

# Adjusting The Whisper Key

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Getting a bassoon's whisper key system properly adjusted is a basic part of every bassoon repair service. It is also a job commonly attempted by bassoonists. A improperly adjusted whisper key can be the source of annoyance and performance problems to the player.

Proper adjustment of this system is complicated by the number of parts involved. Four different keys on two body joints plus the bassoon's bocal are involved. In addition, other complications, such as whisper key locks, high A bridge connections and alternate whisper key spatulas can make the proper adjustment more difficult. Despite the complications, the adjustment of this system is basic to bassoon repair and it must be done in a routine and competent manner.

## The Parts

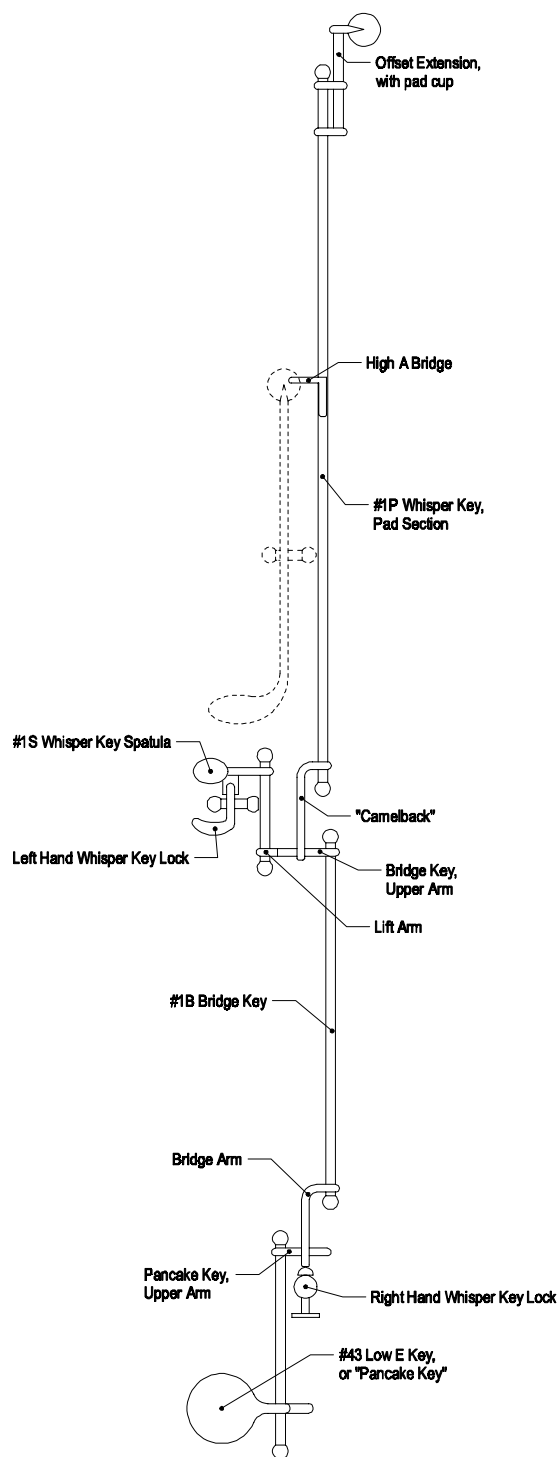
There are four separate keys in the basic whisper key system. After the normal keys come the complicating devices.

**#1P Whisper Key Pad Key:** This is the longest part and includes the pad that closes the vent hole on the bocal. At the top an offset extension bypasses the end of the key to hold the pad cup above the end of the joint. At the lower end a "camelback" extends the key lower, passing over a connection for the C#/D# trill key and resting on the upper arm of the bridge key. (Why "camelback?" It has a hump.)

**#1S Whisper Key Spatula:** This is the key which the player depresses to close the whisper key. One side of the key is the actual touch; the other side lifts the bridge key which in turn closes the pad.

It is important to remember that while makers and repairers see all of the keys involved, players often see only the button they push and are somehow blind to the rest of the system. When a player says "this key doesn't work," the actual problem might be elsewhere in the system.

**#1B Bridge Key:** This is the lowest key on the wing joint and connects to keywork on the boot joint. The upper end is the middle layer of a stack of three arms in which the arm from the spatula on the bottom lifts the upper bridge key arm which in turn lifts the camelback of the pad key at the top of the stack to close the pad. At the bottom end of the bridge key the bridge arm extends the bridge key over to the boot joint where it is picked up by the upper arm of the low E or "pancake key."



