Lesson 10

IMPRESSIONING

Contents

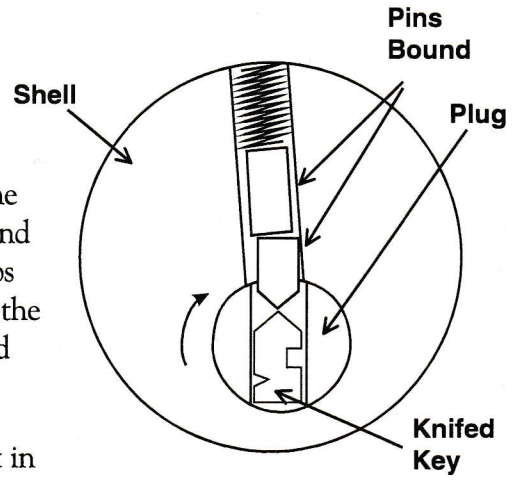
Sounds Like Magic, But It's Not

Impressioning—The art and science of fitting a key to a lock cylinder without disassembling or picking the cylinder

The definition to the left makes **impressioning** sound like magic, doesn't it! But it is NOT magic. It's an art and a science, just as the definition says.

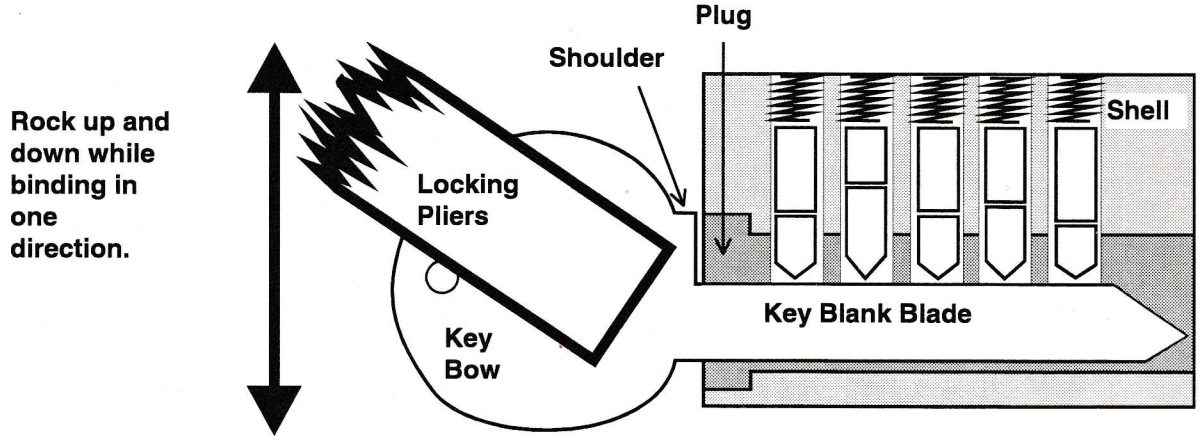
The science of impressioning is how cylinders work. You already know a lot about that. The depths and spacings of key cuts must match those of the cylinder pins. When they do, the cylinder operates. But how can you make that happen without disassembling or picking the cylinder? If you fit a key, you open the lock. That's the art part of the definition. And that's what you'll learn about in this lesson.

Right now we'll give you an overall picture of impressioning. Then we'll spend the rest of the lesson showing you how to practice the art of impressioning.



First, you determine the type of lock and properly prepare the key blank. Then you insert the key blank into the keyway and turn it in the cylinder plug until it stops. The key blank stops because you are binding the pins or wafers. The drawing to the right shows you a driver and bottom pin bound with a knifed key blade.

With the key blank at the binding position, gently rock it in a motion similar to shaking hands while continuing to apply turning pressure. This forces the pins or wafers against the key blank and the cylinder housing at the same time, causing the pins or wafers to leave a mark, or impression, on the key blank. Now you know why the process is called "impressioning"!



Next, you remove the key blank from the cylinder plug and file on the resulting marks. Repeat this process until the marks no longer reappear. When a pin or wafer is at the shear line, no mark will appear because that pin or wafer will no longer be bound by the housing or shell. With practice and patience, you will produce an operating key.

Objectives

When you have completed this lesson, you should be able to

- ☞ Identify tools used for impressioning and describe their functions.
- ☞ Describe the different types of single-sided and double-sided cylinders.
- ☞ Explain knifing the edge and shaving the top of a key blank.
- ☞ List the 5 steps for creating the marks when impressioning a key blank using the binding and rocking method.
- ☞ Describe the difference between the marks left by pin tumblers and those left by wafers.
- ☞ List the 3 steps for filing the marks.
- ☞ Explain some tips for experienced locksmith impressioners.

Main Ideas

1. Preparing for Impressioning
2. Impressioning the Key Blank
3. Tips for Experienced Locksmith Impressioners

Preparing for Impressioning

To prepare for impressioning a key you need to

- check your tools,
- determine the lock type, and
- prepare the key blank.

Checking Your Tools

First of all you need good eyesight. In addition to that, three tools are absolutely necessary.

1. A Flat File
2. A Good Impressioning File
3. A Pair of Locking Pliers

Flat Files

You use a flat file to prepare the blank key for impressioning. If you are using a pippin file, you may not need a flat file.

Most people prefer a #4 cut file. It is one of the most common cuts used on files. However, for certain advanced uses a #6 may be handy. Experience will show you which works best for you.

The number of the file tells you the number of teeth per inch on the file. A lower number means fewer teeth. The number also tells you the coarseness of the cut the file makes. The higher the number the finer the cut.

A finer cut takes off less material and leaves a smoother finish. The #4 leaves a nice fine, dull, corrugated surface on the blank. This helps you better see the marks made on the key blank by the tumblers.

Flat File

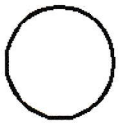
Impressioning Files

You use an impressioning file to cut the marks left on the key blank during the impressioning process. You have several choices for impressioning files. The most common are the pippin file and the 6" round cut file. Both files taper from the tang, or handle end, down to almost a point at the tip. The overall length of both these files is almost 8" including the tang.

The pippin file has an almost teardrop-shaped cross section. It is tapered in width and thickness. Used to finish the junction to different curved surfaces and for opening slots when a V shape is required. It can be used as a flat file during the impressioning process for both pin and wafer locks.

Pippin File

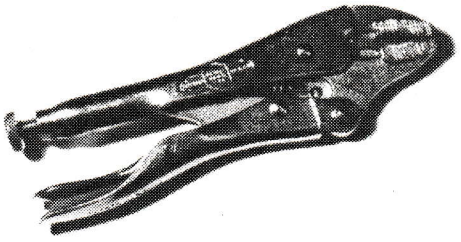
The 6" round cut file is gradually tapered. Used to enlarge a hole or round off a radius for both pin and wafer locks also. However, you will usually use a flat file to prepare the key blank.



