

# How to Modify an Inexpensive Lock

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## Modifications:

- 1) At least two different sizes of top pins matched to the sizes of bottom pins.
- 2) All locks have one pin chamber with a shortest possible bottom pin and no master pin, and one pin chamber with a longest possible bottom pin.
- 3) At least one pin chamber, but not all of them, has a spool top pin.

## Justification:

- 1) Having different sized top pins keeps the pin stack roughly the same length and thus puts about the same pressure on every spring. Too long of a pin stack crushes the spring and prevents the key from sliding in and out. Thus, a lock that has only one size of top pin must use a short one to avoid this problem when it is matched with a long bottom pin. But matching this short top pin with a short bottom pin results in too little spring tension, which makes that pin chamber insecure. A heavy Babe Ruth bump on a short bottom pin works *only* if there is also a short top pin and a loosely fitting spring; if the top pin is twice as heavy as the bottom pin and the spring has the correct tension, the two pins are not going to fly upwards and then spread apart.
- 2) Always cutting keys with shallow cuts reduces wear on one's key machine and reduces time spent making keys. A lock with all very shallow cuts on the key can sometimes be opened with a heavy Babe Ruth bump, but a long pin (#7 in KW1 or #9 in SC1 locks) requires a granny bump. It is not possible to be Babe Ruth and granny at the same time.
- 3) The presence of a spool top pin has no effect on bumping, but makes the lock significantly more difficult to pick. In combination with rules (1) and (2), this rule is easily implemented by having the longer of the two available top pins be of the spool design and the other one standard. By (2), the pin chamber with the shortest possible bottom pin and no master pin will get a spool pin, but they cannot all have such short bottom pins because, by (2), at least one must have the longest possible bottom pin.