

Jake Jakubowski presents:

A Refresher Course of Basic Locksmithing

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Kwikset Tylo Key-in-knob



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Introduction

**Why a "basic"
refresher
course for
experienced
locksmiths?**

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Because:

**No matter how good
we are, or think we are,
if we lose sight of the
basics...**

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**We can
(and
do)
make
mis-
takes!**



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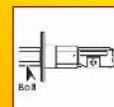


**By forgetting the
basics, we might
wind up calling a
latch a bolt, or a
bolt a latch.**



Dead Latch

Dead Bolt



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We might not remember what the proper name of ... the doohickey that causes the thingamajig to turn the whatizt that secures the whirleygig that winds up the moon!

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*Okay...
so I'm having a little fun with you ...
but you get the idea, right?*

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If we lose sight of the basics, we might develop bad habits, and terminology that are not conducive to good locksmithing.

"So, what?" you ask



This is what: we might pass those undesirable traits and poor nomenclature on to our employees, apprentices and customers!

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There are some jobs where a worker can repeat their first day's until they retire!

Locksmithing is not one of those jobs!

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If we remain 'static' in our careers, that means we do not progress ...

Yet, we cannot progress unless we have, and maintain a thorough grasp of the basics of our trade.

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*That's true whether:
You're a one person mobile business.*

An employee for a large commercial shop.

Or, an institutional, or "in-house" locksmith.

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Basics are important because:

“Any technology that is sufficiently advanced is Black Magic to the uninitiated” ...Anonymous

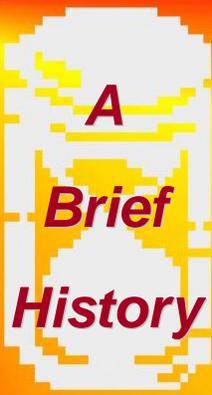
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What is A Lock?

“Any device which prevents access or use by requiring special knowledge or equipment .”

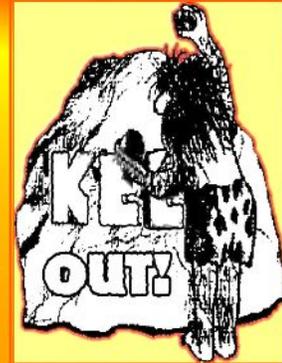
–The List Council

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Mankind's first attempts at security may very well have been a large rock rolled in front of a cave's entrance.

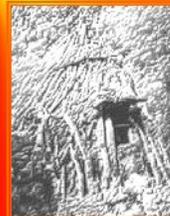


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Or, maybe our forebears sought shelter under a rocky overhang and piled brush in front of it as protection from the weather and intruders...

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From sticks and mud and animal skins...

...to stones piled one, on top, the other .



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Our ancestors built more and more complicated shelters to protect them, their families and their belongings from predators, mothers-in-law and things that go bump in the night.

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Until they finally began building temples, palaces, homes and government buildings that actually had “real” doors on them that required “locks” to secure them.

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In the ruins of the ancient Temple of Karnak, in the Palace of Sargon



the oldest lock, known to man, was discovered in the 1800's.

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The “Egyptian Lock” was about 4,000 years old. Even today, there are similar locks in use in the Faroe Islands.



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In fact, wooden locks working on the same principle as the Egyptian Lock and the Faro Island lock have been found around the world.

The lock in the following slide is a recreation of a type lock used in North Carolina up until the early 20th century.

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Wooden pins

Bolt

Wooden Key

My son made this lock after watching a UNC-PBS program about wooden locks in North Carolina.

These locks were used until the early 1900's

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The lock in the previous slide is locked. To unlock it, the key was inserted, lifted to raise the pins and the bolt retracted.

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A rock covering a hole in the ground may have been an example of an early safety deposit box!

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NOTE:



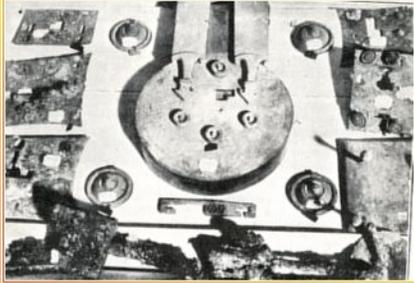
Some scholars think that the Chinese may have "invented" the lock a thousand years before the Egyptian lock was made.

