(12) UK Patent Application (19) GB (11) 2 040 097 A

(21) Application No **7942197**
(22) Date of filing **6 Dec 1979**
(30) Priority data
(31) **7847769**
(32) **8 Dec 1978**
(33) **United Kingdom (GB)**
(43) Application published **20 Aug 1980**
(51) **INT CL³ G10D 7/02**
(52) Domestic classification **G5J** 32
(56) Documents cited **None**
(58) Field of search **G5J**
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(54) **Improvements in or relating to wind instruments**

(57) This invention relates to wind instruments and in particular to improvements to the support, fingering and mechanism of the flute family.

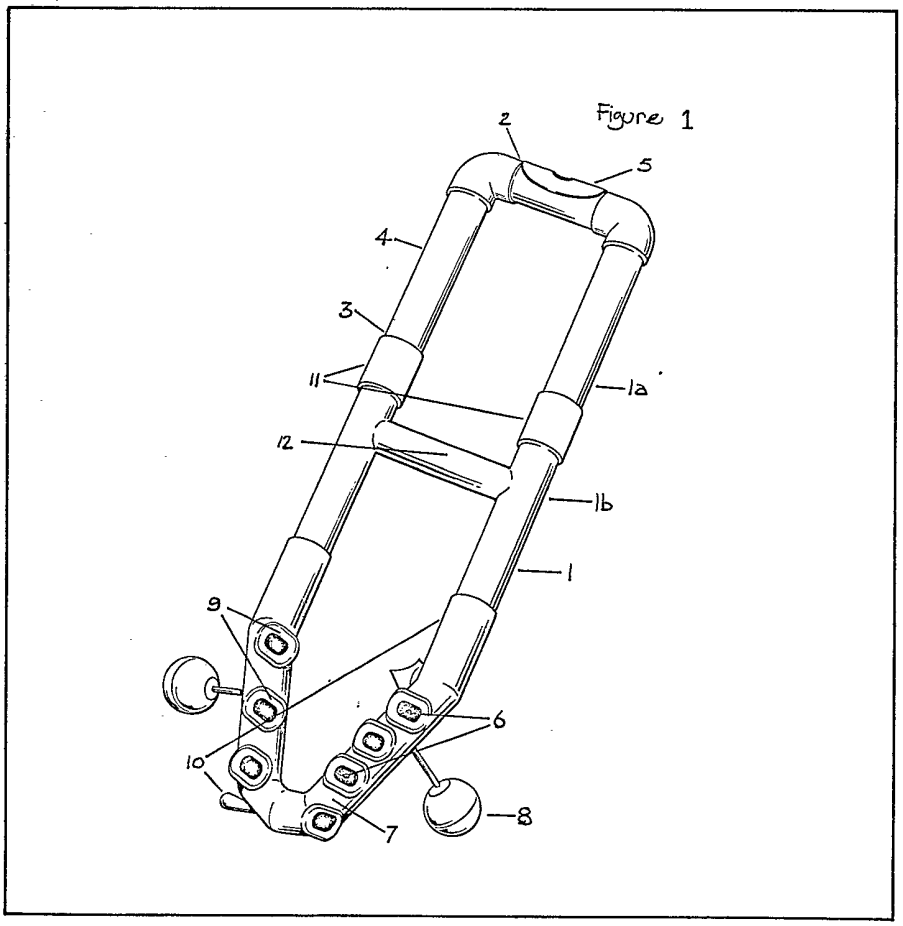
In the prior art the air tube is straight resulting in an unnatural position of head and arms. Support and control of position is difficult and some digits notably the right thumb are not freely available to control note holes or keys.

In the present invention the tube is disposed in an elongated loop with embouchure (5) note holes (6) and palm supports (8).

The instrument is supported in a natural position in front of the body between the hands, acting in opposition, and the lower lip. All digits are thus freely available to operate note holes (6) or keys, and the mechanism and fingering system are significantly simplified.

The configuration is compact and the larger instruments in the consort remain manageable by young players.

