OFFSET AUXILIARY HIGH F KEY FOR SAXOPHONES

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5 Claims. (Cl. 84—385)

I have aptly achieved, it seems appropriate to make cross reference here to prior art con-
nstructions. Let us refer, for general guidance, to Paul Evette's auxiliary high F adaptation dis-
closed in U. S. Patent 638,335 wherein he de-
scribed his now abandoned key, to wit:

"First, in the ordinary saxophone, the note high-E is obtained by the simultaneous use of the three keys 1, 2, 3, Figure 1, which are respectively the keys of D, E-flat, and E. The note high-F is obtained by the simultaneous use of the four keys 1, 2, 3, 4, which are respectively the keys of D, E-flat, E, and F. Moreover, the plate 7, which serves to play the note C, must be closed to re-
cure the note high-F. There is no apparent rea-
son for this; but it is a result of experience. The
consequence of this is that there results a great
difficulty in playing these notes in the arpeggios.
My new key 5, Fig. 1, avoids all these difficulties.
This key is pivoted on a bearing 6, and its object
is to lift the lever 4 while it lowers at the same
time the plate 7. The same effect may be pro-
duced by opening another hole F near the key 4 —
say 5 — the lever 5 having then the form shown
by the dotted lines, Fig. 1. The said lever does
not operate the lever 4. It uncovers simply the
hole 5 and lowers the plate 7. In this case the
result is the same."

On a saxophone equipped with Evette’s key,
designated by him as key 5, Fig. 1 in his patent
drawing, and described in the above quotation,
the following fingerings, for the first time, became
possible: High F (F above the treble staff) may be
fingered thus: press octave key with left
thumb, and press Evette’s key with the ball of
the left index finger, and with the ball of the left
middle finger, press the finger-piece designated as
“A-natural” in my drawing, Figure 1. High F
(F above the treble staff) may be fingered thus:
Press the octave key, Evette’s key (31 in my draw-
ings), and finger-piece “A-natural” as explained
above, and in addition, with the ball of the left
ring finger, press the finger-piece designated as
“C-natural” in my drawing, Figure 1. I have never heard any acoustician give an ex-
planation of why the above fingerings give these
two tones. However, it is a well recognized fact
that these fingerings give a satisfactory High F
and High E.

With the advent of Evette’s key, there came into
being an easier means of passing from high-C to
high-F, from high-C to high-E, from high-C-
sharp to high-E and from high C-sharp to high F.
In playing the above four sequences of tones, us-
ing Evette’s key, there is no use whatsoever made
of the "regular" side keys for D-natural, E-flat, or F (shown in Fig. 1 of my drawing as 1, 16, and 14 respectively) nor is use made of the right hand key (not shown) that raises valve E-natural.

Evette's key, however, has the following drawbacks. Since the tones B, A, G-sharp, and G above the treble staff must each be fingered with the ball of the left index finger pressing and holding finger-plate B-natural, it is obviously quite impossible to pass smoothly from any one of these four notes directly to the high E or high F fingered with Evette's key, since this would entail bodily lifting the ball portion of the left index finger from the B-natural finger-plate and subsequently placing the same portion of the same finger upon Evette's key, a feat which is impossible to accomplish with sufficient rapidity to avoid the sounding of an intervening unwanted note. Thus, while Evette's key created a simplified means of fingerings a few difficult passages, its use is beset by severe and unfortunate limitations.

Years of experience, based on trial and error, and many other involved factors which I do not now recall, necessitated and brought about a needed change in the auxiliary high-F linkage and leverage principles with the result that the form of design and construction now commonly in use corresponds to that shown in Fig. 1 of my drawings wherein the old key (in line with the main bank of valves and keys) appears in dotted lines and my novel and improved laterally displaced or so-called "offset" key presents itself in full lines. By comparison, it will be evident that a single lever of the first class (Patent 638,383) was re-designed to become a more practical linkage characterized essentially by a pair of complementary levers, as will be later described in detail.

