May 1, 1951 H. SOMMARUGA 2,551,177

SAXOPHONE

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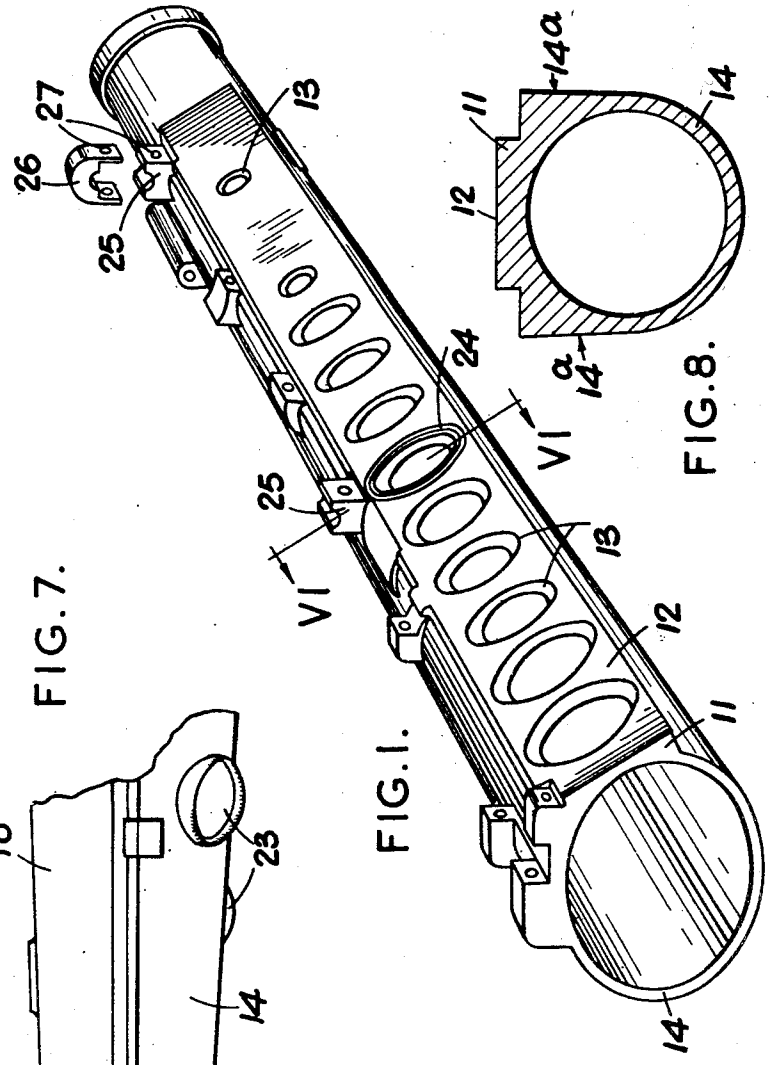


FIG. 1.

FIG. 8.

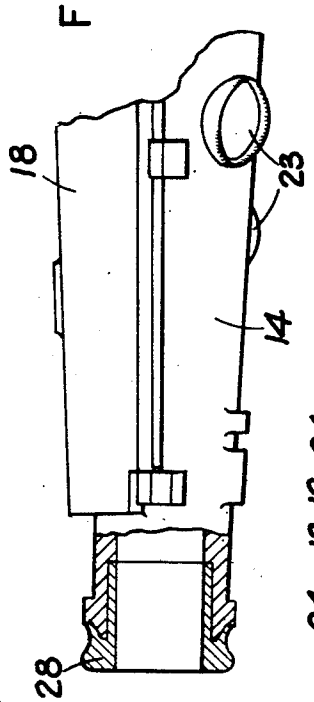


FIG. 7.

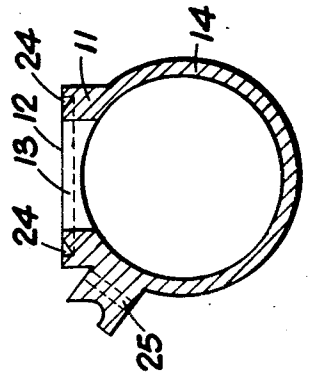


FIG. 6.

