April 18, 1950 J. KUMMER 2,504,538

ACCORDION

Filed Oct. 15, 1947 3 Sheets-Sheet 1

Fig. 1

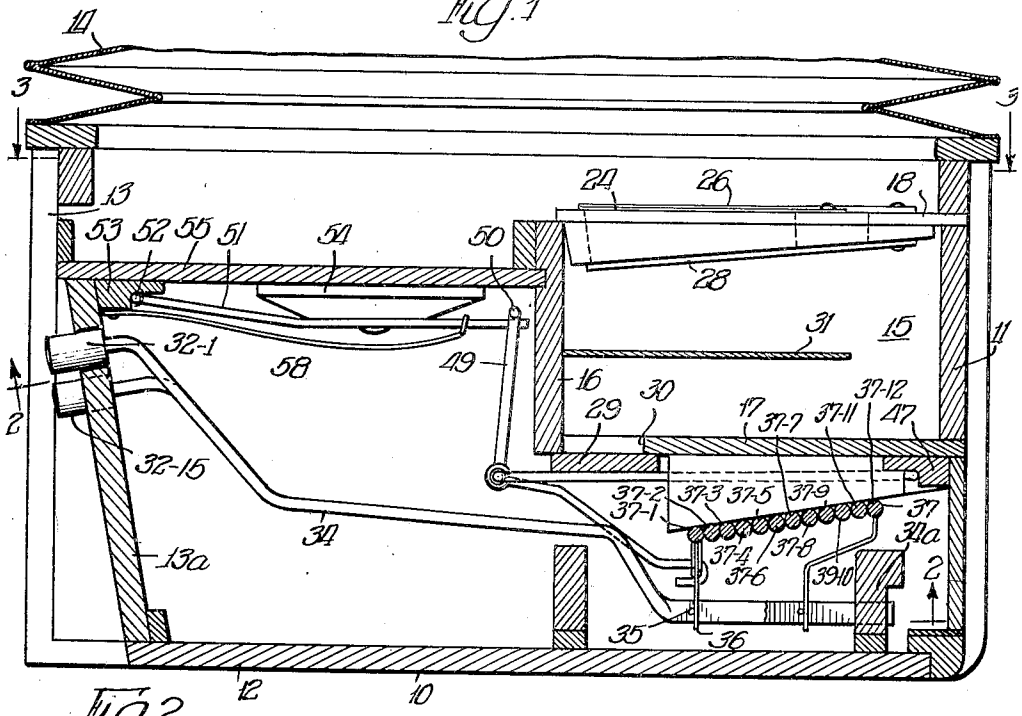


Fig. 2.

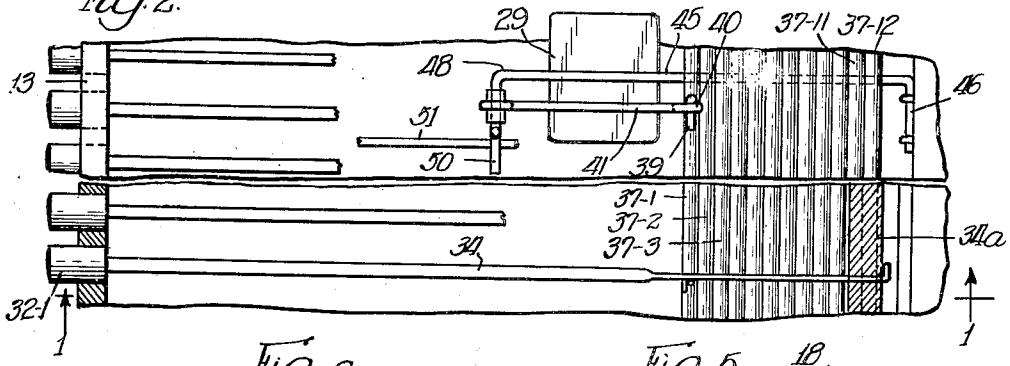


Fig. 6

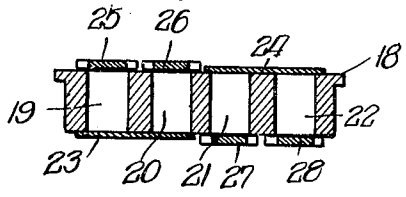
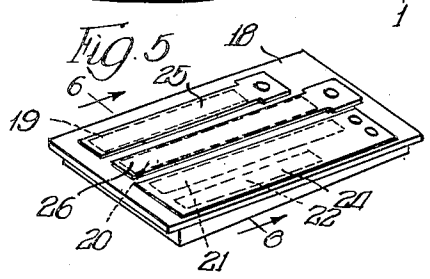