A point to be stressed here is that the "old" finger-piece or key, the one appearing in dotted lines, is in approximate alignment with the main bank of keys and valves, and in particular with the B-natural finger-plate and so space from it that advocated use thereof is open to the objection already alluded to; that is, when one desires to open the high F-natural valve, the index finger of the left hand has to be (1) bodily lifted up and taken off of B-natural and (2) brought to bear on the dotted high F key. Thus, it is still inconvenient and unsatisfactory using present-day saxophones, to clumsily pass back and forth from B, A, G-sharp, and G-natural above the treble staff to either high E or high F played with Evette's key. Consequently, there has been a long felt need for an improved and better adaptation capable of providing refinements and betterments. Hence, the advent of the present invention; one which aptly fulfills expected prerequisites and wants of players and manufacturers alike.

In carrying out the principles of the present invention I have evolved and produced a construction wherein the free actuable end of the conventional finger-tripped lever is appreciably lengthened and then fashioned at its free actuable end (a new point of termination) into an entirely new and systematically inclined "offset" at its high F key. The latter resides in a new as well as unique off-center position on the horn; and is so shaped, balanced, and proportioned that it makes possible a new and ideal fingering step which allows the ball of the left index finger to "stay put" on the B-natural key-piece; and, secondly, permits the second joint or phalange of said index finger to be simultaneously pressed, with facility and ease, on said new high F key that the latter may be operated with instantaneous skill and dexterity.

Another objective is to maintain the now-conventional auxiliary high-F linkage and leverage system intact and, by adding a simple laterally offset key of new design, to introduce what, to me, constitutes an innovation worthy of unqualified approval and adoption. This new auxiliary high-F key does not only permit the index finger to remain fixedly oriented, but allows the left thumb to remain on the usual thumb rest button and the palm of the hand to arch over and clear the underlying upper register side keys, whereby to obviate the need of bodily cating the whole hand in preparation for shifting and jumping the index finger from high B-natural to the "Evette-type" auxiliary high-F key.

What is more, my concept has to do not only with a new key per se, but one which lends itself to scientific location in close proximity to the B-natural finger-plate, and to reside in a plane which coincides with (minus obstruction or interference) the next adjacent "regular" high-F key, whereby it may be said to be deployed for inconspicuous co-action with stock mechanism; a real achievement indeed.

Thus, too, novelty is predicated on the fact that the new key-piece itself carries a stop lug to bear and seat upon the valve which underlies it, and is sized and surface-shaped with requisite nicety to readily pilot, glide and seat the index finger, by natural and convenient manipulation, in ready-to-operate position.

Furthermore, in the "Evette-type" auxiliary high F key construction, as it is seen in dotted lines in Figure 1, the free end portion of the lever, which carries the key-piece, takes a right-angular bend and rests directly over the valve which covers the C-sharp tone hole, and the key-piece itself contacts the latter valve and also has to bridge over and bear simultaneously upon the next adjacent and lower valve (the one equipped with the B-natural key or plate). Therefore, the lift and shift of the index finger to high F means the entire weighty load of the combined valves and complementary linkages has to be contended with and overcome. Thus, the new key must be brought to bear upon the "Evette-type" auxiliary high F key must be sufficient to (1) close the underlying valve covering the C-sharp tone hole and (2) close the valve equipped with the B-natural finger-plate and (3) actuate the auxiliary high F valve linkage. Now, with my new key the stated lever need not and, in fact, does not contact and bear upon the first named valve. Therefore, and since B-natural is already down and closes both of said valves (through conventional linkage means not shown in detail in my drawings) the load only of the high F valve per se and its own linkage has to be overcome. Consequently, it is an important object to thus "cut out" part of the linkage and attending load and "cut in" only the auxiliary high F linkage and thus to lessen the weight and render the new key capable of sensitive and responsive action merely by lightly touching with the second phalange or joint of the index finger.

Figure 1 is a fragmentary top plan or face elevational view of the upper portion of a conventional-type saxophone with my new offset auxiliary high F key shown in its normal up or open position.

