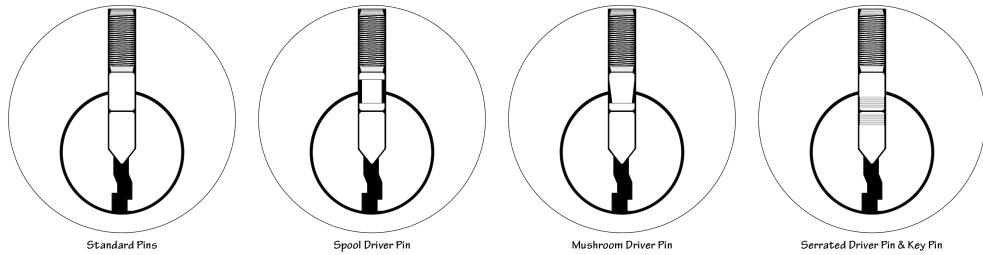


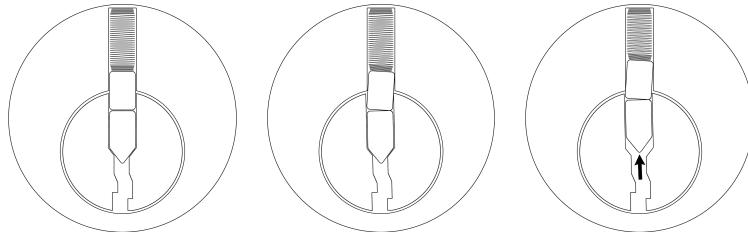
8 Hardening Pin Tumbler Locks against Myriad Attacks for Less Than a Sawbuck

by Deviant Ollam, Merchant of Dead Locks

In 1983, the renowned locksmith and physical security icon Gerry Finch submitted a brief article to Keynotes magazine, a publication of the Associated Locksmiths of America. In it, he described why it was his belief that serrated pins within a lock were superior to spool pins, mushroom pins, or any other kind of manipulation-resistant pins commonly-used in locks. Despite being very popular and well-received at the time, such wisdom appears to have faded away somewhat among locksmithing circles. This article is a re-telling of Finch's original advice with updated diagrams and images, in the hopes that folk might realize that some of the old ways are often still some of the best ways of doing things.



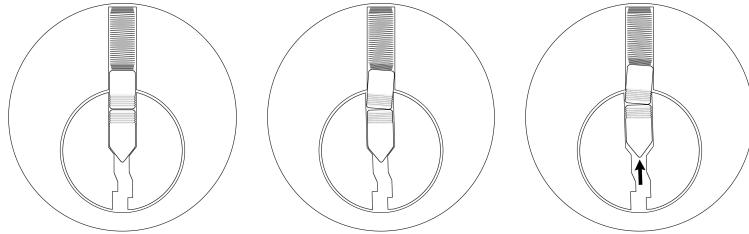
Pick-resistant pins are designed to interfere with the most common methods of attacking pin tumbler locks. Conventional operation of a lock involves first pushing the pin stacks to their appropriate positions and then turning the plug. Lockpicking, however, is performed by first applying turning pressure to the plug, then—subsequent to that—the pushing of the pin stacks is performed, with pick tools instead of a key. The following images document this process.



Pick-resistant pins make such an attack difficult by interfering with the easy movement of pin stacks if a lock's plug is already subject to turning pressure. While standard operation of the lock is still possible (in the absence of any turning pressure, the blade of a user's key will still push the pin stacks smoothly) attempts to turn, then lift (which is how picking is performed) become much more complicated. If inclined, one may acquire entire pinning kits consisting of such special pins from locksmiths supply companies. Seen in the photo below is the tray of an "S-pin" security kit from LAB.



The following images show how the ridges of a serrated pin make for additional friction during a typical lock-picking attack.



While other styles of pick-resistant pins are available on the market (such as the spool style or mushroom style seen in an earlier diagram) it was the serrated style which captured Gerry Finch's attention and became his favorite means of bolstering a lock's ability to resist attack. Part of his reason pertained to the fact that the ridges on a serrated pin are far less pronounced than on a spool or mushroom style pin. When performing the picking process, a skilled attacker can often discern quite clearly the moment when they have encountered a spool or mushroom driver pin. Due to the large ridge present and the very noticeable way in which a lock's plug will tend to turn (but the lock will fail to open) this information leakage will offer up valuable insight to an attacker. Serrated pins give away far less detail to someone who is using lockpicks.

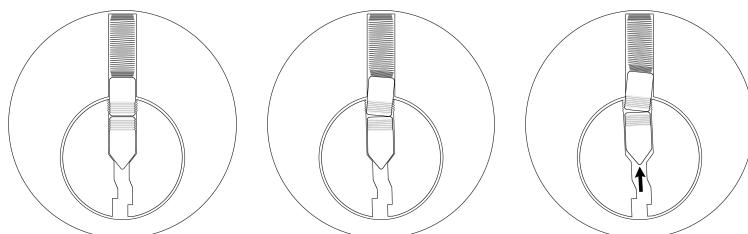
The very small ridges found on serrated pins also lend themselves to another, more substantial, means of preventing attacks against pin tumbler locks, however. Although it was not common practice at the time, Gerry Finch proposed something in the early 1980s which dazzled the locksmith community. Specifically, he advocated the process of using a thin thread-tapping tool to create additional ridges inside of a lock's plug, within the chambers where the pins are installed.

