



The Early Saxophone in Patents 1838-1850 Compared

Author(s): William McBride

Source: *The Galpin Society Journal*, Vol. 35 (Mar., 1982), pp. 112-121

Published by: [Galpin Society](#)

Stable URL: <http://www.jstor.org/stable/841237>

Accessed: 19/11/2013 23:14

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at
<http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Galpin Society is collaborating with JSTOR to digitize, preserve and extend access to *The Galpin Society Journal*.

<http://www.jstor.org>

The Early Saxophone in Patents 1838–1850 Compared

So much inaccurate or incomplete and consequently misleading information has been published about the saxophone—and perhaps even more about Adolphe Sax—that a cool objective examination of as many as possible of the contemporary documents is long overdue. The registers of patents, for example, can provide very important details, but the patents themselves must not be ignored. The first saxophone patent (French patent 3226, 21st March 1846) has often been misrepresented, and rarely have comparative studies been made, even of just the saxophone patents. This article centres on three of Sax's patents (1838 to 1850), bearing in mind that his work on the bass clarinet particularly helped to inspire and influence the development of the saxophone. At the same time, it must be remembered that the developing saxophone would in turn influence his work on other instruments. Perhaps nothing more than the prior existence of the clarinet has led to the suggestion that Sax was trying to make a metal clarinet, or even a clarinet that would overblow the octave. Such debate hides essential differences between the two families. It is certain however, that the development—first of the bass clarinet, and subsequently of the saxophone—was very great, during at least the twelve years from 1838 to 1850.

Sax of course well knew what a metal clarinet was like. There was a 13-key alto clarinet made in brass by Halary in Sax's own private collection.¹ Much more important, through his work on wood and brass instruments, he was coming to realise that the choice of wood or metal for the tube of a wind instrument had little bearing on the particular timbre of that instrument. On the other hand, he was discovering that a wide conical tube had very different acoustical properties from a cylindrical one. Such revolutionary conclusions were not reached overnight, but were rather the fruit of many years' work. In any case, for Sax, the eventual publication of a patent was not the end of his research in that direction, but it was a necessary concentration of the practical results he had obtained up to that point. Furthermore, it is not surprising to find that in his patents he was also trying to protect the new directions in which he was already beginning

to think those results would take him.

Sax began his 1846 saxophone patent with a long discussion of the weaknesses of other wind instruments. He stated particularly that those belonging to the bass register were either too weak or too loud. The bassoon was so weak, he said, that it could only be used to fill in the accompaniment, or produce special effects. Sax even went as far as to say that it was quite useless in the orchestra during loud passages. As for the ophicleide, often used to reinforce the trombones, Sax asserted that it made a sound of a most disagreeable nature—to the extent that it had been banned from being played indoors and was all the more unsatisfactory because its sound was not dynamically flexible.

This sharp criticism of the ophicleide and the bassoon might have been unnecessary unless, of course, there were still defects in the early saxophones. Obviously low-pitched wind instruments at that time were imperfect. The rawness of the ophicleide's sound, for example, did not allow it to blend readily with the other instruments, especially the strings, the sound of which Sax pointed out, was approached by his saxophone. He saw its greatest quality in the possibility of its becoming louder or softer at will, whilst staying in tune throughout its range, as well as possessing potentially great power.

Clearly Sax could not have started with characteristics of a sound and worked backwards, so to speak, to an instrument. A more plausible approach would be to start from something already in existence, however imperfect, and to remedy the defects. Was he inspired to start by trying his new bass clarinet mouthpiece on an ophicleide? Certainly this has in recent years proved a promising suggestion.²

THE DEVELOPMENT OF BELLS AND CROOKS, 1838 to 1847
In the bass clarinet patent (Belgian patent 1051, 21st June 1838) the bell is of the downward pointing type (Fig. 1). Furthermore, this type is also found in the later saxophone patent on the two smallest saxophones (Fig. 2, 3). The emission of notes from a downward pointing bell on a short tube would be quite satisfactory. However, where low notes from longer tubes are concerned, this downward type of bell is far from ideal. So there is in the 1838 patent a rather clumsily drawn alternative (Fig. 4) which curves upwards and forwards. This was developed into the more effective shape Kastner showed in 1847 (Fig. 5).³ By then, this shape was in use for certain saxophones (Fig. 6).

