Nov. 14, 1939. C. J. DAVIES 2,179,993

HARMONICA

Filed Aug. 16, 1937 4 Sheets-Sheet 1

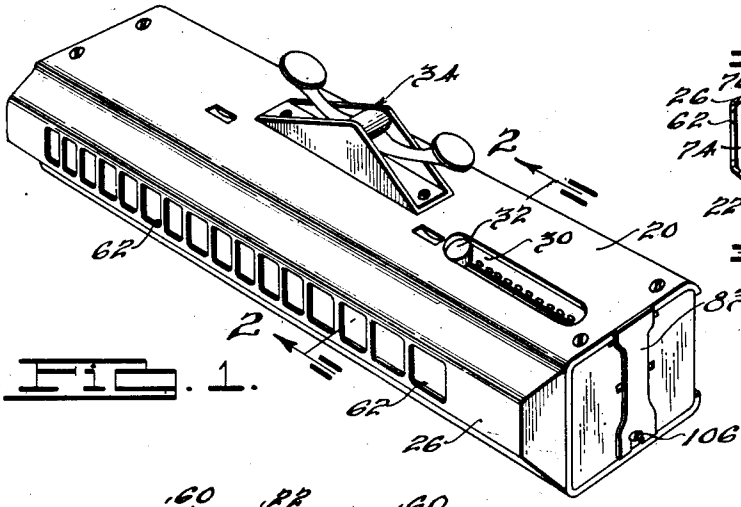


FIG. 1.

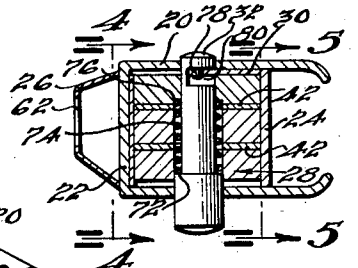


FIG. 2.

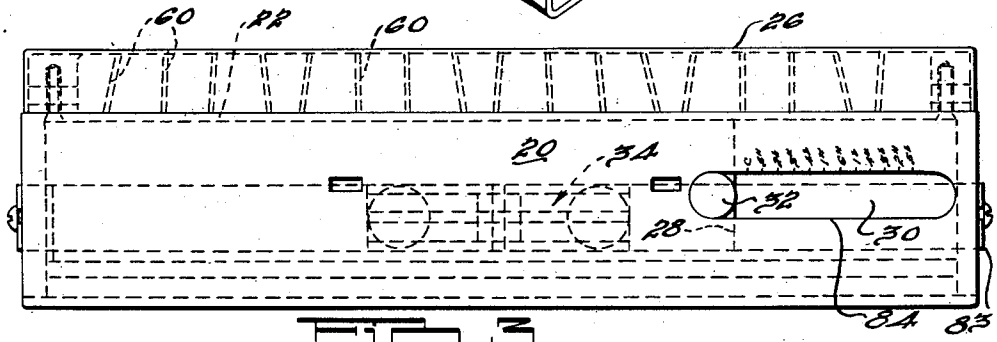


FIG. 3.

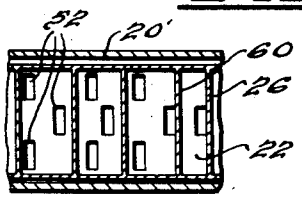


FIG. 4.

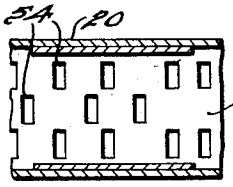


FIG. 5.

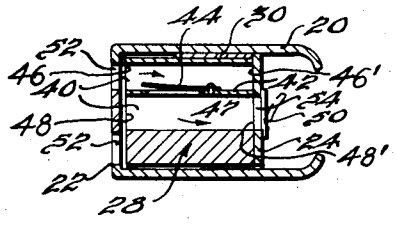


FIG. 6.

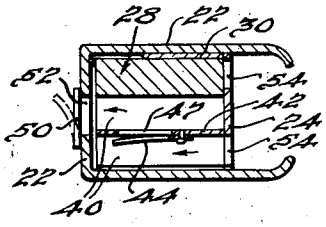


FIG. 7.

INVENTOR
Clarence J. Davies.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

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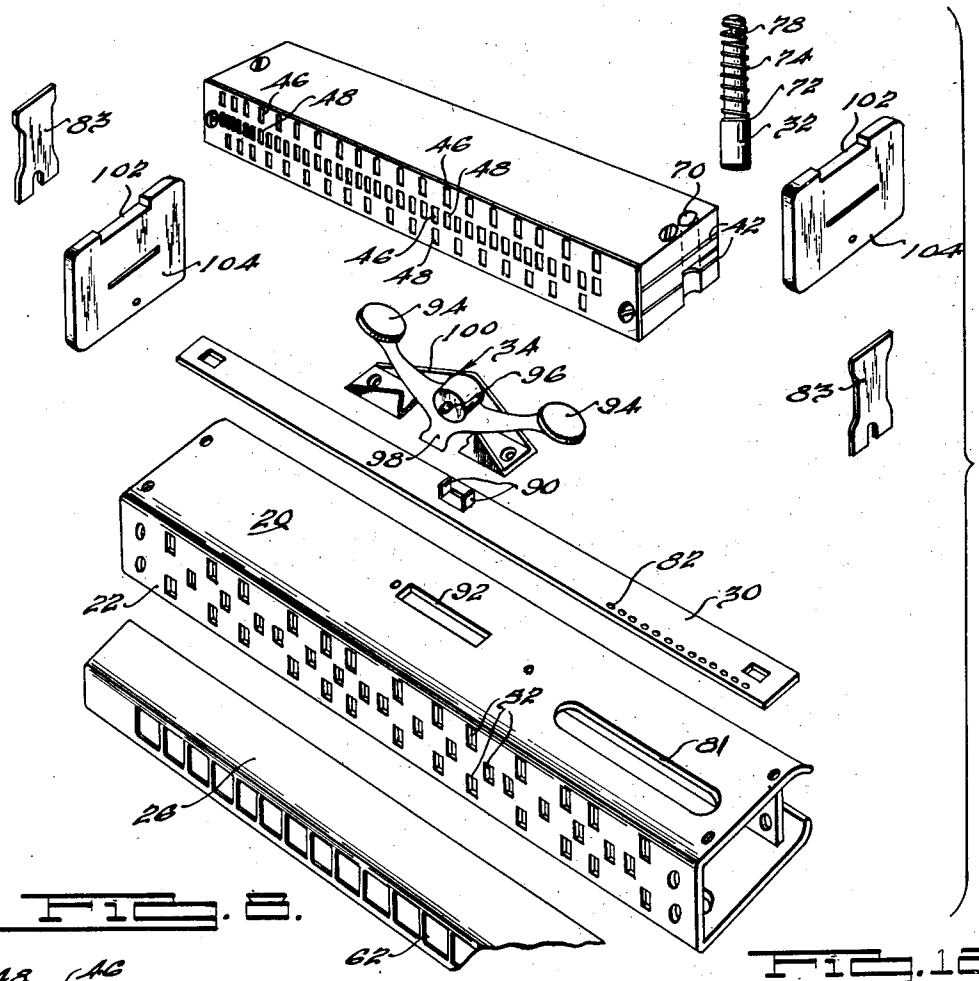


