BYPASS OF LOCKS AND SAFES

Locks, Safes, and Security

LSS+ Multimedia Supplement

www.securitylaboratories.org

BYPASS: WHY IMPORTANT

- Protection of life
- Protection of property
- Protection of information
- Sabotage
- Espionage
- National security
- Terrorism

BYPASS: REQUIRED KNOWLEDGE

- Locks
- Safes
- Security: physical and electronic
- Bypass technologies
- Bypass tools and techniques
- Specific bypass issues
- Specific vulnerabilities

REQUIRED SUBJECTS

- · Anti-picking features
- · Bypass capability and methods of entry
- · Bypass techniques
- · Code cutting of keys
- · Cross-keying
- · Databases and reference materials for locks
- · Decoding of locks·

REQUIRED SUBJECTS

- · Differs and depth coding: theory and reality
- · Disassembly of locks
- · Evidence of bypass
- · Forensic analysis of locks
- · Forensic disassembly of locks
- · Identification of locks, keys, and components
- · Impressioning

REQUIRED SUBJECTS

- · Key duplication procedures
- · Keying of locks
- · Keying systems, including master keying
- · Keyways and restrictions
- · Locking hardware
- · Locks, and theory of operation of each type of mechanism
- · Manufacturing specifications for locks and keys
- · Metals and Metallurgy

REQUIRED SUBJECTS

- · Methods of forced-entry
- · Picking
- · Safes: construction, locks, and methods of entry
- · Security systems and access control
- · Specifications for key machines
- · Tolerance specifications
- · Tools utilized in bypass

WHO IS AFFECTED?

- Anyone who has property to protect
- Valuable items
- Valuable information
- Any premises
- EVERYONE IS AFFECTED BY LACK OF SECURITY

BYPASS: THE PROBLEM

- Lack of knowledge by law enforcement investigators
- Lack of training of forensic specialists
- Lack of knowledge by tradecraft
- Lack of expertise by manufacturer
- Lack of data by public about bypass
- Potential for bypass: often unknown

PRIMER ON LOCKS

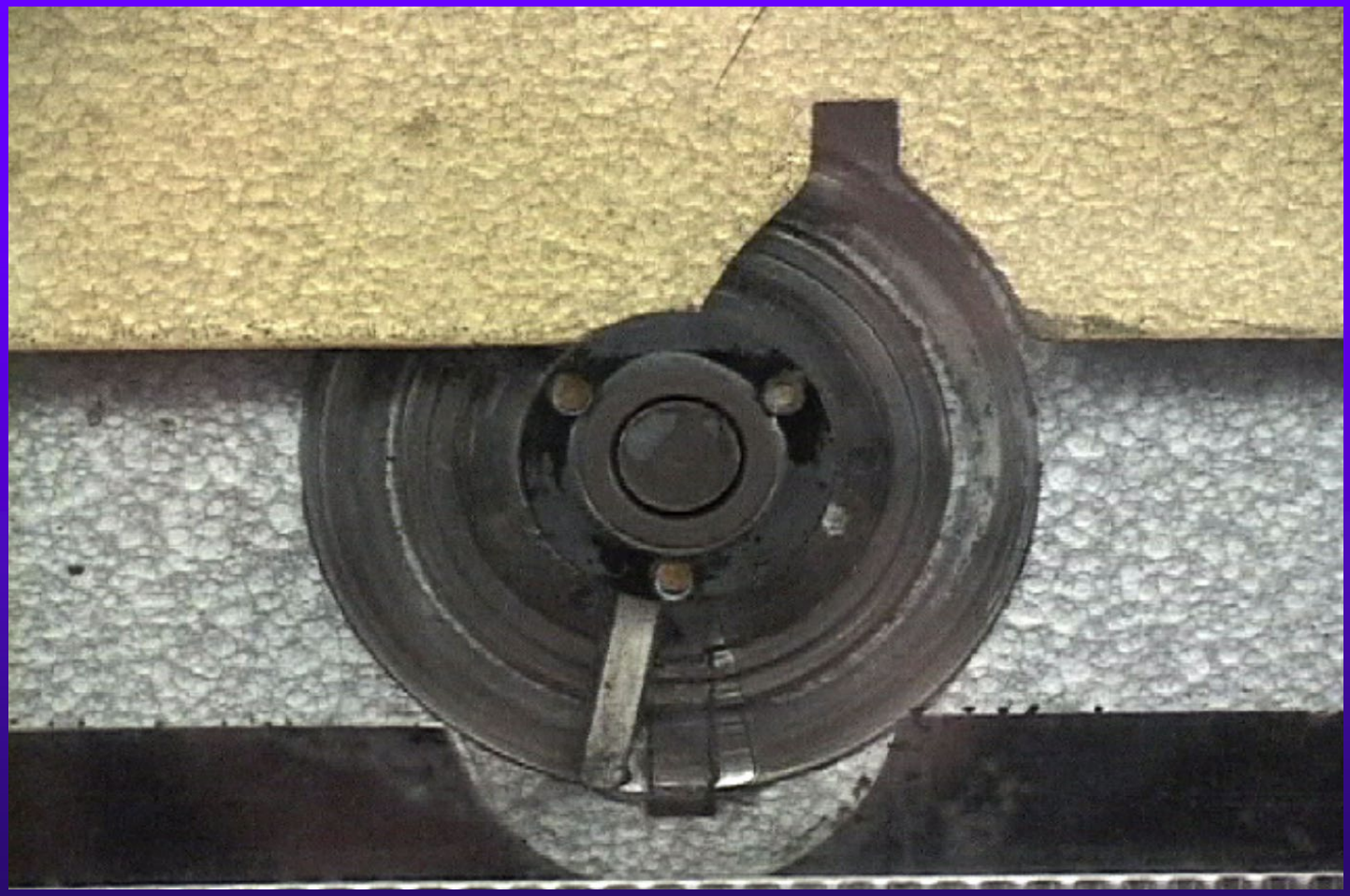
- Basic locking mechanisms
- Must understand theory of operation
- Bypass theories
- Security assessment and limitations

BASIC TYPES OF LOCKS

- Warded
- Lever
- Wafer
- Pin Tumbler
- Hybrid
  - Magnetic
  - Sidebar
  - Rotating Disk
- Combination

