Sept. 7, 1965 D. J. WINCH 3,204,511

MUSICAL INSTRUMENTS WITH BELLOWS OPERATION

Filed Jan. 7, 1965 2 Sheets-Sheet 1

FIG. 1

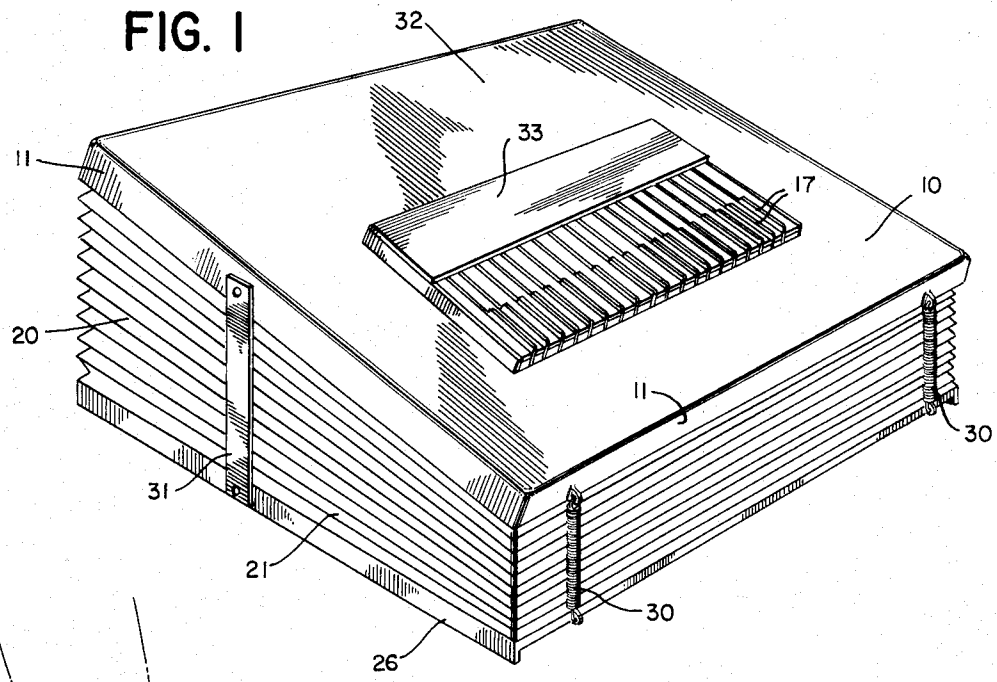
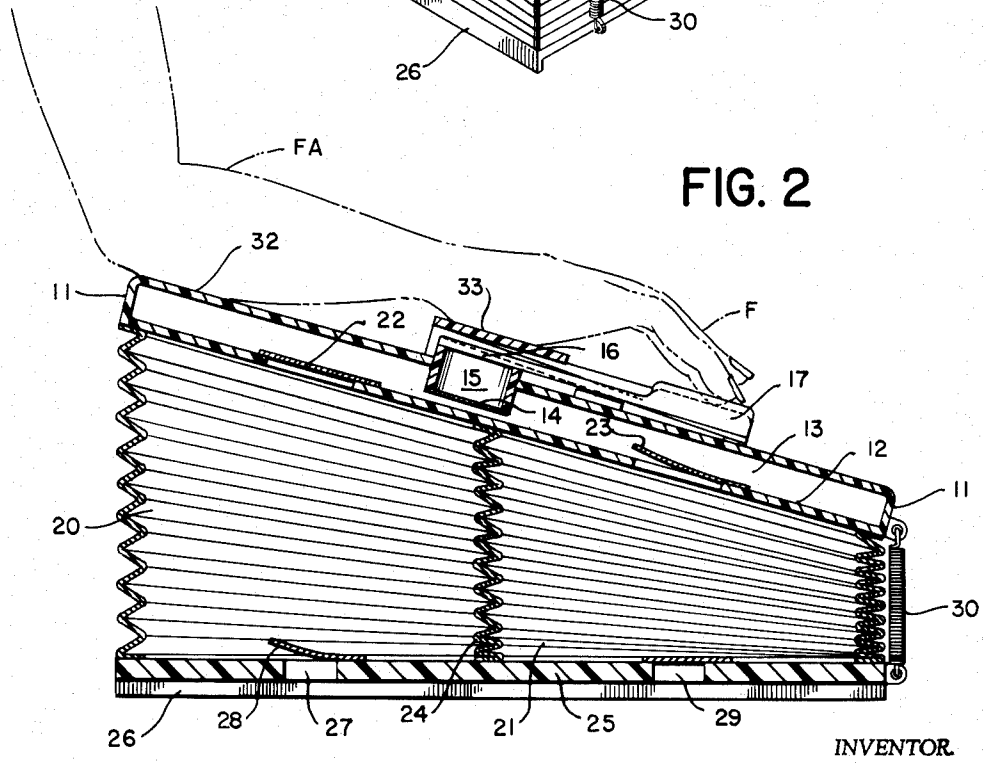