6" Round Cut File

Locking Pliers

You use locking pliers to grip the key bow. This gives you the leverage you need to bind the tumblers and rock the key blank in the cylinder plug.



The most common locking pliers are 5" vice grips. However, you'll choose the pliers that are comfortable for you as you gain experience. Try not to become too dependent on one particular file or locking pliers. You never know when you may not have it available and really need to impression a key.

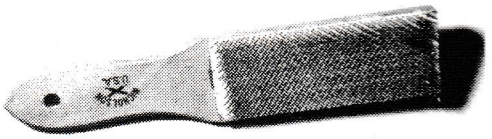
Additional Tools

Whichever file you use, it is a good idea to get a handle for it. A handle lets you control the file better and makes the work easier on your hands.

File with Handle

File Card—A lint brush for a flat or impressioning file

Most of the keys used when impressioning are made of brass. Brass tends to clog a file. So another wise purchase would be a **file card**. You use a file card to clean the teeth of you impressioning files. Clean impressioning files improve the quality of the key blank surface. The better the quality of the key blank surface, the better you can see the impressioning marks.



File Card

A triangle file is mainly used for filing corners and edges that are critical.

Triangle File

Determining the Lock Type

You can determine the type of lock from your prior knowledge of lock types, by looking into the keyway, or by raking the lock with a pick. You learned about raking cylinders in Lesson 9: Professional Opening Techniques.

Single-Sided Cylinders

In single-sided cylinders, the pins or wafers contact the key on one side. You'll find two types of single-sided cylinders with respect to how the key enters the keyway.

Key Inserts Only One Side Up

In a single-sided cylinder, the pins or wafers are on one side of the lock only, the key inserts only one way, and the cuts are on one side of the key only. These are the types of cylinders you have learned about so far in these lessons.

Key Inserts Either Side Up

Convenience Key—A key cut the same on both sides; used with single-sided cylinders

Some single-sided cylinders use **convenience keys**. So if the customer describes a key that is cut on both sides, the cylinder may still be single-sided. Ask your customer if the key operates the lock no matter which side is up. If your customer says the key operates the cylinder no matter which side is up, then you have a single-sided cylinder. And you will need to impression only one side of the key blank.

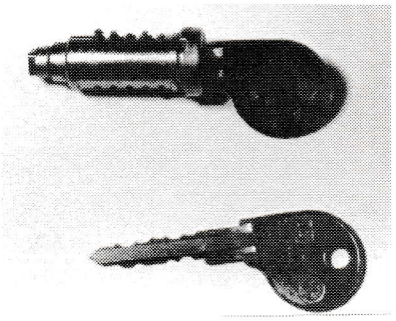
With this type of single-sided cylinder, the pins or wafers are on one side of the lock only, the key is cut the same on both sides, and the key operates the cylinder either side up. This means the key does not have to be cut on both sides to operate. A good example of this is Ford's double-sided, pin tumbler lock.

Double-Sided Cylinders

In double-sided cylinders, the pins or wafers contact the key on both sides, staggered in the cylinder.

Key Inserts Only One Side Up

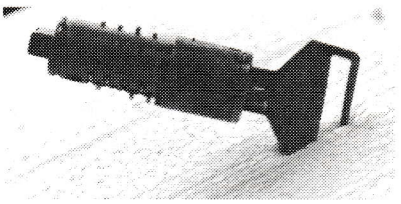
With these double-sided cylinders, the pins or wafers are on both sides of the lock, the key inserts only one way, and the cuts are different on each side of the key. So when impressioning this type of key, you must file both sides of the key blank.



Some of the mid 1970's Volkswagens used this type of lock.

Key Inserts Either Side Up

With these double-sided cylinders, the pins or wafers are on both sides of the lock, the key goes in either side up because it is cut the same on both sides, and both sides must be cut to operate the cylinder.



A good example of this might be a Nissan product circa 1990.

Lock Types

	Single-Sided Cylinder	Double-Sided Cylinder
Key Inserts Only One Side Up	• the pins or wafers are on one side of the lock only • the key inserts only one way • the cuts are on one side of the key only • the key is cut on one side only to operate the cylinder	• the pins or wafers are on both sides of the lock • the key inserts only one way • the cuts are different on each side of the key • the key must be cut on both sides to operate the cylinder
Key Inserts Either Side Up	• the pins or wafers are on one side of the lock only • the key is cut the same on both sides • the key operates the cylinder either side up • the key does not have to be cut on both sides to operate	• the pins or wafers are on both sides of the lock • the key goes in either side up because it is cut the same on both sides • both sides must be cut to operate the cylinder

Preparing the Key Blank

Brass is strong enough to bind the cylinder and soft enough for tumblers to leave a mark. Plain coined brass is a brass key that is machined to the proper keyway. Then it is fed through a machine that "coins" it with information or a logo, usually leaving a currency type rim around it. The coining appears to rise up out of the key blank.

Brass key blanks are the best for impressioning.

Key blanks may also be machined and incised. Incised means that the information is driven into the key blank.

Either plain coined brass or chrome/nickel plated blanks are acceptable and usually available. However, you must file or sand off the chrome/nickel plating before using the key blank.

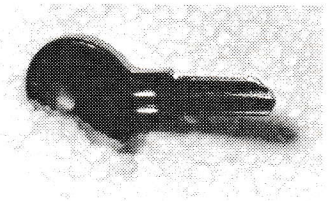
You can impression nickel silver key blanks. But they are much more difficult to work with as they are a much harder material.

The two methods of preparing a key blank for impressioning are

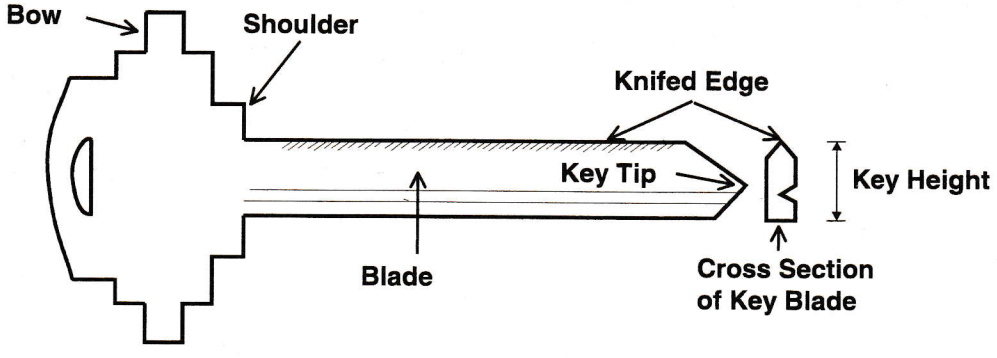
1. knifing the edge of the key blank and
2. shaving the top of the key blank.