The earliest Chinese locks were simply ropes (see above) binding the valuables together. Early non functioning Chinese locks were known as "Scare" locks. Which depended on the ferocity of the carving to 'scare' away thieves.



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The Romans invented the iron ward-ed lock. These found in Pompeii.



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The Romans and the Chinese are credited with the simultaneous invention of the padlock.

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**A Roman
"Face Lock"
Padlock**

**A Roman
"Barbed
Spring"
Padlock**

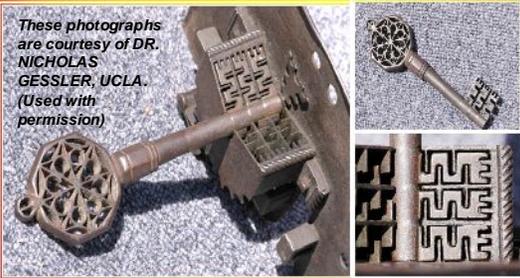


**An example of a Chinese "Spring"
Padlock from the Han Dynasty (206
BC to 220 AD). Note the similarities
between it and the Roman Barbed
Spring Padlock.**

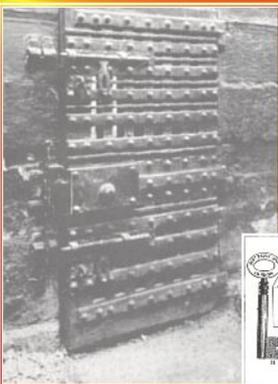


**For a thousand years or more, complicated "warding"
was the security preference of lock makers. Here is a
prime example of a "secure" 15th or 16th century warded
lock. Great workmanship but little security.**

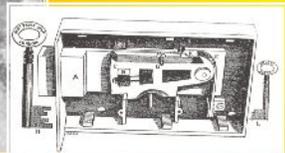
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NICHOLAS
GESSLER, UCLA.
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permission)**



The "Fathers" of The Modern Lock



**In 1780, a Clerkswell
locksmith named Gabriel
Vardon, was supposed
to have developed the
predecessor of this
Chubb Lever Lock
shown on a door to "Old
Newgate Prison".**



**1778: Robert Barron invents
his "Double Acting Tumbler
Lock."**

**1784: Joseph Bramah
patented his "Safety Lock" in
London.**

**1848: Linus Yale, Sr. "in-
vents" the Pin Tumbler Lock.**

1857: James Sargent invents the world's first key-changeable combination lock.
1861: Linus Yale, Jr. develops pin tumbler lock and , and later, the paracentric keyway.
1862: Linus Yale, Jr. invents the first "modern" padlock.

1889: Samuel Redsecker Slaymaker begins manufacturing padlocks in "Arch's Alley". In the early 20's he sold F. W. Woolworth on the idea of putting Slaymaker locks in his first store in Lancaster, PA.

1916: Samuel Segal invented his "Jimmy Proof Lock."

1921: Harry Soref founded the Master Lock Company. His "layered" padlock was patented in 1924.

**Any
Questions?**

**Types
of
Locks**

Locks are like flowers ... there is, seemingly, an endless variety.

Mortise, Rim, Key-in-Knob, Cam, Padlocks, Combination Locks, Mechanical and Electro-mechanical, Magnetic, Digital, Keyed, Passage function, Privacy, Levers and more.....



Mortise locks come in all shapes and sizes. Some are electrified ... some are not. All have one thing in common ... regardless of their application and that is they require a "full mortise prep on the door to accommodate the lock.

This is a very common style of mortise lock and was almost universal in its usage. This type of mortise lock can still be found and are available from a number of suppliers.

The mechanism (or "innards") is typical of this type of lock. A spring latch to open and close the door and a "bolt" to lock the door.

The key through the bolt. The latch remained "free".

This mortise lock with a barrel key is typically found in furniture and cabinet applications.

This Sargent 9800 series mortise lock is easily field "handed". That is, with a quick "flip" of the latch bolt the lock can be RH or LH.

A Schlage Electrified Mortise Lock.

A Securatec Full Mortise Lock with Multi-point locking. A three point locking system.



A Sargent 9900 series full mortise with panic exit hardware.

This is a full mortise Multi-Lock with out side escutcheon and knob trim. Multi-Lock is considered a high security lock.



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A Medeco full Mortise Lock with elegant trim of residential or up scale commercial use.