Fig. 5



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ACCORDION

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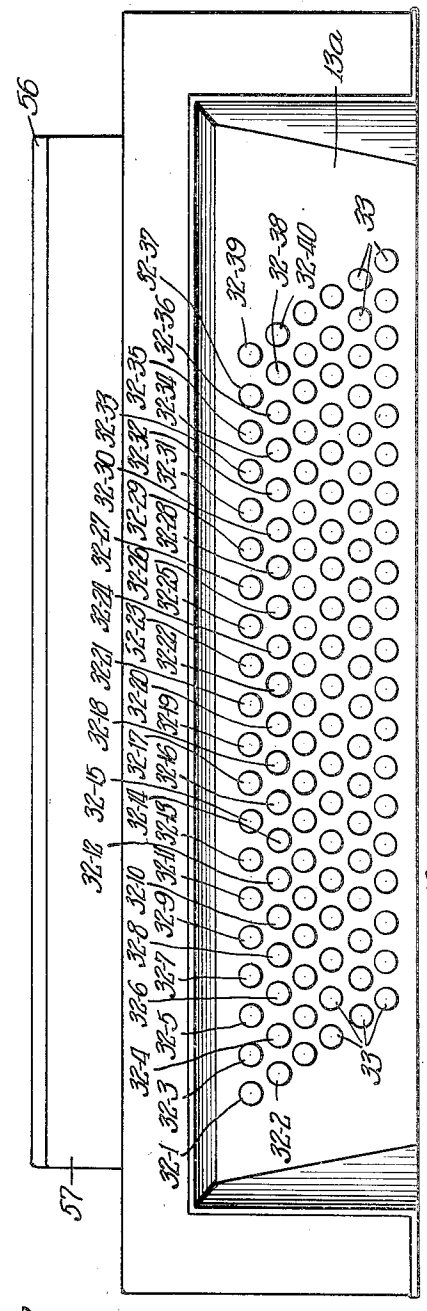


Fig. 7.

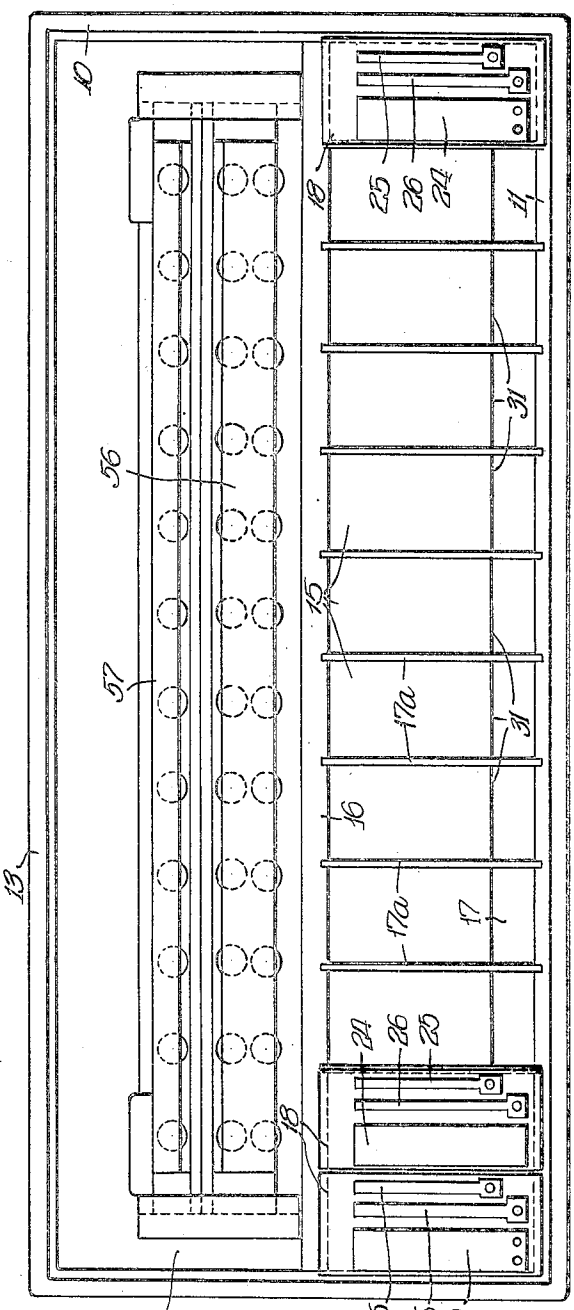


Fig. 3.