FIG. 8.

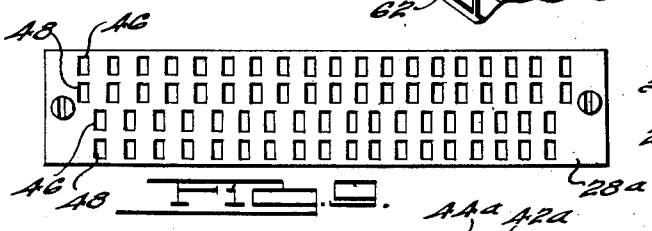


FIG. 9.

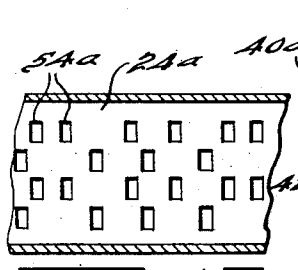


FIG. 13.

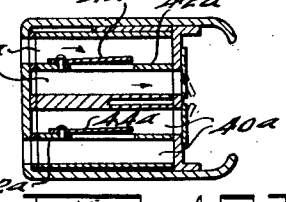


FIG. 10.

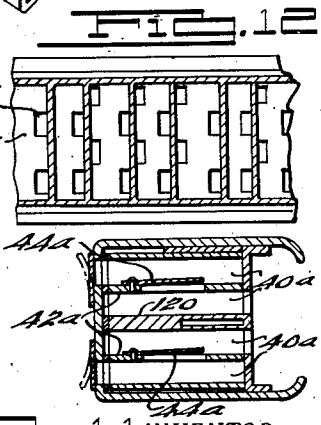


FIG. 11.

FIG. 12.

INVENTOR
Clarence J. Davies.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

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HARMONICA

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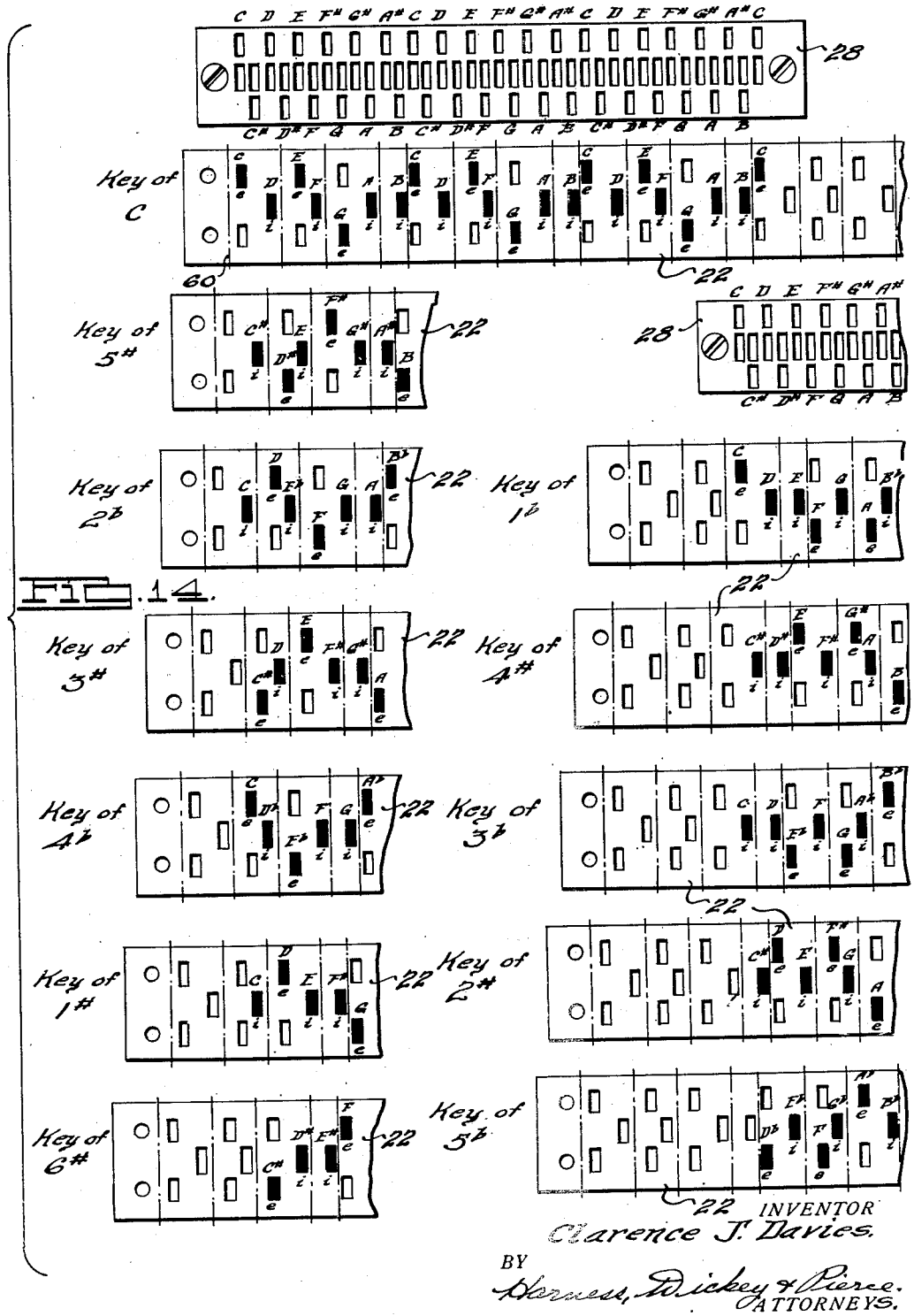


