Odds and Ends About the Bassoon

Chip Owen
Fox Products Corporation

A rambling discussion of various bits of information about the bassoon

Rollers for the Thumb F♯/G♯ Keys:

It is not unusual to see bassoons with many rollers in addition to the normal two pairs of rollers for the little finger keys. One of the common areas where rollers are added are for the keys operated by the right thumb on the boot joint. These are the B♭, E, F♯ and G♯ keys. While the value of any rollers can be debated, there is at least an apparent logic to having rollers between the B♭ and E and between the E and F♯. The value of rollers between the F♯ and G♯, however, is not at all obvious.

For many years I questioned bassoonists about these rollers. I was never able to find anyone who could supply a musical example of a need for these rollers. Despite this, full sets of right thumb rollers always include these. In addition, I have seen a number of older instruments that have only rollers between these two keys without any rollers for the other right thumb keys. Obviously, there must be a valid reason for having rollers in this position.

Eventually, I was able to determine a reason for rollers between the right thumb F♯ and G♯ keys. The answer to this puzzle exists in another key on the bassoon that is often overlooked and always misidentified: the F♯ to G♯ trill key.

The F♯ to G♯ trill key is more commonly referred to as the F♯ rocker. It is a small key located in the center of the thumb side of the boot joint. Whenever the thumb F♯ key is depressed the F♯ rocker pushes a pin through the body of the boot joint closing the low F key. It commonly allows us to play F♯ without the need to simultaneously hold the F key depressed.

The true reason for the existence of the F♯ to G♯ trill key is to play that trill. The trill is played by holding the F♯ depressed while the little finger trills the G♯ key. This allows the trill to be easily performed. Without this little key the gymnastics require by our fingers are overwhelming. In particular, the little finger must rapidly alternate between the low F key and the G♯ key. Fingers may be able to rapidly move up and down but they are not as successful in rapidly moving laterally back and forth.

Try removing the F rocker key and playing an F♯ to G♯ trill. You'll quickly get the idea of just how valuable that little key can be. There is another way. Try playing the same trill while holding the low F key down and moving your thumb rapidly between the F♯ and G♯ keys. It works! And with rollers it is even easier.

So the reason for rollers between the F♯ and G♯ keys of the right thumb is to play a trill for which a better way exists. That little key was first added to bassoons in 1870 and became a standard part of the bassoon immediately. Yet we still see instruments made today with rollers that exist just to play that trill.

Bocal vents:

There have always been vent holes in bassoon bocals, but there have not always been mechanisms to close them. The development of mechanisms to close these vent holes has brought about changes in the vent holes themselves.

The earliest bassoons simply had a very small pin hole in the side of the bocal. The presence of the hole allowed better response of certain notes. However, too big a hole interfered with the player's ability to produce a quiet entrance.

The other side of the problem is that too small of a hole was not all that effective. It is desirable, to a point, to have a larger hole.

The modern whisper key or piano key mechanism came into existence shortly after the beginning of the 20^{th} century. It was not long afterwards that this key became a standard part of every bassoon. As the name suggests, its purpose is to enable the player to perform at soft dynamic levels.

The whisper key also freed the player from the tyranny of the problems caused by too large of a vent hole. Now, the vent hole could be enlarged to a size that allowed it to perform better.

Larger vent holes demanded changes in the player's technique. When the vent hole was still small it was possible to ignore its effects. As the hole became larger it became more important for the player to close it whenever it is not needed to be open.

Today, whisper key locks have become important parts of all but student level bassoons. What once could be ignored now must be secured.

Backwards Whisper Keys:

One of the ironies of the modern whisper key is that it is made backwards.

All modern woodwind instruments utilize one or more "octave keys" or "register keys" to enable the player to play notes higher in the overtone series. With only a single exception all of these keys are closed standing keys. That is, the vent hole operated by the key is normally closed until you take an action that opens it. Only the bassoon's whisper key is open standing and must be closed by the action of the player.

The real irony in this is that only a few notes on the bassoon really demand that the whisper key vent hole must be open. Anyone who has tried playing these notes when their whisper key lock is set knows about them. The octave d is probably the most dramatic example of the problem. Try playing that note with the whisper key closed.

Look at the lengths to which we go to close this key. In addition to the normal touch for the left thumb, there are also several varieties of whisper key locks, alternate whisper keys for the left hand little finger and for the right hand thumb and even bridges to close the whisper key whenever the high A key is depressed. And don't forget the automatic mechanism that closes the whisper key whenever we depress the low E key so that we can have our left thumb free to play the low note keys on the bass joint.