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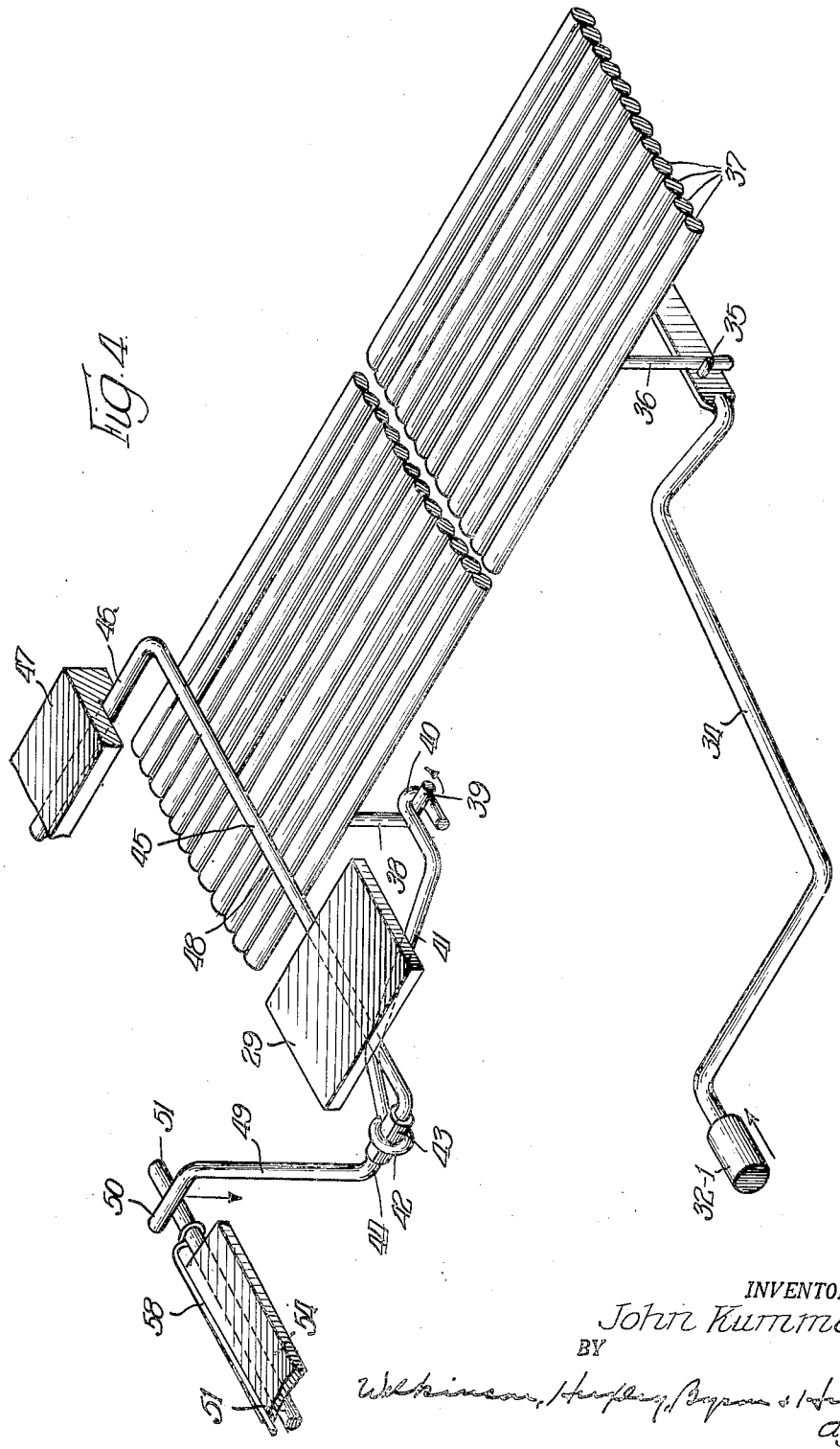
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ACCORDION

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Fig. 4



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2,504,538

UNITED STATES PATENT OFFICE

2,504,538

ACCORDION

John Kummer, Chicago, Ill.

