THE COMPLETE LOCK PICKING GUIDE

Editor — Chris Dangerfield @ LockPickWorld.com

My name is Solomon, and I am a pickaholic. Actually, my name is Mike. Solomon is the handle I use on various forums dedicated to picking. And this is my guide to picking pin tumbler locks. The most comprehensive one you're likely to find, I might add. I've put together everything a newbie could possibly want to know, all in more detail you could ever ask for.

This isn't just another "How to Pick a Lock" thing. This is an over-the-top detailed account of everything I've learned over a period of 2 years obsessively picking locks. In that time I've spent an hour on average picking, every day, whether it be a pile of new locks or the same old I've picked 100 times before.

So grab yourself a coffee and start learning.

I'm writing this because there are a lot of people out there with 30 different books on picking, who can't open or still rely mostly on luck. It's not that books don't explain things properly, cos they do, and with enough practice that's genuinely all you need. But I was new once, and I know what it's like to want more and more information ore detail. And that's something that all the other out there is sorely lacking .

Everyone develops their own technique, but you have to start somewhere, and besides the theory there isn't much out there on specific technique. I for one would've loved this back in the day, so here it is. Detail overkill. If you wanna learn how to pick locks, and this isn't detailed enough for you, then watch our videos.

As well as the really meaty stuff, I'll be covering a bunch of common topics/questions which I've noticed crop up on the forums a lot, so pretty much anything you'd wanna know as a newbie will be covered here.

DISCLAIMER

Now for the serious bit. This is all straight out of my own head, and from my own personal experience picking literally hundreds of different locks. Nothing is copied and pasted, and there's no stupid nonsense I just assumed was right and decided to write down, it's all cold hard fact. I don't have any paper credentials whatsoever, I'm not a locksmith or an engineer. But you don't need to be. Just be thankful I'm not some kid who watched a guy pick a deadbolt with a paperclip on youtube and thought it was awesome so I'd write my own tutorial.

It's taken me a couple of hours each evening for just over a week to get everything written down the way I want it, and all the pictures/diagrams are my own as well so I'd appreciate it if you didn't steal the thing and put your own name on it. I didn't bother putting little copyright things on any of the pics cos it's not copyright and that'd be stupid. I'm not gonna be an internet tough guy and make threats, just don't do it... if you wanna share, just link it and give credit where it's due. I really don't care as long as you're not making anything off it.

I've done my best here to make this worth your time instead of re-wording the basic theory and technique like every- one else seems to. As far as the principles go, I pretty much had to even at that, I've put a lot of time into explaining everything in as detailed and clear a manner as possible.

Edit from Chris:
We have kept the majority of this document intact, improved the language and expanded on a few newly available resources:

Some aspects of lockpicking are more easily learned from video guides on our website; we touch on a broad range of lock types, but understanding the theory and repeated practice are super important as with any skill you pick up.

Have fun learning about locks and lock picking. I find that personally, it relaxes me, improves my ability to visualise problems in my head, and helps to develops finger dexterity. Gifting a set of picks and lock to friends is uniquely unusual and fun. Enjoy!

PART 1

HOW A PIN TUMBLER LOCK WORKS

The first step to learning how to pick a lock is to understand how it works, and why the components can be exploited in the first place. This is something a lot of people don't really take the time to understand properly, because they ther don't think it's necessary, or they can't be bothered. I can't stress this enough, pay attention to this section above all else and make sure you understand everything 100% before you even think about sticking those picks anywhere.

SECTION A: THE MECHANISM ITSELF

The basic pin tumbler lock is pretty simple. I'm not go go into their history or any of the other stuff people like to throw in for filler, let's just stick to the facts. Before we begin, please note that technical diagrams are not to scale. All diagrams and descriptions are for rim or mortise type cylinders which have pins at the top of the keyway. Euro profile cylinders, which typically have pins at the bottom of the keyway, are the same mechanism just in different format. They're picked in the exact same way, but to avoid confusion we'll just focus on the one format.