So why do we go to so much trouble to use a "backwards" key? The reason probably derives from having always had an open vent hole in the bocal. Whisper keys were developed as devices to close the vent, not to open it. That's what we are used to and no maker is foolish enough to try to sell us on changing.

I have known one bassoonist who made a bassoon for himself with a closed whisper key. George Jameson was an interesting repair technician who also made some unusual instruments. I'm sure there must have been other bassoons made with closed whisper keys but George's is the only one with which I have ever actually had any contact.

Knochenhauer Shape:

Bassoon reed makers often refer to the "Knochenhauer" shape. Shapers designated with a "K" have been made to shape cane into this famous shape. The irony of this is that there really is no single set of dimensions that define what a Knochenhauer shape really is.

The gentleman who provided the name for this shape was a German reed maker. He was apparently quite successful in this.

Unlike modern manufacturers of reeds in volume, Knochenhauer did not make his reeds with a lot of machinery. Indeed, his reeds were truly "hand-made." This extends to shaping. He shaped all of his cane by hand, without the benefit of any type of tool that guided his knife.

As a result of his hand shaping, the actual dimensions of his shaped cane would vary from piece to piece. Hence, there is no true set of dimensions that precisely define a Knochenhauer shape.

Today, we tend to depend on a lot of tools that haven't always been available. Nobody thinks of hand shaping today. Within the last generation the use of profiling machines has become so common that the skill of hand profiling is quickly becoming lost.

Despite the modern need for all of these special tools, it can all be done by hand.

Swabs & U-tubes:

The type of swab we use today is a result of the changes in the design of the u-tube.

Getting the bassoon's boot joint properly swabbed out in the vicinity of the u-tube can be a problem. This is a problem that goes back a long way in the history of the bassoon.

The early bassoons didn't really have a u-tube as we know it today. Rather, the bottom end of the boot was closed with a cork plug. Behind the cork plug a connection between the two bores was carved that served as the u-tube.

The problem with the cork plug is that it was not easily removed, or replaced. This made effective cleaning of this area of the bore very difficult.

Because of the difficulties inherent with the cork plug the brass u-tube was developed. The earliest of these were made for ease of removal. The u-tube itself was mounted on a brass plate that slid into a dove-tailed fitting. It was certainly easy to remove the u-tube but it was very difficult to get one of these dove-tailed u-tubes to seal effectively.

The next development was to mount the u-tube using springs that held the u-tube plate against the bottom of the boot joint. This was definitely an improvement. The u-tube was still easily removed and it did seal better, but not dependably enough.

The modern u-tube is attached to the bottom of the boot by means of threaded studs extending from the bottom of the boot joint through holes in the u-tube plate. Tall nuts secure the u-tube onto these studs. The sealing is now effective, but the u-tube is more trouble to remove.

The traditional swabs that have been provided by most makers, up until recent times, has been a long straight stick with a lot of wooly material sticking out of the sides along its length. These push swabs are intended to be pushed into a bore.

A push swab works adequately until it must stop at an obstacle. The u-tube of a bassoon's boot joint is such an obstacle.

The advantage of the early dove-tailed u-tubes is that the u-tube could be easily removed so that a push swab could be used effectively. Even the spring mounted u-tubes were still okay for using with push swabs, although not as easily as the dove-tailed u-tubes.

When the screwed on u-tubes came into existence the push swab when out of date. Unfortunately, it took most of a century for this fact to become apparent.

When the u-tube is not removed push swabs tend to push moisture and debris into the u-tube. This is an area that must be cleaned properly on a regular daily basis. Push swabs don't do it.

To effectively remove moisture from the u-tube and the adjacent bores it is important to use a pull through swab that is introduced into the unlined side socket, passes through the u-tube, and is pulled out the lined side socket of the boot. In this way, the moisture and other debris is effectively removed from the boot joint and the u-tube and the adjacent bore areas are kept clean.

By the way, ask any repair technician who specializes in bassoon repair and he'll tell you that he often sees dents in u-tubes—from the inside out! In addition to overly ambitious use of push swabs some players have used flute type cleaning rods. This are metal rods with an eyelet in one end in which a piece of cloth is inserted. These cleaning rods are particularly damaging to u-tubes. I've had to replace u-tubes because they have been perforated by these rods!

Water in the finger holes:

Moisture in the finger holes of bassoons, along with the attendant strange gurgling sounds and wet fingertips is a problem that most of us have experienced. Holding the bassoon properly can largely eliminate this problem.