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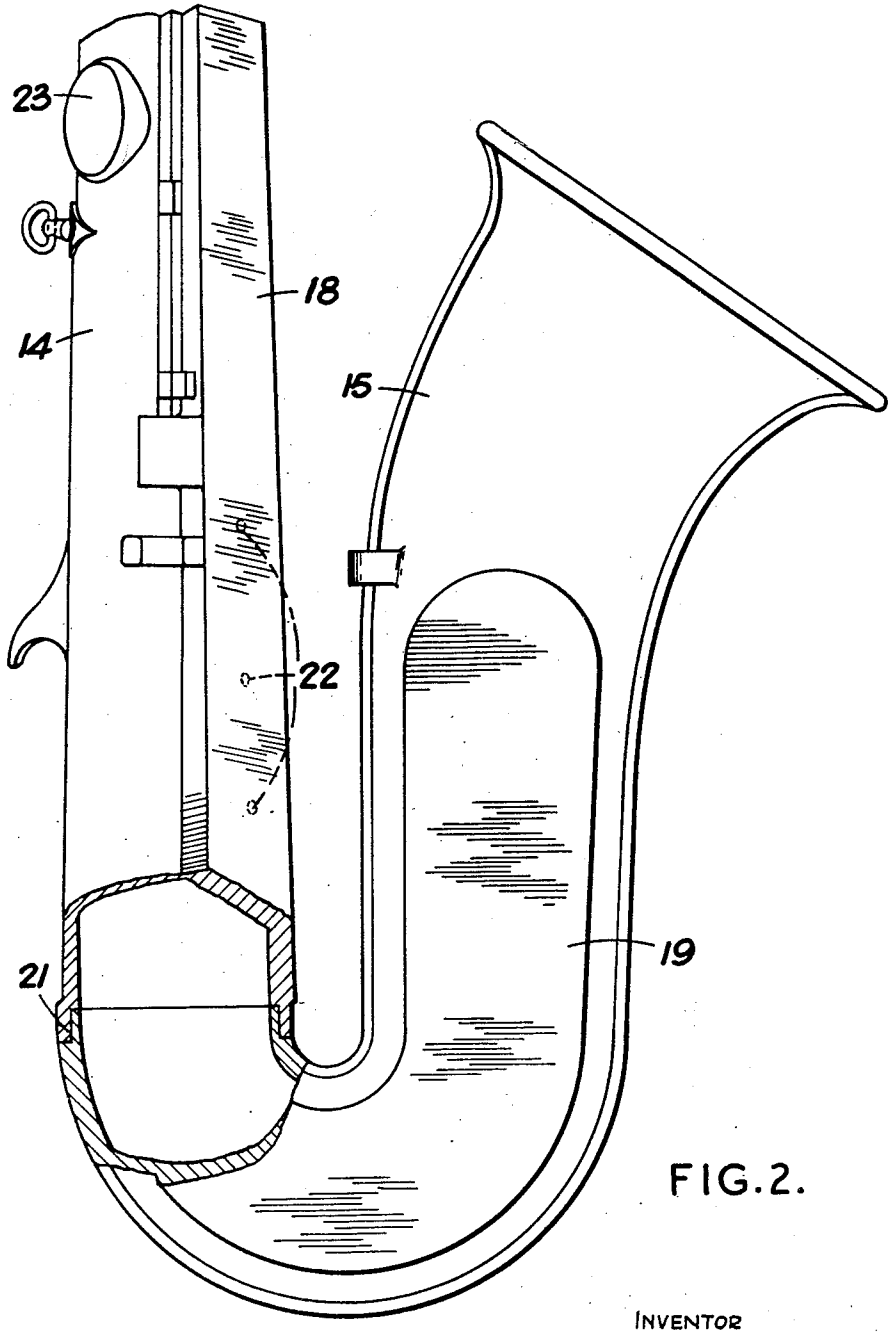


FIG. 2.

