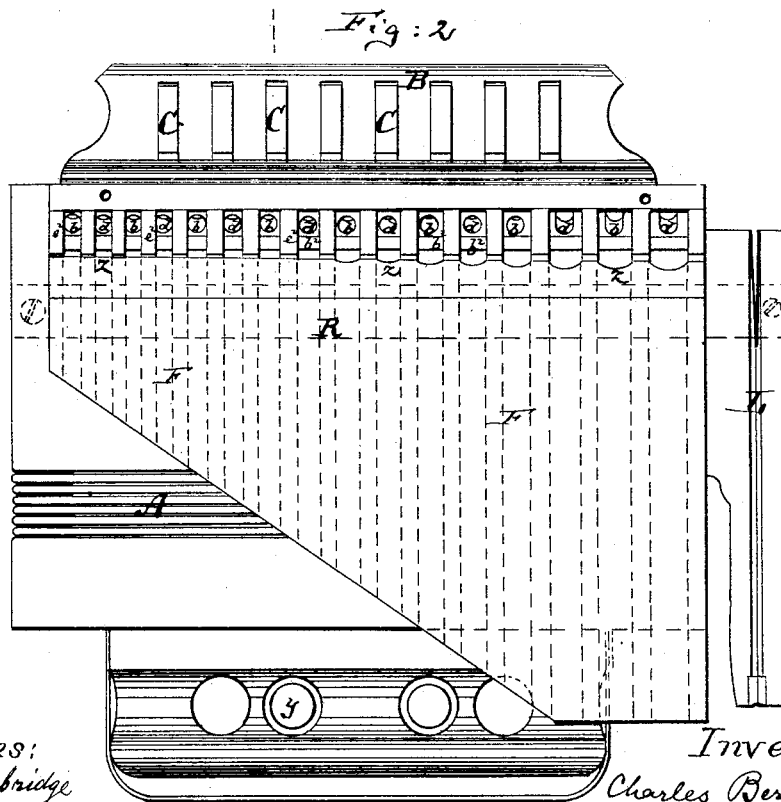
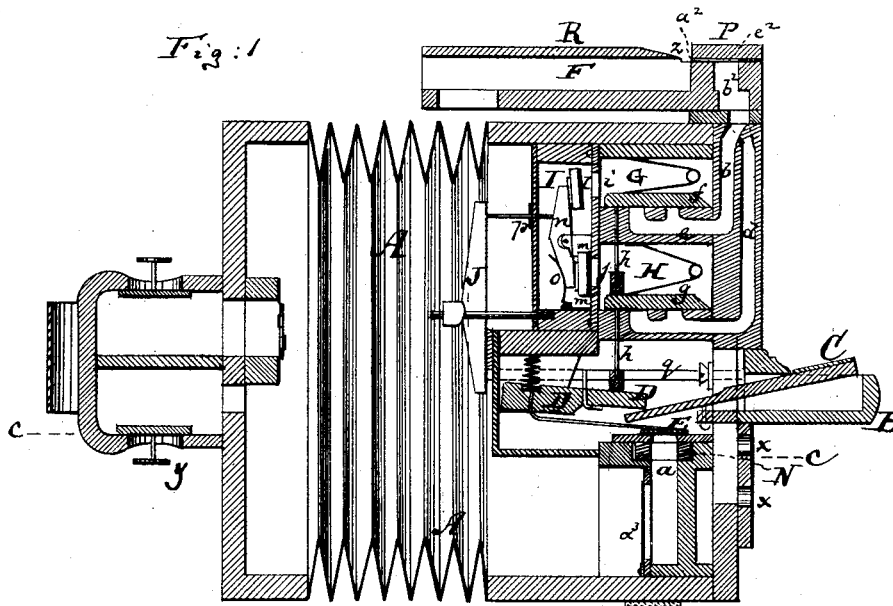


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Combined Accordion and Flute.  
No. 221,148. Patented Nov. 4, 1879.



Witnesses:  
John E. Tunbridge  
Wm. H. C. Smith.