Brawn and beauty!

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Deadlocking Hook Bolt

Dead Bolt

Here's a type of mortise lock that we are all familiar with ...

The "MS" series deadbolt, developed by Adams-Rite

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Throughout your career you will be called upon to repair and service the mortise lock itself. Most often, you are going to be called upon to "rekey" the mortise cylinder on that lock.

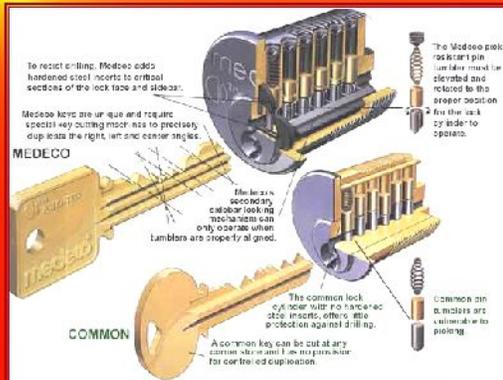
Mortise cylinders are the cylinders that screw into the lock body and by means of a key to turn the plug and a "tailpiece" on the back of the plug will either lock or unlock the mortise lock.

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In the next slide, I'm going to compare a high security (Medeco) mortise cylinder with a "regular" mortise cylinder.

In other slides, I will show you various mortise cylinders. High security and otherwise.

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The most common lengths for mortise cylinders is 1" and 1-1/8". There are other sizes available, if and, when needed.

Mortise cylinders are available in all the popular finishes.

Mortise cylinders are available as non-restricted and restricted and high security models.

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Although this is a Sargent mortise cylinder, typically most mortise cylinders are similarly constructed.

ITEM	ORDERING NUMBER	DESCRIPTION	COMMENT
1	22-214	KEY B-424	REAR INSERT ONLY
2	12-240	KEY	
3	12-235	KEY PLUG KEY PLUG KEY PLUG	1. DETACH FROM FRONT BEZEL REASSEMBLED
4	12-236	KEY	REPAIR LOCK PLUG
5	21-121	KEY	
6	12-237	BOTTOM PIN	SEE TABLE BELOW FOR PINNING
7	12-238	WASHER PIN	SEE TABLE BELOW FOR PINNING
8	12-239	TOP PIN	SEE TABLE BELOW FOR PINNING
9	12-240	COMPRESSION SPRING	

Courtesy: Sargent Locks

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Before trying to repin a lock, make sure you have a good set of followers and a good pair of tweezers.

LAB makes both and I highly recommend them. These great tools are available through your favorite distributor...

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1. Remove Screws and Tailpiece

2. Insert Key and turn plug about 15 degrees

3. Insert plug follower and gently slide follower into cylinder and remove plug and key at the same time.

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Always use tweezers when loading a plug!

Why?

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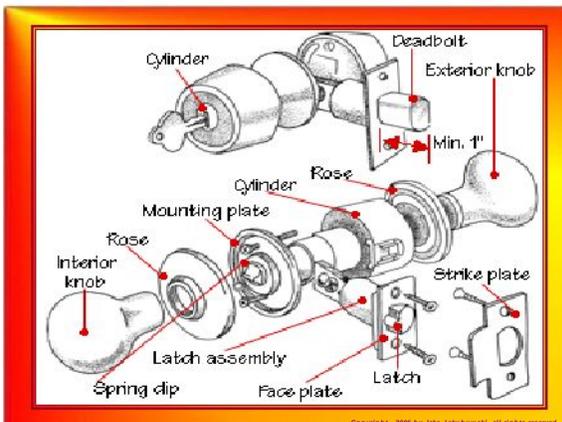
Cylindrical Locks

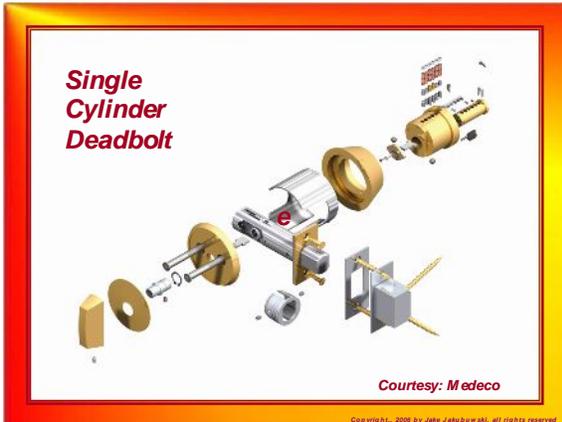
Cylindrical (161 Prep) locks are any type of lock that fit in a circular prep (as opposed to a mortise) in the door. These locks are sometimes called “Bored Locks”.