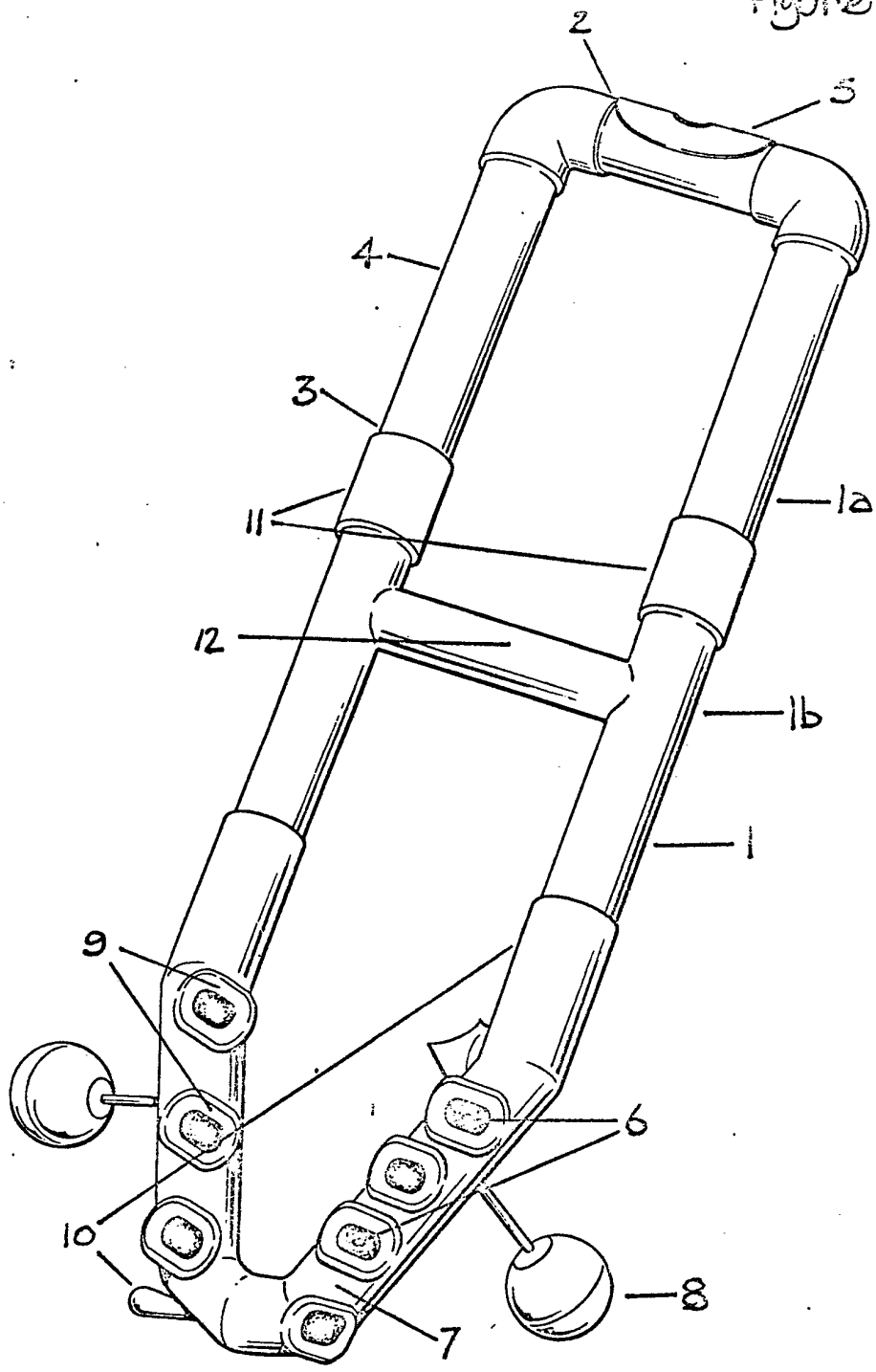
A fipple mouthpiece can be used.