Inventor.  
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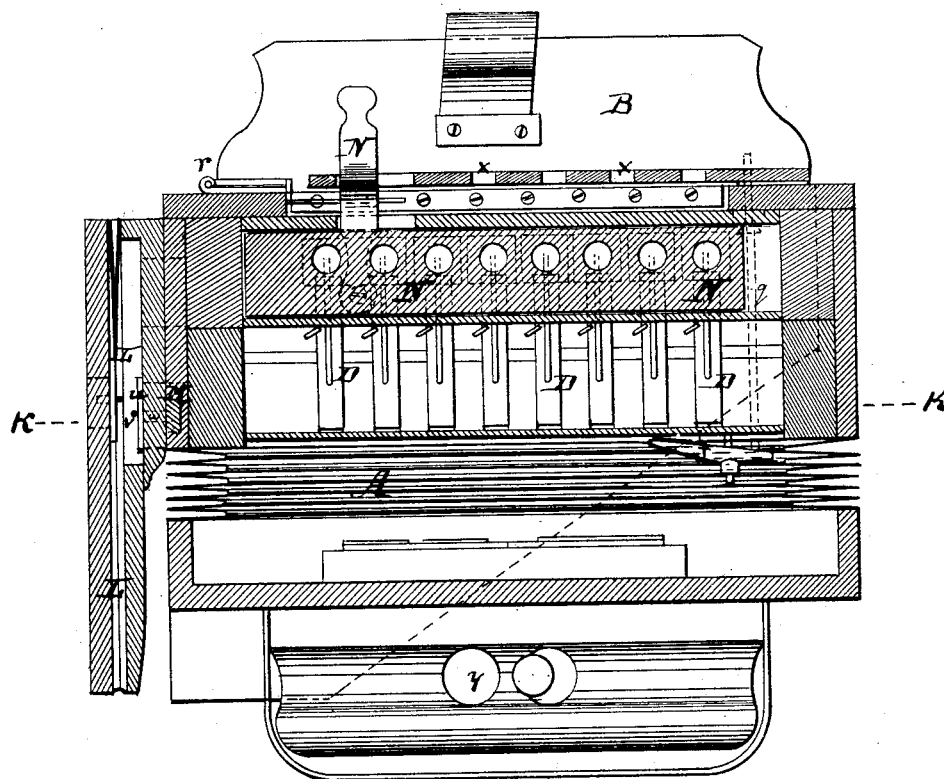
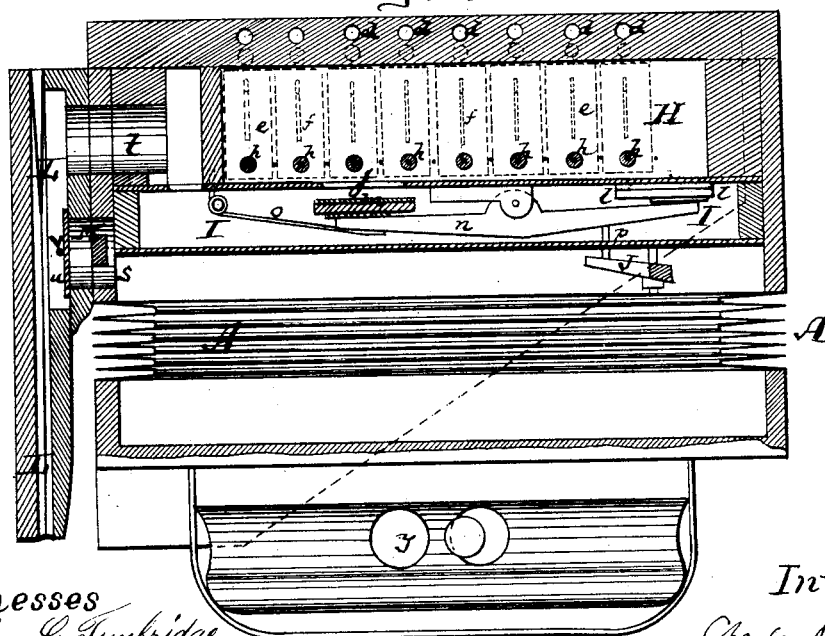