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The following chart will help you identify the most common parts of a cylindrical lock.

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For the most part, cylindrical hardware is non-handed. Variations from some manufacturers are handed locks. The chart in the next slide will help you to determine the hand of a door.

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Cross Bore

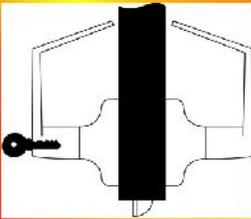
The diameter of the hole for the lock body. The standard bore is 2-1/8 inches. Many older doors had bores that could have been smaller. Most of the current locks require the standard 2-1/8 inch bore. When replacing locks on doors that have smaller diameter holes there are two options. Either re-cut the cross bore or find a lock company (Weiser/Schlage/National) that might still make locks for that smaller cross bore.

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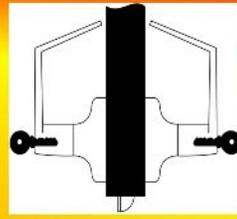
Lock Functions

The following slides will give show you the various lock functions.

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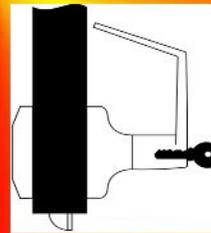


CLASSROOM: Locks and unlocks only with a key from the outside

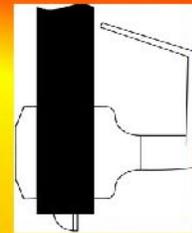


COMMUNICATING OR INSTITUTIONAL: Always locked needs key to unlock from either side.

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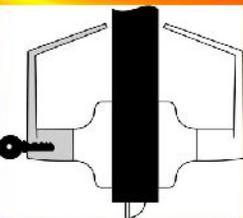


COMMUNICATING: Always locked with blank on one side, key on other.

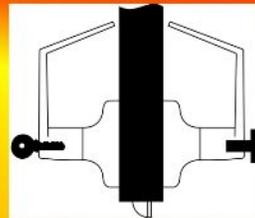


EXIT FUNCTION ONLY: Never locked on inside. Blank plate on outside.

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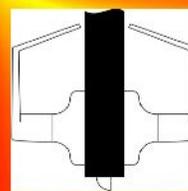


STOREROOM FUNCTION: Outside always locked. Inside always free. Need key for entry.

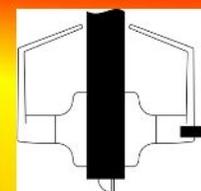


ENTRANCE FUNCTION: Key can lock and unlock from outside. Inside always free but button can lock outside.

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PASSAGE FUNCTION: Both sides always free.



PATIO FUNCTION: Outside locked and unlocked by inside button.

NOTE: If the Patio Function lock had a "poke hole" for outside unlocking, it would be a Privacy Lock.

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Edge Bore

The diameter of the hole for the latch or deadbolt and is the hole that is cut from the edge of the door to the cross bore. Generally speaking; this hole is 1" in diameter.

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Backset

The distance from the edge of the door to the center of the lock bore. Two standard back-sets are 2-3/8 and 2-3/4 inches other back sets (including 2-inch) used by National and Lori Lock and 5 inch used by Weiser, Weslock, Kwikset and others are also available. There are also extensions for some brands like Schlage, that can extend the latch enough to have the lock located in the center of the door. When replacing locks the latch backset needs to match the holes bored in the door.

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Lock Spacing

The distance between two locks. When preping for deadbolt locks in a door, there are two standards for spacing between the bottom lock and the deadbolt. The two most common are 5-1/2 and 6 inches from the center of the two holes. There are other combinations of spacing which are used on specialty locks, however: when adding a deadbolt lock your best choice would be some thing standard.