With that out of the way, a pin tumbler lock consists of some basic main parts which you'll see in the diagram below. The pins are at rest, i e. their normal position when no key is inserted:

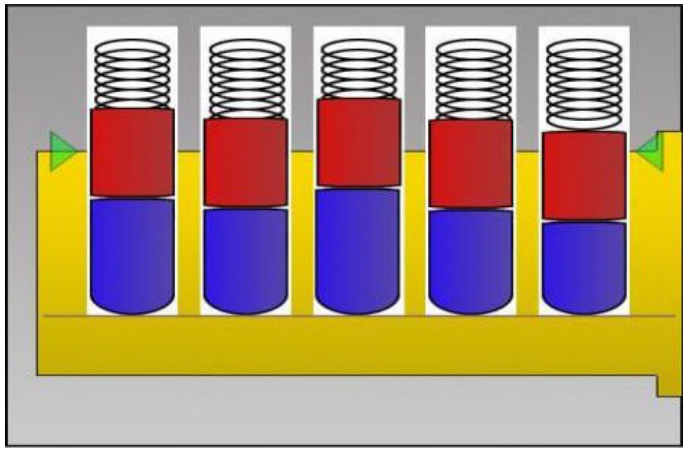


Fig. 1: Cylinder at rest.

The components you can see are:

1. **Shell** (*grey*) — the main body of the lock, in which the plug sits.
2. **Plug** (*yellow*) — this is where the key goes. There is a cam or tailpiece attached to the back of the plug which, when rotated, is what actually throws the bolt or retracts the latch and opens the lock. The point where the plug and shell separate is called the shear line, and is indicated by a pair of green arrows.
3. **Pin chambers** (*white*) — The series of chambers which are drilled through the shell and into the plug, which is where the pins live. Not a component as such, but the relation between the pins and their respective chambers is very important.
4. **Key pins** (*blue*) — the pins which come into contact with the key. These are all different lengths and always sit inside the plug, below the shear line. Their lengths correspond to the cuts on the key. The deeper the cut, the longer the key pin and the less it needs to be lifted in order to shear.
5. **Driver pins** (*red*) — The pins which, in the locked position, block the shear line and prevent the plug from turning. Typically these are all identical in length, although higher quality locks generally contain different lengths of drivers. This isn't random, they're longer or shorter depending on the length of their corresponding key pin. The purpose of which is to make the pin stacks equal lengths, in order to prevent decoding/overlifting attacks. Balanced drivers have no effect on picking.
6. **Springs** (*black*) — to keep everything from rattling around like a skeleton interfering with itself.

SECTION B: HOW THE KEY WORKS

When we insert the correct key, the pin stacks will be lifted to their correct heights. The split between the key pins and drivers rests exactly at the shear line, and the plug is free to rotate. Please excuse the absence of a key in the following pictures, the diagrams aren't to scale and it was hard to draw a key without it looking rubbish.

So here is the correct key:

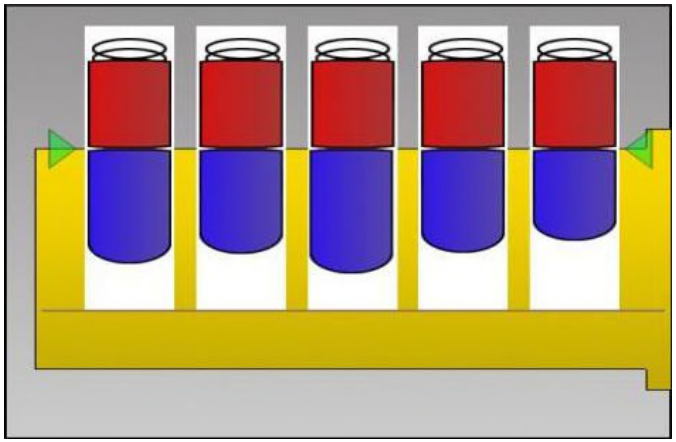


Fig. 2: Correct key inserted.

