in the casing and provided with a finger piece 18 outside the casing for manipulation of the reed plate.

The two sections D and E of the casing are separably held together in any suitable manner as by screws 19 and the top side of the upper cell block G and the lower side of the bottom cell block F slidably engage the inner surface of the top section E and the inner surface of the bottom wall 1 of the bottom section D with a substantially air tight contact to prevent excessive escape of air from the slots 9 to 12 inclusive.

With this construction, it will be observed that the slots 9 constitute wind cells for the "blow" reeds while the slots 10 constitute wind cells for the "draw" reeds; and the slots 11 constitute sound cells for the "blow" reeds while the slots 12 constitute sound cells for the "draw" reeds. Normally the wind cells for the full tone "blow" reeds are in communication with the corresponding wind openings 4, and similarly the sound cells for the full tone "draw" reeds are in communication with the corresponding wind openings 4. By sliding the reed plate and cell blocks to the left the wind cells for the full tone "blow" reeds and for the full tone "draw" reeds are closed by the portions of the wall 2 of the casing between the wind openings, and simultaneously the wind cells for the half tone "blow" reeds and the wind cells for the half tone "draw" reeds are brought into communication with the corresponding wind openings.

While I have shown and described the now preferred embodiment of the invention it should be understood that this is primarily for illustrating the principles of the invention and that many modifications and changes can be made in the details of structure of the harmonica without departing from the spirit or scope of the invention.

Having thus described my invention, what I claim is:

1. A harmonica comprising a body, a reed plate having two sets of sound reeds, the reeds of each set being arranged in alternate parallel relation to the reeds of the other set, there being wind passages for conducting air currents past said reeds, and means including a mounting of said reed plate for reciprocation to cause said sets of reeds selectively to be subject to vibration by wind in said passages.

2. A harmonica comprising a body, a reed plate having two sets of sound reeds. the reeds of each set being arranged in alternate parallel relation to the reeds of the other set, cell blocks having wind passages for said reeds, a mouthpiece having a set of wind openings, and means including a mounting of said reed plate for reciprocation to cause selectively said sets of reeds to be subject to vibration by wind from said set of wind openings in said mouthpiece.

3. In a harmonica, a body, a reed plate having two sets of sound reeds, the reeds of each set being arranged in alternate parallel relation to the reeds of the other set, a mouthpiece having a set of wind openings, means slidably mounting said reed plate on said body, and means cooperating with said reed plate and said wind openings to cause said sets of reeds selectively to be vibrated by wind in said set of wind openings.

4. In a harmonica, a body, a reed plate having two sets of reeds thereon, the reeds of each set being arranged in alternate parallel relation to the reeds of the other set, wind cell blocks having a set of wind passages for each set of reeds, a set of wind openings common to both sets of wind passages, and means mounting said reed plate and said cell blocks for reciprocation together so that upon movement of the reed plate in either direction one set of wind passages is moved into communication and the other set of wind passages is moved simultaneously out of communication with said wind openings.

5. A harmonica comprising a body, a reed plate having two sets of reeds, each set including "blow" reeds and corresponding "draw" reeds, the reeds of each set being arranged in alternate parallel relation to the reeds of the other set, there being one set of wind passages for all said "blow" reeds of both sets of reeds and another set of wind passages for all said "draw" reeds of both sets of reeds, and means for causing the "blow" reeds and corresponding "draw" reeds of one set of reeds to be subject to vibration by wind in the corresponding sets of wind passages and for simultaneously preventing vibration of the "blow" reeds and the "draw" reeds of the other set of reeds by wind in said sets of wind passages.

6. A harmonica comprising a reed plate having a plurality of pairs of reeds, each pair including a "blow" reed and a "draw" reed, and two cell blocks each secured upon one side of said reed plate, one cell block having a wind cell for each "blow" reed and a sound cell for each "draw" reed and the other cell block having a sound cell for each "blow" reed and a wind cell for each "draw" reed, a casing enclosing said reed plate and cell blocks and having a mouthpiece containing wind openings one for the wind cell of each "blow" reed and one for the sound cell of each "draw" reed.