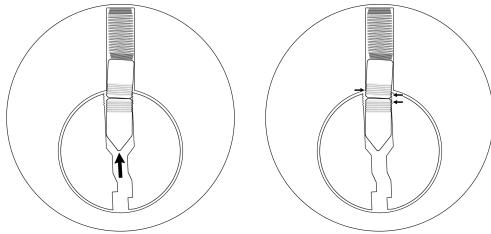


By cutting these threads into the pin chambers, a much greater degree of friction and positive lock-up between the pins and the plug can be achieved. If there is turning pressure on the plug—as there is with a lockpicking attack—and any attempt to push the pin stacks is made, the serrations will bite together. This is remarkably robust for a number of reasons:

- Even if a dedicated lockpicker gets past one region of friction, serrated edges offer repeated additional blockades to progress. Spool pins or mushroom pins typically offer only one point of resistance in each pin stack.
- The positive lock-up between pins and the plug is achieved by the driver pins and also by the key pins (if serrated key pins are installed) and for this reason this style of configuration should also offer some resistance to impressioning attacks, as well.

The following images show the mechanism by which serrated pins and thread-tapped plug chambers work in concert to resist picking attacks.





It is those particular points indicated by the small arrows where the ridges and threading jam together tightly. NOTE—As seen in the earlier photo of the field-stripped plug, I did not opt to run a tap through *all* of the pin chambers. The front-most chamber was left plain and no serrated pins would be installed there. This not only conceals the presence of such pins in the lock (at least from cursory inspection) but it affords one the opportunity to install hardened anti-drill pins in that front chamber.

Gerry Finch suggested that course of action, as well. He also cautioned locksmiths against working a tapping tool too deeply in each chamber. He recommends a maximum of three turns per chamber, no more.

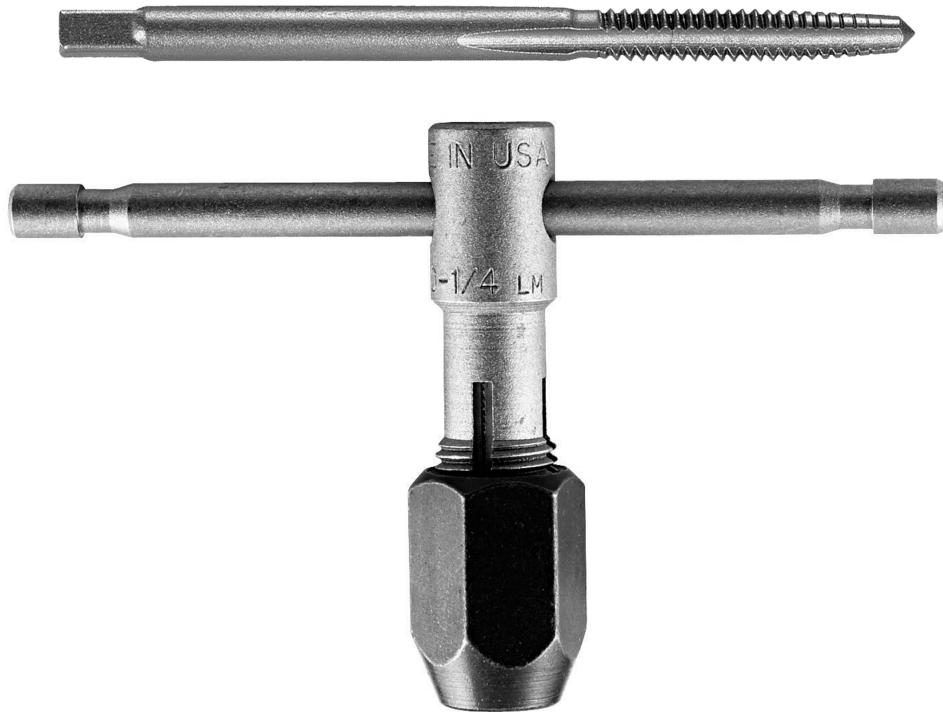
Finch's ideas proved so effective, and locks prepared in this manner tend to be so resistant to even dedicated attacks, that the LAB company started including a 6/32" tap in some of their S-pin kits. But perhaps a little surprisingly, after all these years the practice has become so uncommon that few locksmiths with whom I have spoken nowadays even know what the tap tool is for.



If you have the knowledge of even basic lock field-stripping, it is quite possible to upgrade a pin tumbler lock using this technique for very little cost. The LAB company's S-pins are available for less than a dime each¹³ and hardware tool suppliers sell both the 6/32" tap and a suitable tap handle for four dollars apiece.

Best of luck upgrading your security if you try this yourself. With a little care and dedication and for less than one Hamilton you could make your locks a great deal more resistant to attacks by someone like me.

¹³While this is technically true, such pins are commonly sold in packages of 100. So you're often out six to seven dollars for the bag, and a variety of sizes of key pins and driver pins are needed to do the job properly. It's best to find a friendly locksmith who might sell you a handful of individual pins for a few dollars.



Gerry Finch was a legend in the lockpicking and locksmithing community, developing tools, techniques, instructional courses, and published works throughout his career. A veteran of the US Air Force (ret 1964) he also worked with the US Army Technical Intelligence Center teaching their Defense Against Methods of Entry course. Finch is the recipient of the Locksmith Ledger's Hall of Fame Award, The California Locksmith Association's Golden Key Award, Associated Locksmiths of America's President's Award, the Lee Rognon Award, the Gerald Connelly Pioneer Award, and the Philadelphia Award. He retired officially in 1996, but I still wouldn't want to go head-to-head with him in a picking contest.