Fig. 14.

INVENTOR
Clarence J. Davies.

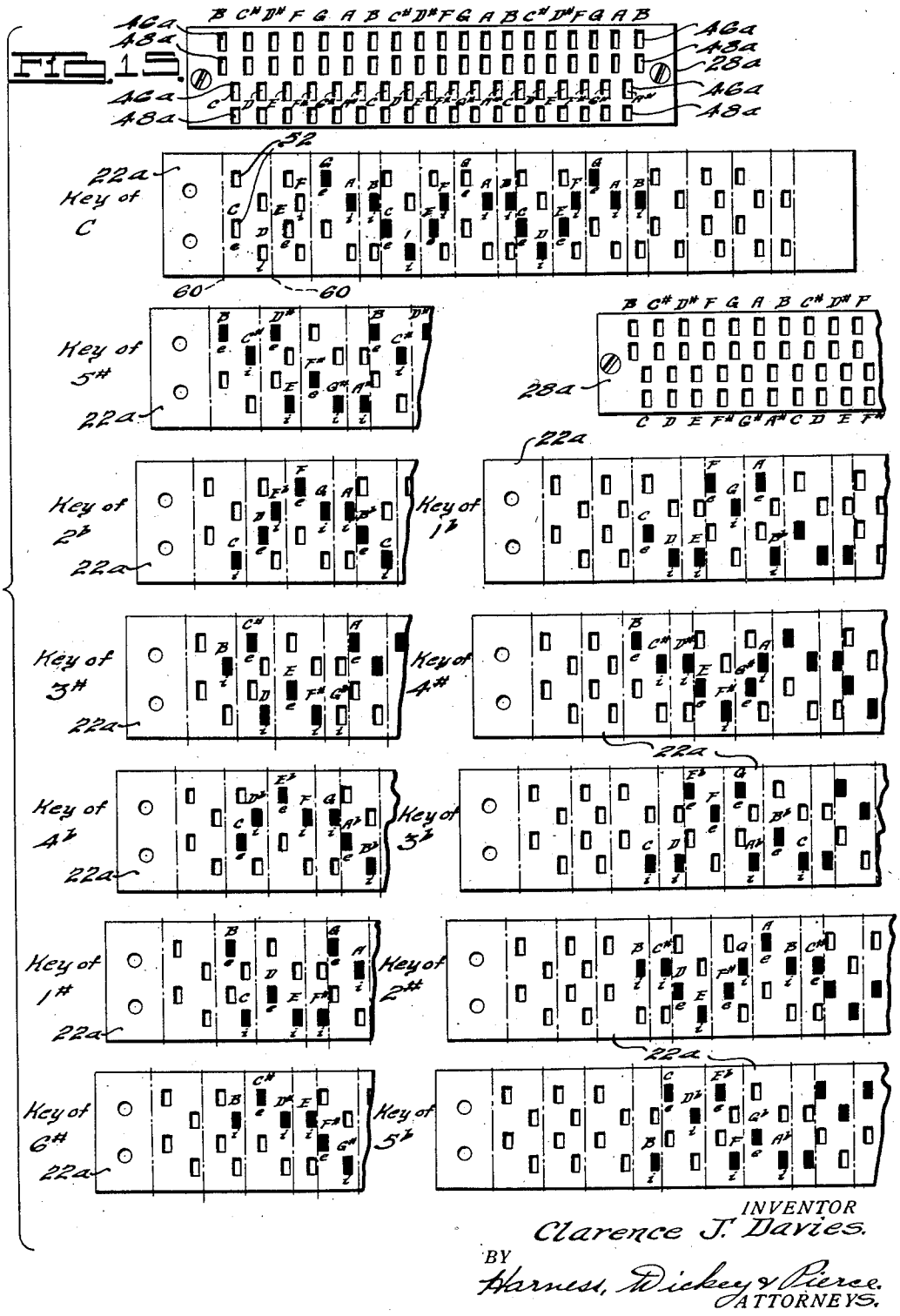
BY
Harness, Dickey & Pierce.
ATTORNEYS.

Nov. 14, 1939. C. J. DAVIES 2,179,993

HARMONICA

Filed Aug. 16, 1937 4 Sheets-Sheet 4

FIG. 15.



INVENTOR
Clarence J. Davies.

BY
Harness, Dickey & Pierce.
ATTORNEYS.

Patented Nov. 14, 1939 2,179,993

UNITED STATES PATENT OFFICE

2,179,993

HARMONICA

Clarence J. Davies, Detroit, Mich.