Fig. 4



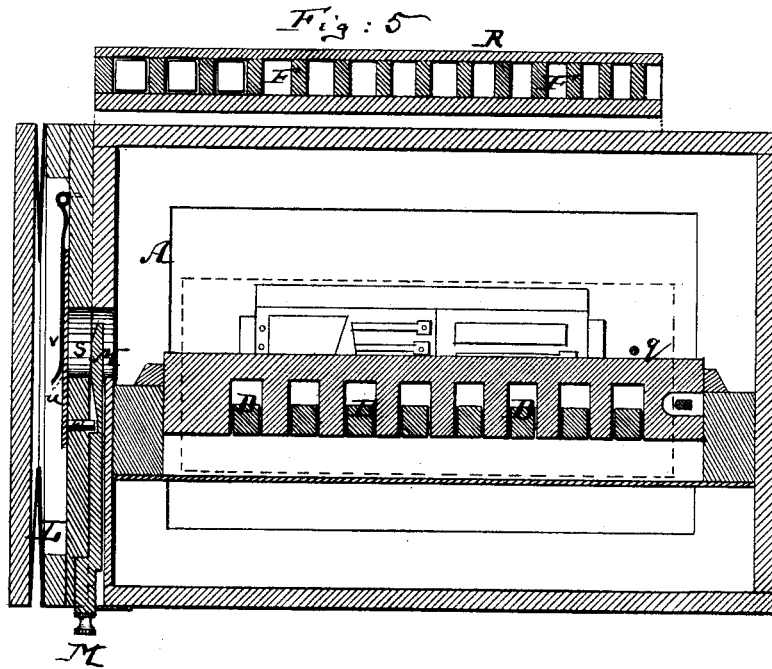
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# UNITED STATES PATENT OFFICE.

CHARLES BERNHARDT, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-THIRD OF HIS RIGHT TO HENRY HEUBACH, OF SAME PLACE.

## IMPROVEMENT IN COMBINED ACCORDION AND FLUTE.

Specification forming part of Letters Patent No. **221,148**, dated November 4, 1879; application filed July 29, 1879.

*To all whom it may concern:*

Be it known that I, CHARLES BERNHARDT, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Combined Accordion and Flute, of which the following is a specification.

Figure 1 is a transverse section of my improved combined accordion and flute; Fig. 2, a side view of the same, the covering-plate for the openings to the flutes being removed. Fig. 3 is a longitudinal section of the same, taken on the plane of the line *c c*, Fig. 1. Fig. 4 is a longitudinal section, showing the communication between the two bellows; and Fig. 5 is a longitudinal section on the plane of the line *k k*, Fig. 3.

Similar letters of reference indicate corresponding parts in all the figures.

The object of this invention is to provide a hand-accordion, which is a reed-instrument worked by bellows and suitable keys on a key-board, with a flute attachment, so that either the reeds alone or the flutes alone, or both the reeds and the flutes, may be simultaneously played.

The difficulty which I encountered in constructing such a device for connection with accordions having double-acting reeds had its principal source in the fact that in such accordions each key works upon two different reeds, one being played when the bellows are being contracted, the other when they are being extended. It is therefore necessary, in order to operate flutes with corresponding sound, so to arrange the apparatus that one flute will be played by the action of a given key whenever the bellows are being drawn out or extended, and a different flute played with the same key when the bellows are being contracted. In order to thus acquire an automatic change of flutes by the mere reversal of the motion of the bellows in harmony with the automatic change of reeds obtained by the same movements, I use a hinged key-board, which has a slight motion of its own, thereby operating a certain valve, which allows air from the bellows to enter one flute-compartment or wind-chamber when the bellows are contracted, and another flute-compartment or wind-chamber when the bellows are extended. The flutes

that communicate with one of these two wind-chambers correspond with the reeds which can be played at the time such wind-chamber is brought into action, and in similar manner the other wind-chamber corresponds with the remaining reeds.

A further difficulty which I encountered led me to apply to the ordinary bellows a secondary bellows particularly intended to supply the flutes.

Other details of invention, which will be hereinafter more fully specified, are also embraced in my improved instrument, and constitute part of that which I claim as new.

In the accompanying drawings, the letter A represents the ordinary bellows of a hand-accordion, and B is the key-board of the same, being a projection on one face of the bellows, in which there are hinged or pivoted a series of keys, C C. Each of these keys communicates at its inner end, as shown in Fig. 1, with a lever, D, that carries or controls a valve, E, which valve, by a suitable spring, is, in its normal condition, placed over the air-opening *a*, that leads to one pair of reeds, *a'*.

As the operator works the bellows A the air will enter that air-channel, *a*, on which the valve E may be lifted by proper compression of one of the keys C, and if one particular key C is depressed, the air will sound one of the reeds as the bellows are being expanded, and another reed as the bellows are being contracted, thus producing two different sounds, according to the motion of the bellows, all of which is well known and common in accordions.