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Note:

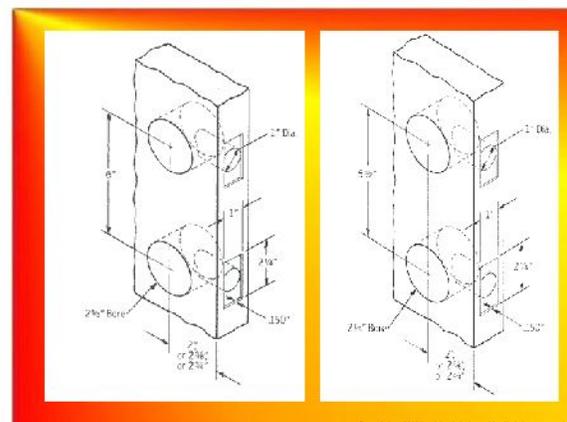
The majority of residential locksets will have a back set of 2-3/8". Less commonly, you will find 2" or 3" back sets.

For the most part commercian and industrial locksets will have a back set of 2-3/4" with occasional variations.

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The most common DOOR thickness will be 1-3/4". Variations will be found depending on age and application.

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Removing plug from housing

Cylinder Plug
Old pins at shear line
Plug Follower

Regardless of the type of cylinder, a properly used plug follower is a must!

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Basic Rekeying

Which is changing the combination of the pins and the bittings of the keys to render the old lock immune from an unauthorized entry by an ex-employee of some one else that has a key.

When the cylinder is rekeyed, the old key will no longer work and new keys have to be issued to the authorized keyholders.

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Disassembly and latch removal. Note that the latch has to be depressed to get the assembly over the spindle.

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Align Tab with slot, insert tool to depress retainer and remove spindle

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#1
#2
#3

Three tools for removing the cylinder of a KW Tylo from the knob housing.

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Using the Kwikset tool to eject the cylinder housing.

Pop!

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The RYTAN tool will make short work of KW cylinder removal!

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A-1's QuikPull 1 Great Tool!

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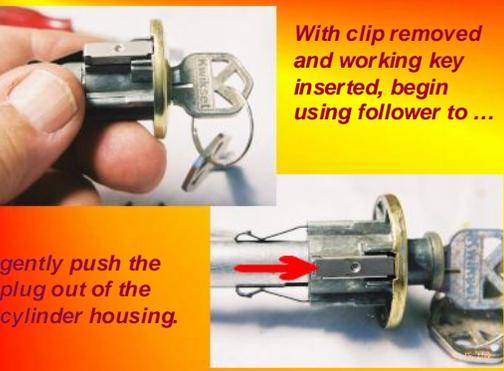


Cylinder Removed from Housing

Use Kwikset tool to push our plug retainer clip.

Arrow – to the right -- points to loosened clip.

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With clip removed and working key inserted, begin using follower to ...

gently push the plug out of the cylinder housing.

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Rekey as indicated. Check key in plug.

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Carefully feed plug into cylinder.

After plug is in cylinder, remove key, being sure not to pull the plug out of the cylinder