FIG. 2



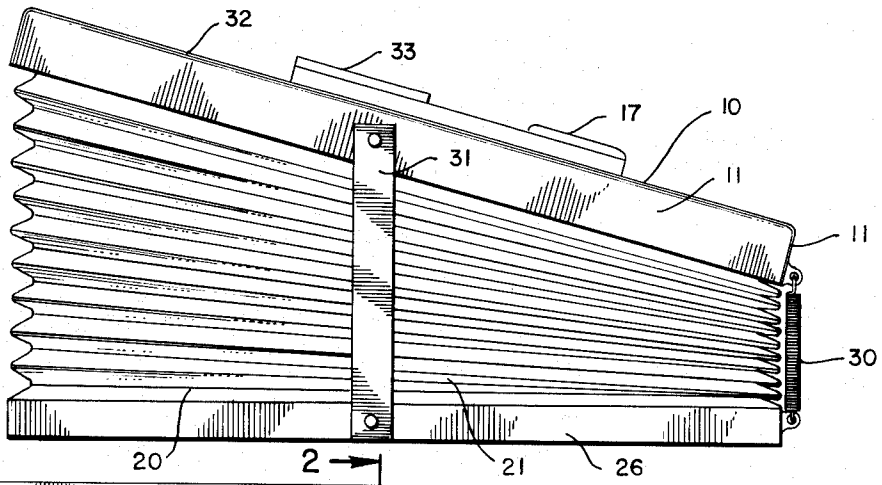
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Filed Jan. 7, 1965 2 Sheets-Sheet 2

FIG. 3



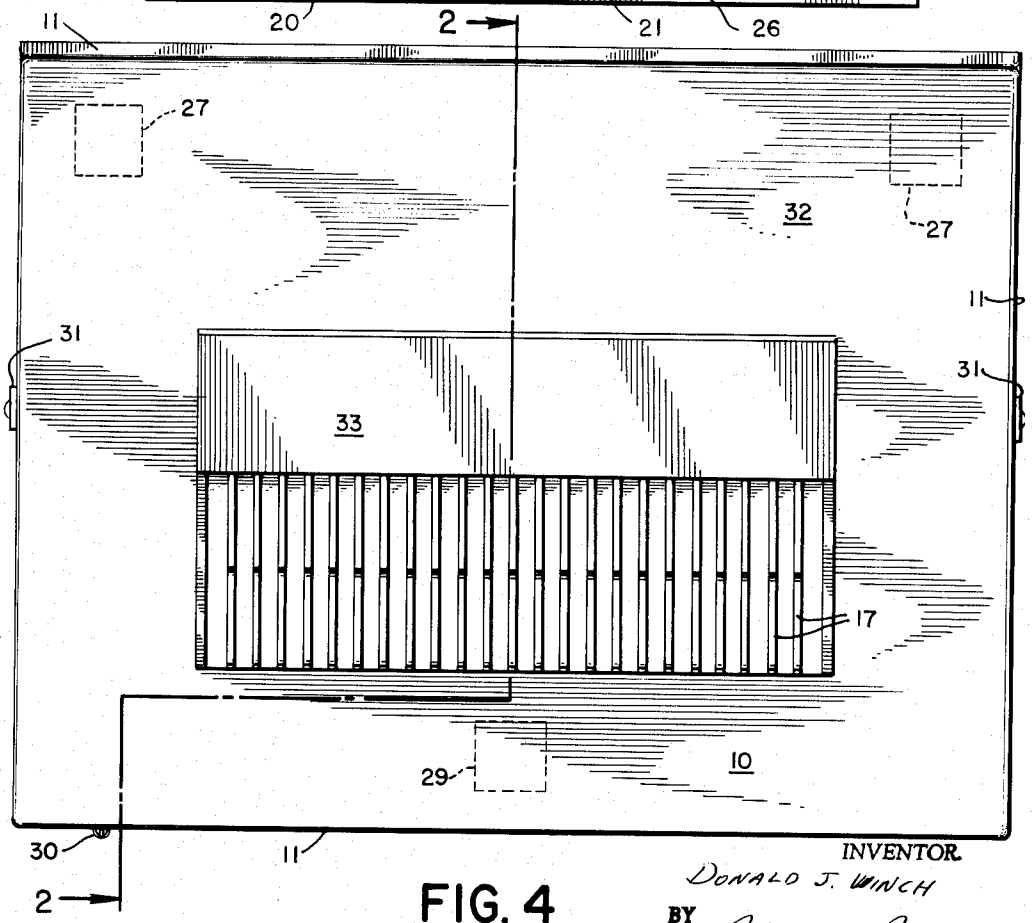


FIG. 4

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MUSICAL INSTRUMENTS WITH BELLOWS OPERATION

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Filed Jan. 7, 1965, Ser. No. 423,949
6 Claims. (Cl. 84—375)

This application is a continuation-in-part of my application Serial No. 367,358, filed May 14, 1964.