And here's an example of an incorrect key. As you can see, the shear line is still blocked because the pin stacks are misaligned:

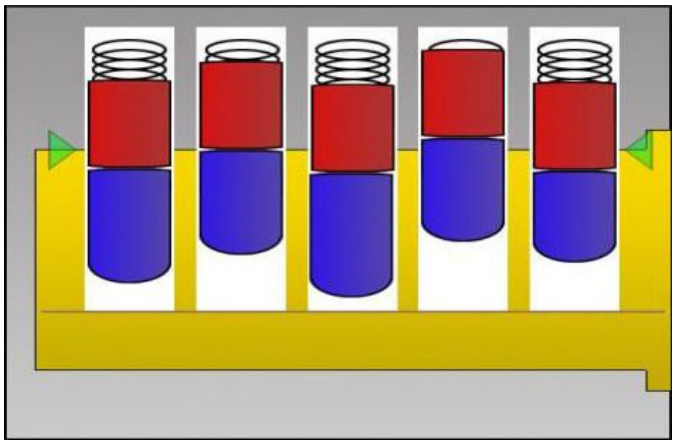


Fig. 3: Incorrect key inserted.

Even if only one pin is partially blocking the shear line, it's enough to stop the plug from turning. So how does picking work? Well, it all boils down to machining tolerances. Read on...

SECTION C: TOLERANCES AND THE BINDING DEFECT

As you know, the key aligns all the pin stacks to their correct heights simultaneously. You'd think that without the key, this just can't be done and you'd be right. While possible, the chances of doing so would be extremely slim. But we can manipulate the pins individually, and this is made possible thanks to tolerances. Even with all our technology, it's physically impossible to make all the components exactly the same dimensions and this is what causes the binding defect.

When we apply a turning pressure to the plug, only one of the pins will be binding against the inside of its chamber. If everything was perfectly machined, then all of them would bind simultaneously, and picking with basic hand tools would be impossible. But in reality, this just isn't the case. The pin chambers are different diameters, they're not perfectly circular, and they're misaligned. The pins are all different as well, not identical in size or shape like you might think. The differences can't be seen with the naked eye unless the lock is very poorly made, but these defects are all present in even the highest quality locks, and this is what makes picking possible.

Below is an exaggerated example. To keep the head scratching to a minimum, the pin chambers are all the same size and everything is the same shape, chambers are perfectly aligned etc. the only variable here is the diameter of the pins. It's nowhere near this simple, but it's the easiest way to explain:

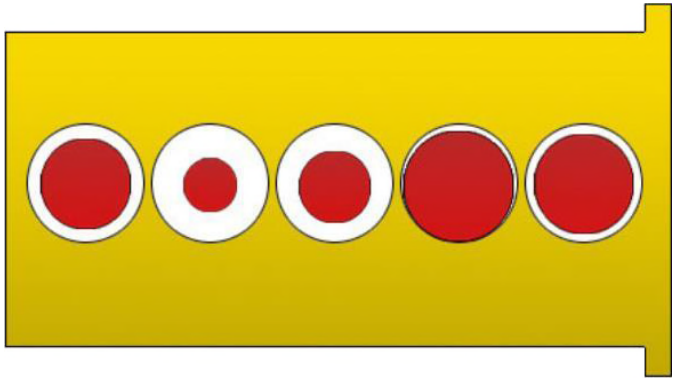


Fig. 4: Tolerances exagerrated & simplified.

In this lock, if we were to apply tension in either direction, pin 2 (looking right to left, where the key enters) would bind first because it's the biggest. It's physically impossible for any of the others to bind at this point, anyone can understand this. Pin 2 is blocking the plug from rotating, but the rest aren't making any contact with their chamber walls whatsoever. We would feel pin 2 binding, whereas the others would just spring up and down without any resistance. More on this shortly.