Application October 15, 1947, Serial No. 779,879

9 Claims. (Cl. 84—376)

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The present invention relates to improvements in accordions.

An object of the present invention is to provide an accordion which will have improved tone qualities.

A further object is to provide an accordion which may be readily handled by the performer and which provides improved tone qualities throughout a relatively wide range.

A further object is to provide an improved accordion having the advantages above outlined in a structure which is relatively sturdy, simple in construction and not likely to get out of order.

A further object is to provide an accordion having the characteristics above mentioned in which the improved controls are made up of simple parts which may be fashioned from stock which is readily purchasable.

A further object is to provide an accordion having improved tone chambers.

A further object is to provide an improved reed plate.

A further object is to provide an improved piano or chromatic accordion.

Further objects will appear as the description proceeds.

Referring to the drawings:

Figure 1 is a sectional view, parts being broken away illustrating the principles of the present invention, the view being taken along the plane indicated by the arrows 1—1 of Fig. 2;

Figure 2 is a sectional view taken along the planes indicated by the numerals 2—2 of Figure 1;

Figure 3 is a sectional view taken along the plane indicated by the arrows 3—3 of Figure 1;

Figure 4 is a perspective view illustrating certain of the mechanisms shown in Figures 1 and 2;

Figure 5 is a perspective view of a reed plate which may be employed in the practice of the present invention;

Figure 6 is a sectional view taken along the plane indicated by the arrows 5—5 of Figure 5; and

Figure 7 is a view of a keyboard which may be employed in the practice of the present invention.

Referring first to Figure 1, the numeral 10 indicates a housing having the wall 11, the wall 12, and the wall 13, which latter wall includes the slanting keyboard wall 13a, containing keys to be manipulated by the operator's left hand. Removably secured to the housing 10 at one side thereof is the bellows portion 14. Attached to the other side of the housing 10 will be another

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housing, not illustrated, which will carry the keys to be manipulated by the operator's right hand.

Disposed within the housing 10 are a plurality of tone chambers 15 placed side by side in a direction parallel with the keyboard wall 13a, that is, in a direction transverse to the paper as the parts are viewed in Figures 1 and 3. As illustrated in Figure 3, there are twelve of these tone chambers 15 in a full piano or chromatic accordion.

Said tone chambers are bounded on one side by the wall 16 (which may be substantially parallel with the wall 11), on another side by the wall 17 and on a third side by the wall 11, said side wall 11 forming the end wall for all of said chambers. Separator walls 17a, disposed substantially at right angles to the walls 16, 17 and 11, separate the tone chambers 15 from one another. Each of the chambers 15 is provided with a reed plate 18 disposed opposite to the wall 17, only three of said reed plates being shown in Figure 3.

Each reed plate 18, according to the present invention, is provided with multiple reeds adapted to vibrate upon the passage of air in either direction through said reed plate.

The reed plate 18 is preferably wedge shaped in conformation and is provided with four apertures for the passage of air, said apertures being indicated by the numerals 19, 20, 21 and 22. On the side of the reed plate 18 adjacent to the corresponding chamber 15, the apertures 19 and 20 are controlled by the valve 23 which may be a semi-flexible member composed, for example, of leather. Said valve 23 will permit the passage of air to and from the bellows portion 14 through the corresponding chamber 15.

The apertures 21 and 22 are controlled by the semi-flexible valve 24 which may be similar in construction to the valve 23. Said valve 24 is placed on the side of the reed plate 18 spaced from the corresponding chamber 15 and will stop the passage of air from the bellows portion 14 to the corresponding sound chamber 15 while permitting the passage of air from said sound chamber 15 to said bellows portion 14.

Disposed in co-operative relationship with the aperture 19 is the reed 25 and disposed in co-operative relationship with the aperture 20 is the reed plate 26. When air is passed from the bellows portion 14 through the apertures 19 and 20, said reeds 25 and 26 will vibrate to provide a tone. Likewise the apertures 21 and 22 are provided with the reeds 27 and 28 which, when

air is passing from the corresponding chamber 15 to the bellows portion 14, will vibrate to provide a tone. Though the reed plate 18 has been illustrated as being provided with two reeds adapted to vibrate upon the passage of air through said reed plate in either direction, a greater number of reeds may be provided if desired. At any rate, the reeds which vibrate at the same time will be of different dimensions and/or characteristics. These multiple reeds having their different characteristics are so chosen as to produce the same fundamental tone but differ in their ability to produce overtones. In other words, the reeds 25 and 26 will be so chosen relative to each other that they will vibrate on common harmonics. Likewise the reeds 27 and 28 will have different dimensions and/or characteristics to provide the same fundamental tone with the improved overtones, as described in connection with reeds 25 and 26.