Replace clip

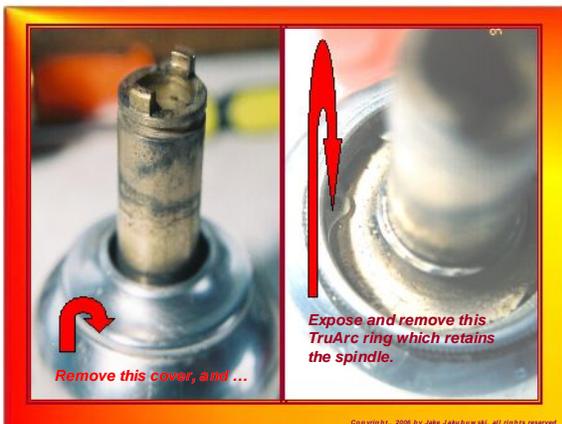
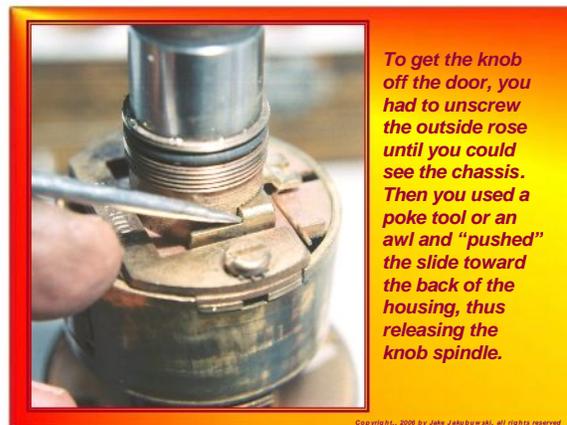
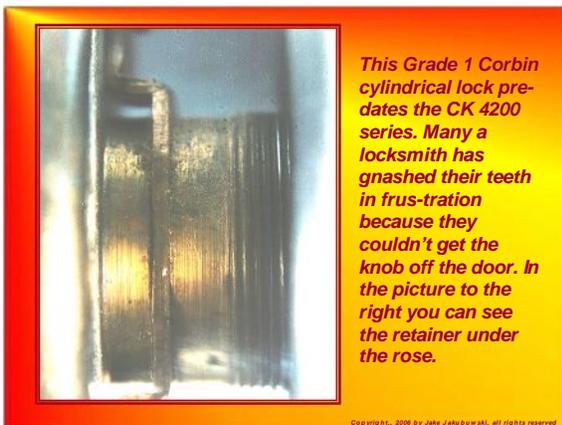
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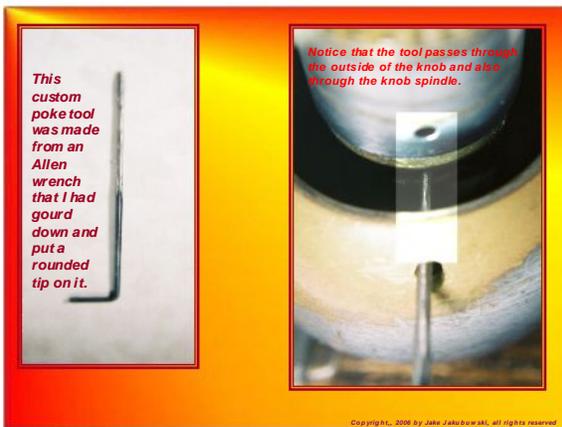
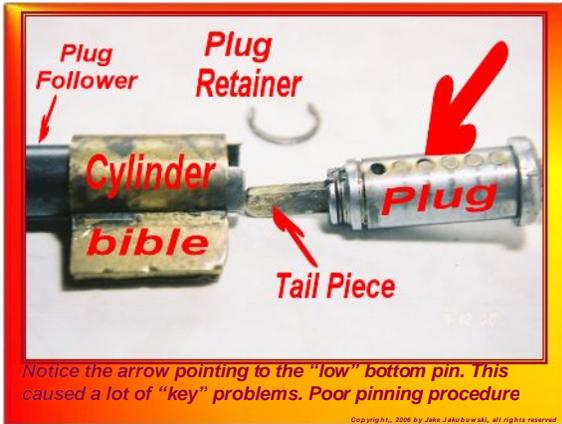


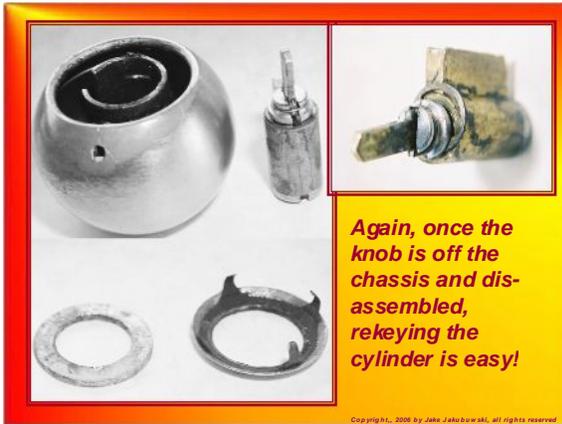
Have you ever had a Corbin/Russwin that you could just not figure how to get it off of the door?

Well, here's three different Corbins you will encounter in your travels!