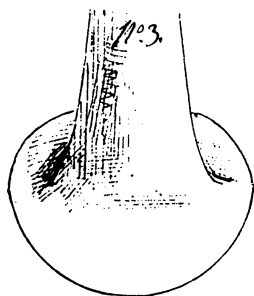


FIG. 1.
Customary bell,
1838 patent.

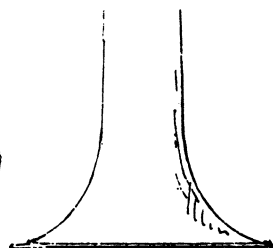


FIG. 2.
Saxophone N° 7,
1846 patent.

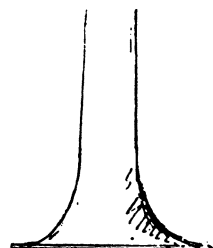


FIG. 3.
Saxophone N° 8,
1846 patent.

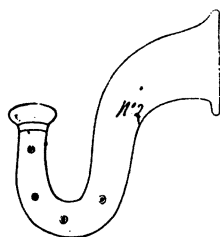


FIG. 4.
Alternative bell,
1838 patent.



FIG. 5.
Bass clarinet,
Kastner 1847.

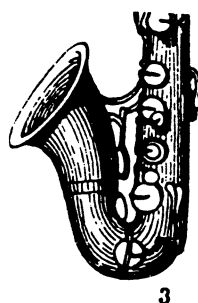


FIG. 6.
E_b Alto
Kastner 1847.

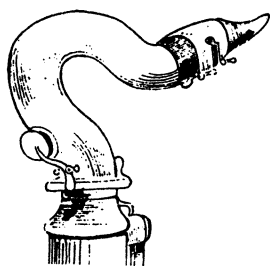


FIG. 7.
Crook, bass clarinet
1838 patent.

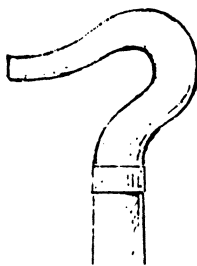


FIG. 8.
Saxophone N° 5,
1846 patent.

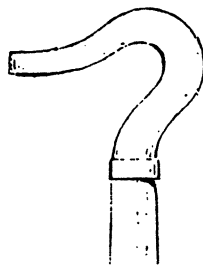


FIG. 9.
Saxophone N° 6,
1846 patent.

When Sax drew the alternative bell for his bass clarinet, he was protecting future developments. Then, when faced with the problem of accommodating the long tube of the saxophone, he had an opportunity to use that bell in modified form. The result was a move towards the present-day shape.

The similarity in shape between the crooks of two of the saxophones in the 1846 patent (Figs. 8, 9) and that of the bass clarinet in the 1838 patent (Fig. 7), is striking and would not be a simple coincidence. It seems unlikely however that such saxophones were realised in any significant quantity for, as early as 1847, Kastner showed no such crook-shape for any saxophone. The crook shape he shows for an alto saxophone (Fig. 10), was a development of that shown for saxophone N° 7 in the 1846 patent (Fig. 11). Kastner's alto-ténor crook seems somewhat constricted (Fig. 12; Sax himself does not seem to have been the author of the composite names given by Kastner on his Pl. XXV: *mi bémol ténor-baryton, si bémol alto-ténor*). In any event this shape did not survive long.

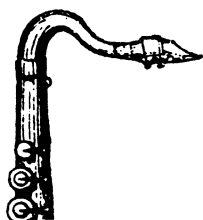


FIG. 10.
Crook, alto sax,
1847 Kastner.

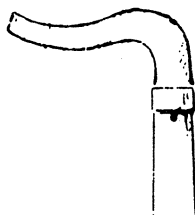


FIG. 11.
Saxophone N° 7,
1846 patent.