Knifing—Using a flat, triangle, or pippin file to bring the edge or blade of a key blank to a knife's edge in order to prepare it for impressioning

"Knifing" the Edge of the Key Blank



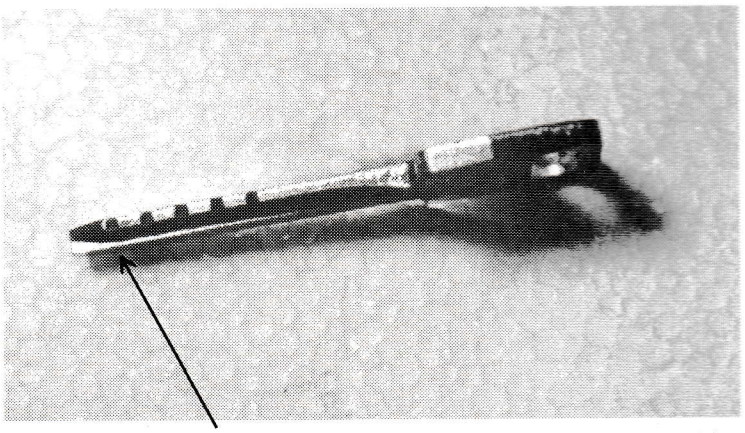
This method makes the key thinner at the point of tumbler contact, allowing visible marks to be made more easily. Use a flat, triangle, or pippin file to bring the edge or blade of the key blank to a knife's edge. The edge or blade of the key is the part that the tumblers ride on. Put this knife edge on only the very top of the key and not the full height of the key.



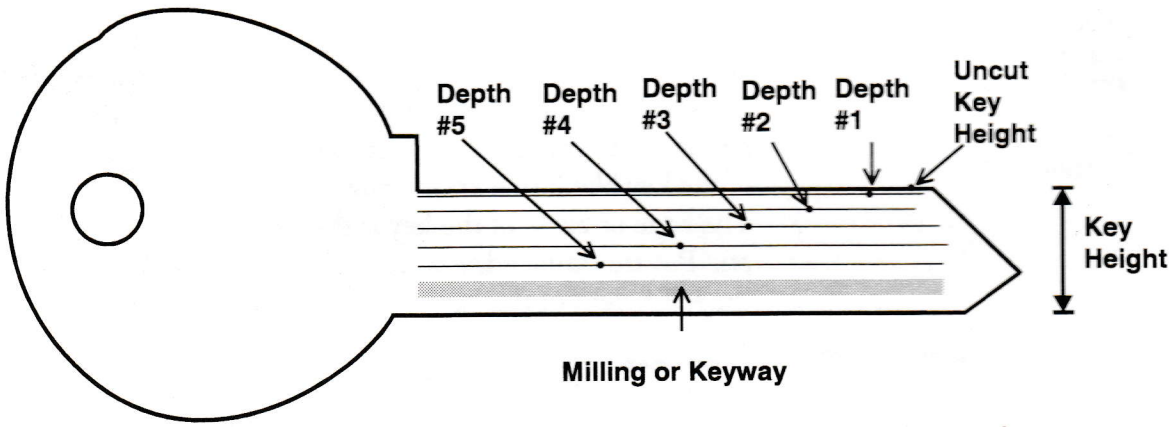
Tips for Knifing a Key Blank

1. Use only forward strokes of the file. You are preparing the key blank, not polishing it. Using only forward strokes provides a uniformly dull, slightly abrasive finish on the blank. Such a finish is perfect for impressioning.

2. Be careful not to reduce the height of the key blank. Some lock manufacturers' shallowest depth is barely the height of an uncut key. In other words, it just barely cuts into the key blank. If you reduce the height of the key blank too much during preparation and if the lock contains pins that are the manufacturer's shallowest cut or depth, you will not be able to impression that pin.

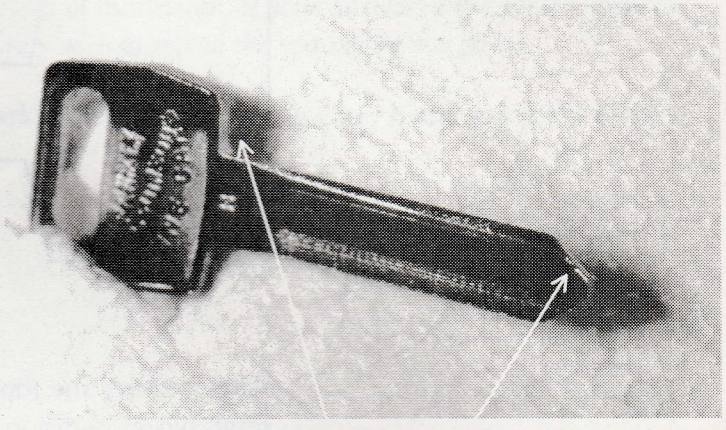


The shallowest depth is barely the height of an uncut key.



Tip Stop—A type of stop located at or near the tip of the key

3. If you are preparing a key blank that has a **tip stop** or is shoulderless, do not knife the edge beyond the face of the lock. If you do, the key blank might not withstand the pressure of binding and rocking needed for proper impressioning. In fact, the key blank may fracture.

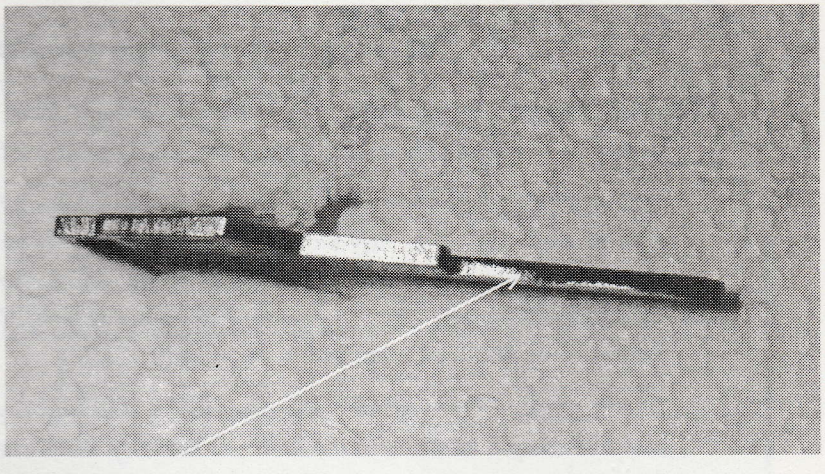


Shoulderless, Tip-Stopped, Knifed Key

Shaving—Using a flat, triangle, or pippin file to shave the top of a key blank in order to prepare it for impressioning