Figure 2 is a cross section on the line 2-2 of
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Figure 1, looking in the direction of the arrows wherein the appearing C-sharp valve is shown normally open; said auxiliary high F key being likewise in its normal "up" position;

Figure 3 is a view, like Figure 2, with the C-sharp valve closed and the auxiliary high F key depressed;

Figure 4 is a perspective view of the improved key per se:

Figure 5 is a cross section taken on the plane of line 5—5 of Figure 1, looking in the direction of the arrows and showing the index finger of the left hand depressing the B-natural finger-plate and thus closing the underlying C-natural valve, with the thumb on the thumb rest button and the hand arching over (not touching) the usual upper register side keys;

Figure 6 is a view based on Figure 5 showing the additional step wherein the second phalanx or joint of the index finger functions to engage and depress the auxiliary high F key while the ball of said index finger remains on the B-natural finger-plate.

By way of introduction to the detailed description, it is to be pointed out that I have not attempted to nor do I seek to describe parts of a complete saxophone and the mechanism thereof since, so far as the present invention is concerned, they have no bearing on it. Therefore, I have shown only those elements which I deem necessary to illustrate the old parts in relation to my new auxiliary high F key and the manner in which it is situated midway between the B-natural key-piece and the median portion of the customary high-F valve lever.

In Figure 1 the tubular body, which is conventional, is denoted by the reference numeral 8. The median portion of the figure the high F tone hole is denoted by the numeral 9 and this is covered by a normally closed "regular" high F valve 10. The valve 10 is carried on the free end of a lever 11, the median portion of which arches over the E-flat lever mounting 12, said median portion being further mounted on and between customary bearing posts 13 on said body 8. The finger-piece of lever 11, which is depressed to obtain the tone high F is denoted by the numeral 14. There are two other valve carrying levers which tend D-natural and E-flat for controlling the complementary tone holes (not shown) which need not be described in detail.

It may be mentioned however, that the finger-piece 16 is for obtaining the tone high D-natural and the next and intermediate finger-piece 18 is for obtaining the tone high E-flat. The tone hole 17 and associated valve 18 cooperate in producing the tone high E-natural and the operating details are omitted to simplify my drawings.

Reference being had now to the tone hole next in succession, this is denoted by the numeral 19 and the tone C-sharp and is therefore referred to as the C-sharp tone hole and is better shown in Figures 2 to 6 inclusive. The C-sharp valve 20 which seats on and closes tone hole 19 is mounted on a rocker arm 21 embodied in a linkage mechanism generally referred to at 22 and valve 23, as usual, is normally open. The next and remaining tone hole to be referred to, which is the C-natural tone hole, is denoted by the numeral 23 and is seen in Figures 5 and 6 only, and this is provided with a normally open complementary C-natural valve 24 carried by the rocker arm 25 which rocker arm is included in and operates simultaneously with the linkage means or mechanism 22. The plate or finger-piece 26 which is rigidly mounted on and made a part of the valve 24 is operated by the index finger A of the left hand and this key-plate is commonly referred to as the B-natural key or finger-piece.