The passage of air through each tone chamber 15 is controlled by a corresponding valve 29 co-operating with an aperture 30 in the wall 17 with the corresponding chamber 15. Disposed in each of the chambers 15 between the wall 17 and the reed plate 18 is a baffle 31 providing a torturous passageway for air through the corresponding chamber 15. Said baffle 31 extends from the wall 16 but terminates short of the wall 11. The free ends of the reeds 25, 26, 27 and 28 and the valve aperture 30 are located adjacent to said wall 16, so that the baffle 31 provides a torturous passageway for air passing through the corresponding tone chamber 15. As illustrated in Figure 1, each of the tone chambers has its long dimension (and therefore its baffle 31) disposed crosswise with respect to the direction of squeeze of the accordion.

According to the present invention, novel means are provided for controlling the valves 29.

In the illustrated embodiment of the invention, the chambers 15 with their corresponding reed plates 18 and valves 29 are shown in co-operation with the keys for producing the bass notes. In an illustrated embodiment of the present invention, twelve tone chambers are provided, each having its individual reed plate 18 and valve 29. For controlling these twelve tone chambers, forty keys or buttons are provided indicated by the numerals 32, the individual keys being represented by the numerals 32—1 to 32—40. The numerals 33, 33 indicate chord keys, the connections to which need not be described in detail inasmuch as they form no part of the present invention.

Figures 1, 2 and 3 illustrate the connections of one of the keys of the 32 series, to wit: key 32—1 to one of the valves 29. Each of the keys 32—1 to 32—40 is adapted when pushed inwardly to control a valve 29, a plurality of said keys being connected to the same valve, another plurality of said keys being connected to another of said valves, each valve having its own plurality of keys. The operative keys for the various valves are distributed along the length of the keyboard wall 13.

Connected to each of the keys of the 32 series is a push rod 34, having a flattened extremity which has sliding movement in a corresponding slot in the strip 34*a*. A pin 35 projects from the side of the flattened extremity of each of said rods 34. Each of said pins 35, when moved to the right as the parts are viewed in Figure 1, engages a pin 36 projecting from a rotatable rod 37. There are as many of these rotatable rods 37 as there are chambers 15, this number in the illustrated embodiment of the present invention being twelve. Individual rotatable rods 37 are indicated by the suffixes ranging from 1 to 12. Said rods 37 are journaled for rotation by any preferred means, not illustrated. Projecting from each of the rods 37 is a pin 38, having a bent-over end portion 39 projecting in a direction generally parallel with the corresponding rotatable rod 37. As a rod 37 is rotated in a counter-clockwise direction as the parts are viewed in Figures 1 and 3, said bent-over end portion 39 is adapted to exert a pull upon a hook portion 40 of a rod 41. The other extremity of said rod 41 is provided with a loop 42 encircling and secured to a sleeve 43. Said sleeve 43 is journaled upon a portion 44 of a swinging rod 45. Said rod 45 has an end portion 46 hingedly mounted within a strip 47 disposed adjacent to the wall 11, said end portion 46 being disposed in substantially parallel relationship with the rotatable rods 37—37. Extending from the end portion 46 is the portion 48 extending in substantially right angular relationship with the end portion 46. Said portion 48 is provided with the portion 44 above mentioned upon which is journaled the sleeve 43. Said portion 44 is in substantially parallel relationship with the end portion 46. Extending upwardly from the portion 44, as the parts are viewed in Figures 1 and 3, is the portion 49 provided with the bent-over end portion 50. Said end portion 50 is disposed in substantially parallel relationship with the end portion 46. Carried by the portion 48 of the swinging rod 45 is the valve 29. The bent-over end portion 50 of the swinging rod 48 is adapted to react against the swinging rod 51, having the bent-over end portion (Figure 1) 52 swingingly carried by the strip 53 disposed adjacent to the keyboard wall 13*a*. Said swinging rod 51 carries the valve 54 which controls apertures in the wall 55 communicating with the chord reed blocks 56 and 57 (Figure 3). The said swinging rod 51 is urged upwardly as the parts are viewed in Figure 1 by means of the spring 58.