Application August 16, 1937, Serial No. 159,221

14 Claims. (Cl. 84—377)

The present invention relates to improvements in harmonicas or mouth organs, and in particular provides an improved harmonica characterized as embodying means whereby it may be adjusted to play in any key, and as embodying additional means by which it may be adjusted to play any note in any key one-half tone higher or lower without altering the position of the mouth on the mouthpiece or changing the direction of the breath.

Objects of the present invention are to provide a harmonica having characteristics as above indicated, which is simple and compact in structure, and which may be easily and rapidly adjusted; to provide such a harmonica embodying a key setting device, through the manipulation of which the harmonica may be set to play a diatonic scale in any selected key, and embodying a chromatic adjustment by which any note in any diatonic scale may be played a half-tone higher or a half-tone lower without altering the position of the mouth upon the mouthpiece or without altering the direction of the breath; to provide such a harmonica in which the operation of the chromatic adjusting means does not alter the adjustment of the key setting means; to provide such a harmonica in which the key setting means is provided with means for releasably holding the parts in positions corresponding to each selected key and is also provided with a graduated scale to facilitate the adjustment to a particular key; and to provide such a harmonica in which the chromatic adjusting means comprises primarily a finger operated element which upon movement to a limit position in one direction causes any note to be played a half-tone higher, and upon movement to a limit position in the other direction, causes any such note to be played a half-tone lower.

Further objects of the invention are to provide a harmonica embodying a casing provided with a mouthpiece, and embodying a reed bank slidable within the casing to selected positions with reference to the mouthpiece; to provide such a harmonica embodying baffle plates at the front and rear side of the reed bank, which are fixed in position relative to the mouthpiece, and which determine which of the reeds of the reed bank are effective, corresponding to each slidable position of the reed bank; to provide such a harmonica in which the key setting means serve to determine the position of the reed bank within the casing, and, in conjunction with the baffle plates, serves to render effective the reeds corresponding to the diatonic scale in the selected key; to provide such a harmonica in which the several reeds of the reed bank may be played either by inhaling or exhaling the breath, the effective direction of the breath being determined by the front and rear baffle plates; and to provide such a structure in which the chromatic adjustment serves to effect a sufficient shifting of the reed bank, independently of the position of the key setting means, to cause any particular note to be played a half-tone higher or a half-tone lower, without altering the position of the mouth on the mouthpiece or without changing the direction of the breath.

With the above and others as well as more specific objects in view, which appear in the following description and in the appended claims, preferred but illustrative embodiments of the invention are shown in the accompanying drawings, throughout the several views of which corresponding reference characters are used to designate corresponding parts and in which:

Figure 1 is a view in perspective of a harmonica embodying the invention;

Fig. 2 is a view in vertical transverse section taken along the line 2—2 of Fig. 1;

Fig. 3 is a view in bottom plan of the harmonica;

Fig. 4 is a fragmentary view in vertical section taken along the line 4—4 of Fig. 2;

Fig. 5 is a fragmentary view in vertical section taken along the line 5—5 of Fig. 2;

Figs. 6 and 7 are detail views in vertical transverse section, illustrating the arrangement for rendering a selected reed responsive only to an exhalation or an inhalation of the breath;

Fig. 8 is an exploded view showing clearly the several structural elements embodied in the improved harmonica;

Fig. 9 is a view in front elevation of a modified construction of reed bank;

Figs. 10 and 11 are views in transverse section showing the arrangement of the reed chambers in the reed bank of Fig. 9;

Figs. 12 and 13 are fragmentary views of the front and rear baffle plates which may be used in connection with the reed bank of Fig. 9; and,

Figs. 14 and 15 are diagrammatic views illustrating respectively the actions of the embodiment of Figs. 1 through 8, and of the embodiment of Figs. 9 through 13.

Referring first to Figs. 1 through 8, the harmonica comprises generally a casing 20, provided with front and rear baffle plates 22 and 24, respectively; a mouthpiece 26, adapted to be secured to the casing 20 over the front baffle plate

22; a reed bank 28, which is longitudinally slidable within the casing 20; a key shifting plate 30, which, in conjunction with the detent 32, is effective to cause the shifting of the reed bank 28; and a chromatic adjusting element 34, which may be actuated in one direction or the other to effect the bodily shifting of the reed bank 28 and the shifter plate 30 within the casing 20, so as to cause any note to be played a half-tone higher or a half-tone lower.

The reed bank 28 is a generally rectangular structure which is suitably partitioned into upper and lower series of reed chambers 40. Each such chamber is provided with a reed 44 individual to it. Upper and lower divider plates 42 are provided to support the reeds, and are provided with openings 47 therethrough, immediately below the positions of the reeds. It will be appreciated that each reed 44 can be sounded only by passing air from the side of the reed plate on which the reed is located to the other side thereof. The front wall of the reed bank 28 is provided with an upper opening 46 and a lower opening 48 individual to each reed chamber, and the rear wall thereof is provided with correspondingly positioned upper and lower openings 46' and 48' individual to each chamber. Each reed chamber is, therefore, open at both the front and rear sides of the reed bank, both above and below the level of the reeds, and the purpose of the baffle plates 22 and 24, as described below, is to close off one such reed chamber opening at each side of the reed bank and determine whether a particular reed is to be sounded by exhaling or inhaling the breath.

It will be appreciated that the total number of the reeds 44, as well as the frequency interval between successive reeds is determined primarily by the desired range of the harmonica, as well as by the individual notes in such range which it is desired to play. In the present instance, thirty-seven reeds are provided for in the reed bank, representing one note in excess of three full chromatic octaves, so that, by successively sounding all of the reeds, all full and half-tones appearing in three full octaves plus an additional note may be produced. The positioning of the several reeds relative to each other is identified in Fig. 14, and is described with reference to such figure.