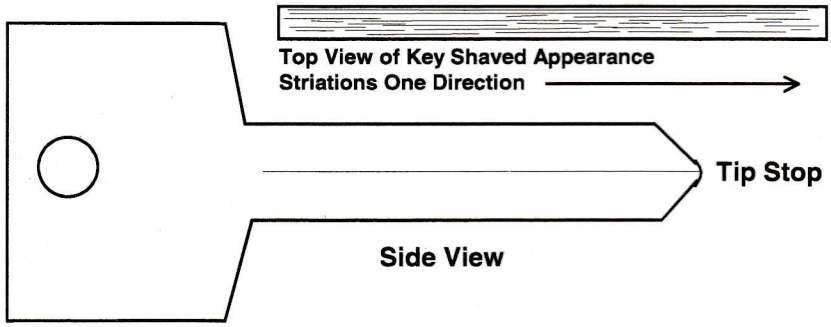
Shaving the Top of the Key Blank

Using a flat, triangle, or pippin file, shave the top of the key blank slightly. This removes any plating or surface irregularities and provides a uniformly flat surface for the tumblers to contact.



Shaved Key Blank

In the case of shoulderless or tip stopped key blanks, this method eliminates the concern for weakening the key at the shoulder or beyond the tumbler area.



Shoulderless, Tip-Stopped Key Blank

Always shave the top of the key from bow to tip. That way, scratches or abrasions on the key blank will be at a right angle to any pin or wafer marks, making the marks easier to see.

The Long Way Is Often the Best Way

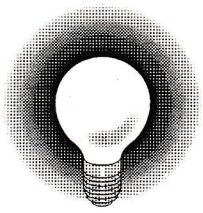
Most people have the idea that impressioning is just like it sounds. They expect the locksmith to use a mold or soap or wax, as in some very old movies.

Impressioning is, in fact, a tool that you store in your mind. You add the proper physical tools, key blanks, and your knowledge of locks and how they operate. Then you practice, practice some more, gain some confidence, practice still more. And then you should be able to fit keys to a good majority of the locks you will ever meet.

Start simple. Try wafer-type desk locks, and when you are comfortable move on to pin tumbler auto locks. Then try double-sided auto wafer locks. Learn from your mistakes. Learn the definition of patience, practice it, and you will be rewarded in the long run.

If anyone ever tries to teach you a short cut before you have learned the long way, learn the long way first—just in case the short cut fails.

Organize the Main Ideas



This outline will help you organize the information in this section of the lesson. Read through the outline and jot down what you remember about each of the topics listed. If you can't remember details related to one or more of the topics, you may wish to reread the text before you go on.

1. Preparing for Impressioning
   a. Checking Your Tools
      1) Flat Files

      2) Impressioning Files

      3) Locking Pliers

      4) Additional Tools

   b. Determining the Lock Type
      1) Single-Sided Cylinders

         (i) Key Inserts Only One Side Up

         (ii) Key Inserts Either Side Up

2) Double-Sided Cylinders

(i) Key Inserts Only One Side Up

(ii) Key Inserts Either Side Up

c. Preparing the Key Blank

1) Knifing the Edge of the Key Blank

(i) Tips for Knifing a Key Blade

2) Shaving the Top of the Key Blank

Check Your Knowledge 1

This quiz will help you check what you've learned in this section of the lesson. Read through the questions and jot down your answers. Then check those against the suggested answers at the end of this lesson. If your answers differ greatly from the suggested answers, you may wish to reread the text before you go on.

1. You use a _____ file to prepare the blank key for impressioning. If you are using a _____ file, you may not need a flat file. (Fill in the blanks.)
2. The most common files used for impressioning are the _____ file and the _____ _____ _____ file. (Fill in the blanks.)
3. You use _____ _____ to grip the key bow and give you the leverage you need to bind the tumblers and rock the key blank in the cylinder plug. (Fill in the blanks.)
4. A _____ _____ lets you control the file better and makes the work easier on your hands. (Fill in the blanks.)
5. A _____ _____ helps you improve the quality of the key blank surface so you can better see the impressioning marks. (Fill in the blanks.)
6. A _____ _____ is mainly used for filing corners and edges that are critical. (Fill in the blanks.)
7. Fill in the table below.

	Single-Sided Cylinder	Double-Sided Cylinder
Key Inserts Only One Side Up	•	•
	•	•
	•	•
	•	•
Key Inserts Either Side Up	•	•
	•	•
	•	•
	•	•

8. _____ the _____ of the key blank makes the key thinner at the point of tumbler contact, allowing visible marks to be made more easily. (Fill in the blanks.)

9. When knifing the edge of a key blank, why should you use only forward strokes of the file?

10. When knifing the edge of a key blank, why is it important not to reduce the height of the key blank?

11. When preparing a key blank that has a tip stop or is shoulderless, you should not knife the edge beyond the face of the lock. Why not?

12. _____ the _____ of the key blank removes any plating or surface irregularities and provides a uniformly flat surface for the tumblers to contact. (Fill in the blanks.)

13. Always shave the top of the key from bow to tip. Why?

Impressioning the Key Blank

This process includes

- creating the marks,
- seeing the marks, and
- filing the marks.

Creating the Marks

Two ways to create the marks are

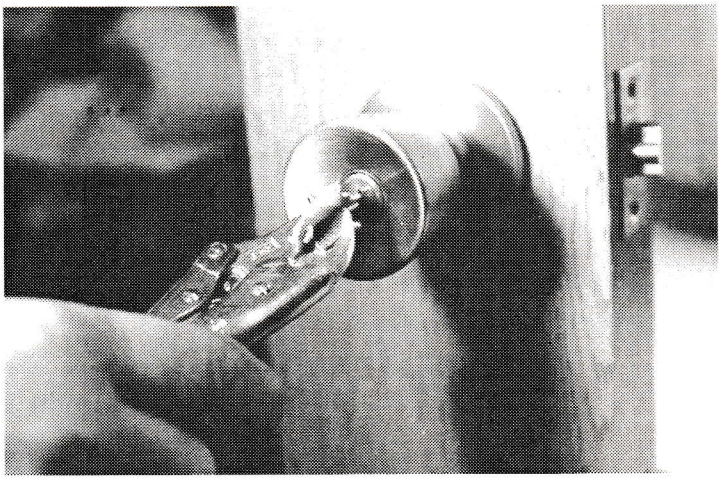
- binding and rocking and
- pulling.