This invention relates to bellows operated musical instruments such as of the accordian or organ type.

In this application I disclose a two-element bellows system which is manually operated by the arms of the user while the tune is being played and while the instrument is resting either on a table or on the lap of the user. To this extent, the instrument resembles the one disclosed in my prior application. However, I have improved the bellows system to produce greatly facilitated operation, such operation being most important since the quality of a rendition will be adversely affected if the player is unduly concerned with the mechanical operation of the instrument.

With the foregoing in mind, I have devised a table or lap supported instrument of the above type wherein two interconnected bellows are alternately operated by a form of see-saw motion, the forearms of the operator doing substantially all the work. I have discovered that the musculature of the forearms make the bellows operation surprisingly easy so that only the slightest exertion is necessary and the player can concentrate exclusively upon the rendition of the composition, with the physical exertion for the bellows operation being minimal and substantially automatic.

The invention will be further understood from the following description and figures wherein:

FIGURE 1 is a perspective view of my improved organ type instrument in its normal or rest position;

FIGURE 2 is an enlarged cross-sectional view as taken along the line 2—2 of FIGURE 4 and illustrating its operation;

FIGURE 3 is a side elevational view; and

FIGURE 4 is a top plan view.

The instrument takes the general form of a foldable box having a top platform **10** which has marginal sides **11**. Within the instrument and opposing plate **10** is plate **12** which is spaced from plate **10** by the sides **11**. These components comprise and define the reed box **13** to which super-atmospheric air is delivered by the bellows action as will be described hereinafter. The reed box is essentially conventional and takes substantially the same form as described in my above-mentioned copending application. Briefly, it includes a series of tuned reeds **14** aligned side-by-side and which may assume the form shown in my prior keyboard construction application Serial No. 363,551 filed April 29, 1964.

Tuned reeds **14** are of a number which serve the number of octaves required, such as in an accordion or conventional organ. The top platform **10** is formed with conventional reed slots **15** which are selectively covered or uncovered by the rear hammers **16** of the keys **17**.

Keys **17** of the keyboard comprise the usual series of so-called black and white keys. Any conventional form of keyboard may be used, that shown in my above-mentioned prior applications being suitable. In any event, when the forward or outer portions of either the black or white keys are selectively depressed by the fingers F, the corresponding rear hammers **16** will be lifted so as to uncover selective reed slots **15** as is well understood. The air under pressure will then flow through the reed slot to vibrate the reed and generate the desired tone.

This invention is essentially directed to the bellows disposition and operation. The bellows system appears

from the outside as one bellows, but it actually comprises the individual bellows **20** and **21**. Inner bellows **20** lies substantially side-by-side with outer bellows **21**, the plate **12** serving as a common top or cover plate for both of said bellows and extending across the entire instrument, front to back, and side to side.

Common plate **12** has a delivery valve **22** for the inner bellows, as well as delivery valve **23** for the outer bellows. The respective delivery valves operate alternately but will be found to jointly deliver a substantially continuous stream of air to reed box **13** so as to avoid objectionable air interruptions.

Bellows **20** and **21** are each substantially complete bellows, having a common inner wall **24** which traverses the entire instrument. The bellows also have a common base platform **25** which is fixed at all times. Base platform **25** is spaced upwardly by side rims **26** to facilitate the intake of air.

Inner bellows **20** is provided with two intake valves **27**, these valves being of the usual flapper type, i.e. a floating finger **28** which closes the valve when the bellows is compressed and which opens to admit air when the bellows is expanded during the charging action. The two intake valves **27** are spaced near the inner corners of the inner bellows **20**, the purpose thereof being not to restrict the air flow when the instrument is resting on the user's lap. Thus, the width of the instrument being about 24 inches, the intake valves **27** will be spaced apart about 21 inches which will insure that they are not obstructed by the thighs of the user.

On the other hand, outer bellows **21** has one, centrally located intake valve **29** which will not be obstructed since it is disposed at the outer end of base platform **25** and outwardly of the knees of the user.

In the form shown, the instrument has its outer bellows **21** normally somewhat compressed, this being effected by return springs **30** which are connected between the common plate **12** of the reed box and the common base platform **25**, at the outer ends thereof. Springs **30** serve to normally bias the front or outer end of the instrument downwardly.