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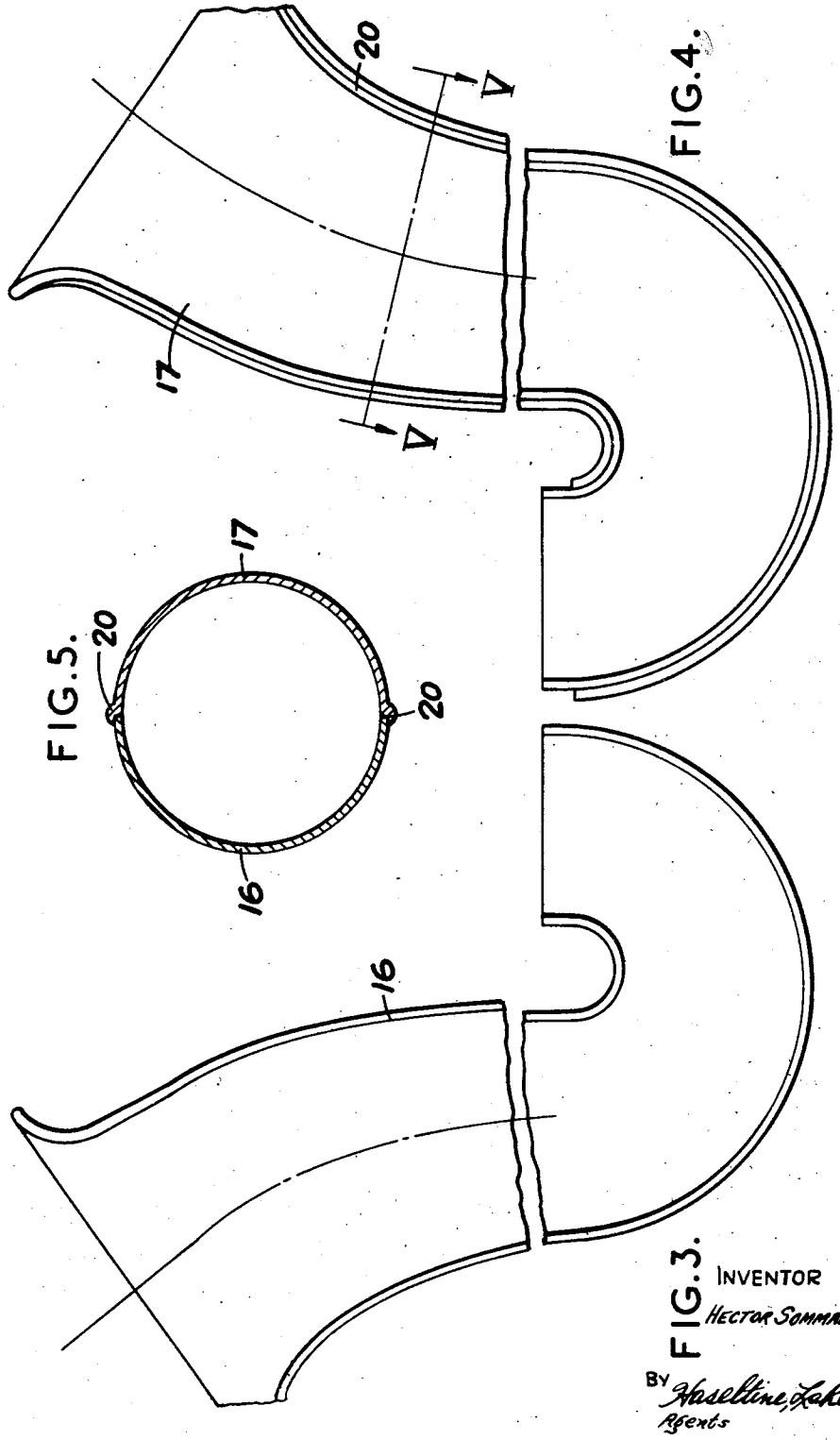


FIG. 4.

FIG. 5.

FIG. 3.

