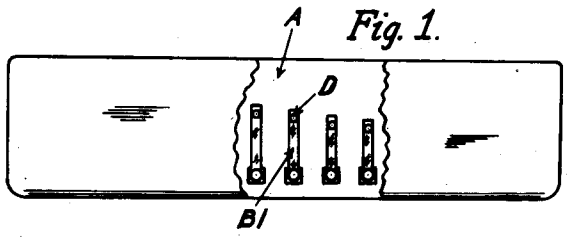
May 27, 1941. F. F. TAYLOR ET AL 2,243,542

HARMONICA

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Fig. 1.



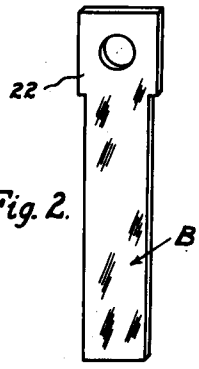


Fig. 2.

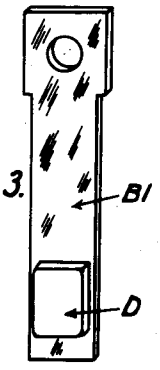


Fig. 3.

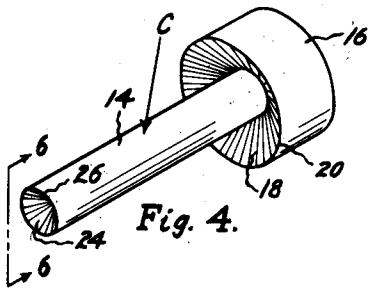


Fig. 4.

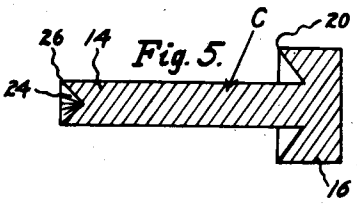


Fig. 5.

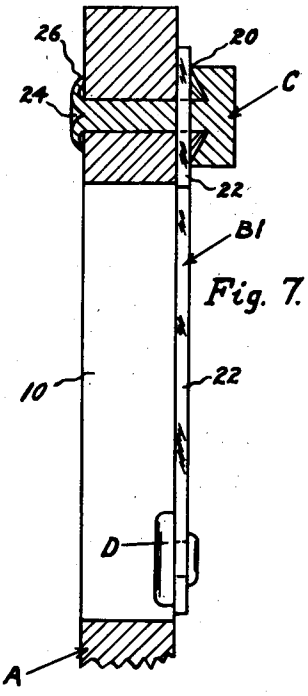
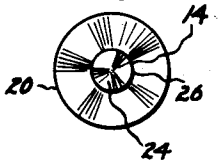


Fig. 7.

Fig. 6.



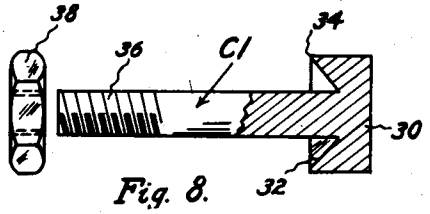


Fig. 8.

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HARMONICA

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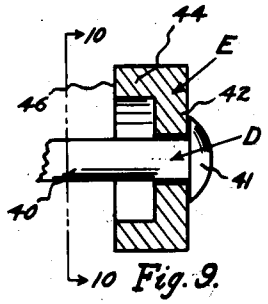


Fig. 9.

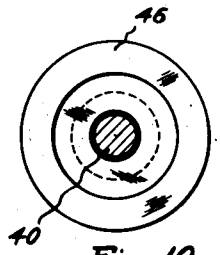


Fig. 10.

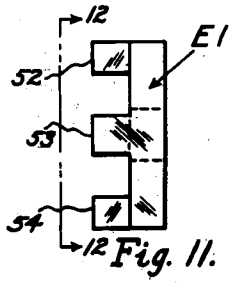


Fig. 11.

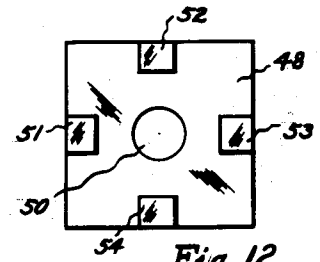


Fig. 12.

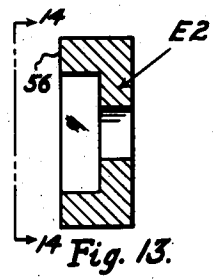


Fig. 13.

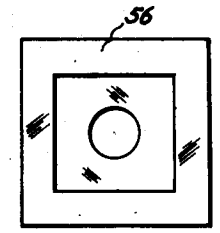


Fig. 14.