Binding and Rocking

To create the impressioning marks using this method, follow the steps listed below.

1. Insert the prepared key blank all the way into the cylinder.

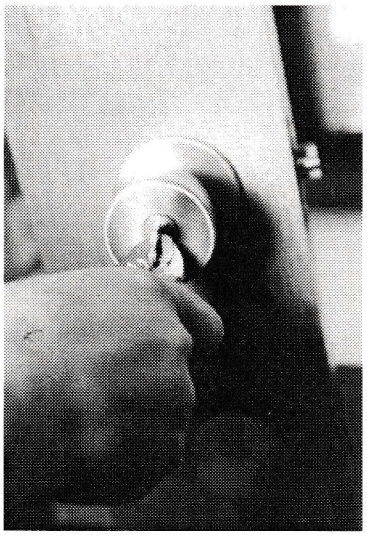
2. Attach the locking pliers to the bow of the key. With the prepared surface of the key blank facing the tumblers, grasp the pliers.



The pliers' handles usually are tilted on an angle slightly down and away from the lock. Make sure the pliers are clamped on tight.

You will have better control and your wrist will tire less quickly if you hold the locking pliers close to the bow of the blank rather than the far end of the pliers.

3. Using your wrist, turn with enough pressure to bind the cylinder but not enough to bend the key. At the same time, gently and purposefully rock or lift the pliers up and down 2 to 4 times.



Because all the tumblers should be above the shear line of the plug, the tumblers will bind against the shell. So it won't turn far.

The amount of turning pressure may vary from lock to lock and lock type to lock type. A pin tumbler lock may need and withstand more pressure than a wafer lock.

It is the rocking action forcing the tumblers onto the prepared surface of the key blank that makes the marks used for impressioning a key. If too little pressure is used, the tumblers will move too easily and not produce marks. If too much pressure is used, the tumblers will be bound and not mark. In the case of wafers, the tumblers may bend or even break.

4. Release the pressure, return the key to center turn, and bind and rock 2 to 4 times in the opposite direction.

Your knowledge of whether the lock operates both directions is a definite plus at this point. For example, you are impressioning a key in a cam lock and the key stops marking when you turn counterclockwise. You know that a cam lock operates both counterclockwise and clockwise. So you try changing directions and work clockwise.

Due to the shape of the keyway, some locks will lose marks or stop marking when impressioning in one direction or the other. If that happens, reverse direction and impression the other way.

5. Remove the key blank and wipe it off.

   You can use a rag, a handkerchief or the leg of your pants. You need to make sure all dirt or contaminants are off the key.

When impressioning with this method, the shoulder of the key stays against the face of the plug. The key moves up and down. This causes the marks left by pins or wafers to remain in about the same spot or place on the key. However, many wafer locks leave marks only on the outside edge of the prepared key surface. When the mark is on the top of the outside edge of the prepared key surface, it shows you where to file. That location is called the **pin seat.**

Pin Seat—The place on a key where the same pin or wafer makes a mark and is filed over and over when impressioning; also the flat on the key where the pin rests

Now let's briefly list the steps for creating the marks when impressioning. As you read, try to recall all the fine points you just read about.

1. Insert the prepared key blank all the way into the cylinder.
2. Attach the locking pliers to the bow of the key. With the prepared surface of the key blank facing the tumblers, grasp the pliers.
3. Using your wrist, turn with enough pressure to bind the cylinder but not enough to bend the key. At the same time, gently and purposefully rock or lift the pliers up and down 2 to 4 times.
4. Release the pressure, return the key to center turn, and bind and rock 2 to 4 times in the opposite direction.
5. Remove the key blank and wipe it off.

Pulling

An alternative to the rocking method of impressioning is pulling. Pulling is just as it sounds. Once the tumblers are bound, pull the key blank out slightly, about 1/16th". This drags the tumblers against the prepared surface of the key blank. The pins or wafers usually mark both sides of the ramp, NOT the bottom of the pin seat.

If a lock does not easily yield marks, using the pulling method in addition to the rocking method may be helpful.

Tips for Creating the Marks

1. Rocking more than 4 times may cause the tumblers of any chamber to rise above the key blank and leave no mark, giving you the idea that no cut is needed in that cell. Depending on the key blank and the lock type, you may find that binding in one direction or another will leave better or more visible marks.

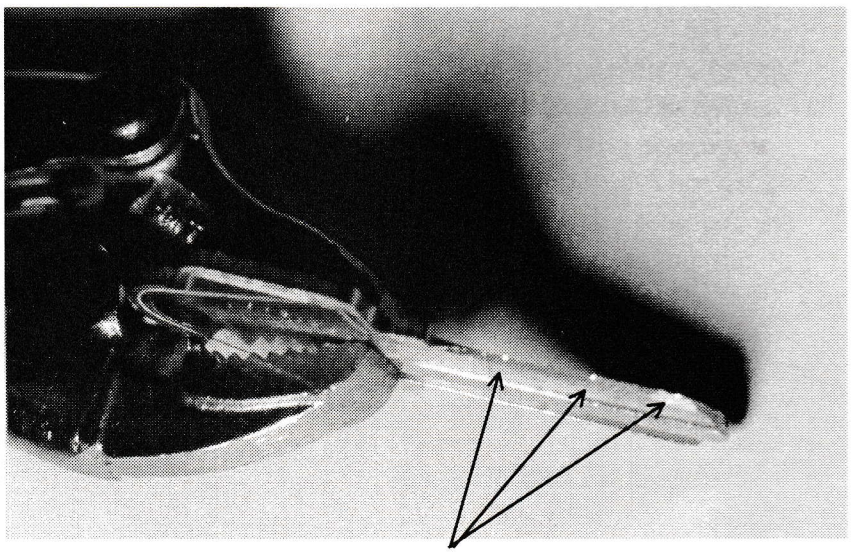
2. Lubrication can make even the easiest lock cylinder extremely difficult to impression. Keeping a can of electronic tuner cleaner or lighter fluid to spray into oily cylinders is a good idea.

Seeing the Marks

Pin Tumblers

Pin tumblers leave a mark that looks like a dot [.] and may be to the left or right of center of the key blank depending on the shape of the keyway and wear in the plug.