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UNITED STATES PATENT OFFICE

2,551,177

SAXOPHONE

Hector Sommaruga, London, England

Application February 27, 1947, Serial No. 731,334
In Great Britain December 14, 1945

Section 1, Public Law 690, August 8, 1946
Patent expires December 14, 1965

5 Claims. (Cl. 84—385)

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This invention relates to saxophones, the saxophone being a musical instrument comprising a tubular body formed with valve apertures, commonly known as tone holes, which are provided with valve seatings, in association with which valves and valve-actuating keys are arranged.

The primary object of the invention is to provide saxophones produced by novel methods of manufacture whereby production is greatly expedited and cheapened, whilst the instruments so made possess certain novel and advantageous features.

A saxophone in its most commonly used forms, (e. g. alto and tenor) comprises a long hollow conical body of which about two-thirds of the length from the smaller diameter is straight whilst the end of larger diameter is doubled back to lie adjacent the straight part; and the back-turned greater part is known as the bell.

In the making of a saxophone, it is customary to form the body of the instrument of sheet metal and to attach subsidiary parts thereto. This work involves a number of skilled operations, including: making various parts of conical tubing; drawing the valve apertures; making and brazing or soldering in place a number of pillars or posts necessary to receive the keywork, to hold the springs and sometimes to act as stops to some of the keys; making and soldering or brazing in place a multiplicity of other fittings, including thumb-rests, sling-ring, key-guides and flat spring rests; making and soldering-on or brazing-on ferrules to join the various parts of the body; and adding a number of guards or guard-holders, designed to protect awkwardly-placed keys.

According to the invention, however, a saxophone is characterised in that the body thereof comprises at least one moulding provided with an emplacement or emplacements adapted to accommodate a plurality of tone holes. Preferably the valve seatings associated with the said tone holes are made integral with the body, in which case the said seatings are formed in the said emplacement or emplacements.

The moulding or mouldings comprised in the body may suitably be made from one or more of the materials now commonly known as "plastics," or of certain other materials as, for example, light alloys or zinc alloys.

By making saxophone bodies comprising mouldings, many customary manufacturing operations may be dispensed with, and dimensional precision in the bodies and in the form and/or location of fittings may be ensured. Such dimensional precision greatly facilitates the assembly of instruments with mass-produced valves, keys and other components. Equally, or even more important in regard to the tonal qualities of the instruments produced, is the possibility of obtaining a high degree of accuracy in the dimensioning of the air column within the body.

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It may not be practicable to include in the moulding or mouldings the 30-odd pillars which are usually soldered on to a metal body, and are used to support the axles on which the keys pivot and to house the 20-odd needle springs necessary to return the keys to their normal positions after fingering; nor would it be practicable to mould all the tone holes, the various guard members, thumb rests, sling ring, key-guides, flat spring rests and other features, because they are so shaped and/or placed as to prevent the withdrawing of the moulding from the tool.

The invention, however, enables these difficulties to be overcome, since it includes the placing of tone holes in suitable positions for easy extraction from the mould; greatly reducing the number of pillars, and altering their shape and position on the body; changing the system of guards used to protect keys; and, preferably, adapting the body for being fitted with a pre-assembled unitary key-work. Such a key-work forms the subject of United States Patent No. 2,471,290 dated May 24, 1949.

In embodying these modifications in a saxophone, many departures may be made from customary constructional practice. For example, with only few exceptions all the keys necessary for the playing of the saxophone, may be grouped in two main units; a left-hand unit for the top part of the saxophone, and a right-hand unit for the lower part. The body may be so moulded with tone hole emplacements as to allow of this grouping and to permit the use of unitary key-work, as explained hereinafter. A few pillars are then sufficient to carry all keys and axles. Instead of, as is normally done now, having a number of small guards protecting individually keys that are placed in more vulnerable positions on the instrument, a single guard for each whole unit of keys may not only protect all the keys of the unit, but may also act as key regulator or stop. The guard may be added after the key-work is mounted and provisions for securing it may be made either on the pillars or direct on the body. The reduced number of pillars still required may be so shaped and placed as to allow the mould to be easily removed from the tool or

the pillars, or parts of them may be detachable with the unitary key-work.