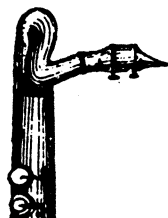


FIG. 12.
Alto-ténor sax,
1847 Kastner.

These small changes in general shape are confirmed by those in Sax's commercial catalogues. They are important as regards physical convenience to the player, ease of manufacture, and aesthetic appearance.

THE DEVELOPMENT OF HOMOGENOUS FAMILIES, 1838 to 1846

Between the time of the first bass clarinet and the first saxophone patents, Sax was developing the general idea that the characteristic sound of a particular instrument could be realised through a family of instruments, the composite range of which would go from the deepest

bass to the highest soprano. In the 1838 bass clarinet patent, he mentions *contre-bass* and *bourdon* models, though the drawing is clearly that of the bass. He adds that by simply changing the bells (Figs. 1, 4), the instrument would go down to C instead of E. Making it still longer would make the lowest note B \flat , the same as with the bass saxophone described in the saxophone patent. Fortunately for carefully tuned ears, he added that he could also change the positions of the keys and presumably the holes that went with them, so tuning each note. At this time a complete family, alternate instruments in E \flat and B \flat , had not been conceived.

In the 1846 French saxophone patent the family is somewhat larger, though still not many details are given. It has been often ill-interpreted and so is reproduced here in its entirety:

Description & nomenclature de divers individus de la famille des Saxophones.

N° 1. Saxophone en mi \flat ténor tout fermé: si en mi \flat fait ré en ut.

N° 2. Saxophone en ut, descendant au si \flat dans son ton.

Le même instrument se fait aussi en si \flat & descend par conséquent en la \flat qui fait si \flat dans le même ton.

N° 3. Saxophone en sol contrebasse; on peut aussi le faire en la \flat .

N° 4. Saxophone en ut Bourdon, on peut aussi le faire en si \flat (un ton plus bas).

Les Saxophones N° 5, 6, 7 & 8 font dans les mêmes tons que les précédents à l'octave supérieure.

Though some fourteen models are just possible within the limits of this description, only three are named and, more important, only two are drawn with keywork. N° 2 would obviously be the bass model, as it falls between the *ténor* and the *contrebasse*. It seems most likely that when Sax wrote the two patents, of 1838 and 1846, few of either family had been perfected, for there is a noticeable lack of information about the other instruments.

BASIC CRITERIA FOR KEYWORK, AND THE MOUTHPIECE, 1846

Regarding his bass clarinet, Sax felt that an important aspect of its construction was the use of large holes, allowing the instrument to speak more readily. Of course, he was not the first to realise that it was important to relate the diameter of a note hole to the tube's diameter at that hole. Where these holes were too large, or too far away from the player's fingers, padded cups and keywork would have to be used. With its wide conical bore the saxophone too needed large holes,