Now I attach to the same accordion a row of flutes, F F, which are indicated in Figs. 1, 2, and 5. These flutes communicate alternately with air-channels *b* and *d*, (shown in Fig. 1,) said air-channels leading, respectively, into air-chambers or wind-chests G and H. In other words, the first, third, fifth, seventh, ninth, &c., flute of the series has each communication with a separate channel, *b*, and thereby with the wind-chest G, and the second, fourth, sixth, eighth, &c., flute of the series communicates each by a separate channel, *d*, with the wind-chest H, the two wind-chests G and H being positively divided by a suitable

partition, *e*. (Shown in Fig. 1.) Communication between the said two wind-chests and the several channels *b d* is interrupted in the normal position of the instrument by valves *f* and *g*, respectively. These valves *f g* are arranged in relation to each other in pairs, (one in the box *G*, the other in the box *H*,) and always in line with each other and with one of the keys *C* of the key-board; and posts *h h* connect said two valves with the lever *D*, that communicates with such key, as clearly shown in Fig. 1, so that by depressing the key *C* the operator raises both valves, *f* and *g*, which pertain to such key off their seats, thereby establishing communication between the wind-chambers *G* and *H* and two of the flutes, being those two flutes which are to be played by means of that particular key *C* which is depressed.

In order, as already stated, to prevent one of these two flutes from being played except in harmony with the corresponding reed of the pair of reeds which is worked by the same key *C*, I cause the wind-chambers *G* and *H* to communicate with another wind-chamber, *I*, by two openings, *i* and *j*, which are also shown in Fig. 1.

Communication between one of the chambers *G H* and the chamber *I* is always interrupted, and between the other and *I* always open, this being effected by means of two valves, *l* and *m*, which are attached to a beam, *n*, that is pivoted within the chamber *I*.

In the normal position a suitable spring, *o*, causes the valve *m* to close the opening *j*, as shown in Fig. 1. The beam *n* connects by a rod, *p*, with another beam, *J*, which, in turn, connects by a rod, *q*, with the key-board *B*. This key-board is, at one end, hinged to the face-plate of the bellows, as shown at *r* in Fig. 3, the rod *q* connecting with it at the free end of the hinged key-board, as indicated by dotted lines in Fig. 3.

Whenever the operator contracts the bellows the hinged key-board is carried close to the bellows, thereby pushing the rod *q* inwardly, and swinging the beam *J*, and consequently, also, the beam *n*, on their respective pivots, and closing the valve *l* against the opening *i*, whereby communication between the chambers *G* and *I* is interrupted, but between the chambers *H* and *I* established. The wind therefore is admitted during the contracting motion of the bellows from the chamber *I* into the chamber *H*, and thence, as the proper key *C* is depressed, into that channel, *d*, which leads to the flute to be played, so that the flute which harmonizes with the reed, which is also played by the depression of the certain key *C* when the bellows are being contracted, will be acted upon.

When the bellows (leaving the same key *C* depressed) is being extended the hinged key-board *B* will be slightly drawn away from the bellows *A* and from the rod *q*, allowing the spring *o* to close the valve *m*, and to thus interrupt communication between the chambers *H* and *I*, and establish communication be-

tween the chambers *G* and *I*. Consequently, by the extending motion of the bellows the air will be admitted into the channel *b* of the flute intended to be played, which is the same flute that harmonizes with the reed which is being played at the time of extending the bellows by the depression of a certain key. If a number of keys *C* are depressed at the same time, the same action will, of course, take place between the respective flutes and reeds that are being played.

It now behooves me to show how the air is admitted into the chamber *I*.

To this end I have attached a separate bellows, *L*, to one end or other part of the bellows *A*. The two bellows communicate with each other through a passage, *s*, (shown in Fig. 4,) so that whenever the flutes are to be played wind will be forced from the bellows *A*, through the opening *s*, into the bellows *L*, whence, through another opening, *t*, the air reaches the wind-box *I*, as clearly shown in Fig. 4.

If the flutes are not to be played, but only the reeds, communication between the two bellows *L* and *A* is interrupted by means of a valve, *u*, which closes the opening *s* under action of a suitable spring, *v*. The power of the spring *v* is such that it will not yield to the pressure of the air contained within the bellows *A*, but will leave the valve *u* closed, no matter how much the bellows *A* is operated; but if the flutes are to be played the valve *u* is positively opened by pulling a slide, *M*, which has a wedge-shaped extremity, (indicated in Fig. 5,) and lifts the valve *u* off the opening *s* by contact with a pin, *w*, on said valve, all as shown in Fig. 5.

Thus it is plain that by simply moving the slide *M* outward the bellows *L* are set in action, and, therefore, the flutes played together with the reeds, while, if the reeds alone are to be played, it is simply necessary to push the slide *M* inward, thereby entirely disconnecting the flute part from the reed part of the instrument.