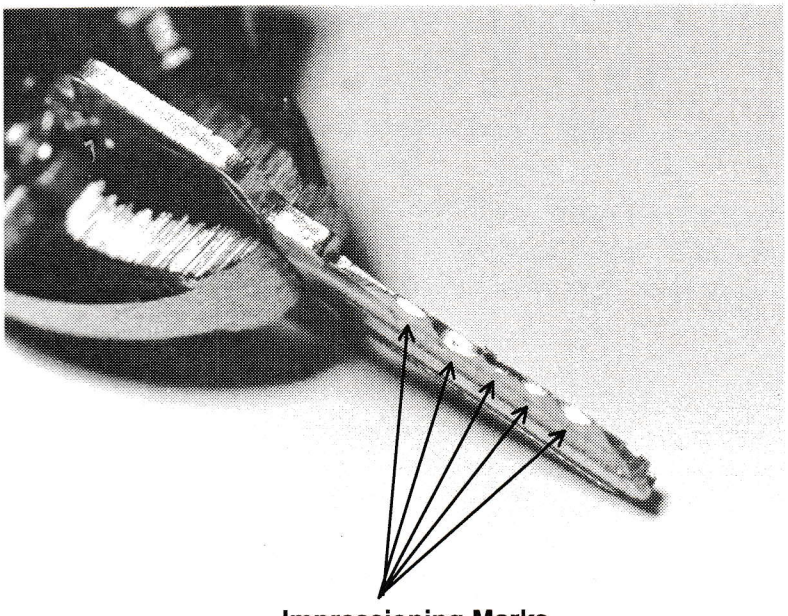
The dot should not move from tip to bow or bow to tip during the course of impressioning a key. If the marks move, you may not be filing the key properly. Be sure to file on the mark every time. Do not let the file wander front or back. Filing on the mark and staying in that spot will create the pin seat.



Impressioning Marks

Wafer Locks

The marks left by wafer locks show up as a line across the key blank. The line may be shorter or longer, depending on how much of the wafer contacted the key blank when the wafer was bound.



Impressioning Marks

Tips for Seeing the Marks

1. The marks left by both pin and wafer type locks most likely won't be deep when you begin impressioning. However, once the key is nearly finished, the pins and wafers are almost at the shear line. If you start seeing deep heavy marks, the key is probably ready to turn the cylinder.
2. Marks usually show up as small reflective spots on the dull surface of the key blank. If at first they don't jump out at you, try angling the key blank. Move it so that you view it at a right angle.
3. If you are working outdoors, try wearing sunglasses or cupping your other hand over the key blank to reduce glare.
4. If your eyesight isn't the best, use a magnifying glass or a magnifying headset. Even with magnifiers, you may need to angle and turn the key blank to see the marks.

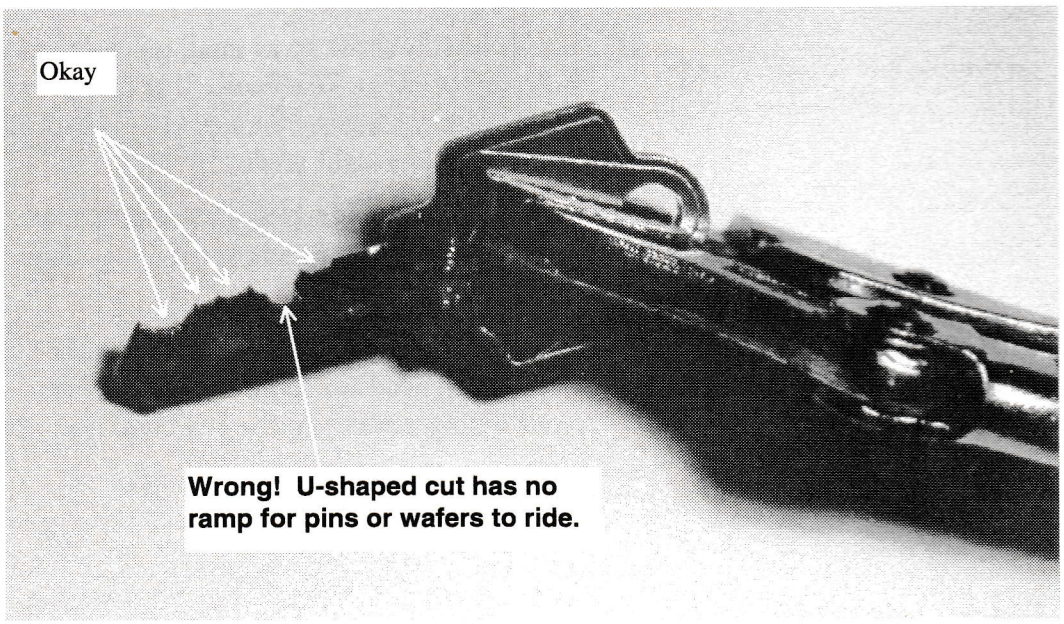
Filing the Marks

If you see what you are certain is a mark or impression, file there. If you don't see a mark, don't file. Don't guess about it. Either you do or you don't see marks. If you don't, go back to work to make a mark.

1. When you are absolutely certain you see a mark, file two or three strokes.
   Stroke away from yourself. File with smooth, straight strokes. Make the strokes long, at least 3/4 of the length of the file. Erratic, short, gouging strokes may be mistaken for marks the next time you mark the key. If you do it right, you will remove only a few thousandths of an inch. The process should go slowly, so that you don't file past the shear line.
2. When you have filed all the visible marks, put the key back in the lock, bind, and rock again. Remove the key and look for marks.
3. Repeat steps 1 and 2 until the key blank turns the cylinder. Some of the marks will become deeper as you approach an operating key.

Tips for Filing the Marks

1. Make sure you file in the shape of a V. Do not make the cut a hook or a U shape. A V shape provides slanted ramps for the pins or wafers to ride. The U shape with its straight sides traps the pins or wafers. You may get the blank into the lock, but probably won't get it back out.



The V shape lets the tumblers ride on the ramps of the V and lets the key blank slide in and out of the lock.

2. However, the bottom of the V needs to be rounded. When filing wafer or small pin tumbler locks, use the top 1/3 of the file to achieve the bottom of the V you are trying to create.

3. On large size tumblers such as rim, mortise, and key-in-knob cylinders, use at least 3/4 of the length of the file at the top of the V. You may need to purposefully file the tops of the V on an angle to increase the width. This is when a pippin file comes in handy—its shape is perfect for V'ing a cut.

4. Sometimes a pin will stop leaving marks just before it reaches the shear line. Then after a few swipes of the file on other cuts, the mark will start again. This is an ordinary occurrence.

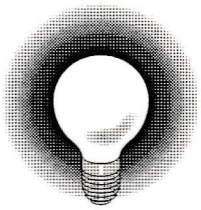
   However, if you hear a distinct clicking noise when you turn and rock the key blank, you have filed too deep. If this happens, you need to take a new blank and start over.