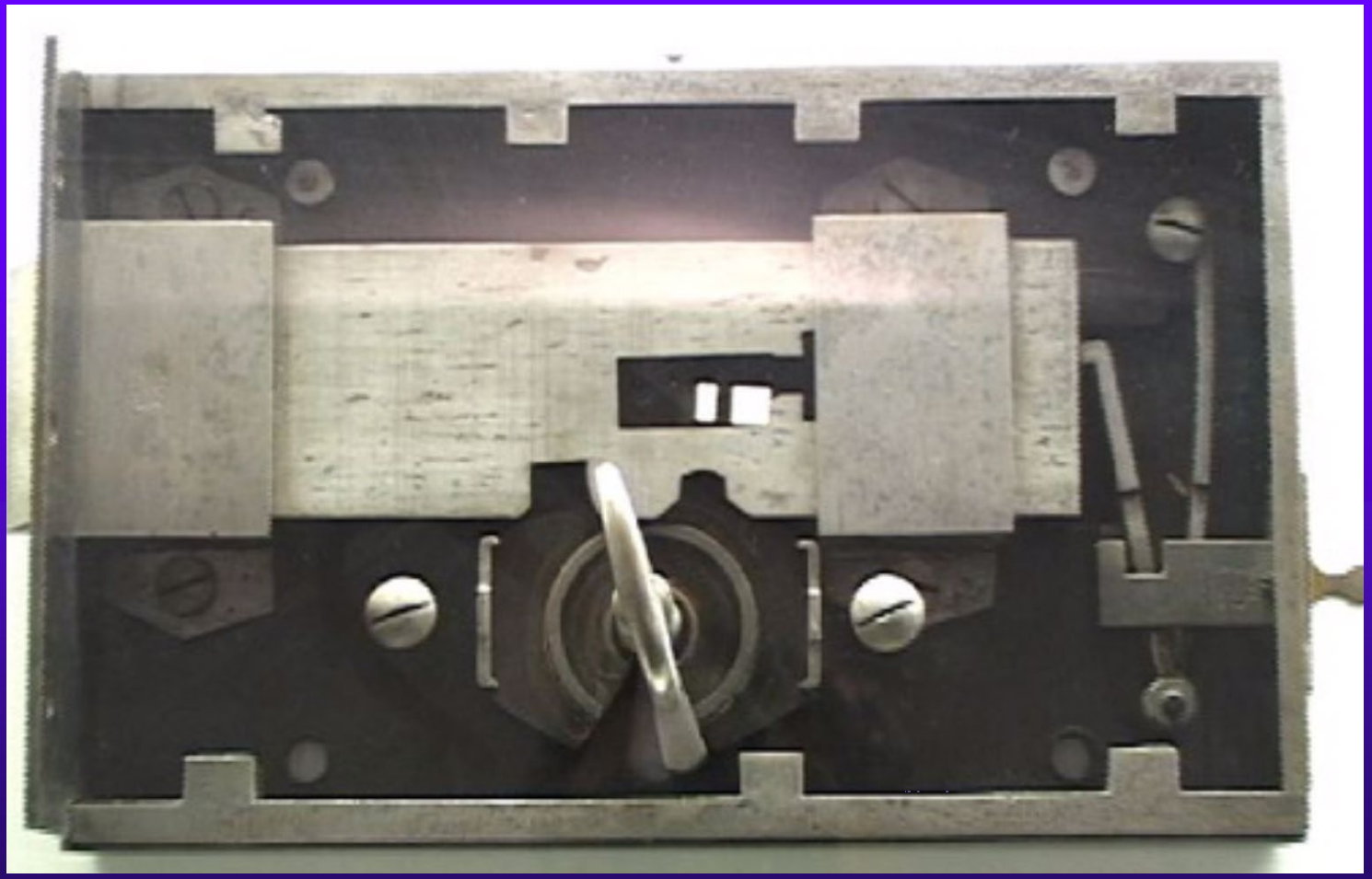
WARDED LOCK

Warded lock detail

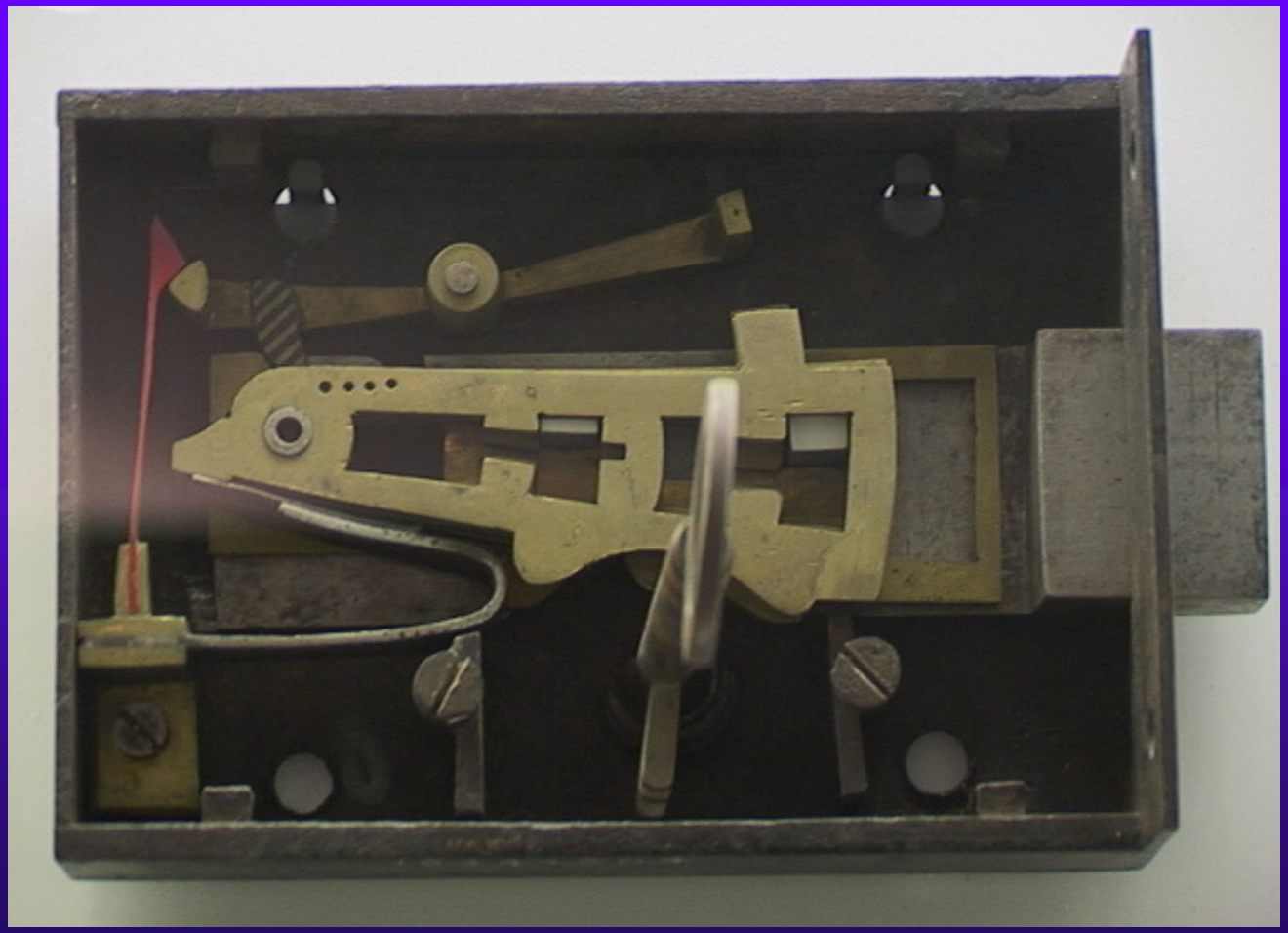


Warded lock for chest

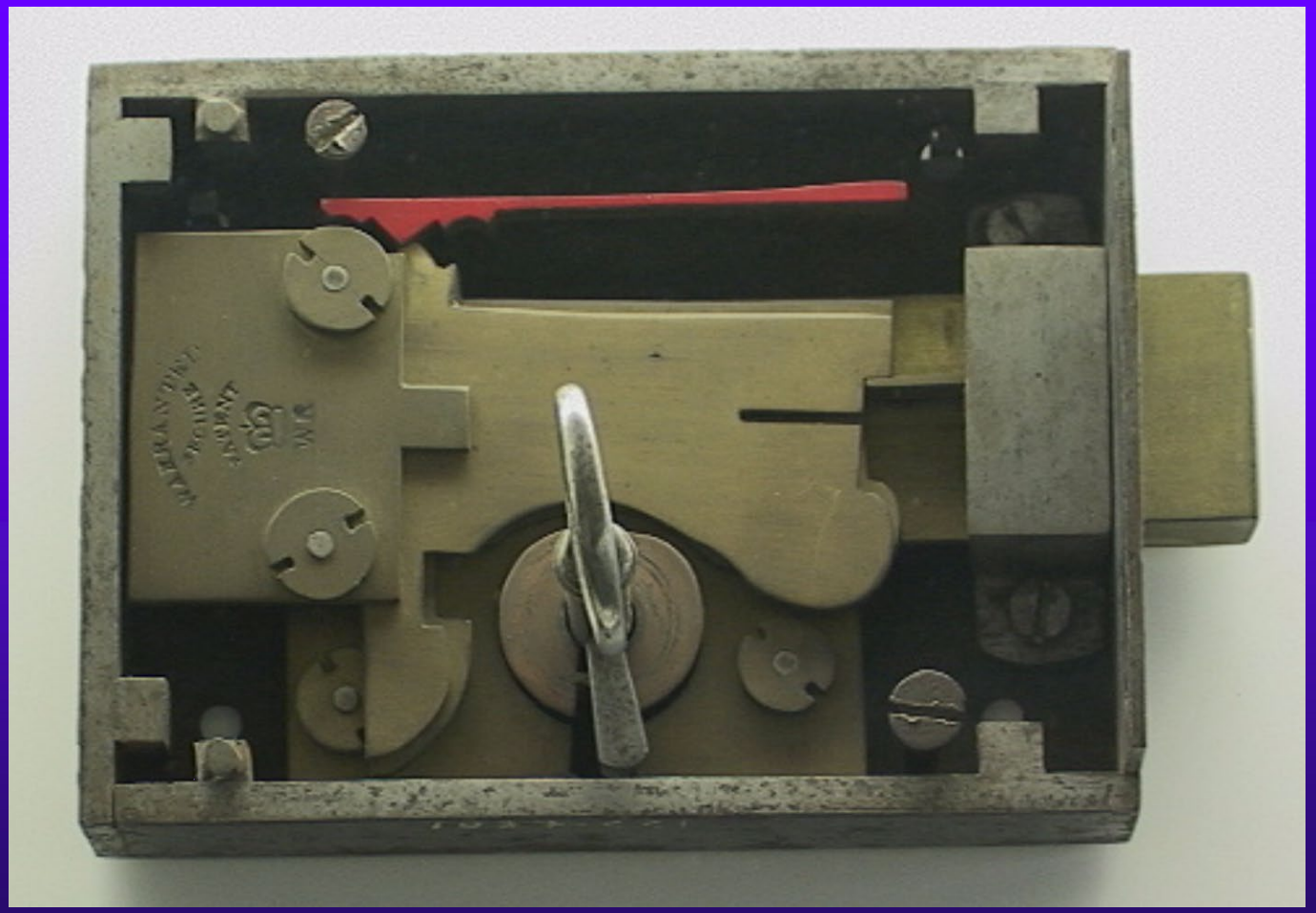
LEVER LOCK



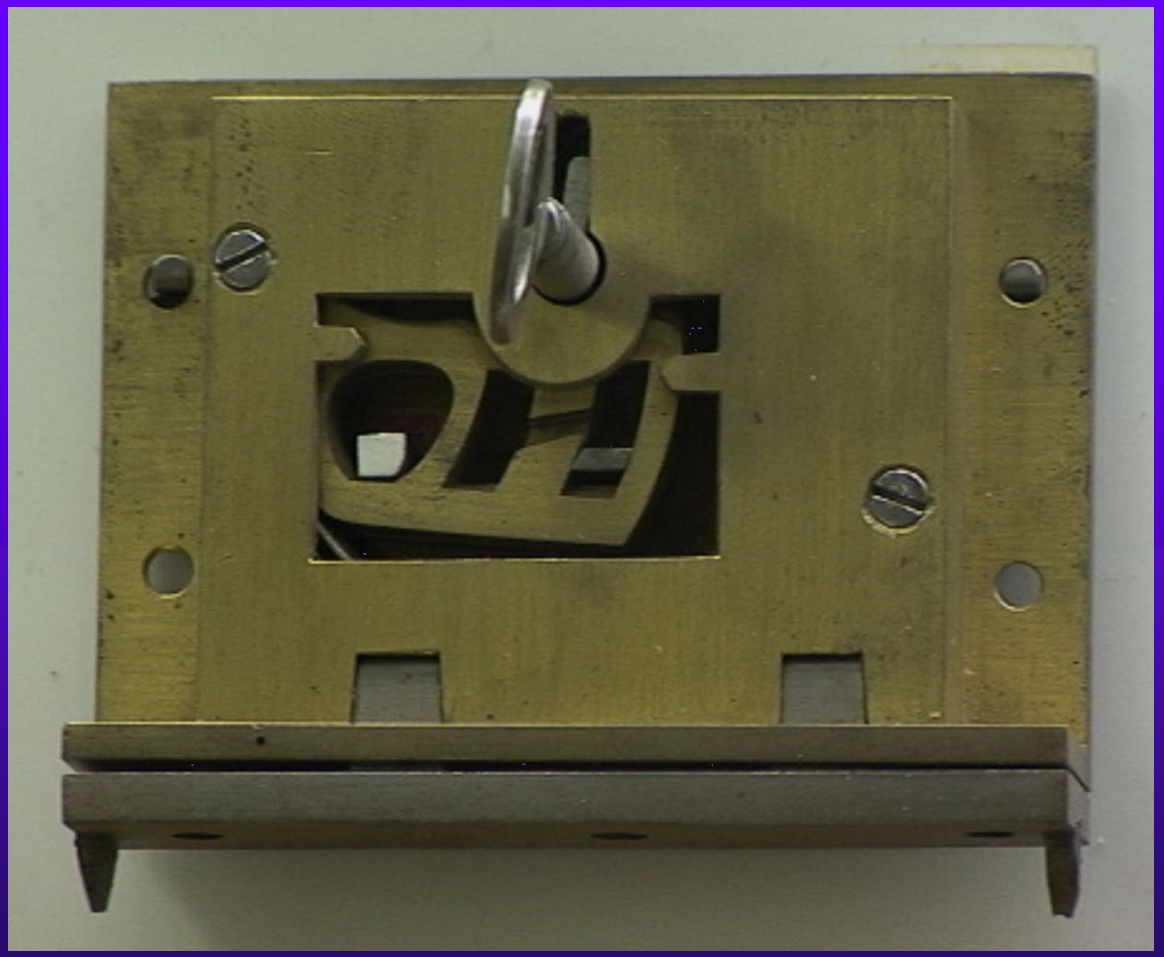
CHUBB Detector, 1827



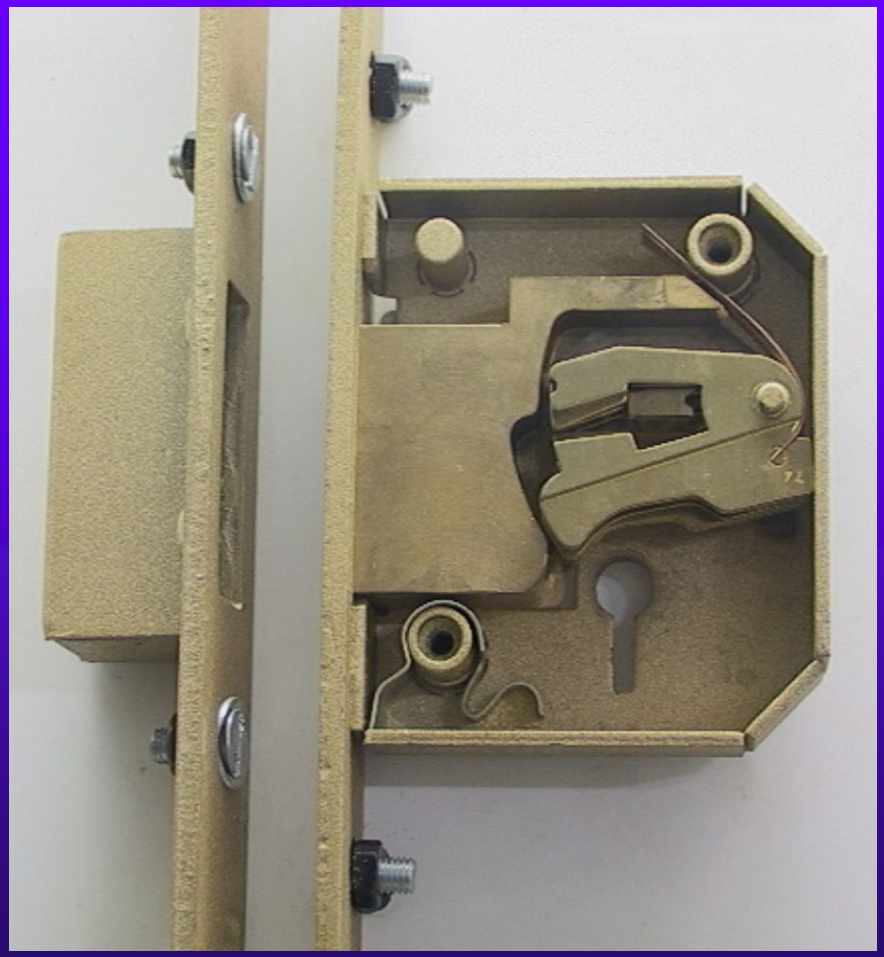