If it should be desired to play the flutes alone, and not the reeds, the usual perforated slide *N* is made use of to interrupt communication between the bellows *A* and the air outlet and inlet openings *x*, which, when the slide *N* is opened, serve as supply and discharge openings for the air operated by the bellows *A*, but, when the slide *N* is closed, prevent the bellows *A* from affecting the reeds. In case the slide *N* is closed and the flutes alone are to be played, air is admitted to the bellows *A* by opening one of the usual apertures provided for that purpose, as shown at *y* in Fig. 1, to obtain air enough for operating the flutes.

The several flutes *F F* of the series are fastened into one single continuous frame, and are of different lengths and of different dimensions transversely to produce the sounds desired of each. The air-cutting edge *z* of each flute is directly above a narrow slit, *a*<sup>2</sup>, which communicates with a small chamber, *b*<sup>2</sup>, that is in communication either with one of the chan-

nels  $b$  or  $d$ , according to the location of the particular flute. The several chambers  $b^2$ , which are more clearly shown in Fig. 2, are all in a row, and the slits  $a^2$  are simply formed by gumming or otherwise fastening small strips  $e^2$ , of pasteboard or equivalent material, upon the partition between the said several chambers  $b^2$ , and in then covering the entire row of chambers  $b^2$  by a covering-plate, P. (Shown in Fig. 1.) This leaves the partitions between the several chambers  $b^2$  closed and the slits  $a^2$  between the several chambers and their respective flutes open, and is a means of forming the air-communication much less expensive than if each flute were separately constructed. In like manner I reduce the expense of constructing the several flutes by forming the bevel for the cutting-edge  $z$  on a board, R, which covers the entire series of flutes, as indicated in Figs. 1 and 2, so that by the one bevel the air-cutting edges for all the flutes are obtained.

I desire it to be particularly understood that instead of flutes other wind instruments may be used, such as clarionettes, cornets, or the like, and that for the purposes of my invention the term "flute" in this specification is intended to include every equivalent wind instrument.

I claim—

1. The combined accordion and flute, constructed and arranged to operate substantially as herein shown and described.

2. The combination of the key C of a reed-accordion with the lever D, carrying the valve E, and with the valves  $f g$  and channels  $b d$ , leading to a series of flutes, substantially as specified.

3. The combined flute and accordion made with a hinged key-board, B, for operating the valves  $l m$  whenever the bellows A is being operated, substantially as specified.

4. The combination of the hinged key-board B with the beam  $n$ , valves  $l m$ , and intermediate mechanism, and with the chambers G, H, and I, for operation substantially as specified.

5. The combination, in a combined accordion and flute, of the key C, with two reeds, which are worked by moving said key, and with two flutes corresponding to said reeds, for operation substantially as specified.

6. The combination of the separate bellows L with the wind-chamber I and with the distributing wind-chambers G and H, which communicate with alternate flutes, substantially as and for the purpose specified.

7. The combination of the key of an accordion with the valves of two flutes and with the key-board and bellows A, all arranged as described, so that by reversing the motion of the bellows the said two flutes are alternately brought into action, substantially as specified.

8. The combination of the bellows A of an accordion with the flute, the bellows L, and intervening valve  $u$ , substantially as and for the purpose specified.

9. The combination of the bellows A and L with the wind-chamber I and distributing-chambers G H, which lead to channels  $b d$ , respectively, substantially as and for the purpose set forth.

10. The combination of the accordion-bellows A, flute-bellows L, and intervening valve  $u$  with the mechanism M, for throwing the flutes into or out of action without interfering with the reeds, substantially as specified.

11. The combination of the accordion-bellows A and flute-bellows L with the mechanism N, for throwing the reeds out of action or into action without interfering with the flutes, substantially as specified.

12. The covering-board R for the series of flutes, made with the continuous bevel  $z$  to constitute the air-cutting edges for all the flutes, substantially as and for the purpose specified.

13. The combination of the series of flutes F F, having air-cutting edges  $z$ , with the slits  $a^2$  and chambers  $b^2$ , and with the narrow strips  $e^2$ , placed upon the partitions between the said chambers  $b^2$ , substantially as and for the purpose herein shown and described.

14. The combination of the hinged key-board B with the rod  $q$ , beam J, rod  $p$ , beam  $n$ , spring  $o$ , and valves  $l m$ , substantially as and for the purpose herein shown and described.

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Witnesses:

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