The source of this problem is in the common habits that most of use develop when we hold our instruments. Bassoon teachers do a good job of teaching how to form an embouchure and blow into the instrument and finger the notes and play the music, but rarely do they actually teach how to hold the instrument in a way that avoids moisture problems in the finger holes.

Fundamentally, we play the bassoon upside down. The classic concept of a woodwind instrument is held in front of the player with the finger holes on the top side of the instrument. A recorder, oboe or clarinet demonstrates this. On bassoon, because we hold the instrument along our side the finger holes end up on the lower side of the instrument, close to the flow of moisture in the bore. But then we make the problem worse.

It is easier to visualize the problem and the solution if the bass joint is removed from the instrument. Assemble the wing and boot joint as well as the bocal and reed and hold it as if you were playing the instrument.

The problem occurs whenever we pause in our playing. The common habit is to rotate the bassoon so that the broad side of the boot joint lays flat against the leg. In this position the bocal would be pointing toward the player's right. The finger holes are now in the worst possible position. Any moisture in the bore heads straight for the finger holes. Tubes inserted into these finger holes and protruding slightly into the bore help avoid the problem but don't always succeed.

The way to avoid moisture problems is simply a matter of changing the way we hold our instrument whenever we pause in our playing. Instead of rotating the instrument so that the bocal points to your right, reverse the rotation so that the bocal points to your left. As you will see, the finger holes are now positioned high and dry.

Of course, nothing comes free. At first this different rotation will seem strange and awkward. Also, your reed will end up in a somewhat more vulnerable position. It may take you a little while to get familiar with this. When you have developed this into a habit you will find that moisture in the finger holes is no longer a problem.

What Temperature do you tune at:

Temperature can have an effect on the pitch at which you play.

The frequency of any sound is determined, in part, by the speed of sound. In a comfortably warm room the speed of sound is 345 meters per second. However, the speed of sound is directly affected by the temperature of the air. That is, when the temperature is lower, the speed of sound will be slower and the resulting frequency of pitches played at that lower temperature will be flatter. In a similar way, we can expect pitches at a higher temperature to be sharper.

This has some interesting social aspects. Instruments made in Europe traditionally have been tuned to yield a pitch at 68°F while instruments made in America have been tuned to yield a pitch at 72°F. It seems that the central heating that came to America before it was used in Europe has produced a population that enjoys its comforts. As a result, the instruments we use must also reflect the same comforts.

One G♯ Tone Hole or Two:

A question that often gets asked concerns the designs of the thumb G♯ on bassoons. On some instruments there are two separate tone holes for the little finger G♯ and for the thumb G♯. On other instruments there is only a single tone hole operated by both keys.

The reasons for the two systems has to do with the evolution of tuning as well as mechanics.

The two hole G♯ system is the older of the two. The objective of this system is to offer different tunings for A♭ and G♯. While modern usage has largely forgotten that these are two different notes, in reality they are different. Note that I am rather casually referring to them both as G♯ tone holes; I could also be referring to them both as A♭ tone holes.

The difference is older than the modern equal tempered scales that are necessary for modern omnitonic instruments to be playable in all scales. Earlier temperaments produced clearly different pitches for the two notes. However, early instruments based on these temperaments were not capable of playing well in all scales. Instead of playing a few tonalities correctly, the modern equal temperament succeeds by playing all scales equally badly.

An important analogy to the two separate G♯ tone holes comes from the flute. Early flutes did not have any keys. J. J. Quantz, one of the early developers of the flute added the first key to the flute: the D♯ key. He also added the second key: the E♭ key. Of all the keys he could have added he chose to add keys for what today we would consider the same note. For him in that time they were significantly different.

Times have changed, however. Today instruments are made to be omnitonic. That is, they must be capable of playing in all keys. As a result the difference between the little finger G♯ and the thumb G♯ tone holes has evolved to a level where we don't notice it.

Now that we have become satisfied with any G♯ tone hole there is little musical reason to have two. Eliminating one of them eliminates one pad that might leak. It's not to difficult to produce a mechanism for the thumb G♯ key that operates the pad on the little finger G♯ key. So what if we lose out on a tuning detail—we don't use it today anyway.

Of course, not everything comes without a price somewhere. The volume of air within any tone hole is a part of the bore of the instrument. Simply removing a large tone hole constitutes a change in the bore design. It's not always a good idea to simply discard part of a successful design to casually. As a result we continue to make all of our long and short bore models with two hole G♯ systems at the same time we make our thick wall models with single hole G♯ systems. Don't bother asking us to make the other G♯ system any given model—we won't.

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