CHUBB Detector Lock



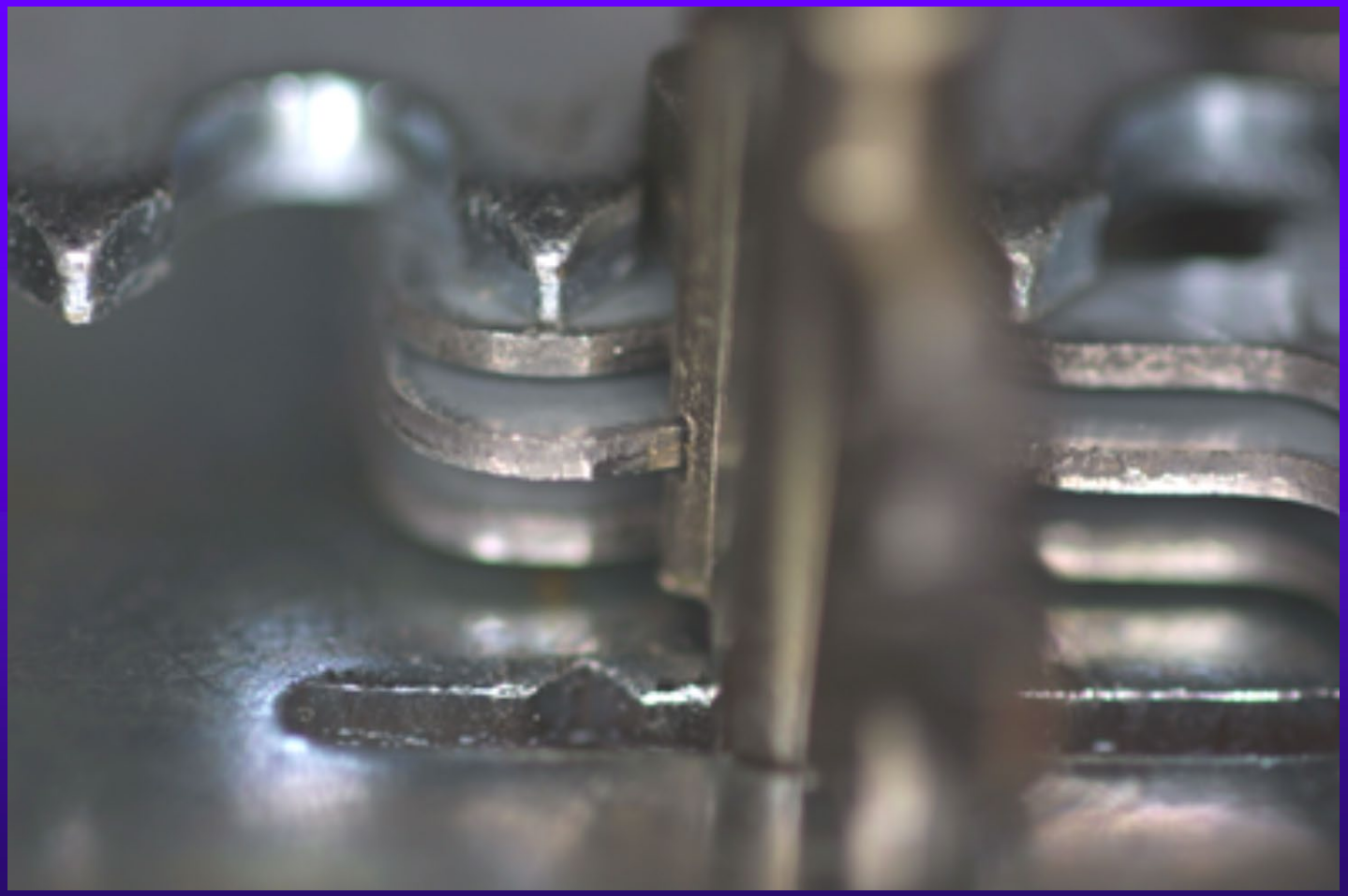
PRICE Ne Plus Lever Lock



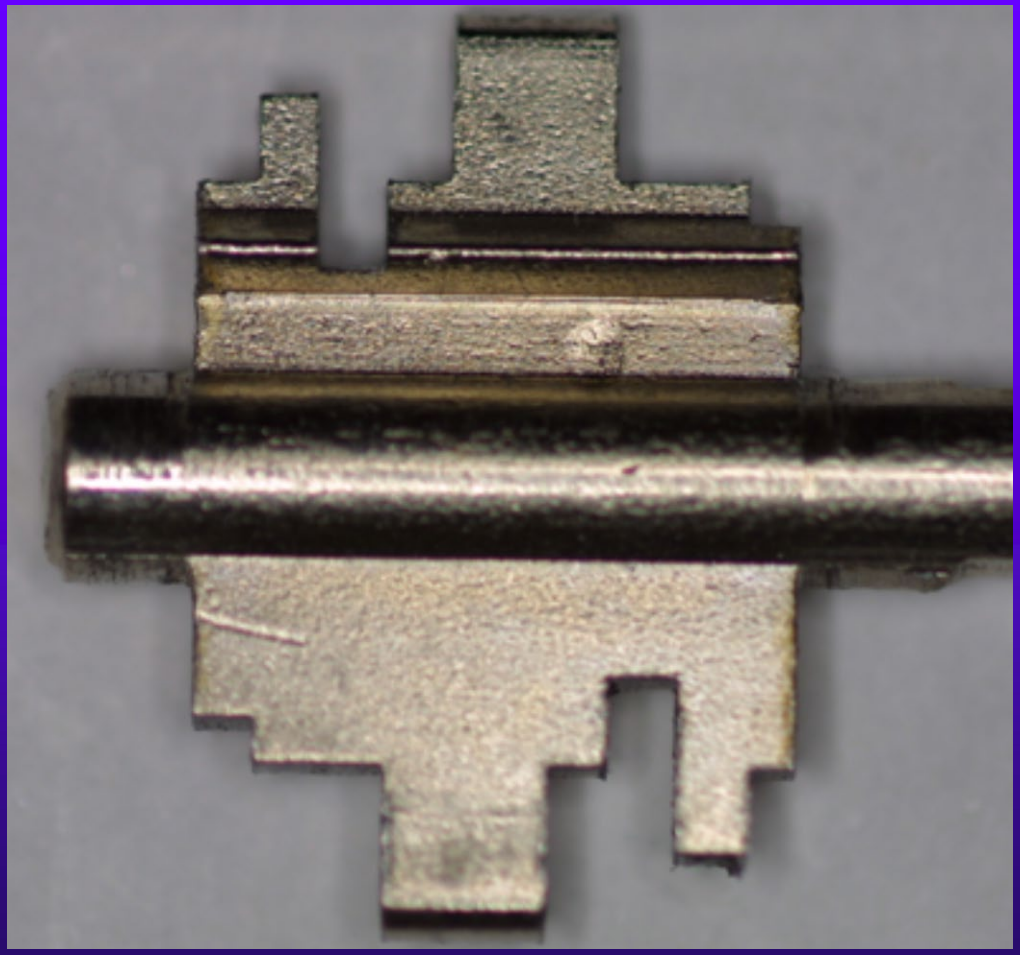
MODERN CHUBB LEVER



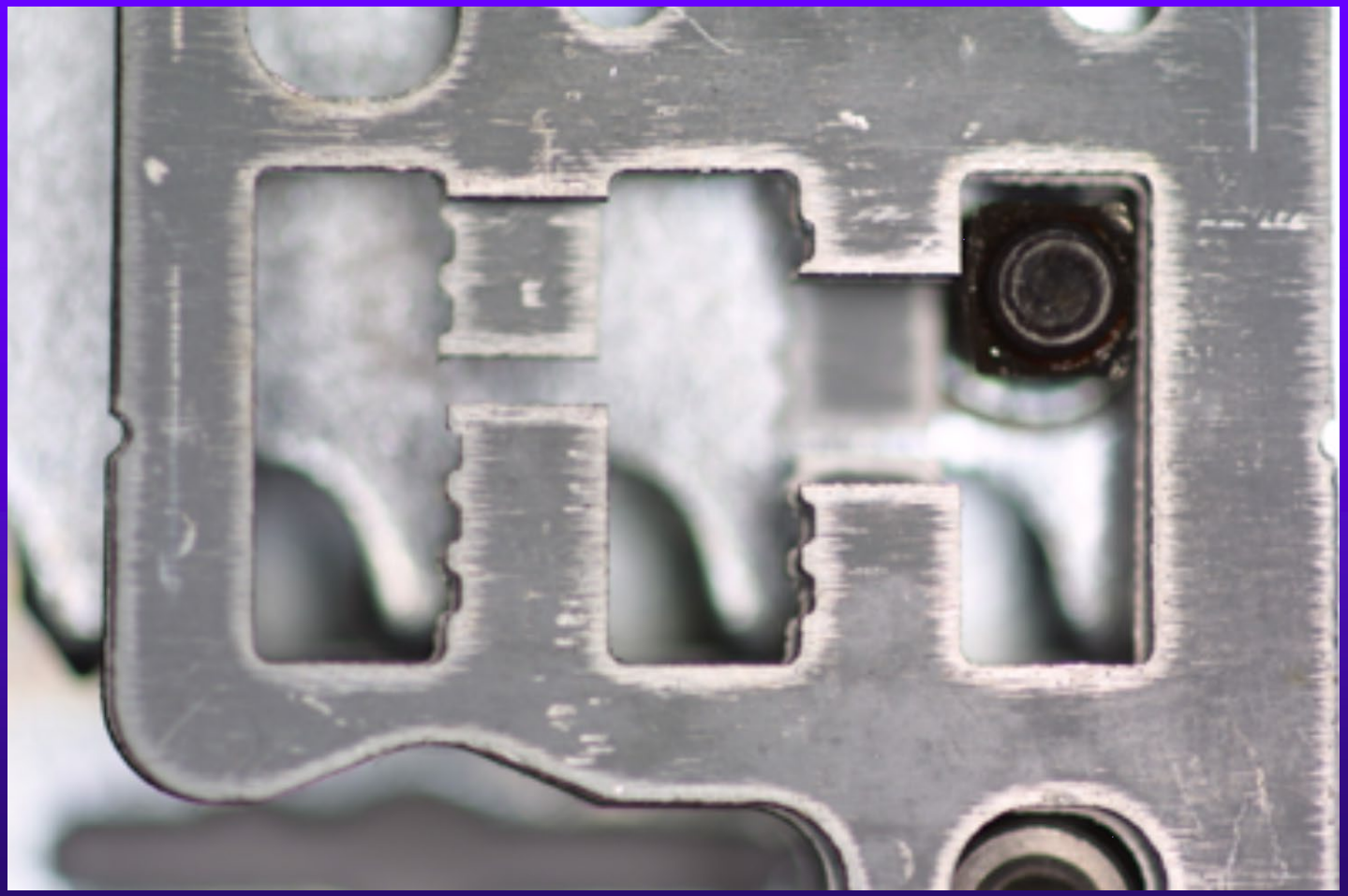
EUROPEAN LEVER LOCK



EUROPEAN LEVER KEY

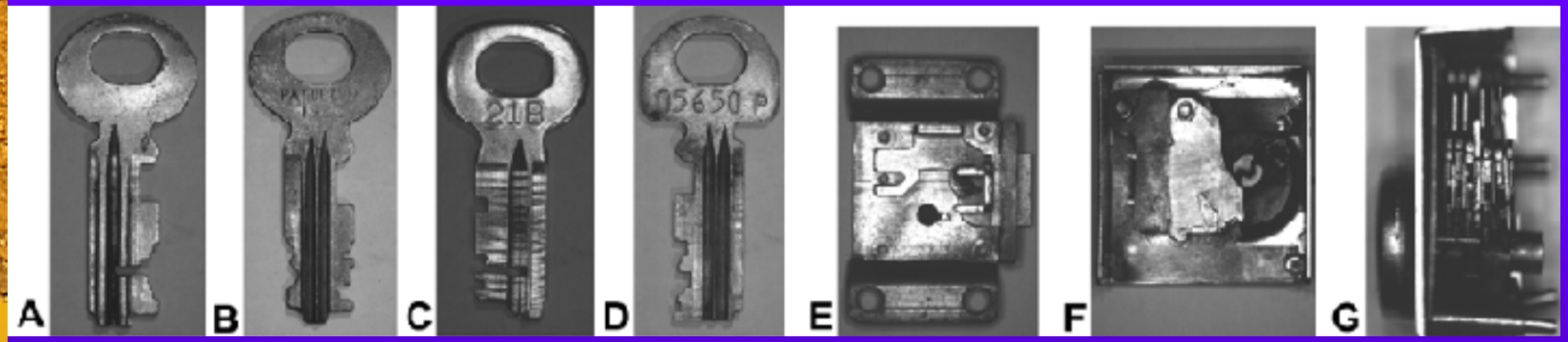