When we apply tension and lift this pin, once it reaches the shear line, three very important things will happen:

1. The rotation of the plug will cause the pins to shear.
2. The next binding pin will stop the plug from rotating any further. In this case, it will be pin 1 since it's the next largest.
3. Most importantly, that slight rotation means the driver we just lifted is now resting on top of the plug. If you can't picture what this looks like, here is an exaggerated example:

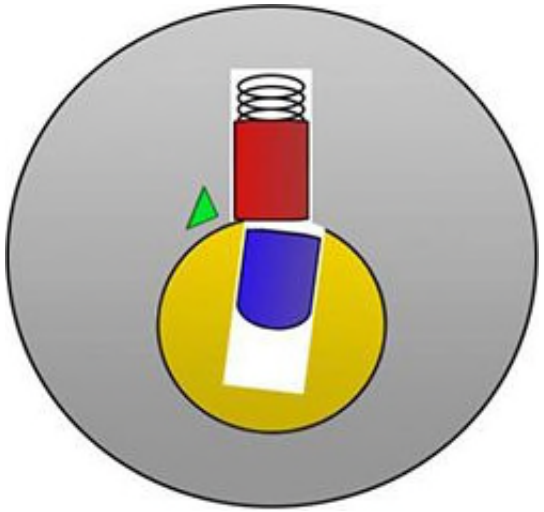


Fig. 5: Small ledge created by plug rotation.

The driver stays trapped above the plug, on that little ledge just to the side of the chamber, and the key pin drops back down. Now the pin stack in chamber 1 is binding, we lift that stack until the pins shear, and this same process continues until the lock opens. In this example, the binding order would be 2-1-5-3-4. And once 4 sets, the plug would rotate freely and open the lock. The binding order is completely random by the way, so don't go trying to pick every lock in this specific order. Even in 2 identical locks with the same key, the binding order will be completely different.

That covers the principles of binding and how pins stay set, so now you'll be able to understand all that funk you're feeling when you start to pick your first lock. Like I said, the tolerances are actually a mixed variety of imperfections working together and are much smaller than I've depicted — but generally speaking, the binding pin is pretty easy to identify. Higher quality machining means tighter tolerances, which makes it harder to tell (since multiple pins will be binding at once), but you'll still be able to tell which is binding more than the others. Don't give this too much thought, it all just comes down to practice and we'll be examining this in all its wonderful detail in just a moment.

I know you're dying to get started, so let's take a quick look at the different pin states and move on.

SECTION D: PIN STATES

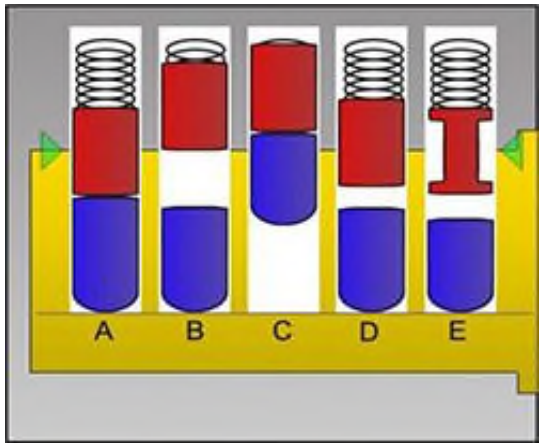


Fig. 6: Pin states.

From left to right:

A) **At rest** — the normal position before any picking takes place. The pins will be pushed down into the keyway and sit on top of a ward in the keyway.

B) **Set** — driver resting above the plug, key pin inside, shear line clear.

C) **Overset** — key pin is lifted too high and blocking plug rotation. We'll talk about this in detail later.

D) **Under set** — driver pin still blocking plug rotation. Not lifted high enough.

E) **False set** — an under set pin which gives the impression of being set, or has trapped the plug in an exaggerated rotation. We'll be examining this later as well.

OK. Now we can go.