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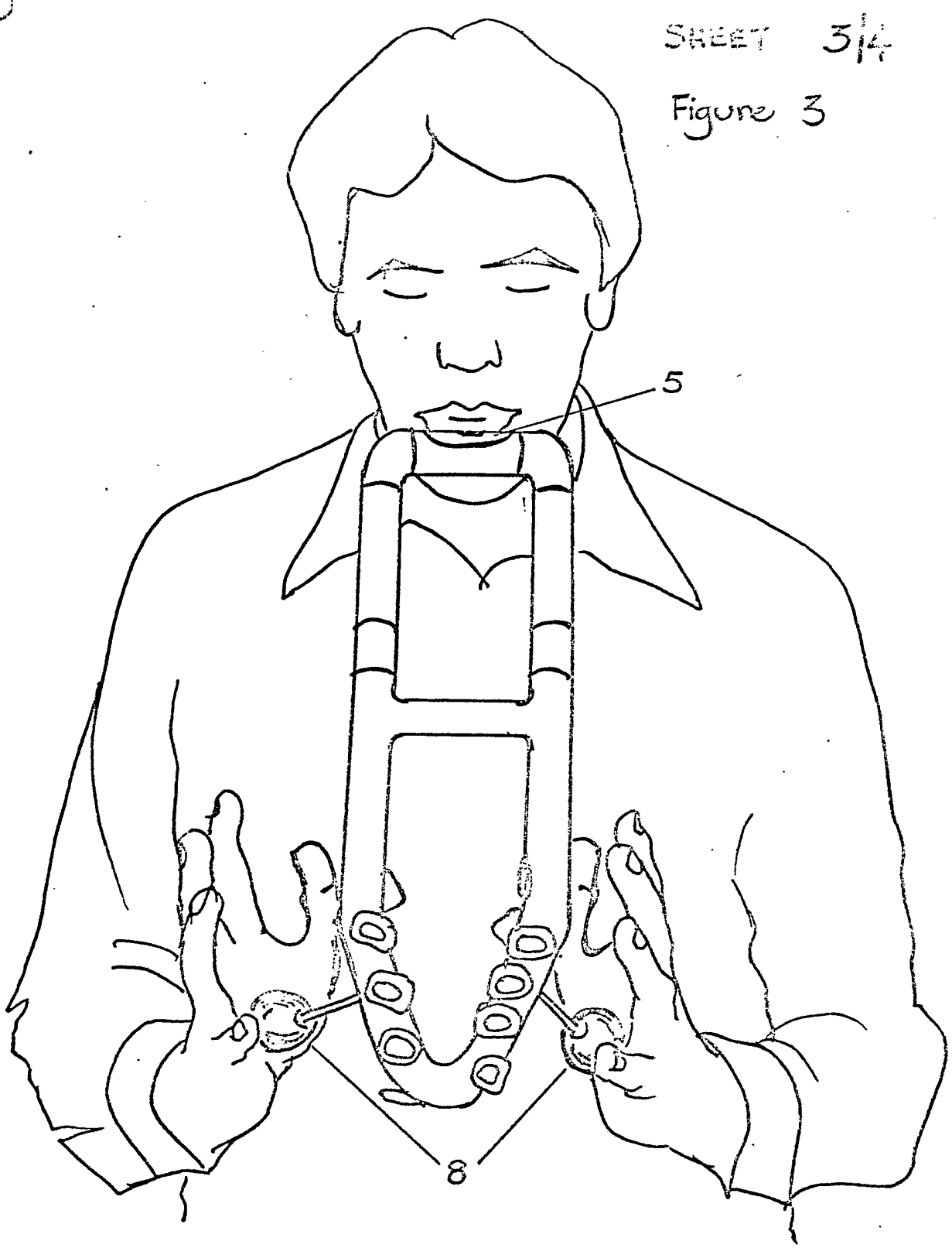
Figure 1



SHEET 2/4
Figure 2



Figure 3



SHEET 4/4

Figure 4



SPECIFICATION

Improvements in or relating to wind instruments

This invention relates to wind instruments and in particular to improvements to the support, fingering and mechanism of the flute family including all instruments with fipple or transverse air-reed excitation of the air column (eg recorder, flageolet, fife, band flute, orchestral flute).

In these instruments the fundamental, or lowest, note is obtained from a simple tube with one end open and the other effectively closed by the excitation system. Further notes are obtained by means of a series of holes formed along the length of the tube and controlled by the fingers so that the effective length, and hence the frequency, of the vibrating air column may be varied may be varied. Therefore, to obtain a 12 note chromatic octave without cross fingering, the tube must be furnished with at least 11 holes in addition to the open end.

Traditional design was conditioned by the material used (wood, bamboo). The tube was straight and the bore cylindrical or nearly so. The fingers, arranged along the tube so that the index finger of one hand was adjacent to the little finger of the other, were required to support the weight, control the position and operate the note holes or keys. In particular one thumb, usually the right, was confined to support and control and was not available to operate keys or holes. Some other fingers, notably the right little finger, contributed to support and were restricted in ability to operate keys or holes. Hence in a chromatic instrument only 9 digits were available to operate a minimum of 11 holes or keys.

More or less complex combinations of fingerings, shaded holes, double holes, keys and mechanisms were evolved to compensate for this deficiency.

When metal tubes were introduced the traditional fingering, hole systems, keys and mechanisms were well established and were in essence retained together with the straight tube except that in some of the large instruments bends were, for convenience, introduced between embouchure and tuning slide or at the lower note holes. In particular a transverse flute in its present day form requires a complex mechanism, is inconvenient to support and to control and involves an unnatural position of head and arms. The present invention seeks to provide simplification of the mechanism and improved support allowing a natural position of head and arms.

In accordance with the present invention a wind instrument includes a tube open at one end and closed at the other having an excitation aperture near the closed end and a note hole row, the tube being arranged as a loop wherein the note hole row is disposed diametrically opposite the excitation aperture.