As mentioned above, the purpose of the front and rear baffle plates 22 and 24 is to selectively close off and open the several reed chambers, and to determine the direction of the breath required to sound the successive reeds. The baffle plates are fixed in position relative to the casing 20 as well as relative to the mouthpiece 26. The front baffle plate is provided with a series of openings 52, and the rear baffle plate is provided with a corresponding series of openings 54, the relation between the openings 52 and 54 being such that when an opening 52 registers with and so exposes one of the lower openings 46 of the reed bank 28, the corresponding opening 54 of the rear baffle plate exposes the upper opening at the opposite side of the said reed chamber. Similarly, if one of the front baffle openings 52 exposes an upper front opening associated with a particular reed chamber, the corresponding rear baffle plate opening 54 exposes the opposite lower opening for the same reed chamber. Thus, as appears in Fig. 6, a front baffle plate opening 52 is in registry with and exposes an upper reed chamber opening 46, and the corresponding rear baffle plate opening 54 registers with and exposes the lower opening at the opposite end of the same reed chamber. The lower front opening and the rear upper opening of the same reed chamber are, however, closed off by the front and rear baffle plates 22 and 24, respectively. As above noted, the reeds 44 respond only to an air flow from the side of the plate 42 on which the reed is located. Accordingly the reed 44 of Fig. 6 responds only to an air flow in the direction indicated by the arrows, caused by exhaling the breath. The opposite relation is indicated in Fig. 7, in which the reed 44 responds only to an inhalation of the breath. Depending upon the position of the reed bank within the casing 20, accordingly, any particular reed may be sounded either by inhaling or exhaling the breath. It is noted that to avoid air leakage the center series of baffle plate openings 52 and 54 are furnished with conventional flapper valves 50.

The mouthpiece 26 is provided with inner separating walls 60, which cause each mouth opening 62 to continuously register with a fixed series of openings 52 in the front baffle plate 22. The relation between the lateral spacings of the openings 52 and the lateral spacings between the openings associated with the reed chambers in the reed bank may best be understood with reference to Fig. 14, described below.

The means for shifting the reed bank 28 longitudinally of the casing 20, so as to correspondingly determine which of the reed chambers are exposed by the baffle plates, and so as to adjust the key of the instrument, comprises the shifter plate 30. The shifter plate 30 is received between the upper wall of the reed bank 28 and the upper surface of the casing 20, as clearly appears in Figs. 2, 4 and 5, and the detent 32 is received in an opening 70 provided therefor adjacent one end of the reed bank 28. The casing 20 is provided with upper and lower slots 81 and 14 through which the ends of the detent 32 project. The detent 32 is provided with a shoulder 72, and a compression spring 74 is seated between this shoulder and a corresponding shoulder 76 formed in the body of the reed bank. Spring 74 thus continuously urges the detent 32 to the position shown in Fig. 2, in which the pin 78 carried thereby and which projects into a U-shaped recess 80 formed therein, is received in one of a series of key openings 82 formed adjacent the end of the shifter plate 30. The shifter plate 30 is normally retained in a fixed position relative to the casing 20 by the springs 83 associated with the ends thereof. The pin 78 associated with the detent 32, by being passed through a selected one of the holes 82 in the shifter plate 30 correspondingly holds the reed bank 28 in a selected position of adjustment. To shift the reed bank 28, the detent 32 may be forced upwardly as viewed in Fig. 2 against the force of the spring 74, withdrawing the pin 78 from a hole 82, and releasing the reed bank for movement within the casing 20. It will be appreciated that one of the holes 82 is provided corresponding to each key in which the harmonica is adapted to play. In the present instance, all keys are represented, so that a total of 12 key holes 82 is provided.

As described below with reference to Fig. 14, the left-hand hole 82 as viewed in Fig. 8 corresponds to the key of C, the next adjacent hole corresponds to the key of 5♯, and the right-hand limit hole 82 corresponds to the key of 5♭. Intermediate holes correspond to intermediate keys. To facilitate adjustment of the instrument to any selected key, the casing 20 is preferably scribed with reference characters corresponding to the several keys. Also, as indicated in Fig. 3, the de-

tent 32 is positioned immediately adjacent the end of the reed bank 28, and the index lines on the casing 20 are positioned to register with the extreme end of the reed bank 28. Accordingly, a comparison at any time between the index lines and the position of the end of the reed bank 28, which is visible through the lower slot 84 in the casing 20, determines the key for which the instrument is set.

As previously mentioned, the chromatic adjustment comprises the element 34, which may be actuated at any time to bodily shift both the shifter plate 30 and the reed bank 28 by an amount sufficient to cause any note to be sounded one half-tone higher or one half-tone lower. To provide this operation, the shifter plate 30 is provided with a pair of spaced upstanding lugs 90, which register with and project through a slot 92 formed in the upper surface of the casing 20. The shifting device 34 comprises a pair of oppositely arranged finger holds 94 carried upon a pin 96, and having a depending lug 98, which is received between the projections 90. The pin 96 is journalled in a yoke 100, suitably and removably secured to the upper surface of the casing 20. With this relation, it will be appreciated that by rotating the chromatic adjustment 34 in a clockwise direction as viewed in Figs. 1 and 8, the lug 98 engages the left-hand projection 90 and forces the shifter plate a corresponding distance to the left. By virtue of the detent connection, this movement of the shifter plate causes a corresponding movement of the reed bank 28. On the other hand, by rotating the chromatic adjustment 34 in a counter-clockwise direction as viewed in Fig. 8, an opposite movement of the shifter plate 30 and the reed bank 28 is effected. The shifter plate 30 is of substantially the same length as the casing 20, and the ends of the shifter plate are normally exposed through slots 102 formed in the end closure plate 104, for engagement by the previously mentioned springs 83. These springs are removably secured to the end closure plate 104, as by screws 106. The springs 83 are relatively stiff, and are effective to maintain the shifter plate 30 in centered relation in opposition to any stresses which may be incident to the shifting of the key setting. Springs 83 may be distorted, however, when the chromatic device 34 is shifted by pressing upon either of the finger holds 94. Upon releasing either finger hold, one or the other of the springs 83 becomes effective to return the shifter plate 30 and the reed bank 28 to the position corresponding to the key setting of the instrument. The chromatic adjustment 34 is proportioned to cause a movement of the reed bank which is equal to the movement thereof which is caused when the instrument is changed from one key to the next adjacent key.