Reference will now be made to the accompanying drawings, in which:

Figure 1 represents a perspective view of the straight part of a saxophone;

Figure 2 represents an elevation partly in section of the greater part of a saxophone;

Figures 3 and 4 represent respectively two halves of a saxophone bell constructed in sections;

Figure 5 represents a section on the line V—V of Figure 4;

Figure 6 represents a section on the line VI—VI of Figure 1;

Figure 7 represents a fragmentary elevation of a saxophone straight part illustrating a constructional detail, while

Figure 8 depicts a useful modification in the cross-sectional shape of the body-part shown in Figure 1.

Shown by way of example in Figure 1 is a saxophone straight part moulded in one piece and formed with an emplacement 11, which in this case is a continuous raised platform with a plane outermost surface 12. The emplacement 11 accommodates eleven tone holes and also provides, in the surface 12, valve seatings (not marked out) which are integral with the body; these tone holes are not all of the same size, but for convenience are indicated by the one reference numeral 13. The straight part here represented is designed to have a bell joined thereto in order to constitute a complete saxophone. It will be understood, however, that in the case of a straight saxophone of the soprano type the body complete with bell may be moulded in one piece.

Figures 2 to 5 depict a saxophone body consisting of three distinct mouldings adapted to be joined together, namely a straight part moulded in one piece, 14, and a bell 15 (Figure 2) divided axially into two sections 16, 17 (Figures 3 to 5), each substantially semi-circular in cross-section. In this case the straight part 14 is formed with an emplacement 18 very similar to the emplacement 11 of Figure 1, whilst the bell 15 is formed with an emplacement 19 of similar cross-section to the emplacements 11 and 18 but curved to conform to the bend of the bell.

To facilitate joining together the sections 16, 17 of the bell 15, and joining the bell to the straight part 14, each of the long edges of the section 17 is formed with a lip 20 (Figures 4 and 5) adapted to overlap the cooperating edge of the section 16 and enable a secure joint to be made by cementing, soldering or like process (all according to the nature of the material used for the mouldings) whilst the co-operating end edges of the straight part 14 and the bell 15 are designed to engage in an overlap joint 21 (Figure 2).

In the case of the straight part shown in Figure 1, the tone holes 13 have all been moulded in situ with the emplacement 11, and they are therefore so shaped and located as to facilitate the moulding operation.

Whilst emplacements such as 18, 19 may on occasion be moulded with plain level outermost surfaces bearing no indications of tone hole locations, as represented in Figure 2, it is preferred when holes are not moulded in situ to mould emplacements with indications of locations for tone holes, as for example small indentions 22 as indicated dotted in the emplacement 18 of Figure 2, which indentions are adapted to serve as drill centres to facilitate the emplacement being pierced after moulding to provide tone holes.

Whether tone holes are moulded in situ—in which case they may be made under size and tooled later to improve finish—or are formed by drilling and emplacement which has been moulded solid with the body, it is preferred that each be arranged with its longitudinal axis radial to the body of the instrument and perpendicular to a plane outermost surface of the emplacement, as for example the surface 12 in Figure 1. The body shown in this figure and in Figure 6 is substantially annular in cross-section but has one part of its periphery deformed, in the vicinity of each tone hole by the presence of the emplacement, a seat for a valve being formed by or in the said outermost surface. Figure 8, however, shows a modification in which the body-part 14 is substantially U-shaped in cross-section, (at least externally), the sides 14a of the U being either parallel or very slightly splayed towards the top of the U, where the emplacement 11 is located. This modified cross-section facilitates withdrawal of the moulded body-part from the moulding tool. In either case, the plane outermost surface 12 of the emplacement 11 may be a continuous surface into which a plurality of tone holes open. Alternatively, the seat for a valve may itself constitute a separate emplacement, and may be an annular protuberance standing out from the body. Such an emplacement and valve seat is shown at 23 in Figure 2. In the case of relatively thick-walled mouldings the outer surface of the emplacement may be flush with, or tangent to, the general cross-sectional outline of the body or even recessed into the body-contour (more especially when the valve seats themselves constitute emplacements).