7. A harmonica comprising a reed plate having two sets of reeds, each set including a plurality of pairs of reeds, each pair including a "blow" reed and a "draw" reed, the reeds of each set being arranged in alternate parallel relation to the reeds of the other set, and two cell blocks each secured upon one side of said reed plate, one cell block having a wind cell for each "blow" reed and a sound cell for each "blow" reed and a wind cell for each "draw" reed, a casing enclosing said reed plate and cell blocks and having a mouthpiece containing wind openings one for the wind cell of each "blow" reed and one for the sound cell of each "draw" reed, said sets of reeds being tuned to different scales, and means mounting said reed plate and said cell blocks for reciprocation together relatively to said mouthpiece for establishing communication of the wind cells of the "blow" reeds and the sound cells of the "draw" reeds of either set of reeds with their respective said wind openings and for simultaneously preventing communication of the wind cells of the "blow" reeds and the sound cells of the "draw" reeds of the other set with said wind openings.

8. A harmonica including a casing, a reed plate within said casing having a plurality of pairs of reeds and a slot for each reed, each pair of reeds comprising a "blow" reed and a "draw" reed, said casing having a mouthpiece containing a wind opening for each "blow" reed at one side of the reed plate and a wind opening for each "draw" reed at the other side of said reed plate, a wind cell at one side of said reed plate and a sound cell at the other side thereof for each reed, each said wind cell of a "blow" reed and each sound cell of a "draw" reed communicating at one end with the corresponding reed slot in the reed plate and communicating at the other end with one of said wind openings, and each said sound cell of a "blow" reed and each wind cell of a "draw" reed communicating at one end with the corresponding reed slot and at its other end opening directly into the atmosphere.

9. A harmonica including a casing, a reed plate within said casing having a plurality of pairs of reeds and a slot for each reed, each pair of reeds comprising a "blow" reed and a "draw" reed, said casing having a mouthpiece containing a wind opening for each "blow" reed at one side of the reed plate and a wind opening for each "draw" reed at the other side of said reed plate, a cell block secured to each side of said reed plate, each block having slots each of which communicates with a reed slot in the reed plate and certain of which communicate with certain of said wind openings while others open directly into the atmosphere, there being a slot that communicates with a wind opening disposed at one side of the reed plate for each reed and a slot that opens directly into the atmosphere disposed at the other side of the reed plate for each reed.

10. The harmonica set forth in claim 9 wherein there is an additional "blow" reed for each wind opening at one side of the reed plate and an additional "draw" reed for each wind opening at the other side of the reed plate, said additional reeds being tuned to a scale different from that of the first-mentioned reeds, and with the addition of means for reciprocably mounting said reed plate and cell blocks in said casing for establishing selectively communication between said wind openings and the corresponding slots.

11. A harmonica including a casing, a reed plate in said casing, a plurality of pairs of reeds mounted on said plate, each pair including a "blow" reed and a "draw" reed, said pairs of reeds corresponding in number and being tuned to the notes of the complete chromatic scale, certain pairs corresponding to the natural tones and other pairs representing the half tones, there being a wind passage within said casing for each reed and said casing having a mouthpiece containing wind openings each in common to the wind passages of one natural tone reed and one half tone, and means including a mounting of said reed plate for reciprocation to cause selectively said wind passages for the natural tone reeds and said wind passages for the half tone reeds to communicate with the respective wind openings.

12. A harmonica comprising a casing having wind openings therein, a reed plate having two reeds for each said wind opening, and means including a reciprocable mounting of said reed plate for causing said reeds corresponding to each wind opening selectively to be vibrated by wind passing through said wind opening.

13. A harmonica comprising a casing having a mouthpiece that contains a plurality of wind openings, a reed plate reciprocably mounted in said casing and having full tone reed and a half tone reed for each wind opening, and means cooperating with said reed plate for causing said full tone reed and said half tone reed for each wind opening selectively to be vibrated by wind passing through said wind opening.

14. A harmonica including a casing, a reed plate having wind slots and "blow" reeds and "draw" reeds alternately arranged on the same side of said plate each mounted over one of said slots, there being grooves in said casing at each side of said reed plate one for each of said reeds, alternate grooves at one side of said plate opening respectively through the front and rear edges of the casing and the corresponding grooves at the other side of the plate opening respectively through the rear and front edge of said casing.

FINN H. MAGNUS.