**#43 Low E Key or Pancake Key:** This isn't truly part of the whisper key but has to be included in the system because it incidentally operates the whisper key. Whenever the low E key is depressed it automatically closes the whisper key. This frees the left thumb from having to hold the whisper key depressed so that it can operate the keys on the bass joint. The lower end of the key is the large plateau touch which closes the low F tone hole to play low E; at the upper end is an arm that lifts the bridge arm of the bridge key on the wing joint.

Most of the problems with the whisper key system relate to how well this key closes the whisper key.

**Whisper Key Lock:** A whisper key lock is simply a device that holds the whisper key closed. There are several different types of whisper key locks, each with their own unique influence on how the whisper key system must be adjusted. These are basically described by whether they are operated by the left hand thumb or the right hand thumb. Left hand locks have the little influence on adjusting the whisper key. Right hand locks can have a lot of influence on the whisper key.

**High A Bridge:** This is an attachment that connects the high A key to the whisper key so that the whisper key is automatically closed whenever the high A key is depressed. It is rarely seen on student bassoons but is often seen on professional bassoons. It includes an arm extending from the middle of the #1p pad key to a point on or near the pad cup of the high A key. There may or may not be some added hardware on the high A key to connect with the high A bridge arm. When the high A key is depressed the pad cup raises lifting the arm from the high A bridge which rotates the whisper key closing its pad.

**Alternate Whisper Key Spatulas:** There are a couple other places where alternate touches for the whisper key can be located. As these keys are uncommon I will only mention them in passing.

The little finger whisper key is played by the left little finger. Although hinged from the wing joint the touch is located just below the low C# spatula on the bass joint.

A whisper key spatula for the right thumb is located just above the Bb key on the boot joint.

### **Before You Start Adjusting:**

Successful adjustment requires that each of the component parts does its job correctly and other potentially complicating details be under control.

The adjustment of the whisper key should normally be the last detail to be taken care of in a repair service. When this job is done the instrument should be ready to play.

Sloppy pivot sockets at the upper end of the pancake key, each end of the bridge key and, to a lesser

extent, the pad key can cause a lot of adjustment problems. Make certain that there is no lateral movement at these pivots before the keys begin to rotate.

The pancake key needs to be properly padded, with no sponginess to the pad. This is one of the most difficult pads to install on the bassoon and careless installation of the pad will cause a lot of trouble. Be sure to get the pad opening set correctly.

The wing tenon needs to be fitted correctly to the boot joint. If the tenon fits loosely and rotates or wobbles in its socket the adjustment of the bridge key will not be dependable.

The positioning of the wing must be correct. If the wing is slightly out of position this will seriously affect the bridge adjustment. Put the bass joint into its boot socket without the wing and scribe around the bass joint leaving a line in the top of the boot joint. Remove the bass and put the wing in place. The groove of the wing should be concentric with this line. Put the bass joint back in and check the adjustment of the body lock, correcting it if necessary to make certain that the wing and bass joints relate to each other properly.

### **Adjusting the bridge key without a lock:**

The adjustment begins by getting the #1B bridge key coordinated with the #43 pancake key. The presence or absence of a right hand whisper key lock affects the way this is done. I'll begin with the procedure without the lock.

To begin, the boot, bass and wing joints should be assembled. Remove the #1P pad key. At first this key will only be in your way. Leave the #1S spatula and the #1B bridge key on the wing.

The objective is to end up with the ends of the bridge key in contact with both the upper arm of the pancake key and the lower arm of the spatula. Free play at either end can feel uncomfortable to the player.

It is also very desirable for the upper arm of the pancake key to be as close to the body as possible without actually hitting the body. The lowest position gives the cleanest simple lifting action between these two keys. As the height of the upper pancake key arm gets higher the movement of the two parts tends to pull against each other.

It is also very desirable for the bridge arm to be level with the body, that is, roughly parallel with the bore axis of the wing and lined side boot bores. Bending the arm at an angle either up and down is useful for small amounts of adjustment. Arms that are obviously at an angle are wrong.

The lateral angle of the bridge arm can be used to control the amount of pad opening at a later time. In general, the bridge arm should have little or no lateral

angle. However, this is often a factor of the way the instrument was made. As a rough general rule the bridge arm should contact the upper pancake key arm about half way between the bridge key hinge axis and the pancake key hinge axis.