   On the other hand, if the reappearing marks move toward the tip or bow, it is the way you are filing that is causing the marks to disappear and reappear. You are not filing on the center of the proper space.

   If you file too far toward the tip of the key, the marks will move toward the bow. If you file too far toward the bow of the key blank, the marks will move toward the tip.

   Disappearing and reappearing marks can also happen if you are using the pulling method. When impressioning by this method, the pins or wafers ride up and down the ramps. So you are constantly changing the pin or wafer height on the key blank without using the file.

Organize the Main Ideas



This outline will help you organize the information in this section of the lesson. Read through the outline and jot down what you remember about each of the topics listed. If you can't remember details related to one or more of the topics, you may wish to reread the text before you go on.

1. Impressioning the Key Blank
   a. Creating the Marks
      1) Binding and Rocking

      2) Pulling

      3) Tips for Creating the Marks

   b. Seeing the Marks
      1) Pin Tumblers

      2) Wafer Locks

      3) Tips for Seeing the Marks

   c. Filing the Marks

      1) Tips for Filing the Marks

Check Your Knowledge 2

This quiz will help you check what you've learned in this section of the lesson. Read through the questions and jot down your answers. Then check those against the suggested answers at the end of this lesson. If your answers differ greatly from the suggested answers, you may wish to reread the text before you go on.

1. List the 5 steps for creating the marks when impressioning a key blank using the binding and rocking method.

2. The place on a key where the same pin or wafer makes a mark and is filed over and over when impressioning is called the _____ _____. (Fill in the blanks.)

3. _____ _____ leave a mark that looks like a dot while the marks left by _____ _____ show up as a line across the key blank. (Fill in the blanks.)

4. List the 3 steps for filing the marks.

5. Explain why it is important to file a V shape and not a U shape when filing the marks.

Tips for Experienced Locksmith Impressioners

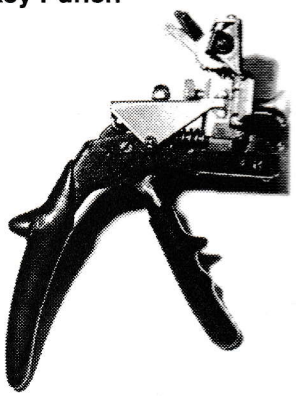
Once you are skilled at using the impressioning techniques shown in this lesson, some of the following tips may interest you.

Using Code Machines and Key Punches

Key Punch—A manually operated device which stamps or punches the cuts into the key blank rather than grinding or milling it

You can use code machines or **key punches** to your advantage for impressioning. By pre-cutting all 0's or 1's on a prepared blank, you can ensure spacing and eliminate the first depth you could possibly encounter.

Key Punch

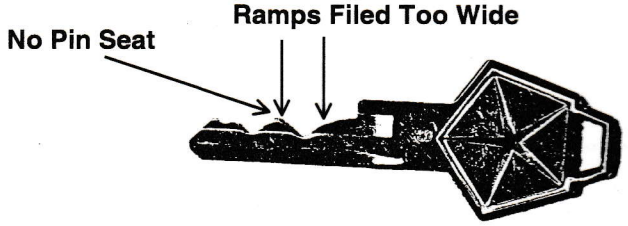


When you see a mark on one of the spaces, you can cut or clip the next depth, and so on until the key turns. This procedure may not work well for heavily worn locks that may be between cuts. It may not work well for locks that have been repinned to non-**OEM specifications** either.

OEM Specifications—The specifications that the Original Equipment Manufacturer writes for the product

Saving Your Work

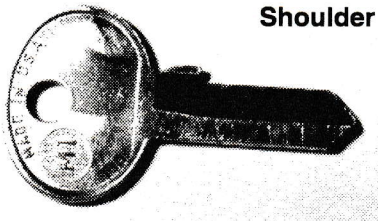
If a key you are making and still getting good marks on starts to crack or break, you should stop and duplicate what you have. Then proceed with the new key blank. You can fan out U-shapes with your file. But be careful not to file the pin or wafer seat of the adjoining cut off.



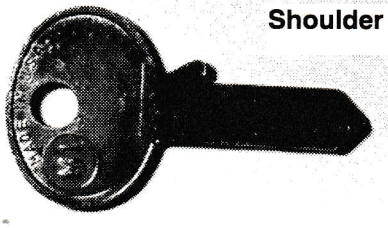
Pin Seat Destroyed by Too Large Ramps on Adjacent Cuts

Impressioning Master Padlocks

When impressioning Master Padlocks, use a flat file to lower the shoulder of a Master Padlock Key Blank. Doing this allows more room for the key to rock, speeding up the impressioning process.



Shoulder Height Lowered



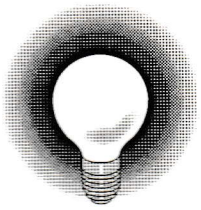
Shoulder Height Not Lowered

With experience and patience, you'll soon be able to impression most any lock.

Get a good working knowledge of how different lock cylinders operate.

When you impression, you are using the manufacturer's tolerances for your key making. As you know from Lesson 9: Professional Opening Techniques, no cylinder is drilled exactly so that all pins or wafers bind at exactly the same time. It is those tolerances you are exploiting when you make a key by impressioning.

Organize the Main Ideas



This outline will help you organize the information in this section of the lesson. Read through the outline and jot down what you remember about each of the topics listed. If you can't remember details related to one or more of the topics, you may wish to reread the text before you go on.

1. Tips for Experienced Locksmith Impressioners
   a. Using Code Machines and Key Punches

   b. Saving Your Work

   c. Impressioning Master Padlocks

Check Your Knowledge 3

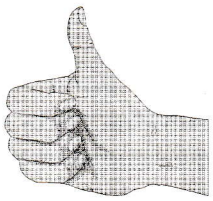
This quiz will help you check what you've learned in this section of the lesson. Read through the questions and jot down your answers. Then check those against the suggested answers at the end of this lesson. If your answers differ greatly from the suggested answers, you may wish to reread the text before you go on.

1. When impressioning a key blank, how can you ensure spacing and eliminate the first depth you could possibly encounter?

2. Using a _____ _____ to cut or clip a mark to the next depth until the key turns may not work well for heavily worn locks that may be between cuts. (Fill in the blanks.)

3. What should you do if a key you are making and still getting good marks on starts to crack or break?

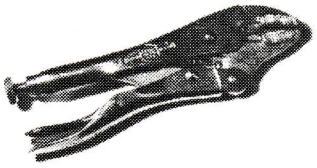
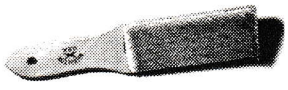
4. Why should you use a flat file to lower the shoulder of a Master Padlock Key Blank when impressioning Master Padlocks?