European Lever

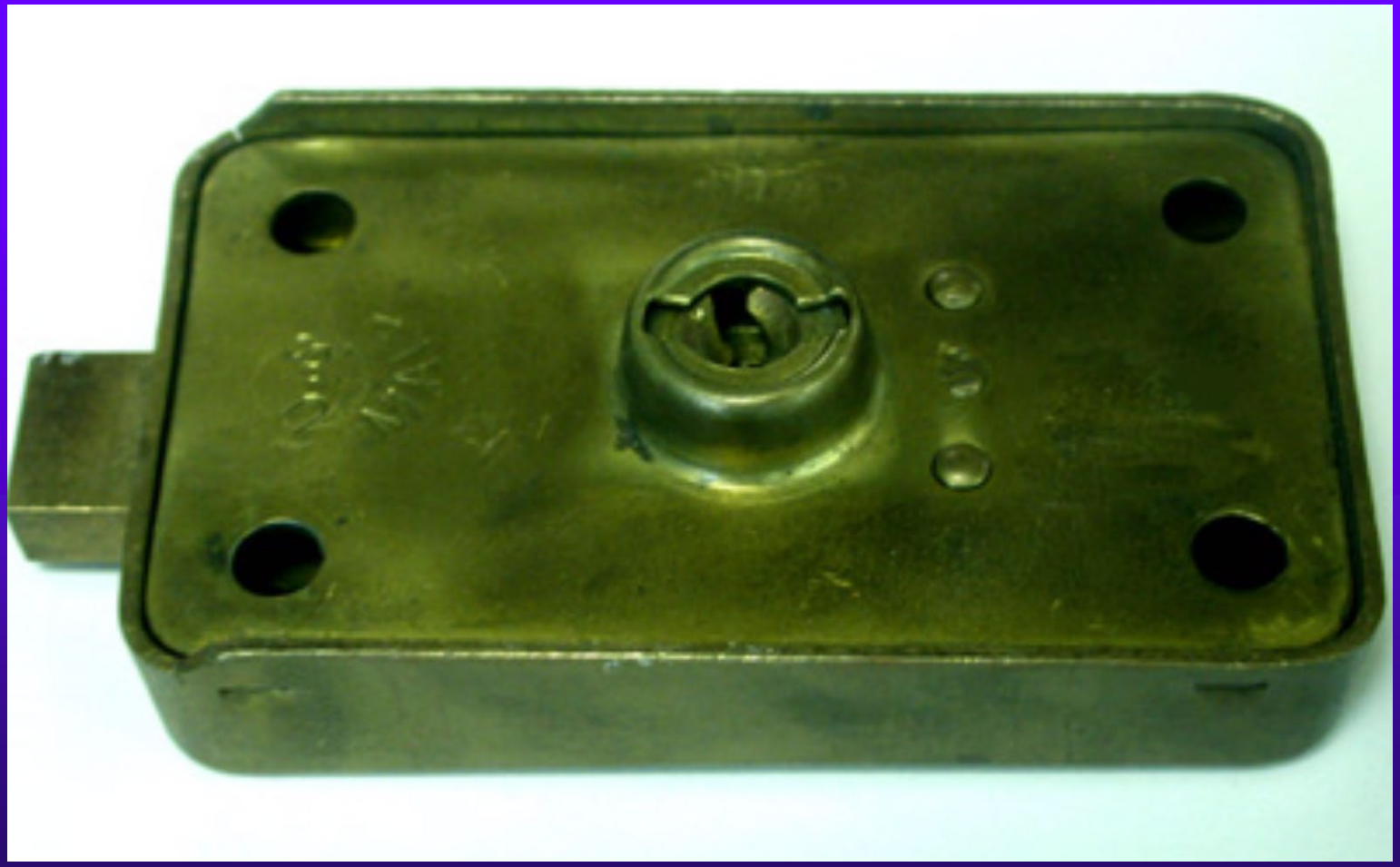


TELEPHONE LEVER KEY

Telephone Lock Detail



POST OFFICE LEVER LOCK



Lever Key Detail – Postal

Lever Detail – Postal

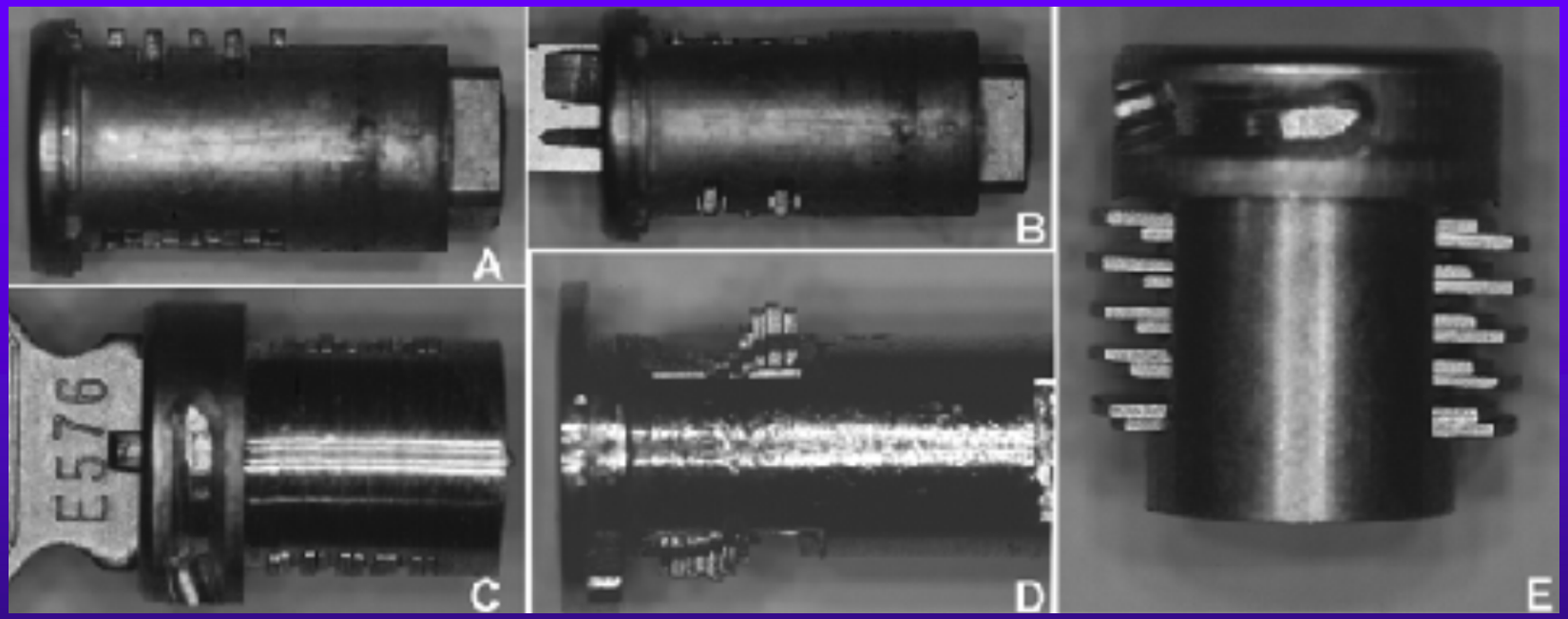
POSTAL Registered Mail Key

Registered Mail Padlock