Remaining details of the construction of the embodiment of Figs. 1 through 8 may best be considered with reference to the diagrammatic view of Fig. 14. In Fig. 14, the reed bank 28 is shown at the top of the page, and from previous description, it will be recalled that each pair of openings 46 and 48 correspond to a particular reed. The note to which each such reed corresponds is indicated by the characters appearing adjacent each such pair of openings, from which it will be noted that all tones and half-tones occurring in three octaves and an additional note are provided for in the reed bank. The front baffle plate 22 is shown immediately below the reed bank 28, in the longitudinal position the reed bank 28 occupies relative to the plate 22 when the harmonica is set for the key of C. In such positioning of the parts, it will be noted that the two lower openings 52 corresponding to the first mouth opening 62 of the instrument are in vertical registry with the reeds corresponding to the notes C and D in the reed bank 28. This relation is indicated by the blacked-in front baffle plate openings corresponding to the active reeds C and D. It will further be noted that the baffle plate 22 is in a position to close off the lower reed opening 48 associated with the note C and to open the upper reed opening 46 associated with the note C. On the other hand, the baffle plate 22 is in a position to close off the upper reed opening associated with the note D and to expose the lower reed opening associated with the note D. Accordingly, as described with reference to Figs. 6 and 7, the note C may be sounded by exhaling the breath, and the note D may be sounded through the same mouth opening by inhaling the breath. The same relation obtains between the notes E and F associated with the second mouth opening 62 as well as between the notes G and A associated with the third mouth opening. The baffle plate 22 is in a position to expose the lower reed opening 48 associated with the note B, so that the note B is also sounded by inhaling the breath. The next note C, which introduces the next diatonic scale in the key of C is sounded by exhaling the breath as in the instance of the previously mentioned note C. The exhaling and inhaling relation of each note is indicated by the small reference characters *e* and *i*, respectively, appearing near each blacked-in baffle plate opening. With the instrument set in the key of C, accordingly, the diatonic C scale may be played by first exhaling and then inhaling through the first mouth opening, repeating the operation at the second and third mouth openings and inhaling at the fourth mouth opening. The same scale may be played in the next two higher octaves by repeating these operations at the corresponding mouth openings.

Opposite the legend "Key of 5♯", the front baffle plate 22 is shown in the vertical position occupied by it relative to the reed bank 28 when the latter is moved from the first or key of C position to the second position marked in the graduated scale in Fig. 3 as the key of 5♯. This movement of the reed bank 28 may be effected as previously described by moving the detent 32 upwardly, as viewed in Fig. 2, so as to release the pin 78 from the first hole 82 in the slide 30, and again releasing the detent 32 when the pin 78 is in registry with the second hole 82 in the slide 30. When positioned to correspond to the key of 5♯, it will be appreciated from the legends in Fig. 9 that the diatonic scale in the key of 5♯ is produced. Opposite the legend "Key of 2♭" in Fig. 9, the front baffle plate 22 is shown in the vertical position occupied by it relative to the reed bank 28 when the latter is moved to its next lower key position, or to the key of 2♭. The same relation between the reed bank 28 and the front baffle plate 22 for the remaining keys of 3♯, 4♭, 1♯, 6♯, 1♭, 4♯, 3♭, 2♯, and 5♭ are indicated by the remaining showings of the baffle plate 22 opposite the corresponding legends. In each instance the keynote of the scale is sounded by exhaling the breath.

It will be noted that in the key of D, for example, the twelve mouth openings 62 of the mouthpiece 26, from the left-hand end thereof, as viewed in Figs. 1 and 8, are active, and that the remaining right-hand mouth openings 62

are inactive. On the other hand, when the reed bank **28** is moved to its right-hand limit position, corresponding to the lowest key or the key of 5♭, the right-hand twelve mouth openings **62** become active and the remaining mouth openings **62** are inactive. For intermediate keys, the active and inactive mouth openings are correspondingly distributed.

With reference to the action of the chromatic adjustment, it will be recalled from previous description, that by depressing the right-hand finger hold **94**, as viewed in Fig. 8, the same movement of the slide **30** and the reed bank **28** are produced as result from changing the key setting from one key to the next higher key; for example, from the key of 2♭ to the key of 5♯. On the other hand, by depressing the left-hand finger hold **94**, as viewed in Fig. 8, the same movement of the slide **30** and the reed bank **28** occurs as results from moving the key adjustment to change the key from, for example, the key of 2♭ to the key of 3♯. The action of this adjustment is clearly shown in Fig. 14. For example, with the instrument set in the key of 2♭, the note D is sounded by exhaling through the second mouth opening **62**. If the right-hand finger hold **94** is depressed, however, moving the reed bank **28** to the same position as it occupies when the instrument is set in the key of 5♯, exhalation through the second mouth opening produces the note D♯. On the other hand, if the left-hand finger hold **94** is depressed, moving the reed bank **28** to the position corresponding to the key of 3♯, exhalation through the second mouth opening produces the note C♯. The same relation as is above described with reference to the note D in the key of 2♭ applies equally well to any other note in any of the diatonic scales, as appears from an inspection of the several diagrams of Fig. 9. Accordingly, a depression of the right-hand finger hold serves to cause any note in the diatonic scale for which the instrument is set to be played one-half tone higher and depression of the left-hand finger hold serves to cause any note of any such diatonic scale to be played one-half tone lower.