Now You Can Do It!

You've reached the end of the lesson, but what have you learned? Let's find out. First complete the exercise below using only your memory. Next go back to the text to complete and/or check your answers.

1. Identify tools used for impressioning and describe their functions. (Fill in the table below.)

Tool	Name	Use
		
		
		
		
		
		
		

2. Describe the different types of single-sided and double-sided cylinders. (Fill in the table below.)

	Single-Sided Cylinder	Double-Sided Cylinder
Key Inserts Only One Side Up	•	•
	•	•
	•	•
	•	•
Key Inserts Either Side Up	•	•
	•	•
	•	•
	•	•

3. Explain knifing the edge and shaving the top of a key blank. (How do you do each and why?)

4. List the 5 steps for creating the marks when impressioning a key blank using the binding and rocking method.

5. Describe the difference between the marks left by pin tumblers and those left by wafers.

6. List the 3 steps for filing the marks.

7. Explain some tips for experienced locksmith impressioners.

Using Code Machines and Key Punches

Saving Your Work

Impressioning Master Padlocks

Stop for Review

To answer the following questions, circle the letter next to the correct response. Only one correct response is provided for each question.

1. You use a _____ to prepare the blank key for impressioning.
   a. 6" round cut file
   b. flat file
   c. key punch
   d. locking pliers
2. You use an impressioning file to _____.
   a. prepare the blank key for impressioning
   b. grip the key bow
   c. cut the marks left on the key blank during the impressioning process
   d. create the impressioning marks
3. The most common impressioning files are the pippin file and the _____ file.
   a. 6" round cut file
   b. flat file
   c. key punch
   d. locking pliers
4. You use _____ to grip the key bow, giving you the leverage you need to bind the tumblers and rock the key blank in the cylinder plug.
   a. 6" round cut file
   b. flat file
   c. key punch
   d. locking pliers
5. A _____ lets you control the file better and makes the work easier on your hands.
   a. key punch
   b. handle
   c. locking pliers
   d. file card
6. A _____ helps you improve the quality of the key blank surface so you can better see the impressioning marks.
   a. key punch
   b. handle
   c. locking pliers
   d. file card
7. A triangle file is mainly used for _____.
   a. filing corners and edges that are critical
   b. gripping the key bow
   c. cutting the marks left on the key blank during the impressioning process
   d. creating the impressioning marks

8. When the pins or wafers are on one side of the lock only, the key is cut the same on both sides, and the key operates the cylinder either side up, which means the key does not have to be cut on both sides to operate, you have a _____.
   a. a double-sided cylinder where the key inserts only one side up
   b. a single-sided cylinder where the key inserts either side up
   c. single-sided cylinder where the key inserts only one side up
   d. a double-sided cylinder where the key inserts either side up
9. When the pins or wafers are on one side of the lock only, the key inserts only one way, the cuts are on one side of the key only, and the key is cut on one side only you have a _____.
   a. a double-sided cylinder where the key inserts only one side up
   b. a single-sided cylinder where the key inserts either side up
   c. single-sided cylinder where the key inserts only one side up
   d. a double-sided cylinder where the key inserts either side up
10. When the pins or wafers are on both sides of the lock, the key goes in either side up because it is cut the same on both sides, and both sides must be cut to operate the cylinder, you have a _____.
    a. a double-sided cylinder where the key inserts only one side up
    b. a single-sided cylinder where the key inserts either side up
    c. single-sided cylinder where the key inserts only one side up
    d. a double-sided cylinder where the key inserts either side up
11. When the pins or wafers are on both sides of the lock, the key inserts only one way, and the cuts are different on each side of the key, which means both sides must be cut to operate the cylinder, you have _____.
    a. a double-sided cylinder where the key inserts only one side up
    b. a single-sided cylinder where the key inserts either side up
    c. single-sided cylinder where the key inserts only one side up
    d. a double-sided cylinder where the key inserts either side up
12. _____ makes the key thinner at the point of tumbler contact, allowing visible marks to be made more easily.
    a. Shaving the top of a key blank
    b. Filing the impressioning marks on a blank
    c. Knifing the edge of a key blank
    d. Using a flat file to lower the shoulder of a key blank
13. _____ removes any plating or surface irregularities and provides a uniformly flat surface for the tumblers to contact.
    a. Shaving the top of a key blank
    b. Filing the impressioning marks on a blank
    c. Knifing the edge of a key blank
    d. Using a flat file to lower the shoulder of a key blank

14. _____ is NOT a step in the 5-step procedure for creating the marks when impressioning a key blank.
    a. Using your wrist, turn with enough pressure to bind the cylinder but not enough to bend the key
    b. When you are absolutely certain you see a mark, file two or three strokes
    c. Insert the prepared key blank all the way into the cylinder
    d. Release the pressure, return the key to center turn, and bind and rock 2 to 4 times
15. When you impression a key blank in a pin tumbler cylinder, the marks left look _____.
    a. like lines across the key blank
    b. U shaped
    c. V shaped with a small U in the bottom of the V
    d. like dots
16. When you impression a key blank in a wafer lock, the marks left look _____.
    a. like lines across the key blank
    b. U shaped
    c. V shaped with a small U in the bottom of the V
    d. like dots
17. _____ is NOT one of the steps in the 3-step procedure for filing the marks.
    a. When you have filed all the visible marks, put the key back in the lock, bind, and rock again. Remove the key and look for marks
    b. Repeat steps 1 and 2 until the key blanks turns the cylinder. Some of the marks will become deeper as you approach an operating key
    c. Attach the locking pliers to the bow of the key. With the prepared surface of the key blank facing the tumblers, grasp the pliers
    d. When you are absolutely certain you see a mark, file two or three strokes
18. _____, you can ensure spacing and eliminate the first depth you could possibly encounter.
    a. By fanning out U shapes with your file
    b. By filing the pin or wafer seat of the adjoining cut off
    c. By pre-cutting all 0's or 1's on a prepared blank
    d. By using a flat file to lower the shoulder of the key blank
19. Cutting or clipping the next depth when you see a mark on one of the spaces _____.
    a. works well for heavily worn locks that may be between cuts
    b. ensures spacing
    c. eliminates the first possible depth you would possibly encounter
    d. may not work well for locks that have been repinned to non-OEM specifications
20. Using a flat file to lower the shoulder of a Master Padlock Key Blank _____.
    a. allows more room for the key to rock, speeding up the impressioning process
    b. ensures spacing
    c. eliminates the first possible depth you would possibly encounter
    d. works well for heavily worn locks that may be between cuts