With all of these guidelines in mind adjust the bridge key so that each end of it is in contact with its connecting parts. Lightly put some resistance on the top arm of the bridge key and depress the pancake key. If any lateral movement occurs at any of the four pivot screws of the pancake key and/or the bridge key before the bridge key rotates there is slop in the pivot socket. Fix it!

The connection between the upper bridge key arm and the spatula arm needs to be checked. At rest the contact between these two keys is relatively long. Depressing the spatula should create a single point of contact with no sliding of the point of contact. Adjust the shape of the upper bridge arm if necessary.

### **Adjusting the bridge arm with a right hand whisper key lock**

There are a lot of ways that right hand whisper key locks can be made. It's impossible to describe all of them. Fortunately, certain guidelines are common to all of them.

The presence of a lock means that both the lock and the pancake key must lift the bridge arm. It is how these two parts lift the bridge arm that is the key to good adjustment.

Without a lock it is the static position of the #43 pancake key that determines how the bridge is adjusted. With a lock it is the depressed position that becomes important.

When the lock is engaged the bridge arm is lifted. The amount of lift must be very slightly greater than the lift that the pancake key would cause. The extra amount of lift generated by the lock does not need to be much but it does need to be there.

With the lock engaged the player must not feel any contact from the whisper key bridge whatsoever when the pancake key is depressed. If the player feels the pancake key's upper arm contact the bridge arm it might be perceived as the point of closure before the pancake key pad is actually closed, allowing a leak. By the lock lifting the bridge past the point of contact by the pancake key upper arm no contact will be felt when the pancake key is depressed.

In order to achieve this adjustment it may be necessary to raise the static position of the upper pancake key arm higher than would otherwise be needed or desirable. Simple plunger style locks tend to have this problem. More sophisticated locks can function with less raising of the arm.

One other limiting factor created by the lock: The lateral position of the bridge arm must be aligned

with the position of the lock. This is particularly important with plunger and slide type locks.

### **Positioning the Bocal:**

It is necessary to install the bocal in order to adjust the pad key. The position of the vent button can be variable on different makes and vintages of bocals. Try to use the bocal that will be regularly used on this instrument.

The correct position for a bocal is not square with the instrument but rather somewhat "outboard." Instead of positioning the bocal so that its plane is perpendicular with the plane defined by the two bores, rotate the bocal about 15° away from the bass joint.

Beginning bassoon students are usually taught to position the bocal by lining up the pad with the vent button. If the key is properly made and adjusted the student will usually succeed in positioning the bocal in the right place.

### **Adjusting the Pad Key:**

The adjustment of the #1P pad key is done from the top down. With the key on the instrument, examine how the pad contacts the bocal vent button. The pad thickness has a considerable influence on how the pad centers on the bocal vent button. In general, avoid overly thick pads. (Saxophone pads will be too thick!) The pad should be centered on the button when it is closed. A little bit of error is okay but avoid being too far off center.

There are two ways to adjust the pad centering. First of all, the position of the bocal is not absolute. A little bit of rotation is okay as long as you don't go too far out of position. Second the offset pad cup assembly of the pad key can be adjusted.

The offset pad cup assembly of the #1P pad key includes the extension shaft, usually offset from the hinge axis by a couple small offset arms, and the pad cup mounted on an arm at the top of the extension shaft. The centering adjustment can often be done by rotating the pad arm on the extension shaft relative to the plane of the offset arms. As the pad arm is rotated the pad cup will move laterally across the vent button.

Usually the extension shaft should be straight; there should be no lateral bend to it. Sometimes it may be necessary to bend the shaft laterally but that method is not at the top of the list.

Adjusting the pad cup assembly will alter the amount of pad opening. In fact, this same adjustment can later be used for fine adjustment of the pad opening. If the pad centering is reasonably close leave it alone for later. If you do need to do much changing of the pad assembly you are likely to get the pad opening too small to work with comfortably. If that happens adjust the length of the pad key to give yourself enough working room. Don't worry now

about too much pad opening—that comes almost next.

The next thing to check is the position of the camelback extension. Ideally, this key part should be square with everything. The underside should sit flat on the upper bridge key arm, rising perpendicularly above that arm; and the length of the underside should be roughly parallel with the body. Check that the side of the camelback doesn't hit the post beside it. (The lower post for the two-prong key.)