The button 32—1 is illustrated with its connections to the rotatable rod 37—1, disposed furthest to the left as the parts are viewed in Figure 1. Another of the buttons, to wit: 32—15 is illustrated as being connected to the rotatable rod 32—12 disposed furthest to the right as the parts are viewed in Figure 1. A plurality of buttons 32 will be connected to each of the rotatable rods 37 and therefore each of the valves 29 and the corresponding valve 54 may be operated by any one of a plurality of buttons 32 spaced along the length of the keyboard wall 13*a*. According to an embodiment of the present invention which has been successfully operated, the following keys are connected to move the rotatable rod 37—1 at the extreme left as the parts are viewed in Figures 1 and 3, to wit: 32—1, 32—10, 32—25 and 32—34.

The second rotatable rod, 37—2, may be rotated by any one of a plurality of keys, to wit: 32—11, 32—20 and 32—35.

The third of said rotatable rods, 37—3, counting from the left as the parts are viewed in Figures 1 and 3, may be operated by any one of the following keys: 32—6, 32—21 and 32—30.

The fourth of said rods, 37—4, counting from the left as the parts are viewed in Figures 1 and 3, may be operated by any one of the following keys: 32—7, 32—16, 32—31 and 32—40.

The fifth of said rods, 37—5, counting from the left, may be operated by any one of the following keys: 32—2, 32—17 and 32—26.

The sixth of said rotatable rods, 37—6, counting from the left as the parts are viewed in Figures 1 and 3, may be operated by any one of the following keys: 32—3, 32—12, 32—27 and 32—36.

The seventh rotatable rod, 37—7, counting from the left as the parts are viewed in Figures 1 and 3, may be operated by any one of the following keys: 32—13, 32—22 and 32—37.

The eighth rotatable rod, 37—8, counting from the left as the parts are viewed in Figures 1 and 3, may be operated by any one of the following keys: 32—8, 32—23 and 32—32.

The ninth rotatable rod, 37—9, counting from the left as the parts are viewed in Figures 1 and 3, may be operated by any one of the following keys: 32—9, 32—18 and 32—33.

The tenth rotatable rod, 37—10, counting from the left as the parts are viewed in Figures 1 and 3, may be operated by any one of the following keys: 32—4, 32—19 and 32—28.

The eleventh rotatable rod, 37—11, counting from the left as the parts are viewed in Figures 1 and 3, may be operated by any one of the following keys: 32—5, 32—14, 32—29 and 32—38.

The last rotatable rod, 37—12, toward the right may be operated by any one of the following keys: 32—15, 32—24 and 32—39.

The present invention has the advantages that relatively large tone chambers may be employed, each providing a torturous passageway for air; that a full complement of reed plates may be employed having multiple reeds on each side thereof; and that the sound chambers co-operating with said multiple reed plates may be controlled by relatively simple operating means co-operating with the usual keyboard arrangement so that improved sonorous tones with the desired overtones may be had in an accordion or the like of practical size.

Though a preferred embodiment of the present invention has been described in detail, many modifications will occur to those skilled in the art. It is intended to cover all such modifications that fall within the scope of the appended claims.

What is claimed is:

1. In an accordion, in combination, a bellows portion, a housing, one side of said housing including a bass keyboard wall, a chord reed block and a series of tone chambers placed side by side in a direction parallel with said chord reed block, one side of said housing forming the end wall for each of said chambers, each of said chambers being provided with a reed plate, said reed plate having a set of reeds on each side thereof, the swinging extremities of which are located adjacent to one side of the corresponding chamber, a chamber valve for each of said chambers disposed adjacent to said one side of the corresponding chamber and a baffle within said chamber extending from said one side of said chamber to provide a torturous passageway for air through said chamber, chord reed block valves for controlling communication with said chord reed blocks and common operating means for controlling said chamber valves and said chord reed block valves in unison.