In the modified embodiment of Figs. 9 through 13, the reed bank **28***a* corresponds generally to the above described reed bank **28**, with the exception that the reed chambers **40***a* are arranged in separate series positioned one above the other, and are defined by horizontally disposed reed divider plates **42***a* and **120**, and by corresponding vertical separating walls. As in the above described embodiment, each chamber **40***a* is provided with a reed **44***a* individual to it, which is adapted to be sounded either by exhaling or inhaling the breath, as determined by the position of the reed bank **28***a* relative to the front baffle plate **22***a*, and the rear baffle plate **24***a*. The front baffle plate **22***a* is provided with a series of openings **52***a* which cooperate with corresponding openings **54***a* in the rear baffle plate, to selectively open and close the upper and lower front openings **46** and **48** of each reed chamber and the corresponding rear openings of each reed chamber. The arrangement of the openings in the front and rear baffle plates corresponds to the arrangements described with reference to Figs. 1 through 8 except that they are modified to accommodate the just described arrangement of the reed chambers.

In all other respects except those just noted, the construction and operation of the embodiments of Figs. 9 through 13 preferably correspond to the description of Figs. 1 through 8. The operation of the embodiment of Figs. 9 through 13 is diagrammatically shown in Fig. 15.

From Fig. 15, it will be noted that the reed bank **28***a* may be moved relative to the baffle plates **22** from an extreme left-hand or key of C position through all intermediate key positions, to an extreme right hand or key of 5♭ position. In each key position, the diatonic scale may be played by exhaling the breath to produce the key-note and by either exhaling or inhaling the breath to produce the remaining notes of the scale in the same relation as described above with reference to Fig. 14. Also, by operating the chromatic adjustment, any note in a selected diatonic scale may be played a half-tone higher or a half-tone lower without changing the direction of the breath or altering the position of the mouth upon the mouthpiece.

It will be appreciated from the foregoing that the present invention provides a simple, compact, and easily operated harmonica characterized primarily in that the instrument is provided with one adjusting device effective to set it to play diatonic scales in any of the twelve recognized keys, and is provided with a supplemental or chromatic adjustment, by which, with the instrument set for any selected key, any note in the corresponding diatonic scale may be played a half-tone higher or lower without altering the position of the mouth upon the mouthpiece, and without altering the direction of the breath. The key adjustment is readily releasable to permit the adjustment of the instrument from one key to another, but except when released, serves to securely hold the instrument in a selected basic key. The chromatic adjustment, on the other hand, is readily operable at any time and, upon being moved to its limit position in either direction, serves to flat or sharp each note in the existing diatonic scale. The chromatic adjustment, accordingly, does not require a careful or a sensitive operation.

Although the specific embodiments of the invention have been described in detail, it will be appreciated that various modifications in the form, number, and arrangement of parts may be made within the spirit and scope of the invention.

What is claimed is:

1. In a device of the class described, a reed bank comprising in combination a plurality of reed divider plates defining a plurality of reed chambers, a reed in each of said chambers, said bank having a pair of openings at each side thereof leading into each chamber, one opening of each pair being positioned above the associated reed and the other opening of each pair being positioned below the associated reed, and a baffle plate associated with each side of the reed bank and movable as a unit relative thereto, said baffle plate having a predetermined series of openings therein, so that for each position of the baffle plates relative to the reed bank, the reeds corresponding to a selected diatonic scale are rendered effective.

2. In a device of the class described, the combination of a reed bank adapted to support a plurality of reeds, baffle means having openings therein effective upon movement relative to the reed bank to render effective the reeds corresponding to any of a plurality of diatonic scales, adjusting means for releasably securing the baffle means relative to the reed bank in a position corresponding to any of said plurality of scales, and additional adjusting means actuable to cause a

movement of said first mentioned adjusting means and to cause a further movement of the baffle means relative to the reed bank so as to cause any note in a selected said scale to be played a half tone higher or a half tone lower.

3. In a device of the class described, the combination of a reed bank having a plurality of reeds therein, baffle means adjustable relative to the reed bank so as to selectively render the reeds effective and ineffective, adjusting means operatively associated with the reed bank and baffle means and operable to adjust the reed bank and baffle means relative to each other, said adjusting means including means operative to releasably hold the reed bank and baffle means in positions corresponding to different selected keys, and including additional means operative to effect a movement of the reed bank relative to the baffle means so as to cause a note in the selected key to be played a half-tone higher or a half-tone lower without altering the key setting of said first mentioned adjusting means.

4. In a device of the class described, the combination of a reed bank having a plurality of reeds therein operative to produce a predetermined succession of natural and half-tones, baffle means adjustable relative to the reed bank so as to selectively render the reeds effective and ineffective, a mouthpiece having openings therein communicating with the said reeds respectively, adjusting means operatively associated with the reed bank and baffle means and operable to adjust the reed bank and baffle means relative to each other, said adjusting means including means operative to releasably hold the reed bank and baffle means in positions corresponding to different selected keys whereby flow of air in a certain direction through a particular mouthpiece opening produces a natural note in the selected key, and including additional means operative to effect a movement of the reed bank relative to the baffle means such that the same direction of air flow through said particular mouthpiece opening causes said note in the selected key to be played a half-tone higher or a half-tone lower.

5. In a device of the class described, the combination of a reed bank having a plurality of reeds therein, baffle means adjustable relative to the reed bank so as to selectively render the reeds effective and ineffective, adjusting means operatively associated with the reed bank and baffle means and operable to adjust the reed bank and baffle means relative to each other so as to set the device to play in any of a plurality of selected keys, and additional adjusting means operatively associated with the first mentioned adjusting means and operable to effect a further adjustment between the baffle means and the reed bank so as to cause a note in the selected key to be played a half-tone higher or a half-tone lower without altering the key setting of the first mentioned adjusting means.