PART 2

PICKING TECHNIQUES

SECTION A: THE BASICS... HOW TO HOLD THE TOOLS

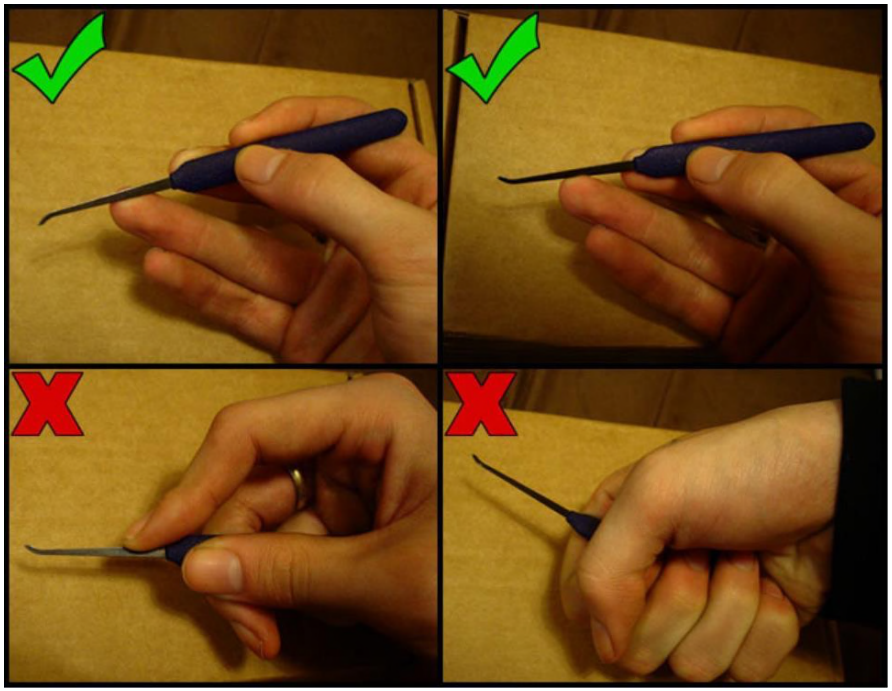
You'd think this is pretty simple, but there are a number of things you should keep in mind if you want to optimise your performance.

When applying tension, only use one finger. You can position the wrench at the top or bottom of the keyway, it does not really matter a lot of the time so you can just do whatever is comfortable for you. It's wise to give yourself as much room as possible though; having the wrench taking up space in the bottom of the keyway makes it easier to overset pins or get your pick trapped. Sometimes the pins bind better with the wrench at the bottom, so if it doesn't cause any trouble, by all means do. See example below:

The wrenches supplied with pretty much all pick sets are designed more for bottom of keyway tension; a shorter wrench is more desirable for top of keyway but not compulsory. I find that if you trim a wrench down to about 8mm it's great for all-round use, it gets in good and deep for bottom tension and doesn't stick out so much that is loses grip when up top. The actual "handle" can be as long as you please, and can be twisted or not depending on your preference.

Another thing worth mentioning is that, when using top of keyway, it's good practice to keep the wrench from making contact with the front pin so you don't get any confusion with the binding. Most of the time it doesn't really matter if you're making light contact with it though.

As for the pick, again you can do whatever you find comfortable. As long as you have a nice relaxed grip and can move it without having to put your wrist into it, you're good to go. Personally I use my thumb and middle finger to grip the handle, just before the shaft. I keep my ring finger on the shaft to get maximum feedback. Doesn't matter if the pins are at the top or bottom of the keyway. See example below:



This way might not be comfortable for you, so experiment and see what you like. Just don't hold it like a knife, or in such a way that your wrist is doing all the movement, like in the bottom examples. Remember, you're moving small pins by small amounts.

All movement should be done with the fingers.

And that's that covered.

SECTION B: SINGLE PIN PICKING — THE SPEED BUMP METHOD

No, this doesn't have anything to do with bump keys. If you want to learn how to bump locks, go to our website.

Single pin picking is the art of manipulating the pins one by one, by exploiting the tolerances we looked at earlier. I recommend you start off with a short hook. And if you skipped straight to this section without getting to grips with the concept of binding and how the mechanism actually works, go back to the basics first.

Ready? Well it's about time.