2. In an accordion, in combination, a bellows portion, a housing, one side of said housing including a bass keyboard wall, a chord reed block and a series of tone chambers placed side by side in a direction parallel with said chord reed block, one side of said housing forming the end wall for each of said chambers, each of said chambers being provided with a reed plate, said reed plate having a set of reeds on each side thereof, the

swinging extremities of which are located adjacent to one side of the corresponding chamber, a chamber valve for each of said chambers disposed adjacent to said one side of the corresponding chamber and a baffle within said chamber extending from said one side of said chamber to provide a torturous passageway for air through said chamber, and operating means for said valves, said operating means including rotatable rods individually connected to said valves and extending along said chambers and push rod means responsive to the bass keys of said accordion for rotating said rotatable rods, chord reed block valves for controlling communication with said chord reed blocks and means co-operating with said operating means for controlling said chord reed block valves.

3. In an accordion, in combination, a bellows portion; a housing; said housing removably secured to said bellows portion; a plurality of tone chambers arranged side by side in said housing, one wall of said housing including a bass keyboard wall, one wall of said housing forming the end wall of all of said chambers; a reed plate assembled in each of said chambers; said reed plate comprising a plate having a plurality of apertures for transmitting air in one direction through said plate and a plurality of apertures for transmitting air in the other direction through said plate, flexible valve means for stopping the passage of air in one direction through said first mentioned plurality of apertures, valve means for stopping the passage of air through said second mentioned plurality of apertures and a plurality of reed plates disposed on the opposite side of said plate from each of said valve means.

4. In an accordion, in combination, a bellows portion; a housing; said housing removably secured to said bellows portion; a plurality of tone chambers arranged side by side in said housing, one wall of said housing including a bass keyboard wall, one wall of said housing forming the end wall of all of said chambers; a reed plate assembled in each of said chambers; said reed plate comprising a plate having a plurality of apertures for transmitting air in one direction through said plate and a plurality of apertures for transmitting air in the other direction through said plate, flexible valve means for stopping the passage of air in one direction through said first mentioned plurality of apertures, valve means for stopping the passage of air through said second mentioned plurality of apertures and a plurality of reed plates disposed on the opposite side of said plate from each of said valve means, the individual reed plates on each side of said plate being different in their characteristics but being vibratable on common harmonics.

5. In an accordion, in combination, a bellows portion; a housing; said housing removably secured to said bellows portion; a plurality of tone chambers arranged side by side in said housing; one wall of said housing forming the end wall for each of said chambers, a reed plate for each of said chambers disposed at one side thereof, a chamber valve for each of said chambers located at the side of its corresponding chamber opposite to said reed plate, each of said reed plates having a set of reeds responsive to the passage of air in one direction therethrough, the reeds of each of said sets being dissimilar from each other but being capable of vibrations on common harmonics, each of said tone chambers being provided with a baffle positioned to cause air flowing between said valve and said reed plate to take

a tortuous passageway, said baffle and said passage being disposed crosswise with respect to the direction of squeeze on said accordion.

6. In an accordion; in combination, a bellows portion; a housing; said housing removably secured to said bellows portion; one side wall of said housing including a bass keyboard wall; a plurality of tone chambers arranged side by side in said housing, said chambers arranged in a direction parallel with said keyboard and in a plane opposite to the direction of squeeze of bellows portion, each of said chambers being rectangular in cross-section with its length arranged in a direction at right angles with the direction of said keyboard, with its width arranged in a direction parallel with said keyboard and with its depth arranged in the direction of squeeze and in a direction away from said bellows; one side of said housing forming the end wall of all of said chambers; a reed plate for each of said chambers located at the top side thereof adjacent to said bellows portion, and a valve for each of said chambers located at the opposite side thereof; each of said reed plates having a set of reeds responsive to the passage of air in one direction therethrough and a set of reeds responsive to the passage of air in the opposite direction therethrough; a wall for supporting the chord reed blocks of said accordion arranged between said chambers and said side of the accordion housing including said keyboard wall; said wall arranged in a plane parallel with the planes embodying the upper and lower sides of said chambers, said wall having apertures communicating with the chord reed blocks, a plurality of valves arranged adjacent said wall for controlling the passage of air to said chord reed blocks, and keys, rods and means for operating said valve in each of said chambers and for operating said valves controlling air to each of said chord reed blocks.