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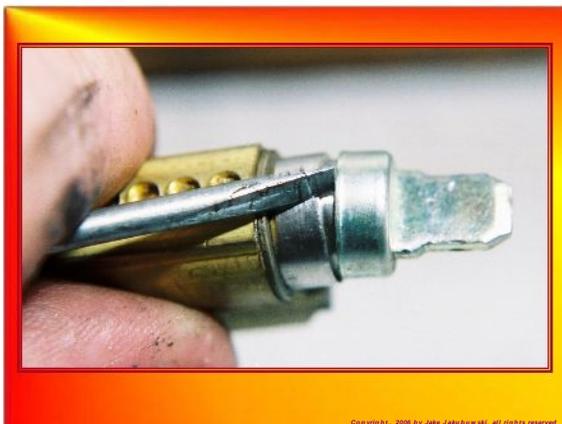






**Reassemble
and
replace on door**

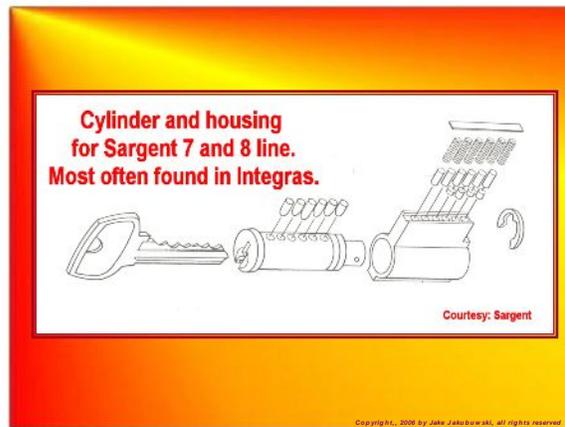
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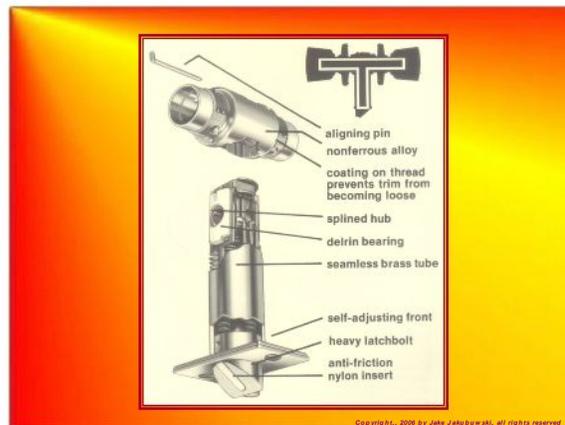


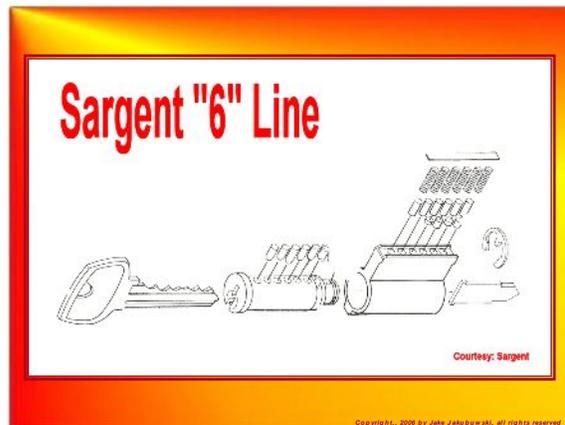


**How
About
Some
Sargent?**

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A little something about Keys

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Aside from knowing how to rekey a lock, being able to identify keys and keyways is one of the skills you need to work on and practice.



Skeleton Keys



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Detention Key



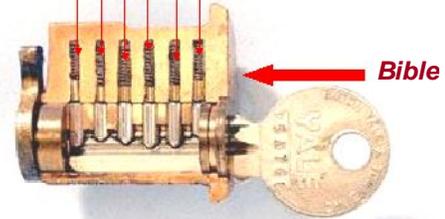
Tubular Keys



We also need a grasp of why keys work and how they work...

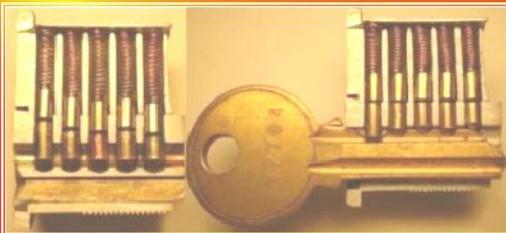
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Chambers inside of Bible



Shows pins aligned with the Shear Line. That alignment is what allows the plug to turn when the key is rotated.

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The cylinder to the left has an improper key inserted. Pins cross the shear line. Cylinder on the right, has the proper key inserted: Pins align at shear line.

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This is not the end, but the beginning. There are dozens of locks, locking mechanisms, key cutting machinery and a hundred other things that I did not cover here because of the time constraints. That's all grist for other mills.

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