Whether a tone hole opens flush with the continuous surface of an extended emplacement or opens into a separate emplacement, a groove is preferably moulded or otherwise formed adjacently around the tone hole, as shown, for example, at 24 in Figures 1 and 6. Such a groove tends to ensure reliable obturation of the tone hole by the pad of the co-operating valve.

Pillars and other projections, as for example lugs for the attachment of removable fittings, guard-holders, etc., may be moulded integral with a saxophone body or a part thereof. Thus in Figure 1 two lugs 25 are moulded integral with the body part depicted. Each lug 25 is adapted to co-operate with a bracket 26 which slides on to it and is secured by a pin or screw traversing both members 25, 26 through holes 27. Each pair of members 25, 26 is thus adapted to constitute a pillar serving as a bearing or socket for one end of a key axle. It is pointed out that if a key axle is supported in this manner between the two lugs 25, such axle can carry a plurality of valves, springs and keys, the whole constituting a unit of key-work, somewhat similar to that described in the above-mentioned copending patent application. Instead of a pair of members 25, 26 a single fitting, equivalent to such a pair made integral wth each other, may be used to carry one or more key axles and may be removably attached to the body as by being screwed thereto.

It is a great advantage for some of the pillars—or brackets, as 26, forming part thereof—to be easily detachable from the body, allowing a complete unit of keys to be removed from the body with axles and springs in position, that is to say, without having to dismantle each key as it is now necessary to do. The new construction greatly

facilitates the assembling of the instrument, and simplifies repairs.

In all cases where pillars and other projecting fittings are not moulded in situ, it is convenient to arrange that the body of the instrument is moulded with locating means, as, for example, holes, recesses, or protuberances adapted to facilitate correct affixing of such fittings. Fittings may be attached by screwing, pinning, cementing or other means.

It is not beyond the scope of the invention that separately made fittings should be incorporated into mouldings during the moulding process. Thus Figure 7 illustrates a separately made ferrule 28 moulded into place in a body 14 to serve as a socket for the crook of the instrument.

In order to facilitate the flow of moulding material in the moulds, the walls of the moulded saxophone body may be made considerably thicker than is usual in sheet metal instruments. Moulding in brass, the usual material for sheet metal saxophone bodies, would, therefore, produce too weighty an instrument and it is to overcome this drawback that the use of lighter materials, e. g. plastics, light metal alloys, or zinc alloy is contemplated. Thickening of the walls confers the further advantage of suppressing undesired resonances.

By virtue of the invention it is possible to manufacture a saxophone possessing all the conventional playing facilities, and moreover with a more pleasing appearance, greater sturdiness, less liability to breakdown, improved tonal qualities—and all this at a greatly reduced cost of production.

I claim:

1. A saxophone body comprising a main tubular body part to one end of which is adapted to be connected the mouthpiece, the said body part being a one piece tube of plastic material, an integral emplacement extending as an external longitudinal enlargement along the tube, tone holes in said emplacement, and a bell extension in the form of a flared tube, and an emplacement formed integral with said bell extension.

2. A method of producing a saxophone body having a longitudinal emplacement consisting in moulding the tubular body part from a plastic material and forming during the moulding thereof the said longitudinal emplacement integral with the tubular body part.

3. A method of producing a saxophone body having a longitudinal emplacement with tone holes consisting in moulding the tubular body part from a plastic material and forming during the moulding thereof integral with the tubular body part the said longitudinal emplacement with its tone holes.

4. A method of producing a saxophone body having a longitudinal emplacement with tone holes and also with key retaining lugs close alongside the emplacement consisting in moulding the tubular body part from a plastic material and forming during the moulding thereof integral with the tubular body part the said longitudinal emplacement with its tone holes and simultaneously moulding the said key retaining lugs integral with the body part.

5. A method of producing a saxophone body having a longitudinal emplacement with tone holes and obturating grooves, and also with key retaining lugs close alongside the emplacement, consisting in moulding the tubular body part from a plastic material and forming during the moulding thereof integral with the tubular body part the said longitudinal emplacement with its tone holes and obturating grooves, and simultaneously moulding the said key retaining lugs integral with the body part.

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