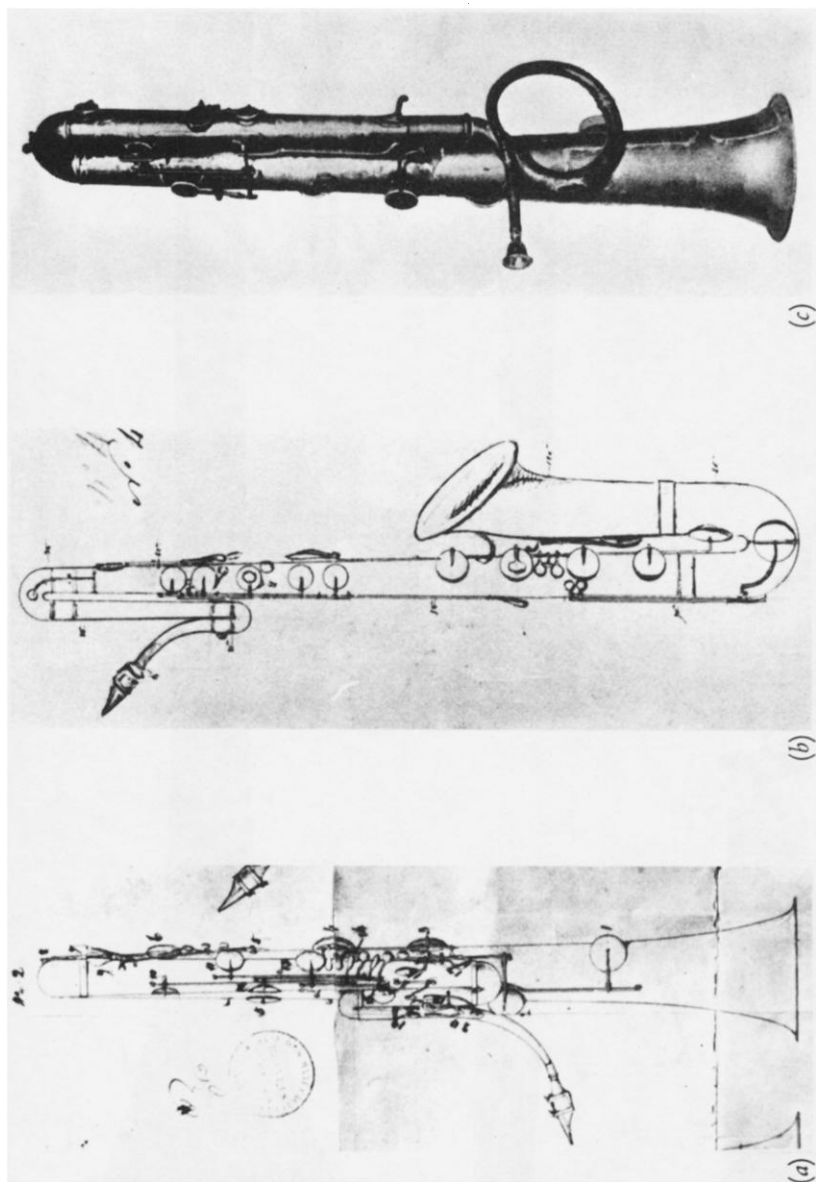


PLATE XXIII

(a) Saxophone N° 2, 1846 patent; (b) Bass saxophone, 1850 patent; (c) An ophicleide

and as the holes were to be disposed according to the acoustical laws governing the tube, long-rodged keywork was essential. For the bass clarinet and saxophone, the result was the same: *all* holes being opened and closed by keywork, none by direct contact of a player's finger with the hole.

While the mouthpiece of the saxophone has some resemblance to that of a clarinet, Sax's description is more precise:

... un bec à anche simple dont l'intérieur très évasé va en se rétrécissant à la partie qui vient s'adapter au corps de l'instrument.

In the part 'Description du Bec' Sax states that this mouthpiece (Fig. 13) is for the *basse* model though it *could* be made in different sizes for the other saxophones. Once more, Sax was trying to protect future possible lines of development.

TECHNICAL DEVELOPMENTS, 1846 to 1850

In 1850 Sax applied for a second saxophone patent, this time for its importation into Belgium (Belgian patent 5469, 7th December 1850). The title-page contains a curious error: it speaks of the saxophone as having been patented in France on 22nd July 1848. This should have been 1846. However, even then it would not have been the date of application, but that of the article of law. In any case, it has commonly been supposed that the Belgian patent was identical to the 1846 French one. As Table 1 shows, this is not the case. Only the first part is the same in both patents (but for two purely grammatical word-changes).

TABLE 1.

Comparison of the various parts of the first two saxophone patents.