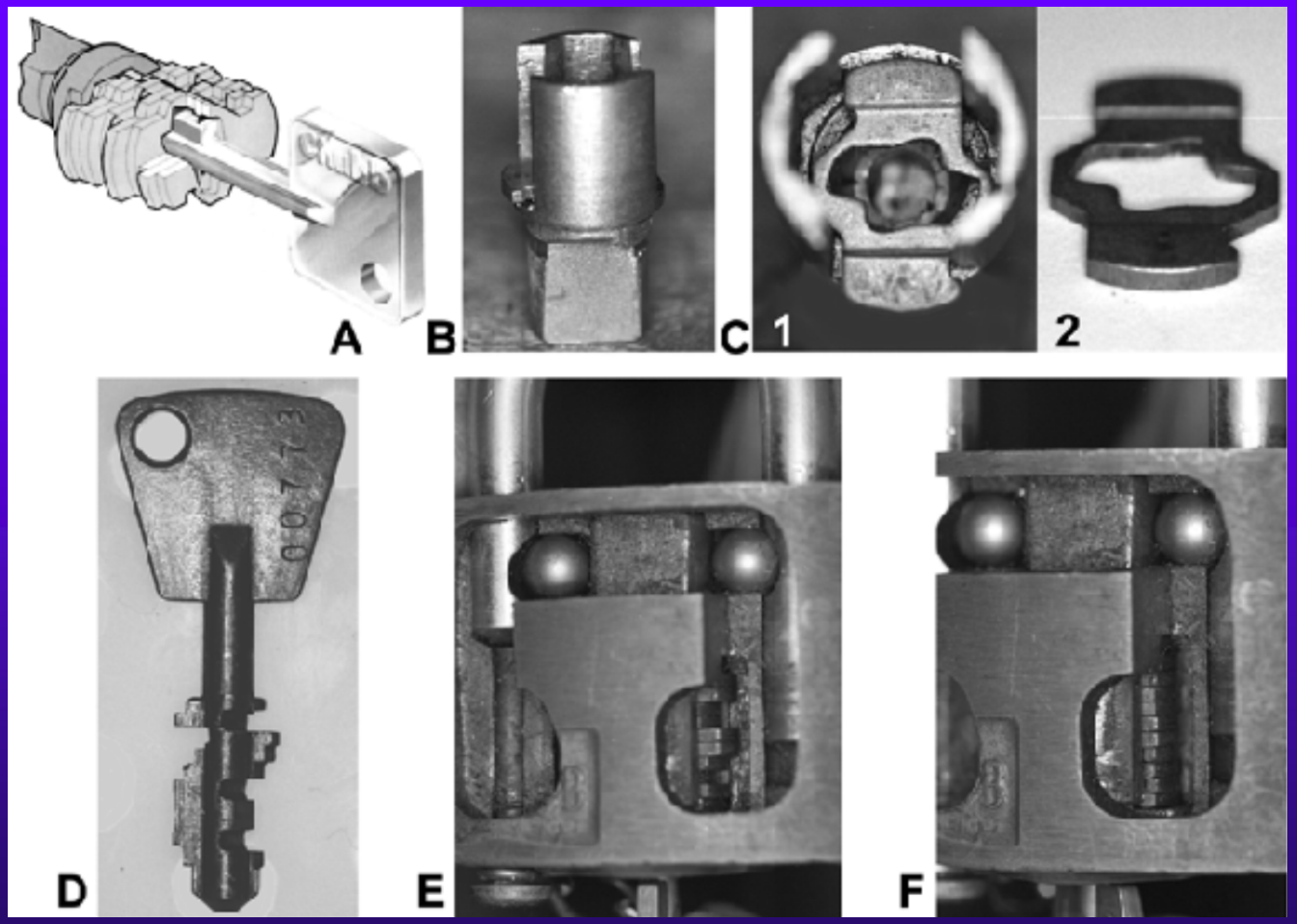
WAFER LOCK – LOCKED

WAFER LOCK – OPEN

WAFER LOCKS – DOUBLE BITTED



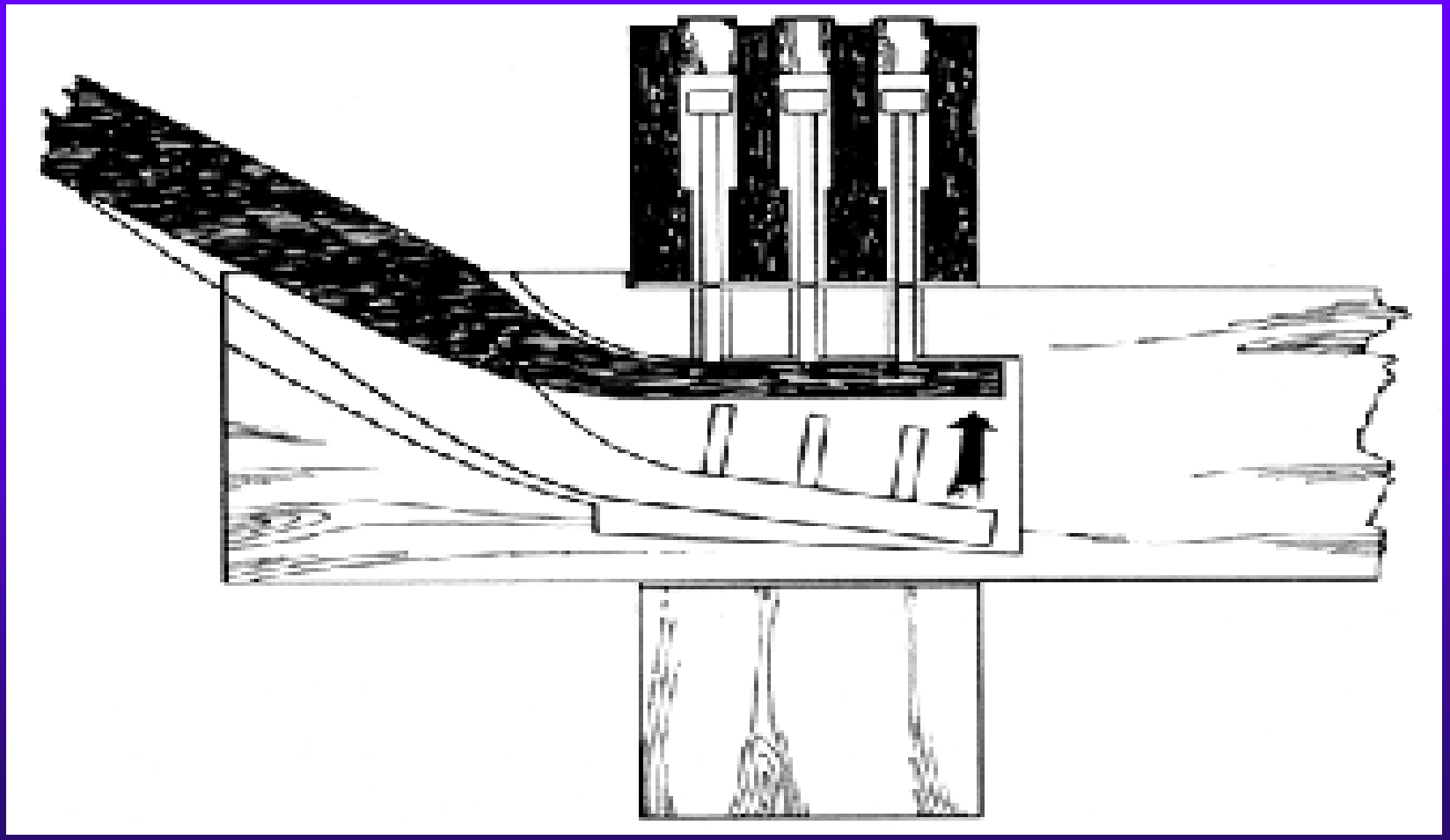
CHUBB AVA WAFER



PIN TUMBLER LOCKS

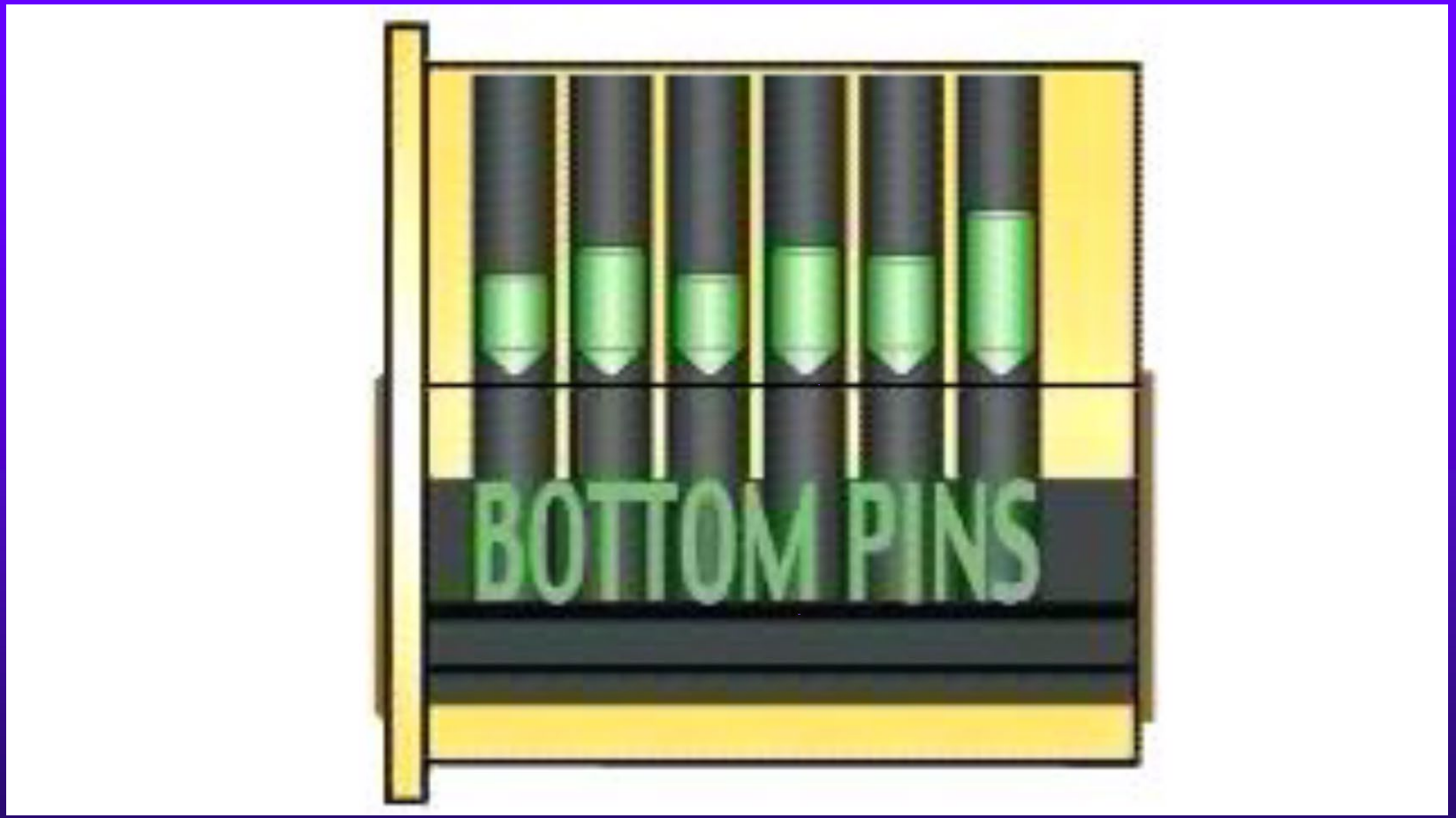
- Top pins
- Bottom pins
- Master pins
- Pin stack
- Shear line