The spring under the camelback is an important part of the natural adjustment of the system. It should be set so that there is a small amount of free space behind the spring that can be used if the adjustment of the whisper key system is too tight.

The gross adjustment of the pad opening is done by twisting the length of the #1P pad key. When everything works right the whisper key pad closes when the #43 low E key is depressed without extra effort required to close the low E key. Twisting the pad assembly can give a smaller adjustment more easily than twisting the long hinge of the key.

### **Pad Opening vs. Spatula Movement:**

The amount of pad opening in the static position determines how much key movement is required to close the pad. In general, a 3/32" (2.4mm) pad opening is about right.

If the pad opening is too small or too great the movement of the whisper key spatula will be uncomfortable. This can be adjusted by the lateral position of the bridge arm. Moving the point of contact of the bridge arm on the upper pancake key arm changes the amount of action at the pad cup. As the contact point moves close to the pancake key hinge the pad movement decreases; as the contact point moves away from the pancake key hinge the pad movement increases.

When spatula movement is a problem, set the pad opening at a distance that gives a comfortable feel at the whisper key spatula, then adjust the lateral position of the bridge arm until the pad closes with the pancake key. If you do this go over all of the adjustments again. And be advised, this trick can't always be used when a right hand whisper key lock is involved, as the bridge arm needs to be aligned with the lock.

### **High A Bridges:**

This is a desirable piece of optional keywork that is often seen on professional bassoons. It is rarely seen on student models, and students will do fine without it.

The function of the high A bridge is to close the whisper key whenever the high A key is opened. The correct fingering for high A requires that the left thumb depress three keys simultaneously: the whis-

per key, the C# key and the high A key. Since very few thumbs have the over one inch width needed to work all three keys together the whisper key usually gets omitted. Indeed, it is rarely even mentioned in fingering charts!

The high A bridge in its simplest form is just an arm attached to the hinge rod of the #1P pad key and extending over to the high A key's pad key. Whenever the pad is opened it lifts the arm causing the whisper key pad to close.

More sophisticated forms of the high A bridge include attachments to the high A key. One version uses a roller attached to the pad cup for the arm to rest on. Another version uses an arm extending from the side of the high A key just below the pad cup which lifts the arm on the whisper key hinge.

Players who have never used a high A bridge are usually somewhat skeptical about it at first. As a result, they often ask for a key that can be disengaged if they choose. The roller version is nice for this as the roller can be removed to disengage the arm. Players that are familiar with the high A bridge never give the idea of disengaging it any thought.

Adjusting a whisper key that includes a high A bridge is a bit of a bother. The #1P key must now be adjusted so that both the camelback and the bridge are simultaneously in contact with their respective connections.

### **Whisper Key Flat Springs:**

There is usually a spring on the underside of the camelback extension at the bottom end of the #1P pad key which bears on the upper arm of the bridge key. Most often this is a flat spring attached with two flat spring screws but some makers will have a wire spring.

The function of this spring is to provide some automatic accommodation for misadjustment. The spring should have some available space behind it. If the whisper key system is set too tight this space allows the low E key to still be closed without excessive force.

The "two-hole flat springs" tend to be a problem for replacement. As long as you can get them from the bassoon maker, and the maker hasn't changed the distance between the holes since the bassoon was made, replacement is easy. It is strongly recommended that any repair technician who works on bassoons should have on hand a spring hole punch. With this tool any flat spring of the right width and thickness can be made into a two hole flat spring. Start with a spring that is too long and shorten it to the length of the camelback extension.

Adjusting the shape of the flat spring can sometimes be challenging. The simplest format is to have a straight spring with a notch in the key behind it.

The notch provides the accommodation for the automatic adjustment. Another format is to belly the flat spring between the tip and the screws so that it bellies away from the underside of the camelback just over the upper bridge key arm.

These flat springs can get noisy. Attaching a bit of ultrasuede to the flat spring itself where it will bear on the upper bridge key arm can eliminate the noise. Worse than the noise is when the edge of the spring digs into the plating on the top of the upper bridge key arm. The ultrasuede also takes care of this problem.