The 1846 patent contains:	The 1850 patent contains:
'Expose'	'Expose'
'Doigtés' (2 saxophones)	'Mémoire descriptif' (general)
'Description du Bec' (bass saxophone)	
Drawings (8 saxophones, 2 with keywork)	Drawings (4 saxophones, all with keywork)
	Fingering chart (6 saxophones)

Not only does the 1850 patent show considerable development of the saxophone in itself, but also, of its family. Sax described, in detail, only two instruments in the 1846 patent, and these are marked with an

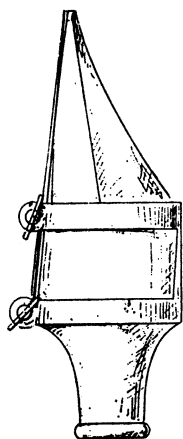


FIG. 13.
*Bass saxophone mouth-
piece, 1846 patent.*



FIG. 14.
*Tenor, E♭,
1846 patent.*

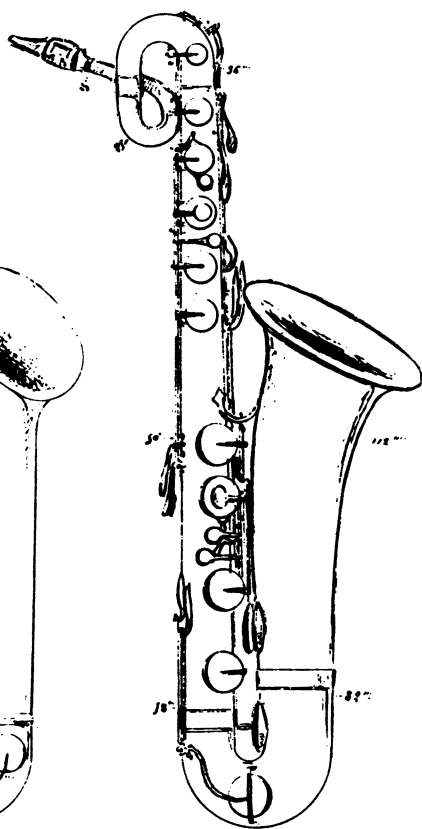


FIG. 15.
*Baritone, E♭,
1850 patent.*

asterisk in Table 2. Names were added or changed in the 1850 patent probably because, amongst other details, the general shape of many saxophones had been changed, as clearly seen in the illustrations (Pl. XXII, XXIII). However, the 1846 tenor in its general shape, resembles the 1850 baritone (Figs. 14, 15), and moreover, the range and pitch of these two are identical; D to ab' (sounding). Nonetheless, the 1850 baritone was still very different from the 1846 tenor.

Certain fingerings have changed. The note *f* was obtained as a fundamental on the lower register in 1846 whereas in 1850 it became a second harmonic on the upper. Doubtless, then as now, both fingerings *could* be used on either instrument according to the passage in the music, though probably the ones cited were the most accurate.

Though the drawings are not of a high engineering standard, it is clear that certain technical aspects have changed. A number of holes seem to have been relocated, certainly those most near to the bell opening. This would change the precise tuning of the corresponding notes. There were six sections of tube in 1846 compared with five in 1850, eliminating the joint between the two hands. This would facilitate the mounting of certain parts of the keywork and obviously mean less soldering. The bell section of the 1850 model is shorter than that of 1846; the change has been accommodated in the bow section, again permitting the mounting of improved keywork.

The four highest semitones, f' , $f\sharp'$, g' , $a\flat'$, were obtained on the 1846 model by the left-hand, whereas in 1850, g' is obtained by a right-hand side key. This arrangement is more flexible, and is in principal the same as still adopted today, although far from ideal. The bottom two semitones, $E\flat$ and D , are no longer obtained by simple keys mounted entirely on the bell section, but by long rodded mechanisms, presumably to give an improved action. The pad of one of the octave keys, being situated at the bottom of a U-bend on the 1846 model, would deteriorate more quickly as a result of the condensation collecting at that point. It does not appear there on the 1850 model. The narrow end of the tube is folded into a U-shape of quite different proportions from those of 1846. The reason for this, at least partly, is to present the reed to the player's lips at a different angle. This would be more towards the horizontal, facilitating control of the reed. In general, the 1850 baritone saxophone seems much more graceful, largely as the result of a different bell. Perhaps, however, this reshaping was done only for better tuning and a more suitable direction of emission.