PIN TUMBLER – EGYPTIAN

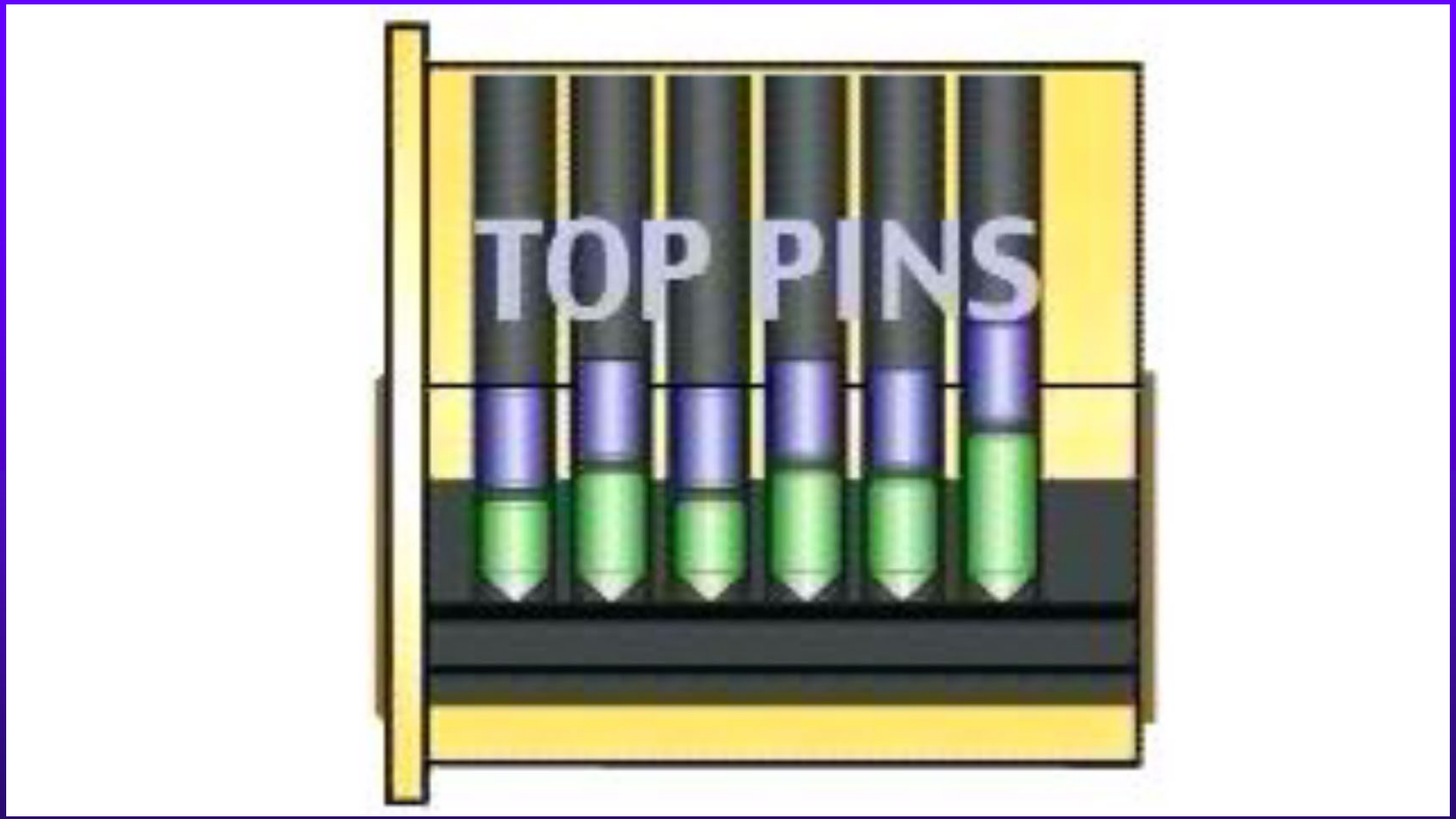


EGYPTIAN DETAIL

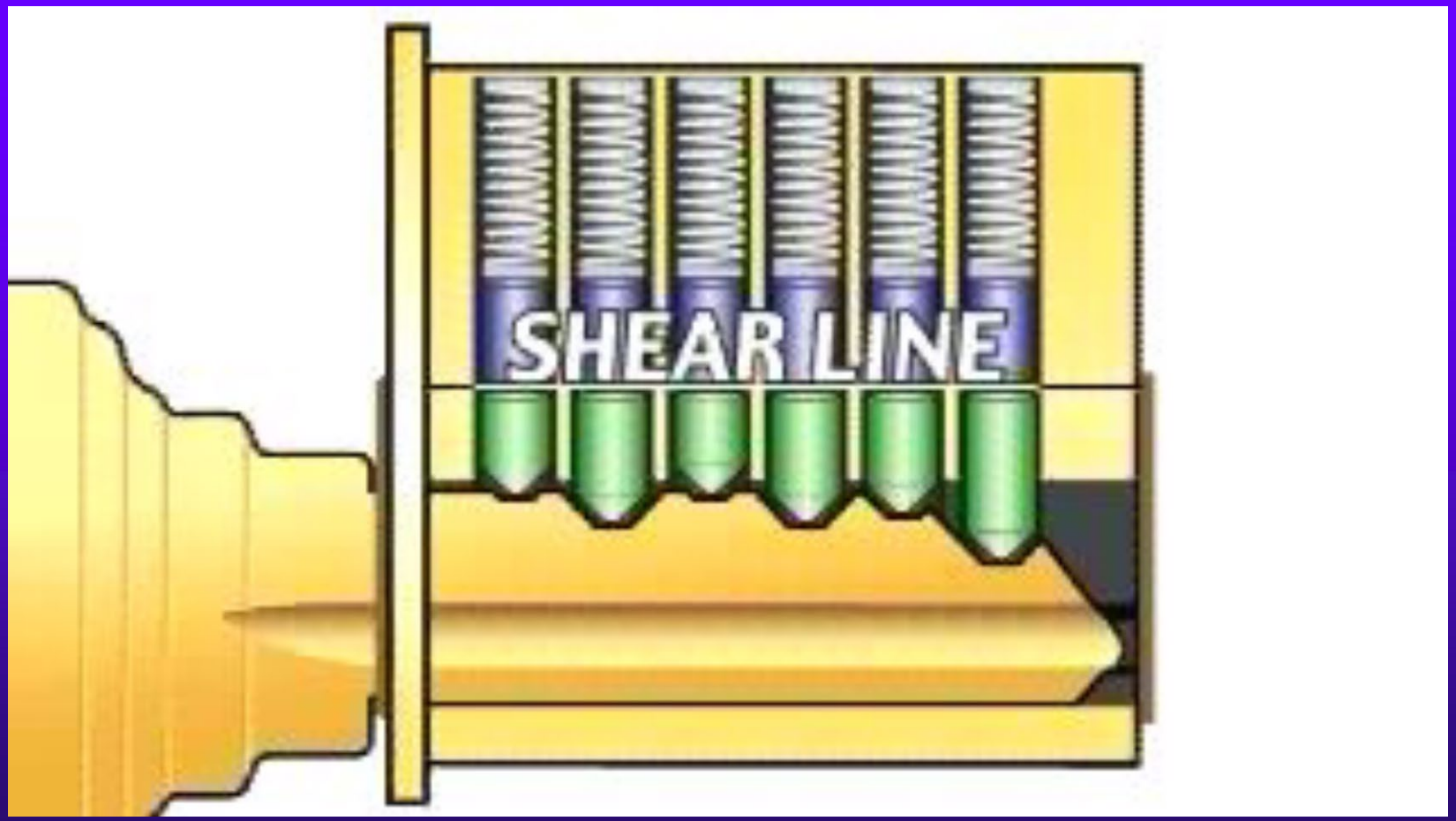
Bottom Pin Detail



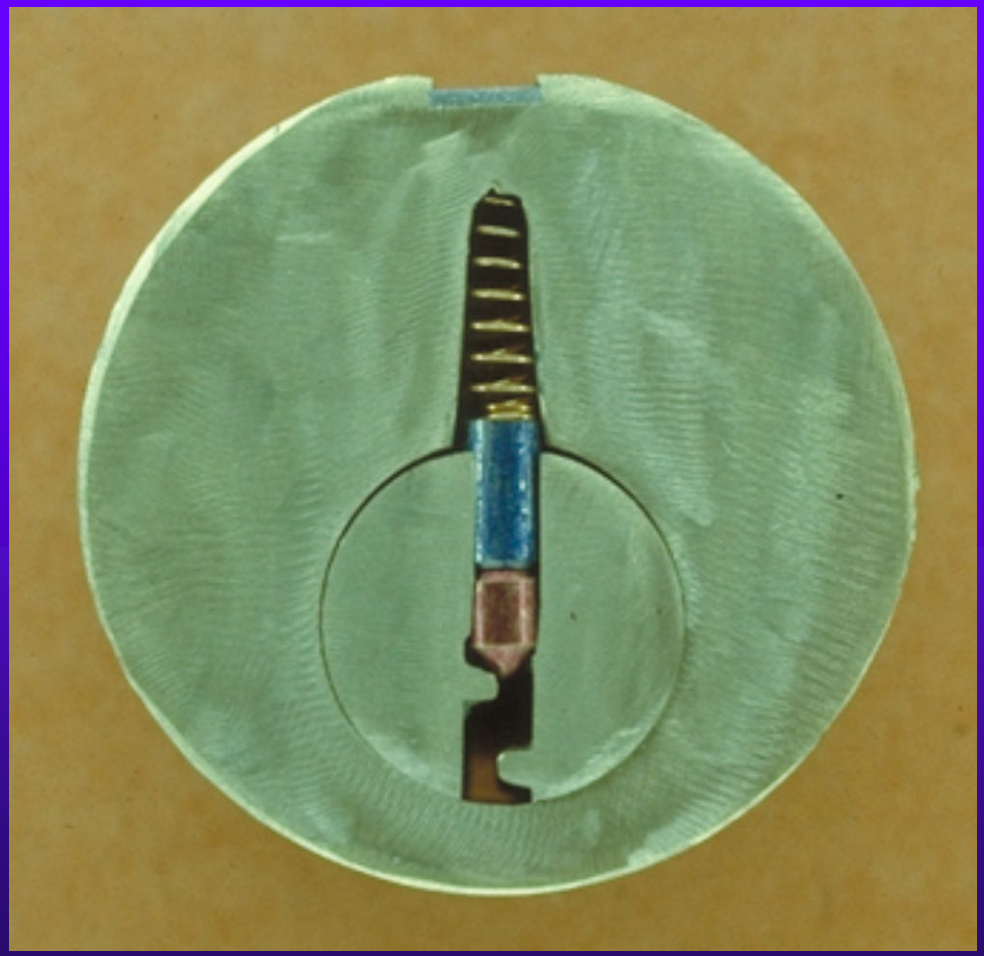
Top Pin Detail



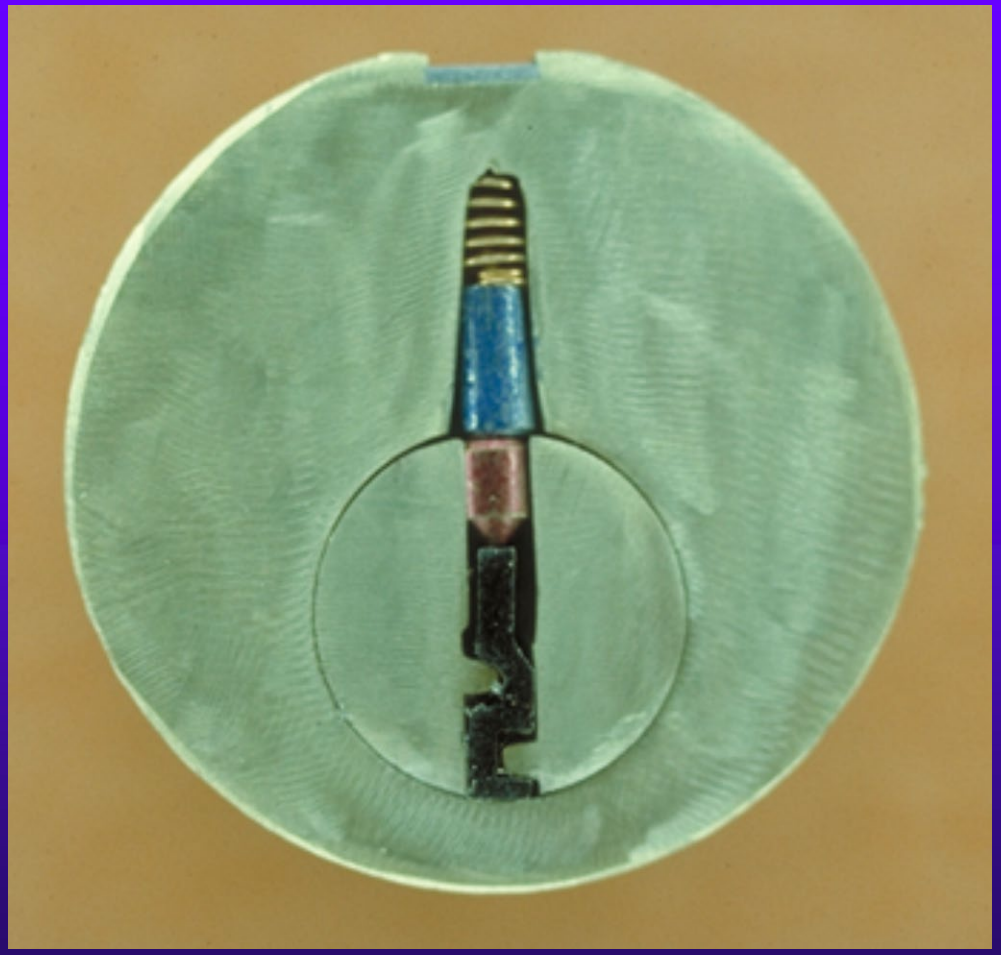
Shear Line



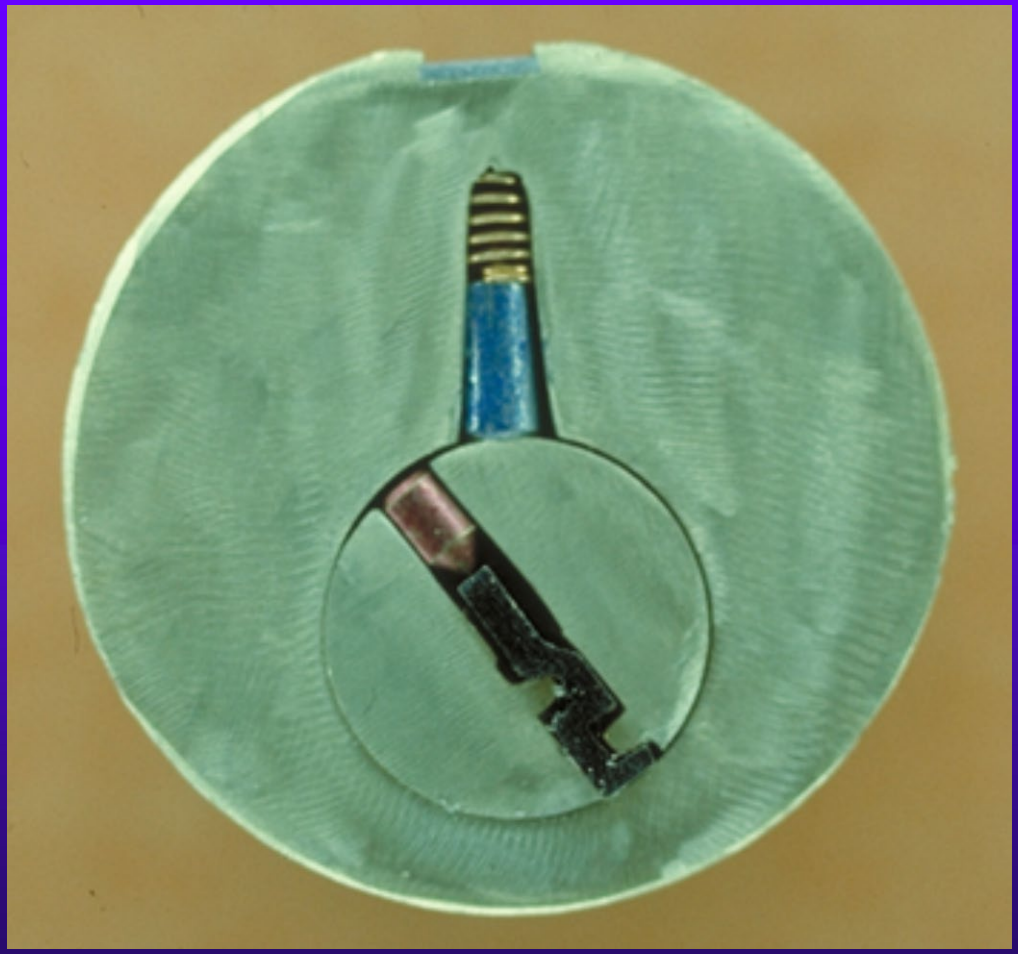