### **Unusual bocal vent positions:**

Certain makers, primarily East German bassoon makers, have designed their bassoons and bocals in a way that is not compatible with other more conventional bassoons and bocals. With the exception of these non-conforming makes most makers are surprisingly consistent in their whisper key and bocal vent positions. This allows players to use bocals of most makers in whatever make bassoon they choose.

In these non-conforming makes the whisper key is mounted for a bocal vent position further around behind the bocal rather than to the side of the bocal. When a conventional bocal is used in one of these bassoons the position of the reed is so extremely far to the right of normal that it is impossible to play the instrument. Attempting to adjust the existing whisper key to use a normal bocal is next to impossible.

It is possible to remake the pad extension to function with a normal bocal. It doesn't work ideally but it's better than declaring the bassoon unusable. Plan on a lot of screwing around to get a pad arm and cup to function reasonable well. Expect the pad to slide into position rather than squarely closing the vent hole.

### **Special shaped pad cups:**

A number of makers offer oval pad cups on whisper keys either as standard or as options. Schreiber is the most commonly seen make using oval pads but is certainly not the only one.

Usually these oval pad cups are mounted so that the long axis of the oval is oriented along the vertical axis. The objective is to allow the player to pull the bocal out to various positions for tuning purposes.

Oval pad cups oriented with the long axis horizontal are also seen. The objective of these is to allow the player to position the bocal radially wherever he might prefer irregardless of the radial position of the vent button on the bocal.

### **Left Hand Whisper Key Locks:**

While right hand whisper key locks are more commonly seen in North American, left hand locks are more universally preferred around the world.

In many ways the left hand lock is easier to set up. Indeed, it doesn't require a precise adjustment to coordinate multiple keys in a system. The left hand lock needs only to hold the whisper key spatula depressed. As long as that spatula is depressed the pad will be closed on the vent button.

Left hand locks normally exist as a separate key mounted between posts. A heavy flat spring normally screwed to the body of the wing joint provides the tension for the lock. When the lock is rotated to close the whisper key the lock bears on a plate or other added feature of the whisper key spatula to hold that spatula depressed.

Setting up the spring can sometimes be difficult. The spring operates against a bearing point protruding under the lock key. As the lock is turned this point moves from one side of the hinge to the other. The spring pressing against the bearing point holds the key in position.

The lock keys often do not press with much pressure against the whisper key. The amount of pressure that is produced is a function of how far on each side of the key hinge the bearing point presses against the spring. As design of the lock key places the bearing point further from the hinge, however, the effort to engage and disengage the lock key becomes excessively difficult.

### **The Pancake Key:**

The introduction of the whisper key by Heckel in 1905 brought about changes in the design of the low E or "pancake key" so named for its large circular appearance.

Bassoons that predate the modern whisper key system did not require that the pancake key have any upper extension toward the top of the boot joint. The early pancake keys were simple plateau keys mounted in the center of a short hinge. The sole purpose of this key was to function as a plateau key so that the player's right thumb could close the large low F tone hole under this key. Many of the original details of this simple key have never been changed despite the otherwise significant changes that have occurred.

One of these details is the lower post position. The two original posts were spread about an inch and a half apart, centered on either side of the tone hole facing. This was needed to get enough hinge to provide stability and spring length for the pancake key. When the connection to the whisper key was made a new upper post was added near the top of the boot band. Curiously, the original two posts remained in place. The old upper post was changed into a spring post. On many makes this function has been moved to another post allowing this post to evolve out of existence. The lower post, however, has never been moved. It remains in its old position leaving an un-

## ADJUSTING THE WHISPER KEY

usually long distance between the key casting and the end of the key. There's no good reason why it couldn't be moved. It has just been left there out of tradition.

Another detail is the footing of the key. The old style key had a simple foot extending from the single key casting on the hinge. For most makes this same foot position has been preserved. Other makers have chosen to remove this foot and use the upper arm that connects to the whisper key as the foot. There are valid arguments that support either method.

When the upper connecting arm foots the pancake key the connections to the whisper key may be more certain. The height of this arm above the body of the boot joint will be a constant. In addition, corking this arm will prevent unpadded metal from hitting the boot band.

When the traditional position of the foot on the pancake key casting is preserved the pad opening of the key becomes the constant. Everything else is related to this pad opening. The upper connecting arm does not need to be corked as it should not normally make contact with the body under it.

It doesn't really which design is used on a bassoon. One end has to cover the tone hole; the other end has to connect to the whisper key; either end can be used to set the pad opening.

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