THE SAXOPHONE FAMILY EMERGES, 1846 to 1850

The family in the 1846 patent (Pl. XXII *a*) little resembles that of today. Apart from the two drawn with keywork, the text gives little information about the other members. If it is assumed they did exist at that time, then they were probably undergoing development and not manufactured in any quantity.⁴

While the drawing in the 1850 patent shows only four instruments (Pl. XXII *b*), six were named in the fingering chart. The shapes and names drawn are essentially those of today. The disappearance of the 1846 Bourdon and Contrebasse, and the naming of the four highest saxophones, suggests a changing emphasis, from low to high pitched instruments.

TABLE 2.
Comparison of saxophone families as named and numbered in the 1846 and 1850 patents.

Saxophones in the 1846 patent		Comparable instruments in the 1850 patent	
N° 8	—	—	AIGU
N° 7	—	N° 1	SOPRANO
N° 6	—	N° 2	ALTO
N° 5	—	—	TENOR
N° 1*	TENOR	N° 3	BARYTON
N° 2*	—	N° 4	BASSE
N° 3	CONTREBASSE	—	
N° 4	BOURDON	—	

THE 'OPHICLÉIDE-À-BEC' AND THE FIRST SAXOPHONE

There is one saxophone in Table 2—N° 2—which is described but not named (Pl. XXIII *a*). This bass model bears little resemblance to the bass drawn in the 1850 patent (Pl. XXIII *b*). It must have been an instrument of the 1846 type that has been called an '*ophicléide-à-bec*' (in the *Revue et Gazette Musicale de Paris*, 13th March, 1842, p. 99). The tube as it approaches the mouthpiece does not have to be bent as much, or be coiled in the same way, as on many ophicleides of the period (Pl. XXIII *c*). However, there is no doubt that superficially the 1846 bass saxophone resembles an ophicleide.⁵ This resemblance is limited to the overall shape, simply a logical result of the way in which the tube of the instrument has been curved back on itself. There was much use of long rods running along the length of the instrument, resulting in keywork advanced for its time. This was simply because of the relatively great distances between holes. Virtually all holes were too large to be covered by a human finger. In all there were 20 keys on both models, but the respective ranges were slightly different. For the 1846 model, pitched in C, it was *Bb'* to *d#'*, whereas in 1850 it had become *B'* to *f'*. Instead of the later two octave keys, there were three on the

1846 model, so presumably its facility in overblowing the octave was not identical with the 1850 model. Certainly, to make either of these two saxophones, a maker—very skilled for that time—was required. Furthermore, if Sax's first inspiration had been a bass clarinet mouthpiece on an ophicleide, then the 1846 model shows considerable evolution. Equally, between the 1846 and 1850 models, there is much development of no less significance.

Many considerations regarding the early saxophone were absent from the often referred to 1846 patent. Subsequently many details were modified. The saxophone was still being developed at the time of the first patent and Adolphe Sax was responsible for these developments for a considerable time. Between 1838 and 1850, the 'ophiclède-à-bec' came into existence, changed form and was perfected. Around it was then built a family of saxophones. And still today, albeit perhaps imperceptibly, the saxophones' evolution continues.

Finally, I extend my gratitude to the staff of the Belgian and French patent offices, where the patents cited are kept: Service de la propriété industrielle et commerciale, Bruxelles; and Institut National de la Propriété Industrielle, Paris.