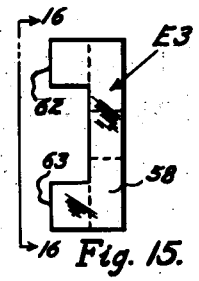


Fig. 15.

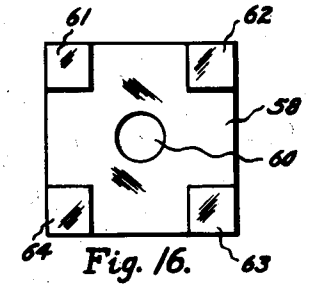


Fig. 16.

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UNITED STATES PATENT OFFICE

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HARMONICA

Frank F. Taylor and Otto K. Cazin,
Philadelphia, Pa.

Application July 12, 1939, Serial No. 283,981

3 Claims. (Cl. 84—363)

Our invention relates to musical instruments and relates more particularly to a harmonica.

Heretofore, harmonicas have been made wherein (1) the vibrating reed has been tapered, or (2) wherein the reed has been ground in its central portion and a corner of the free end has been removed by filing in order to change the sound pitch. The reeds aforementioned usually have been held to the reed block or reed plate by a solid rivet or bolt. The necessity of grinding the hollowed central portion of the reed or the corner or to taper the reed to produce good tone quality makes harmonicas expensive.

It is an object of our invention to provide a harmonica wherein the tone quality is clear.

Another object of our invention is to provide in a harmonica a reed which is of uniform thickness and which may be accurately stamped from a sheet.

Another object of our invention is to hold the reed to the reed block so that the reed is clamped to the block at a predetermined point or line by a suitable fastener for the purpose of always making the vibrating length of the reed a constant predetermined value.

Another object of our invention is to provide reeds made from thin sheet reed material wherein the hard outer skin is not disturbed or altered.

Other objects of our invention are to provide an improved device of the character described, that is easily and economically produced, which is sturdy in construction and which is highly efficient in operation.

With the above and related objects in view, our invention consists in the following details of construction and combination of parts, as will be more fully understood from the following description, when read in conjunction with the accompanying drawings, in which—

Fig. 1 is a fragmentary side elevational view of a harmonica embodying our invention.

Fig. 2 is a perspective view of a reed embodying our invention.

Fig. 3 is another embodiment of our reed invention.

Fig. 4 is a perspective view of a holding bolt embodying another embodiment of our invention.

Fig. 5 is a longitudinal cross-sectional view through the holding bolt illustrated in Fig. 4 taken on the line 5—5.

Fig. 6 is an end view taken on the line 6—6 of Fig. 4.

Fig. 7 is a fragmentary sectional view showing the improved fastener holding the constant thickness reed against the reed block.

Fig. 8 is a fragmentary sectional view of a modified embodiment of the holding screw and nut.

Fig. 9 is a fragmentary sectional view of a holding washer and a solid rivet.

Fig. 10 is a view taken on the line 10—10 of Fig. 9.

Fig. 11 is an end view of another embodiment of a holding washer.

Fig. 12 is a view taken on the line 12—12 of Fig. 11.

Fig. 13 is a fragmentary sectional view of another embodiment of our holding washer.

Fig. 14 is a view taken on the line 14—14 of Fig. 13.

Fig. 15 is an end view of still another modification of a holding washer.

Fig. 16 is a view taken on the line 16—16 of Fig. 15.

Referring now to the drawings in detail, we show a reed holding frame or reed block, generally designated as A. The reed block usually constructed of metal is of general rectangular formation with a plurality of vertically arranged slots 10 therein. The slots usually are of different lengths for the purpose of complementing reeds, each of which is generally designated as B. Each reed B vibrates within a complementary slot, and the vibration of the reed vibrates the air thereby resulting in the creation of sound. Each of the reeds B are stamped of reed material of a constant thickness having a hard skin, so that the reeds will maintain a constant temper and emit a pure tone. The hard skin on the reed material is relatively hard compared to the interior of the reed and is brought about by suitable heat treatment during the fabrication of the metal.

Heretofore, it has been customary to have the reed either tapered or of a hollowed intermediate portion which necessitated grinding, and, of course, grinding a small reed requires considerable time and care in order to secure accuracy. If a constant thickness reed were employed with the old type of rivet or fastener, a true tone could not be produced, because the rate of vibration of the reed would not be a definite value, and it is known that musical tones depend on the rate of frequency of vibration of the air.

We have discovered that a reed of predetermined constant dimensions and predetermined constant thickness could be employed to emit a predetermined note, provided it is held at a pre-

determined point or line contact against the reed block. Thus, we provide a predetermined and constant length of vibrating reed.

Thus, we devised a holding bolt, generally designated as C, so that the head of the bolt or fastener contacts a portion of the planar face of the reed along substantially a circular line contact. The holding bolt C has a shank **14** which pierces the reed and the reed block and an enlarged head **16**.