7. In an accordion, in combination; a bellows portion; a housing removably secured at each end of said bellows portion; one of said housings embodying a bass keyboard to be manipulated by the operator's left hand; said housing comprising a plurality of tone chambers arranged side by side therein; said housing comprising a wall for supporting the chord reed blocks of said accordion; said wall arranged between said chambers and the side of said housing embodying said keyboard; said chambers and said wall forming a partition between said bellows portion and the closed end portion of said housing and arranged in a direction parallel with said keyboard and in a plane opposite to the direction of squeeze of said bellows portion, one side of said housing forming the end wall of all said chambers, each of said chambers comprising a generally rectangular receptacle having solid end walls, solid side walls, a bottom wall having an aperture therein, and an open top portion; said top portion arranged to receive a reed plate to form a closure, said closure arranged adjacent to said bellows portion; each of said reed plates in said chambers having a set of reeds responsive to the passage of air in one direction therethrough and a set of reeds responsive to the passage of air in the opposite direction therethrough; each of said chambers having a valve to close said aperture in said bottom wall thereof; said wall for supporting the chord reed blocks provided with a plurality of apertures therein and a plurality of valves for closing said apertures; a plurality of rotatable rods extending along said chambers and equal in number to said chambers; operating means for said chamber valves, operating means for said valves cooperating with said chord reed blocks; said controlling means also including keys, said keys being provided with push rods for individually rotating said rotatable rods.

8. In an accordion; in combination, a bellows portion; a housing; said housing removably secured to said bellows portion; one side wall of said housing including a bass keyboard wall; a plurality of tone chambers arranged side by side in said housing, said chambers arranged in a plane parallel with said keyboard and in a plane opposite to the direction of squeeze of said bellows portion, each of said chambers being rectangular in cross-section with its length arranged in a direction at right angles with the direction of said keyboard, with its width arranged in a direction parallel with said keyboard and with its depth arranged in the direction of squeeze and in a direction away from said bellows; one side of said housing forming the end wall of all of said chambers; a reed plate for each of said chambers located at the top side thereof adjacent to said bellows portion, and a valve for each of said chambers located at the opposite side thereof; each of said chambers being provided with a baffle means to provide a torturous passageway for air traveling through the corresponding chamber; each of said reed plates having a set of reeds responsive to the passage of air in one direction therethrough and a set of reeds responsive to the passage of air in the opposite direction therethrough; the reeds in each of said sets being dissimilar from each other but being capable of vibrations on common harmonics; a wall for supporting the chord reed blocks of said accordion arranged between said chambers and said side of the accordion housing including said keyboard wall; said wall arranged in a plane parallel with the planes embodying the upper and lower sides of said chambers, said wall having apertures communicating with the chord reed blocks, a plurality of valves arranged adjacent said wall for controlling the passage of air to said chord reed blocks, and keys, rods and means for operating said valve in each of said chambers and for operating said valves controlling air to each of said chord reed blocks.

9. In an accordion; in combination, a bellows portion; a housing; said housing removably secured to said bellows portion; one side wall of said housing including a bass keyboard wall; a plurality of tone chambers arranged side by side in said housing, said chambers arranged in a direction parallel with said keyboard and in a plane opposite to the direction of squeeze of said bellows portion, each of said chambers being rectangular in cross-section with its length arranged in a direction at right angles with the direction of said keyboard, with its width arranged in a direction parallel with said keyboard and with its depth arranged in the direction of squeeze and in a direction away from said bellows; one side of said housing forming the end wall of each of said chambers; a reed plate for each of said chambers located at the top side thereof adjacent to said bellows portion, and a valve for each of said chambers located at the opposite side thereof; each of said chambers being provided with a baffle means to provide a torturous passageway for the air traveling through the corresponding chamber; each of said reed plates having a set of reeds responsive to the passage of air in one direction therethrough

and a set of reeds responsive to the passage of air in the opposite direction therethrough; the reeds of each of said sets being dissimilar from each other but being capable of vibrations on common harmonics; a wall for supporting the chord reed blocks of said accordion arranged between said chambers and said side of the accordion housing including said keyboard wall; said wall arranged in a plane parallel with the planes embodying the upper and lower sides of said chambers, said wall having apertures communicating with the chord reed blocks, a plurality of valves arranged adjacent said wall for controlling the passage of air to said chord reed blocks, and keys, rods and means for operating said valve in each of said chambers and for operating said valves controlling air to each of said chord reed blocks; said operating means for said valves including a plurality of rotatable rods extending along said chambers, each of said rods being connected to a corresponding valve, bass keys and means connected with said bass keys for rotating said rods.

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