At this point I would explain that I am primarily concerned, as will be seen later, with the valves; the normally closed conventional high F valve 10, the normally open C-sharp and C-natural valves 20 and 24, the lever 11 for valve 10, linkage 27 and the B-natural key-piece 26 on said valve 24. To those familiar with the saxophone construction and the manner in which it is obvious that the tones high D, high E-flat, high E-natural and high F-natural are produced by depressing, in predetermined order, the upper register side keys 14, 15 and 16 together with the right hand side key (not shown) that opens valve 18. Also, I have explained in the preceding portion of the description, it is perhaps unnecessary to go into detail to explain that depressing the finger-piece 15 produces high D, and depressing the same in conjunction with the finger-piece 16 produces high E-flat, that high B-natural is produced when the valve 16 is depressed in conjunction with the high D and high E-flat valves, and that high F natural is produced when all four valves are open. These valves are operated, three of them, with the palm of the left hand, and the high E-natural valve with an independent side key (not shown) on the lower part of the body of the instrument, using the index finger of the right hand. However, as stated, I am not concerned with the manner of regularly producing these high tones. I am interested in and emphasize herein the improved auxiliary high F key means. This leads me to explain that in addition to the primary linkage means 22, there is a complementary or secondary auxiliary linkage means 21 involved which is isolated and separate from linkage means 22 and includes an L-shaped rocker lever 28 on one lateral end of which is engaged with the lever 11 for opening the valve 10 and the other angular end of which is engaged beneath the so-called auxiliary high F lever 29. The latter lever is hinged mounted in conjunction with linkage means 21, but has no active connection therewith. Ordinarily, the free end portion of lever 29 is formed with a right angle bend 30 which terminates above and rests directly on the valve 20 (as shown in dotted lines). End 30 is provided with a pearl button or finger-piece 31 which is of a diameter such that its peripheral portions straddle the respective underlying peripheral edges of the two valves 20 and 24. This structure which includes the L-shaped lever 29 and the finger-piece 31 is commonly known in the trade and elsewhere as the auxiliary high F key and when it is depressed with the index finger of the left hand it sluggishly depresses and seats valves 20 and 24 and motivates linkage means 21, and, in particular, operates the lever 28 and opens the high F valve 10.

In accordance with the principles of the present invention instead of terminating the lever 29 with the bend 30, I provide the lever with an extension 32 which is of appropriate length and is properly curved and arched and carries the new and improved "offset" auxiliary high F key 33, the essence of the instant invention.

As shown in Figure 4, where the improved lever and key are detailed, one end of the lever is provided with the customary sleeve or hinge tube 34 and cork tipped stop arm 35, which parts are mounted with the linkage mechanism 22 and
which parts are common and well known. The new out-of-line or offset key 33 is formed integrally with the outer curve of the lever and, looking at it in top view, it is approximately triangular in shape, though this shape may be slightly varied if found necessary. Experimentation has shown that it appears to be the best shaped and sized key for the intended purpose. One corner porug is provided with an extension constituting a lug 36, having a cork buffer 31, which functions as a motion stopping device and rests upon the valve 24 when the key 33 is depressed. The recess or cavity 38 in the underside is there to provide accommodation and clearance for the bearing post means 13 shown in Figure 1. This recess permits the key to be depressed to the desired level without interference from said bearing post means 13.

It is further to be pointed out that the upper surface of this new key is tapered and thinned and thus made convex as denoted at 39 in Figures 2 and 3. This formation and the contouring of the finger contact E renders the latter susceptible of piloting and feedback of the joint or phalange B of the index finger A onto said key 33 when the latter is to be depressed.

It will be noted that the attenuation of the thus improved lever 29 is such that it positions and locates the new key-piece 33 close to the pivot point of the lever 29 and the valve 24 in the old arrangement. The upper portion of the underside of key-piece 31 rests directly upon the valve 24. The underside of said key-piece 31 rests directly upon the valve 24. Thus the key-piece 31 bridges the two valves 20 and 24. I have already established the fact that when the index finger of the left hand A is on the B-natural key-piece 31 and it is desired to play high-F by means of depressing key-piece 31, it is essential to play high-F on the extreme top register and to radically change the way it is to be played on the extreme top register. This is done by the index finger of the left hand A by using the new offset auxiliary high-F key-piece 33, and this means that the operation of key 33 is rendered light, precision-sensitive, and quickly responsive. Since the point of application of force to the new key, which is a lever (2nd class), is now further from the point of fulcrum than it was in the old style auxiliary high-F key 31, the amount of force necessary to actuate the new key 33 is reduced, which fact contributes further to the lightness of action of said new key in comparison with that of the old key 31.

Also, in the case of the old arrangement, when it was necessary to use key 31 the entire left hand had to be shifted in order to bring the ball of the left index finger into position to press said key 31. Under the new arrangement, the left hand as a whole need not be shifted at all. The fact that the new key arrangement does away with the necessity of bodily shifting the left hand is an added advantage.