Disposed centrally of the instrument, on both sides thereof, are rigid spacers **31** pivotally connected at their bottom ends to base platform **25**, and pivotally connected at their top ends to sides **11**. Spacers **31** thus serve as fulcrums for the respective bellows operation.

In playing the instrument the user will place it on his lap (or on a table if desired). His forearms FA will rest upon the inner area **32** as illustrated in FIGURE 2. His palms may rest on the hand supporting platform **33** of the keyboard structure while his fingers F will operate the keys **17**. At first, his forearms FA will bear downwardly on inner area **32** to compress bellows **20** and simultaneously charge bellows **21**. At this time intake valve **29** will open, while both intake valves **27** will close. At the same time, delivery valve **23** will close, while delivery valve **22** will open.

At the next stroke, the user will relax his forearms while still selecting the keys for playing the tune. Bellows **21** will again compress by the action of the return springs **30**, no such effort being required at all of the operator. Of course, ordinary rubber bands may be used instead of springs. At this time, intake valve **29** is closed, delivery valve **23** is open, intake valves **27** are both open, and delivery valve **22** is closed. The alternate operation of the bellows will be found to produce a completely continuous fully controlled flow of air so that even one note can be sustained indefinitely without apparent interruption.

It will be found that only the slightest forearm pressure is required and even the slightest musculature can easily effect the required operation.

In a satisfactorily operating embodiment platform **10** was 18 inches from front to back, and 24 inches wide. Spacers **31** were 6¾ inches high, from top pivot to bottom pivot thereof. Each bellows comprised 10 folds or pleats. Of course these figures are merely representative. These figures are satisfactory for a professional type instrument. For a toy, the device may be made proportionally smaller.

During the operation of the instrument, the entire reed box **13** rocks slightly about a substantially central and horizontal axis traversing the instrument so as to produce alternate compression and expansion of the respective bellows. While I state that the axis is substantially central, actually spacer **31** and wall **24** are somewhat nearer the operator. For example, outer bellows **21** may be about an inch longer, front to inner wall **24**, than is bellows **20**.

I have shown a preferred embodiment of my invention, but it is obvious that numerous changes and omissions may be made therein without departing from its spirit.

What is claimed is:

1. In an air operated musical instrument having a series of tuned reeds, an air flow system, said system comprising a foldable box for producing compressed air, a top platform for said box, said platform being swingable about a substantially central horizontal axis traversing said top platform so as to alternately produce compression and expansion of air in said box on respective sides of said axis, a reed box fed by said compressed air, a keyboard mounted on said top platform, and said top platform being formed with an inner area whereby a user may rest his forearms on said inner area while his fingers operate said keyboard, so that his forearms may simultaneously apply pressure to said inner area for compressing said foldable box.

2. A musical instrument according to claim **1** and including spring return means at the ouer end area of said top platform.

3. An air operated, tuned reed musical instrument comprising an inner bellows, an outer bellows aligned substantially side-by-side with said inner bellows, a common plate mounted over both of said bellows, a common base platform on which both of said bellows are mounted, said common plate being rockable about a substantially central horizontal axis traversing said common plate so as to alternately compress and expand the respective bellows, a reed box fed by the compressed air generated by each of said bellows during compression thereof, and a keyboard mounted over said common plate whereby said keyboard may be operated by the fingers of a user while the arms of the user rock said common platform.

4. An instrument according to claim **3** and including a top platform disposed over said common plate and wherein said keyboard is mounted outwardly on said top platform so as to leave an inner area of said top platform to serve as a rest area for the forearms of the user to facilitate manual compression of said inner bellows, and return spring means mounted adjacent to the outer ends of said top and base platforms respectively so as to normally urge the outer end of said top platform toward the outer end of said base platform to normally compress said outer bellows.

5. An instrument according to claim **4** and wherein each of said bellows is formed with flapper intake valve means, the valve means of said inner bellows comprising two valves which are spaced along the respective sides of said base platform, and the valve means of said outer bellows being one valve which is located at the outer end of said base platform and centrally thereof.

6. An air operated, tuned reed musical instrument comprising an inner bellows, an outer bellows aligned substantially side-by-side with said inner bellows and being joined thereto by a common inner transverse wall, a common top plate mounted over and on both of said bellows, a common base platform on which both of said bellows are mounted, said base platform being fixed and said common top plate being rockable about a substantially central horizontal axis traversing said common plate so as to alternately compress and expand the respective bellows, a top platform spaced above said top plate and defining therewith a reed box, a keyboard mounted on said top platform and disposed thereon so as to leave an inner area of said top platform to serve as a rest for the forearms of a user, air intake and reed box air delivery means for both of said bellows, and return spring means for normally biasing one of said bellows to a compressed state in opposition to the state of the other bellows.

No references cited.

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