Locked



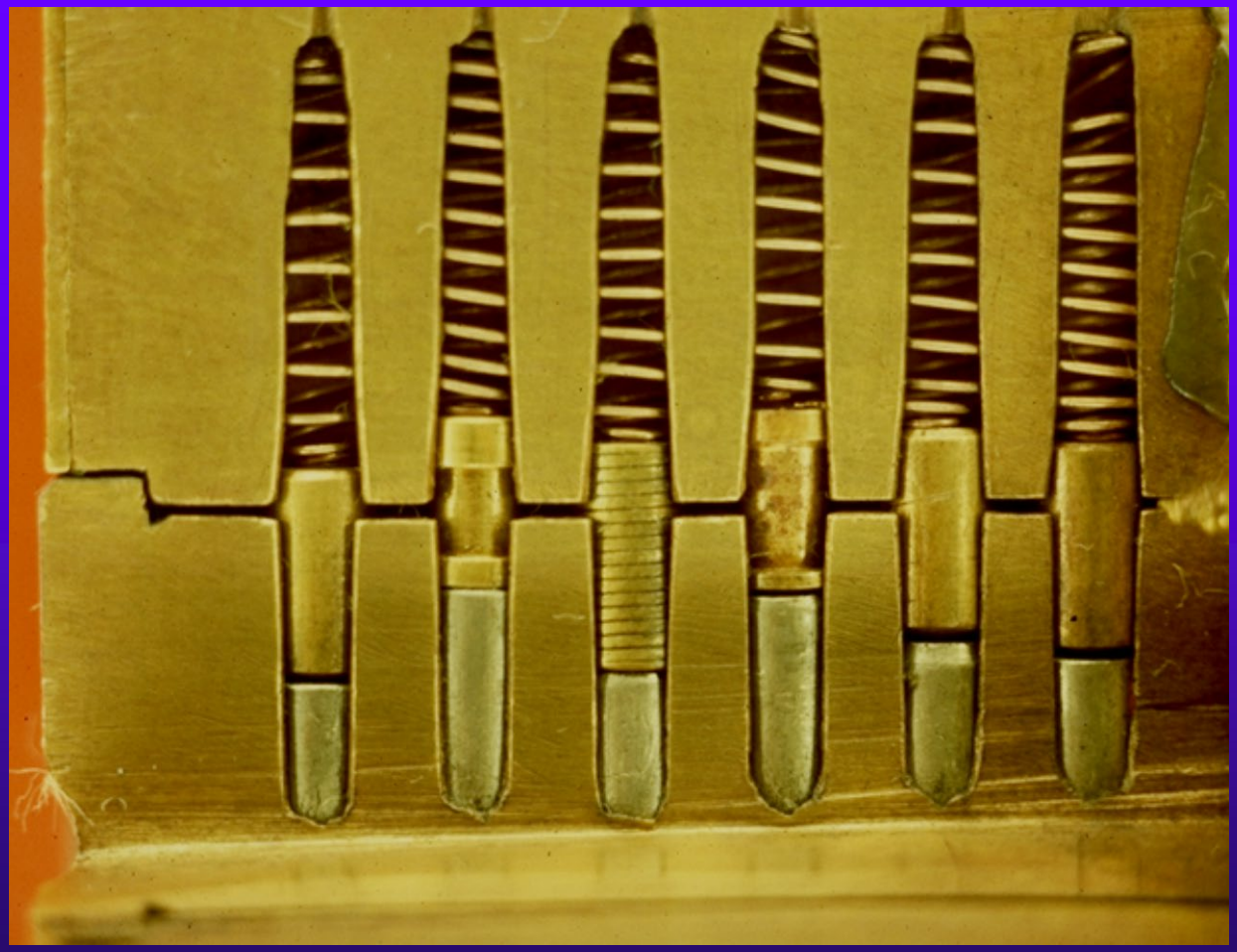
Pins at Shear Line



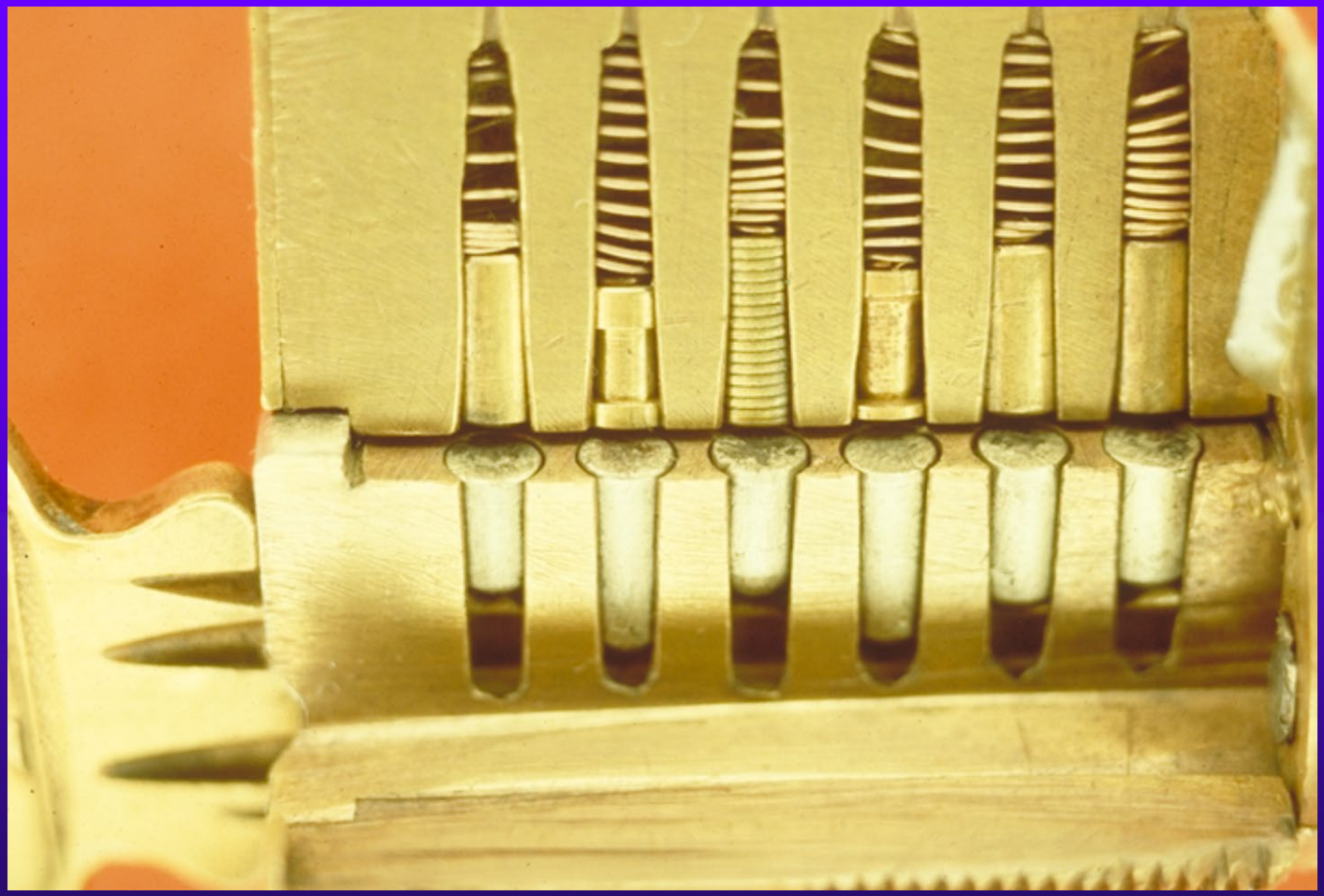
Plug Rotated



SECURITY PINS



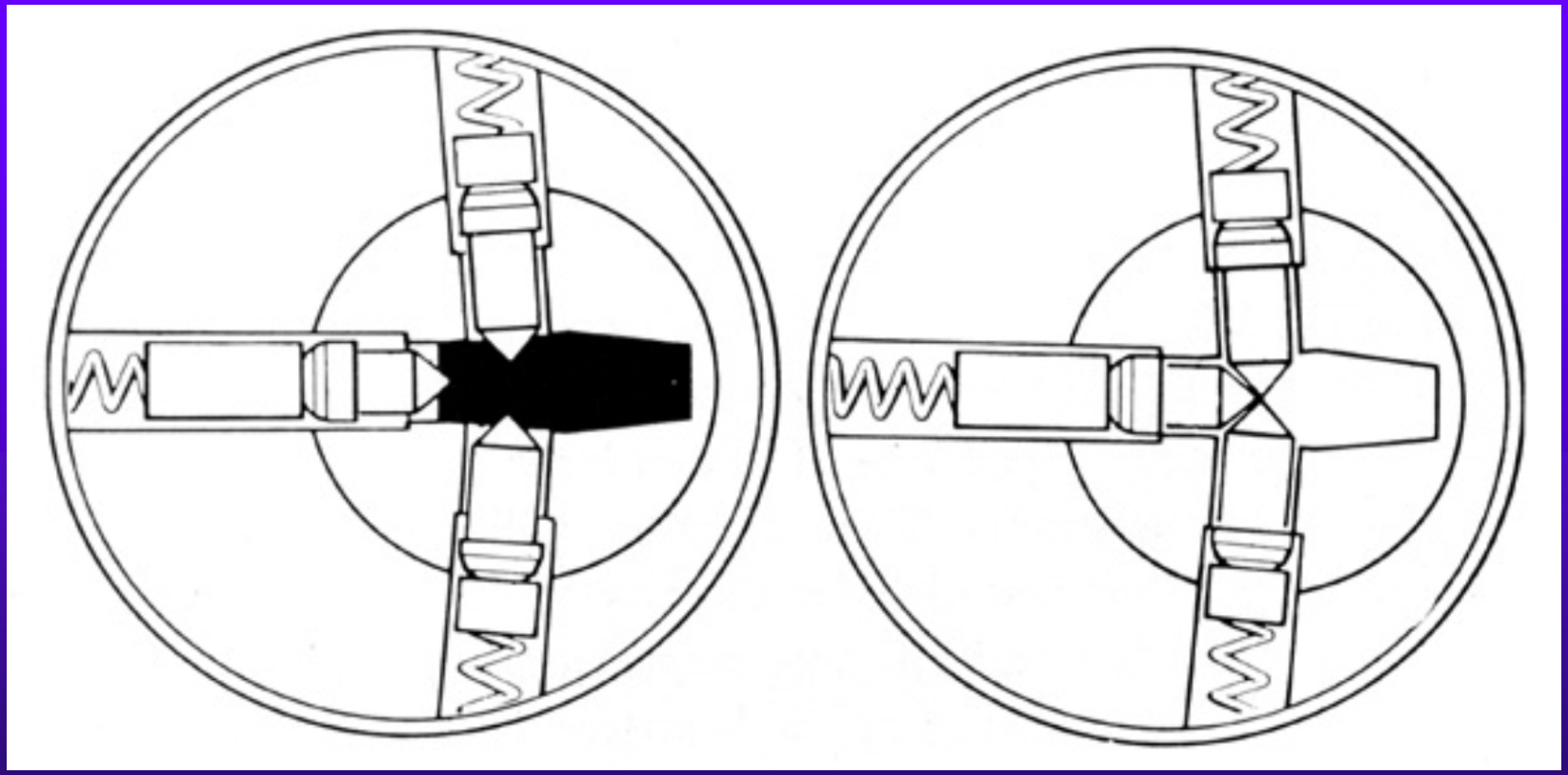
SECURITY PIN DETAIL



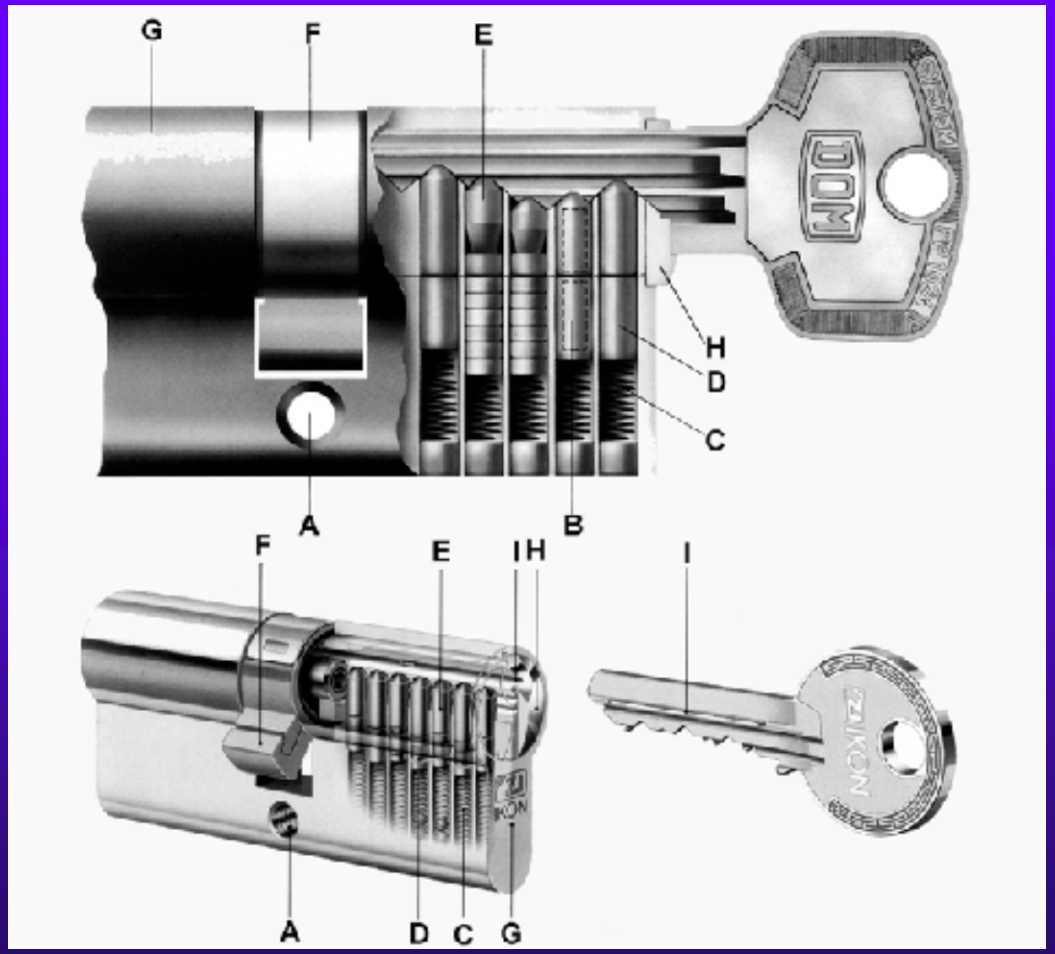
HYBRID LOCKS

- Dimple
- Magnetic