Preferably the loop lies substantially in one plane and is symmetrical about an axis in that plane defined by the excitation aperture and the centre of the not hole row and for a natural fingering position includes a V-shaped portion in which the note hole row is located, each arm of the V being typically inclined at about 20° or more or less in the range from 0° to 90° to the axis of symmetry and containing about half of the note hole row.

Additionally a palm rest may be attached to or near each arm of the V shaped portion so that the instrument can be supported in the palms which are pressed inwards towards each other to react against the two palm rests, thereby ensuring that the fingers are not involved in support or control and all 10 digits are available to operate holes or keys, (an increase of more than 11% availability).

The excitation aperture may be an embouchure hole or a fipple.

This invention leads to a significant simplification of mechanism over the prior art. In the simplest typical instrument, ie 12 notes in each of the 1st and 2nd registers (the 2nd register being obtained by overblowing on the fingering of the 1st) no interconnection of keys is required and nine of the ten digits are assigned to control only one hole or key each. The tenth digit is required to control two holes or keys.

The third octave is obtained by cross fingering.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings of which

Figure 1, is a general view of a V-shaped flute, and Figure 2, 3 and 4 are two front and one side view respectively of the same flute in use.

The flute illustrated in Figure 1 comprises a uniform or nearly uniform bore tube having a closed end 2 and an effectively open end 3. The closed and open ends are interconnected for rigidity by a vented support tube 4. An embouchure plate 5 is located adjacent to the closed end 2 and note holes 6 are located in a V-shaped portion 7 of the tube 1. A palm rest 8 is attached to each arm of the portion 7.

Shaped finger plates 9 are fitted over the note holes 6, each having an elongated hole of optimum area to allow the whole of the pad of the first joint of each appropriate finger and thumb to be used. The note holes operate by the little finger and thumb of the right hand and the thumb of the left hand are located at the back of the portion 7 and two of these holes are provided with keys 10.

To permit a small degree of tuning the tube 1 is divided into portions 1a and 1b, the portion 1a and the support tube 4 being slidable to a limited extent in sleeves 11. A transverse brace 12 is provided for additional rigidity.

The support provided by the palms pressing in opposition against the palm rests 8 is as shown in figure 3 and is supplemented by maintaining with the hands a slight pressure of the embouchure plate 5 against the lower lip.

The fingers controlling the holes or keys are disposed as shown in figures 2 and 4, that is with the hands generally in opposition and with the little fingers controlling adjacent holes.

The natural position of head, arms and hands that can be adopted with this embodiment is illustrated in figures 2, 3 and 4.

This embodiment has incidental advantages over the straight tube design of the prior art. It is compact and robust and can be stored in its case without dismantling. In use it can be suspended by a neck strap so that when not actually playing the hands are

free, and the usual floor stand is not required. Since there are no key inter-connections the fingering pattern is logical and obvious for the first two registers. Furthermore, the keys necessary in the prior art, although convenient for control of large note holes, are no longer essential and can in all but two cases be omitted provided the shaped finger plates shown in figure 1 are provided.

The embodiment described can be manufactured from metal tubing, or plastics mouldings, or alternatively can be constructed conveniently and inexpendively in simple form from standard plastics material tubing and elbow joints, for example in Osma cold water overflow fittings.

It will be apparent that various other embodiments of the invention are possible, for example, the embrochure can be readily replaced by a fipple mouthpiece more suitable for beginners or for extended finger practice without overtiring the lips.

Further whilst retaining the general configuration of the tube, the method of support and natural position of the head, arms and hands, additional mechanism can be provided to afford facilities such as for example overlap of the octaves, alternative fingerings for shakes and trills, venting for uncertain notes and alternative keys for cross fingering.

CLAIMS

1. A wind instrument including a tube open at one end and closed at the other end. Having an excitation aperture near the closed end and a note hole row, the tube being arranged as a loop wherein the note hole row is disposed diametrically opposite the excitation aperture.

2. A wind instrument as claimed in Claim 1 wherein the loop lies substantially in one plane and is substantially symmetrical about an axis defined by the excitation aperture and the centre or apex of the note hole row.

3. A wind instrument as claimed in Claim 2 wherein the loop includes a V-shaped portion in which the note hole row is located, the portion being symmetrical about the said axis.

4. A wind instrument as claimed in Claim 3 wherein the included angle of the V-shaped portion is no greater than 160°.

5. A wind instrument as claimed in any of the preceding claims additionally having a palm rest attached adjacent each half of the note hole row.

6. A wind instrument as claimed in any of the preceding claims wherein the excitation aperture is an embouchure hole.

7. A wind instrument as claimed in any of Claims 1 to 6 wherein the excitation aperture is a fipple.

8. A wind instrument substantially as herein before described with reference to the accompanying in Figure 1 and Figure 4.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1980.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.