

(Model.)

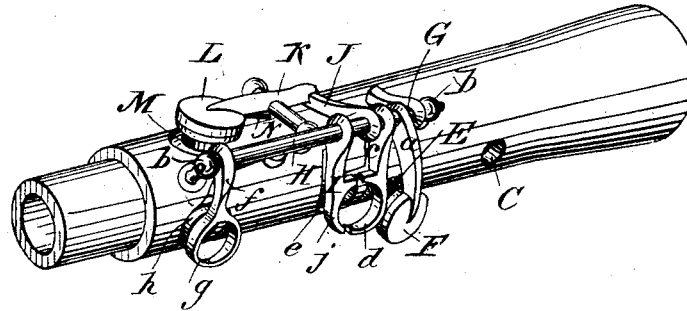
T. BERTELING.

FLUTE.

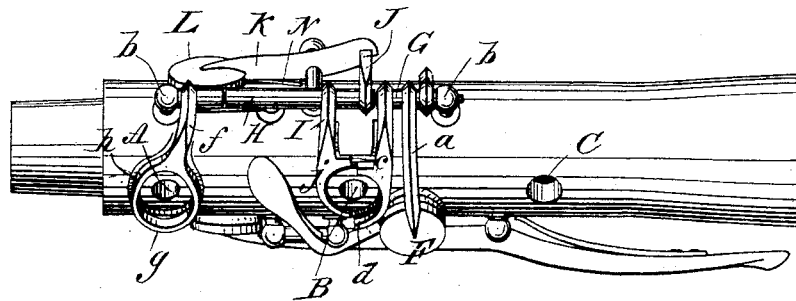
No. 264,611.

Patented Sept. 19, 1882.

*Fig. 1.*



*Fig. 2.*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

THEODORE BERTELING, OF NEW YORK, N. Y.

## FLUTE.

SPECIFICATION forming part of Letters Patent No. 264,611, dated September 19, 1882.

Application filed February 27, 1882. (Model.)

*To all whom it may concern:*

Be it known that I, THEODORE BERTELING, of the city, county and State of New York, have invented certain new and useful Improvements in Flutes, of which the following is a full, clear and exact description.

The object of my invention is to provide certain new and useful improvements in flutes, whereby playing on the flute is greatly facilitated, and the tones can be produced much more distinctly and stronger than with a flute of the usual construction.

The invention consists in a flute provided with certain novel arrangements of the key-valves whereby the F's can be produced by means of fork-fingering, and can consequently be played much more easily and more distinctly and rapidly than in a flute of the usual construction. The volumes of the F tones and nearly all the other tones are greatly augmented.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a perspective view of part of a flute provided with my improvements. Fig. 2 is a longitudinal plan view of the same.

The flute is provided with the apertures A, B, and C, arranged in a straight line, as in ordinary flutes. Adjoining the aperture B there is another aperture, E, which can be closed by a key-valve, F, attached to an arm, *a*, of a rod or shaft, G, journaled in two standards, *b*, on the flute. This shaft G is provided with an additional arm, *c*, which terminates in a half-ring, *d*, fitting into an annular groove or recess, *e*, surrounding the aperture B. At the opposite end the shaft G is provided with an arm, *f*, projecting in the same direction as the arms *a* and *c*, and terminating in a ring, *g*, fitting into an annular recess or groove, *h*, surrounding the aperture A. A sleeve, H, is loosely mounted on the shaft G, between the arms *c* and *f*, and this sleeve is provided with an arm, I, projecting in the same direction as the arm *c* of the shaft G, and provided at its end with a half-ring, *j*, and facing the half-ring *d*, and fitting in the remaining half of the annular groove *e* surrounding the aperture B. The sleeve H is provided with an arm, J, projecting in the inverse direction of the arm I,

and on the end of this arm one end of a pivoted lever, K, rests, provided at the other end with a key-valve, L, adapted to close an aperture, M, in the flute. This key-valve is held open by a spring, N. The aperture A is known as the "E hole." The aperture M is known as the "F hole." The aperture E is known as the "F-sharp hole," and the aperture C is known as the "G hole." The aperture B can be dispensed with if desired.

The operation is as follows: The aperture E can be closed by means of the valve F by pressing on the ring *g* at the end of the arm *f* or the half-ring *d* at the end of the arm *c*. The aperture M can be closed by means of the valve L by pressing down the half-ring *j* at the end of the arm I, for thereby the end of the lever K resting on it. The apertures E and M can be closed simultaneously by depressing the two half-rings *d* and *j* at the same time.

If a flute is provided with my improvements, the high, low, and deep F's can be produced with fork-fingering—that is, such fingering as is used in playing on the piano or organ—whereas a sliding movement must be given to the fingers to produce these tones on a flute of the usual construction.

As is well known, it is very difficult in slow movements to bind the first, second, and third F with other notes, in the usual way, with the F key, and in rapid movements it is too difficult to be executed perfectly. By means of my improvements the first, second, and third F can be bound or united with other tones with fork-fingering, which is so easy to execute that these notes can be bound easily in slow and rapid movements. To play an E both half-rings *d* and *j* are depressed. To play an F the apertures A and E are closed and the half-ring *j* remains raised. To play an F-sharp the finger is raised from the aperture A. With the half-ring *j*, in combination with the key-valve L, an F can be played on the first space of the staff, also on the first and second octaves above, all by means of fork-fingering. By means of the other half-ring, *d*, in combination with the full ring *g*, a correct F-sharp for all three F's—that is, for the first, second, and third octaves—can be produced. The aperture M is farther from the mouth-hole in my improved

flute than in a flute of the usual construction, and this causes a great volume of tone, not only in the three F's and F-sharps, but nearly all the notes above F-sharp gain in volume, distinctness, power, and correctness. The entire fingering of the instrument is materially simplified.

This improvement can be applied on a piccolo, and for the left-hand piece of clarionets, and on all flutes in any key.

I am aware that it is not broadly new to construct a flute with two key-valves and arms attached to a journaled shaft, and two other key-valves and arms attached to a sleeve loosely mounted on the said shaft; but

What I do claim as new and of my invention is—

1. The combination, with a flute, of the half-ring *d* within the line of finger-apertures A, B, C, and of the key-valve L for closing aperture *m*, and key-valve F for closing aperture E, as and for the purpose specified.

2. The combination, with a flute, of the half-rings *d* and *j* within the line of finger-apertures A, B, C, and of the key-valves L and F, substantially as herein shown and described, and for the purpose set forth.

3. The combination, with a flute, of the half-rings *d* and *j* and the ring *g* within the line of finger-apertures A B C, and of the key-valves F and L, substantially as herein shown and described, and for the purpose set forth.

4. The combination, with a flute, of the key-valve F and the arms *c f*, attached to a journaled shaft, G, and the arms I and J, attached to a sleeve, H, loosely mounted on the shaft G, and of a pivoted key-valve and lever L K, acted on by the arm J, substantially as herein shown and described, and for the purpose set forth.

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Witnesses:

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