6. In a device of the class described, the combination of a casing, a reed bank having a plurality of reeds therein and formed to define a separate chamber for each reed with openings at the front and the rear of the reed bank leading into each such chamber, front and rear baffle plates secured to said casing in spaced relation so as to receive the reed bank between them, said baffle plates having a series of openings therein arranged so that in each position of the reed bank relative to the baffle plates, the baffle plates expose a predetermined series of the reed bank openings and cover the remaining reed bank openings so as to render a predetermined series of the reeds effective, means connected between the casing and the reed bank and operable to releasably hold the reed bank in any of a selected series of positions relative to the baffle plates whereby to set the device to play in a selected key, and additional adjusting means operatively associated with the just mentioned connecting means for effecting an additional movement of the reed bank relative to the baffle plates so as to cause any note in the selected key to be played a halftone higher or a halftone lower.

7. In a device of the class described, the combination of a casing, a reed bank having a plurality of reeds therein and formed to define a separate chamber for each reed with openings at the front and the rear of the reed bank leading into each such chamber, front and rear baffle plates secured to said casing in spaced relation so as to receive the reed bank between them, said baffle plates having a series of openings therein arranged so that in each position of the reed bank relative to the baffle plates, the baffle plates expose a predetermined series of the reed bank openings and cover the remaining reed bank openings so as to render a predetermined series of the reeds effective, means connected between the casing and the reed bank and operable to releasably hold the reed bank in any of a selected series of positions relative to the baffle plates whereby to set the device to play in a selected key, and additional adjusting means operatively associated with the just mentioned connecting means for effecting an additional movement of the reed bank relative to the baffle plates so as to cause any note in the selected key to be played a half-tone higher or a half-tone lower, said front and rear reed bank openings being so arranged relative to each reed that each such reed may be sounded either by inspiration or respiration of air through the associated chamber, and said baffle plate openings being so arranged that said additional movement causes said half-tones to be produced by the same direction of air flow as is required to sound the corresponding said any note in the selected scale.

8. In a device of the class described, the combination of a casing, front and rear baffle plates associated with said casing, a reed bank adapted to support a plurality of reeds and slidably fitted in said casing for movement to different positions therein, said baffle plates cooperating with said reed bank to render said reed bank effective in each such position to produce the notes corresponding to a selected diatonic scale, and adjusting means connected between the reed bank and the baffle plates and operable to slide the reed bank between said different positions and to releasably retain the reed bank in each such position.

9. In a device of the class described adapted to be operated by inspiration and respiration of air therethrough, the combination of a reed, a reed bank having a reed space within which the reed is adapted to be supported, said bank having openings leading into the space in such relation to the reed that the reed may be sounded either by inspiration or respiration of air through the space, and baffle means having openings therein and movable relative to the reed bank so as to selectively expose and cover the reed bank openings in such relation that in one position of the baffle means relative to the reed bank the reed may be sounded only by inspiration of air through the space and in another relative posi-

tion of the baffle means and reed bank the reed may be sounded only by respiration of air through the space.

10. In a device of the class described adapted to be operated by inspiration and respiration of air therethrough, the combination of a reed, a reed bank having a reed space within which the reed is adapted to be supported, said bank having openings at the front and at the rear thereof leading thereinto the space in such relation to the reed that the reed may be sounded either by inspiration or respiration of air through the space, and front and rear baffle plates having openings therein and movable relative to the reed bank so as to selectively expose and cover the front and rear reed bank openings in such relation that in one position of the baffle means relative to the reed bank the reed may be sounded only by inspiration of air through the space and in another relative position of the baffle means and reed bank the reed may be sounded only by respiration of air through the space.

11. In a device of the class described adapted to be operated by inspiration and respiration of air therethrough, the combination of a reed bank adapted to provide a series of separate chambers, a series of reeds in chromatic sequence positioned in said chambers respectively, each said chamber having openings leading thereinto in such relation that the corresponding reed may be sounded either by inspiration or respiration of air through such chamber, baffle means movable relative to the reed bank and having openings therein arranged to selectively expose and cover the reed bank openings in such relation that in each position of the baffle means relative to the reed bank the baffle means render effective the reeds of a corresponding diatonic scale and render the remaining reeds ineffective, said baffle means also serving to determine the direction of the air required to sound each reed of the selected scale.

12. In a device of the class described, a reed bank comprising in combination a plurality of reed divider plates defining a plurality of reed chambers, a reed in each of said chambers, said bank having a pair of openings at each side thereof leading into each chamber, one opening of each pair being positioned above the associated reed and the other opening of each pair being positioned below the associated reed, and baffle means having openings therein selectively registerable with said reed bank openings for selectively closing and opening said openings whereby to determine the direction of air through each chamber required to sound the corresponding reed.

13. In a device of the class described, a reed bank comprising in combination a plurality of reed separating plates adapted to define two series of reed chambers, the chambers of one series being positioned above the chambers of the other series, the opposite walls of said bank being provided with pairs of openings disposed respectively above and below the level of the associated reed, a reed supported within each chamber, and baffle means having openings therein selectively registerable with said reed bank openings for selectively closing and opening said openings whereby to determine the direction of air through each chamber required to sound the corresponding reed.

14. In a device of the class described, a reed bank comprising in combination means defining a plurality of reed chambers each having upper and lower portions, a reed in each chamber intermediate said portions, said chambers being arranged in two series one above the other, with the lower portions of the chambers of the upper series being positioned in telescoped relation to the upper portions of the chambers of the lower series, each of said chambers having openings leading thereinto through which air may be admitted to and discharged from the corresponding chamber, and baffle means having openings therein selectively registerable with the reed bank openings for rendering said reeds effective and ineffective.

CLARENCE J. DAVIES.

CERTIFICATE OF CORRECTION.

Patent No. 2,179,993. November 14, 1939.

CLARENCE J. DAVIES.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 61, claim 1, for the word "plate" read plates; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of December, A. D. 1939.

Henry Van Arsdale,
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