With my new offset auxiliary high-F key 33, high-F and high-E are fingered as follows: To produce high-F, key 33 and post-staff 1, press octave key (not shown) with left thumb, press key 33 with the second joint of the left index finger, press the B-natural finger-piece 26 with the ball of the left index finger, and press the A-natural finger-piece with the ball of the left middle finger. To make high-E (above the treble staff) press the octave key 31, and then the finger-pieces B-natural and B-natural as explained above, and in addition press the G-natural finger-piece with the ball of the left ring finger.

Many otherwise clumsy passages are susceptible of easy execution by way of my new key 33. A few examples are: (1) the B major scale played in ascending sixteenth notes starting with the note E in the fourth space, treble staff, (2) above the staff up to B up to E and back to B, (3) G above the staff up to B up to F and back to B, (4) A above the staff up to F down a perfect fourth to C and back to A, (5) above the staff up to B below the lower portion of the linkages 22 which are as shown in the drawings, that the curvature of the lever 29 as improved by me is such that no portion of the lever 29, at any time either up or down, comes into direct contact with the underlying valve 26. In the old arrangement, the upper portion of the underside of key-piece 31 rests directly upon the valve 24. Thus the key-piece 31 bridges the two valves 20 and 24. I have already established the fact that when the index finger of the left hand A is on the B-natural key-piece 31 and it is desired to play high-F by means of depressing key-piece 31, it is essential to play high-F on the extreme top register and to radically change the way it is to be played on the extreme top register. This is done by the index finger of the left hand A by using the new offset auxiliary high-F key 33, the use of the new key provides the one and only satisfactory and convenient way of passing chromatically or diatonically from the regular register of the saxophone up into the newly explored top register (above high-F) which consists of a series of harmonic cross-fingerings; and, conversely, provides a way of passing chromatically or diatonically from the top register back down into the regular register, since the F-sharp and G (above high-F) are both commonly fingered with the ball of the left index finger depressing the B-natural key-piece. This point of advantage will become increasingly apparent as time goes on and the use of the said top register becomes more commonplace.

The professional saxophonist and accomplished amateur will find that the new key opens up heretofore undreamed of possibilities in the field of technical execution in the highest portion of the regular saxophone register and in the extreme top register. Thus for the first time the use of said extreme top register has become thoroughly practical, thus giving the
Inventor a range equal to that of the flute, greater than that of the oboe, and only a very little less than that of the clarinet and bassoon.

The instrument described is designed for the orchestra and band and will be relieved of the extreme care heretofore necessary to avoid the writing of technically impractical parts in the upper regular register of the saxophone. Also, since the upward extension of the range of the saxophone is made practical for the first time with the advent of my new instrument, the band, the saxophone section, no longer be criticised, as it has been so frequently in the past, as having too small a range to compare favorably as a solo instrument with the flute, oboe, clarinet and bassoon. Thus the saxophone will now have a much better chance of taking its rightful place in the eyes of composers and arrangers as a solo instrument of great importance.

The student or pupil will appreciate that since the use of the new "offset auxiliary high F key" makes comparatively easy the execution of certain technical passages that heretofore have been almost impossible, even for the virtuoso, the pupil is not so likely to become discouraged regarding his prospects of becoming a proficient performer. No doubt, this will make the difference between discarding the instrument on the one hand, to a continuation of progress leading to mastery of the instrument on the other hand. Probably there will be fewer pupils who purchase an instrument, study it for a few months, and then become discouraged because of seemingly insurmountable technical difficulties and give up their ambition to become accomplished instrumentalists.

The teacher will appreciate that the use of this new "offset auxiliary high F key" so simplifies the execution of certain heretofore difficult passages that tedious practice on the part of the pupil is greatly reduced; therefore, the teacher is enabled to cover more ground in a given period of time, thus sustaining the pupil's interest and bringing about superior results in the advancement of the pupil toward technical mastery of the instrument. The use of the so-called "regular" high F key, and of the high E key operated by the right hand to open valve 16 (both of which are inconvenient to manipulate) is almost entirely eliminated. The instrument as a whole thereby becomes easier to teach.