NOTES

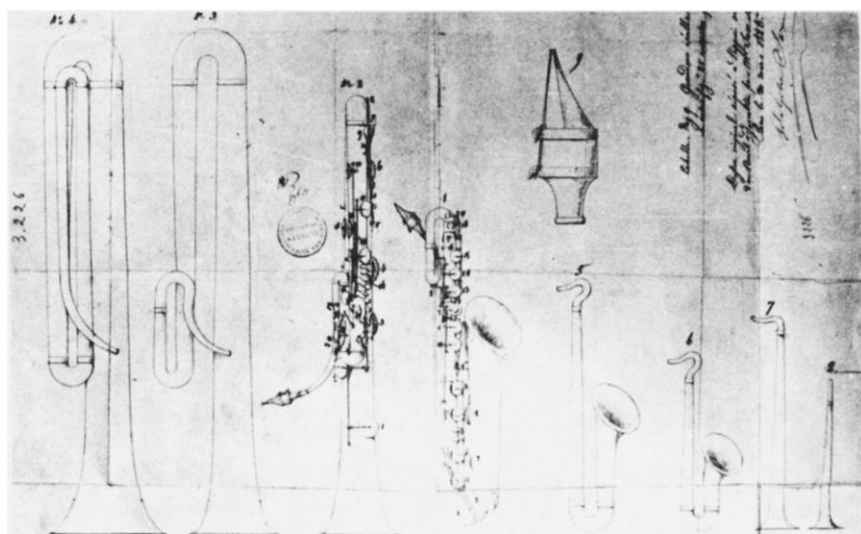
1 *Catalogue de vente du Musée Instrumental de M Adolphe Sax*, Paris, 1877, instrument No. 50.

2 Philip Bate, 'Saxophone' in *Grove*, 5th ed. Wally Horwood, *Adolphe Sax 1814–1894*, Bramley, 1979, p. 31.

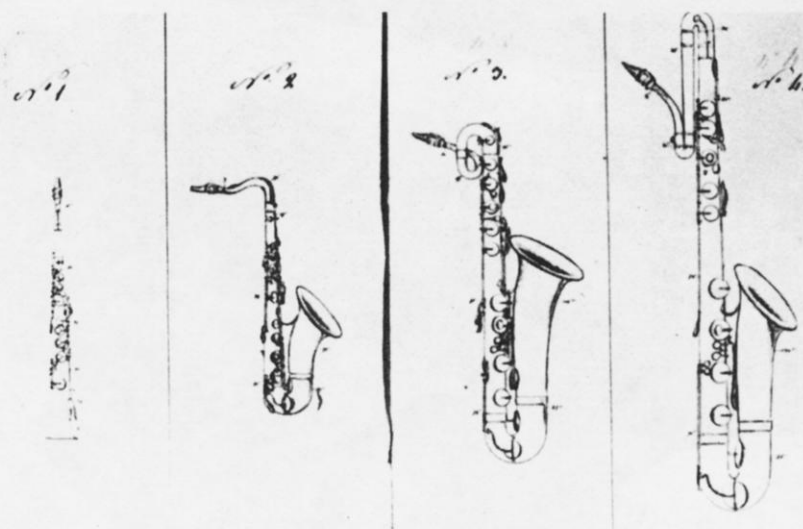
3 Georges Kastner, *Manuel Général de Musique Militaire*, Paris, 1848, Pl. XXV, fig. 5. The dedication is dated 10th December, 1847. While a general comparison of Kastner's illustrations with the patent drawings are justifiable, the quality of Kastner's drawings does not permit a more detailed analysis. Moreover, either his alto and alto-tenor have been 'turned over' so to speak, or Sax was making left handed models.

4 Malou Haine, *Adolphe Sax, sa vie . . .*, Brussels, 1974, p. 127. In the 1852 bankruptcy of Sax, there were in Sax's workshops some 19 saxophones in A \flat , which may have been early contrabass models. M. Haine and I. de Keyser, *Catalogue des Instruments Sax*, Brussels, 1980, pp. 235–268. Although giving some 400 instruments preserved in public and private collections, the list does not pretend to be exhaustive.

5 *Catalogue de vente* (see Note 1), pp. 5, 6. Sax's personal collection contained a surprisingly large number of serpents and ophicleides, made by other makers—the more surprising considering few instruments of either type are known to have been made by him. There were six serpents and eleven ophicleides. Two of the ophicleides were bass models. One of the serpents—No. 69—is of particular interest as the catalogue states it was fitted with a system of keys like that of Sax's own bass clarinet.



(a)



(b)

PLATE XXII

(a) The saxophone family as drawn in the 1846 patent;

(b) The saxophone family as drawn in the 1850 patent