The inside surface **18**, or side of the bolt head placed adjacent the reed, of the bolt head **16** is hollowed in a cone-like manner so that an outside edge **20** may engage a portion of the surface **22** of the reed B on a line which is defined by the periphery or rim edge of the bolt head **16**. The free end of the shank **14** of the bolt C is hollowed or conically shaped, as at **24**, so that the end or edge **26** can be easily expanded to hold the reed block and the reed together, as is shown in Fig. 7, after the end has been peened over or expanded. By having a line contact, it should be apparent, as Fig. 7 is viewed, that the vibration of the reed B1, which is a modification of the reed B, will occur at a very sharp line, that is a sharp line is caused by the edge **20** pressing against the reed.

In the prior art the solid rivets or bolts would not hold the reed to the reed block because the junction of the bolt head and the shank is usually not clearly cut, and the result was that the contact of the bolt head against the reed varied in different instruments.

With our invention, a clear and accurate tone is reproduced with a reed of constant thickness and which is held at substantially aligned contact.

In Fig. 3 we show a modification of our invention wherein a constant thickness reed has a weight, generally designated as D, placed thereon. In Figs. 3 and 7, the weight D is shown as though it were held in the free end of the reed in a rivet fashion. However, the weight D placed at the end of the reed may be held to the reed by solder, a rivet, spot welder, or any other suitable way.

In Fig. 8 is shown a bolt, generally designated as C1, having an enlarged head **30** and an inwardly inclined surface **32** leaving a square or circular edge **34** which is adapted to contact the reed. A plurality of threads **36** at the free end are adapted to cooperate with a nut **38**. Thus, the screw C1 pierces aligned openings in the reed block and is tightened in position by the nut **38**.

In Fig. 10 we show a solid holding rivet, generally designated as D, which has a shank **40** and an enlarged head **42**. A washer, generally designated as E, is adapted to be pressed against the outer flat face of the vibrating reed so that the washer E is of cup-shape having a substantially ring-like base **42** and a flange **44**. The flat surface **46** of the flange **44** is adapted to abut against a portion of the vibrating reed. The holding rivet D holds the washer, the reed, and the reed block together after its ends have been expanded.

In Figs. 11 and 12 we show another modification of a washer E1 which may be used in lieu of the washer E and which has a base **48** and an opening **50** therein. From the outer edge of the base **48** are four extensions or lugs **51**, **52**, **53** and **54**.

In Figs. 13 and 14 is shown another embodiment of a holding washer, designated as **E2**, which is similar to the construction of the washer in Figs. 9 and 10 but wherein the washer is square instead of circular. There is a flange **56**.

In Figs. 15 and 16 we show another modification of a washer, generally designated as **E3**, wherein the base **58** is flat, and a central opening **60** enables a holding rivet to pass therethrough, and at each of the corners **61**, **62**, **63** and **64** are short lugs or projections. Each of the lugs are spaced from one another.

The purpose of showing the separate extensions on the washers is that different machines may be used to manufacture the different washers where desired.

The washers E, E1, E2, and E3 hold the reed in a definite point, thereby enabling a clear and accurate tone to be reproduced in a harmonica with a reed of constant thickness.

Thus, with our invention we can produce an inexpensive harmonica wherein the tones are clear and accurate.

Although our invention has been described in considerable detail, such description is intended as illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

We claim as our invention:

1. A mouth organ comprising a reed block having a plurality of parallel slots therein, a plurality of reeds complementary to said slots, each reed being of a constant thickness and having a hard skin thereon, a plurality of openings in said reed block wherein each opening is above each slot, a fastener passing through said reed block and a reed to hold the reed to the reed block, said fastener having an enlarged head, and only the outer edge of the enlarged head of the fastener engaging said reed at a position between the opening wherein it is and its complementary slot.

2. A mouth organ comprising a reed block having a plurality of parallel slots therein, a plurality of reeds complementary to said slots, each reed being of constant thickness and having a hard skin thereon, a plurality of openings in said reed block wherein each opening is above each slot, a fastener retaining a reed and the reed block together, and said fastener pressing against the outer portion of the reed which it holds on substantially a line contact between the opening through which it passes and its complementary slot.

3. A harmonica musical instrument, a reed block having a rectangular slot and a hole in said block adjacent to one of the short sides of said slot, a T-shaped musical reed of uniform thickness throughout having a hole in the T-head of said reed arranged for alignment of said reed with the hole and slot in said reed block, a fastener including a head making a line pressure contact securing said reed to said block, the head of said fastener making a line pressure contact between said reed plate slot and said reed hole, and said line pressure contact being at a fixed constant distance from the center of said fastener.

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