The manufacturer will appreciate that the change in design of keyboard that would be necessary in order to fit the "offset high F key" to saxophones as now manufactured could be made without a great deal of re-tooling, inasmuch as the linkage remains the same as in present saxophones, the change being only in the attenuated and arched lever 29, key 33 and its unique position on the instrument.

A careful consideration of the foregoing description in conjunction with the invention as illustrated in the drawings will enable the reader to obtain a clear understanding and appreciation of the alleged features of merit and novelty sufficiently to clarify the construction of the invention as hereinafter claimed.

Minor changes in shape, size, materials and rearrangement of parts may be resorted to in actual construction without departing from the spirit of the invention as claimed.

Having described the invention, what is claimed as new is:

1. In a saxophone, a tapered tubular body including a high F tone hole, a C-sharp tone hole, and a C-natural tone hole, a side high F lever pivotally mounted intermediate its ends on said body, a valve carried by said lever and normally closing said first named tone hole, a rocker arm pivoted on said body and carrying a normally open valve registrable with said C-sharp tone hole, a second rocker arm pivoted on said body and carrying a normally open valve registrable for closing said C-natural tone hole, linkage means mechanically joined to said second and third valves for operation in unison, a B-natural key-piece fixed on said third named valve, a normally "up" finger-depressed auxiliary high F lever mounted in conjunction with said linkage means and sloping over the depressed auxiliary high F lever, the free actuable end portion of said auxiliary high F lever extending laterally beyond said second and third named tone holes and terminating adjacent to the intermediate portion of said side high F lever, and an auxiliary high F key-piece carried by the free actuable end portion of said auxiliary high F lever and located in a position substantially mid-way between the left side of said B-natural key-piece and right side of the intermediate portion of said side high F lever and lying in an even plane in relation thereto so that the portion of the index finger bridging the space between the B-natural key-piece and the intermediate portion of said side high F lever is in the path of movement of said auxiliary key, whereby to permit the butt of said finger to remain in operation position on the B-natural key-piece and said mid-portion of said finger to fall naturally and without restraint on said auxiliary high F key.

2. As a new article of manufacture, an offset-type auxiliary high F key for saxophones comprising a longitudinally arched lever having a bearing at one end, having its opposite end arcuately formed into a reverse bend and terminating in an integral finger-piece, the latter being substantially triangular in shape and provided in its underside with an obstruction clearance cavity.

3. As a new article of manufacture, an offset-type auxiliary high F key for saxophones comprising a longitudinally bowed lever having a bearing at one end, having its opposite end arcuately formed into a return bend and terminating in an integral finger-piece, the latter being substantially triangular in shape, the finger contacting surface thereof being cambered and slightly canted and thus adapted to permit the finger which operates said key to contact and depress the key with the maximum of comfort, convenience, effectiveness, and economy of motion.

4. In a saxophone, a tapered tubular body including a high F tone hole, a C-sharp tone hole, and a C-natural tone hole, a side high F lever pivotally mounted intermediate its ends on said body, a valve carried by said lever and normally closing said first named tone hole, a rockere arm pivoted on said body and carrying a normally open valve registrable with said C-sharp tone hole, a second rocker arm pivoted on said body and carrying a normally open valve registrable for closing said C-natural tone hole, linkage means joining said second and third valves for operation in unison, a B-natural key-piece fixed on said third named valve, a normally "up" finger-depressed auxiliary high F lever mounted in
5. As a new article of manufacture, an offset-type auxiliary high F key for saxophones comprising longitudinally arched lever of a length appreciably greater than the diametral cross-section of that portion of the tubular body on which it is adapted to be mounted, having a bearing at one end, having its opposite end accurately bent and terminating in an integral key-piece, the latter being substantially triangular in plan view, one marginal edge being a continuation of the arc of said accurately bent end, another edge being at approximate right angles to said arc at the point of intersection of the first and second named edges, and the remaining edge being oblique to the longitudinal axis of said lever.

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The following references are of record in the file of this patent:

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<thead>
<tr>
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