This is a method you can use to find the optimal tension for any given lock — which is the most important step, and lays the groundwork to get it open with minimal frustration. I'll also give you a complete rundown of what to do and what to feel for. I'm not the only person who does it this way, it's not a groundbreaking new technique, I just haven't seen anyone else explain it in real detail.

Just before we start, a word on tension. Everyone says you need barely any pressure on the wrench, which is true, but just because a lock will open with the bare minimum, it doesn't mean you have to use that amount. There is actually a range of tension you can get away with, so I'll be teaching you how to find that range. That way, you can choose the amount you're most comfortable working with. In most cases, you really don't need to go too low.

As a beginner, using the absolute minimum, you probably won't have a clue what's going on inside the lock because the feedback will be so subtle. That was my experience, anyway. Don't get me wrong, I opened plenty of locks by applying a hair's amount of tension and working the pins, but I couldn't tell you the binding order or how high to lift any of the pins to save my life. I just felt a set here and there and after a while the lock opened, there was no real consistency. And now that I actually have developed the touch for minimal tension, ironically, I've found that it isn't necessary. So this is why we will focus on the tension range, and not the lightest touch.

The technique I use is as follows:

1. Start with a "medium" amount of tension. When I say that, I don't mean half way between snapping the wrench and barely touching it. It's still a light-ish amount, just not light-light. The easiest way to explain this is for you to put a standard (non-twistflex) tension wrench into a lock and hold it in your hand. Where your finger would push on the wrench, hold it just above one of the keys on your keyboard and push it down. Don't actually tension the lock itself, it's just there to keep the wrench from flipping around so you're pushing on the flat part. I want you to see how much it takes to just about hold it down and no more.

   Now add a little more on top of that, we'll be using this as your starting point.

   I'm using a standard cheap keyboard so I don't know if this is the best way to explain for everyone — it's not an exact science. Remember this isn't the amount you'll be using to actually pick it, very few locks will require anywhere near this much. It's just a starting point we'll be working from in order to find the range.

2. Insert your pick right to the back of the plug, and drag it very slowly back towards you and across the pins. As you do this, push the pick gently against the pins so you can feel them springing a little. Don't try to push them as deep as they'll go or anything like that, just use very gentle pressure. Think of it like drawing a soft line on a page, just not with a pen that's desperately low on ink. You should be able to feel a soft springiness to the pins as it rolls over each one.

What you're looking for is a pin which feels more solid than the others. This is the binding pin, and the reason I call this the speed bump method is because when you hit it, it's like the pick has hit a little bump. A lot of people push each pin individually to find which one is binding, which you can do if you want. As long as you find it, that's the main thing.

The more tension you apply, the more obvious the binding pin will be, but I wouldn't recommend using anything heavier than what I described before. Honestly, the binding pin will stick out like a sore thumb under that amount so there's really no need to start any higher.

If you can't feel anything binding under that amount of tension, and assuming you're not being dense and pushing against the warding, it's usually because the binding pin is the one right at the back. Since it's the first pin you're in contact with, it just feels like part of the back of the lock, so if you can't feel any binding, don't jump the gun and start piling on more tension. Carefully get onto the back pin and see if it gives any resistance when you push on it. I guarantee if you can't feel any binding, it'll be the pin at the back you need to be focusing on. If you're having a hard time feeling the back pin, roll gently from front to back over the pins instead until you get onto it.

If it's definitely not the back pin, then you can try more tension. Some locks do take a fair amount. Anyway, when you've identified the first binding pin, move onto step 3.

3. Position the very tip of the pick on the middle of the pin which is binding. You might find it helpful to roll the pick back and forth over it a little to get the position just right. You don't need to be exactly in the middle of the pin, but it's good practice. Next you want to apply some pressure to the pin. Think about the amount it takes to push a non- binding pin all the way down and use that.

4. Slowly start to reduce the amount of tension you're applying to the plug. The pin will start to move under the pres- sure of the pick at some point, so try your best to hold the pick pressure steady and concentrate on the tension rather than pushing harder on the pin to get it to move. You're already using quite a bit of pick pressure here, so concentrate on the tension until you feel the pin start to move a little.