- Rotating disk
- Split sidebar
- Laser track
- Rotating pin and sidebar

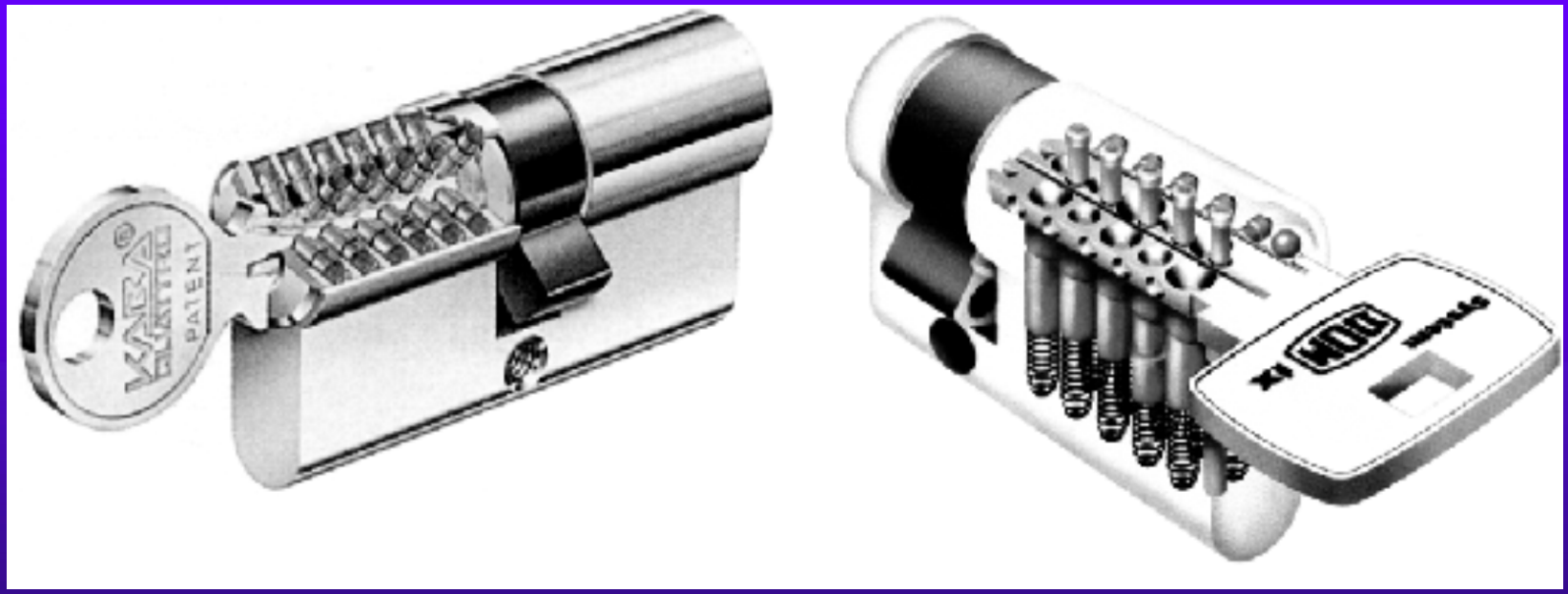
DIMPLE LOCK PIN DETAIL



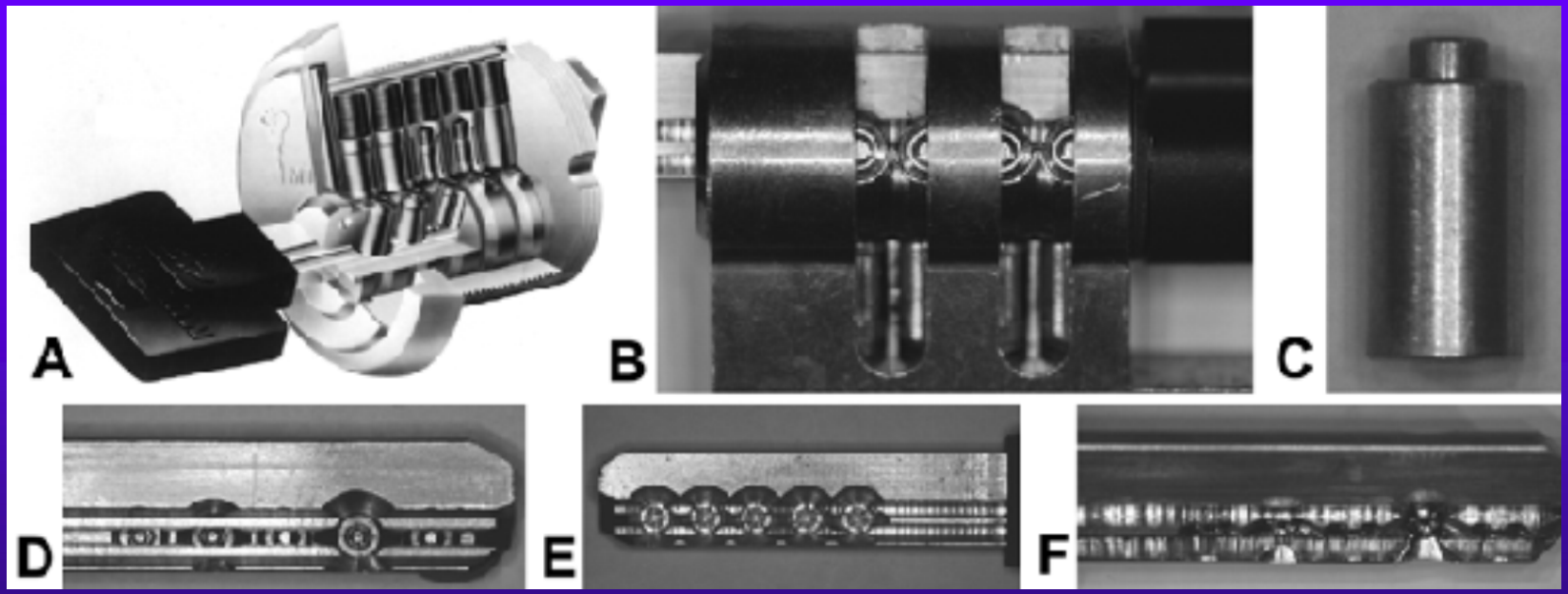
DOM PIN TUMBLER LOCK



DIMPLE LOCK BY DOM

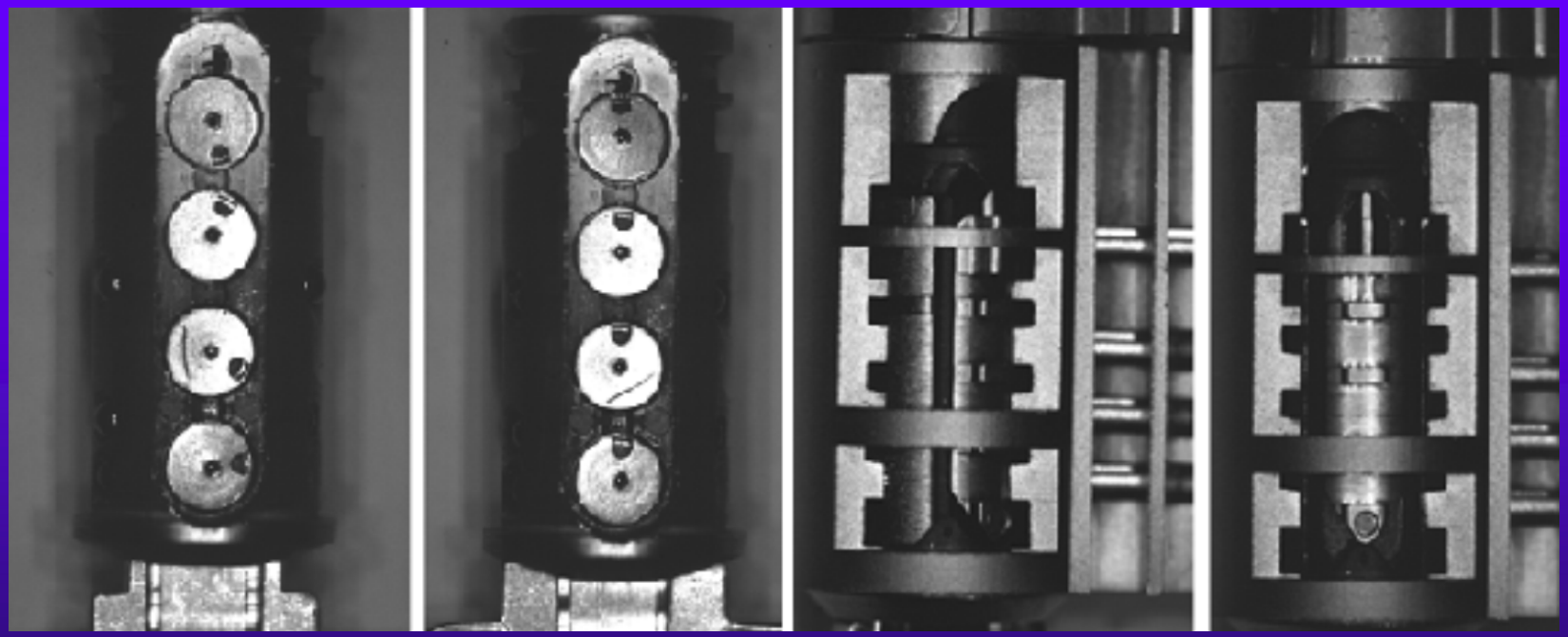


MUL-T-LOCK DIMPLE



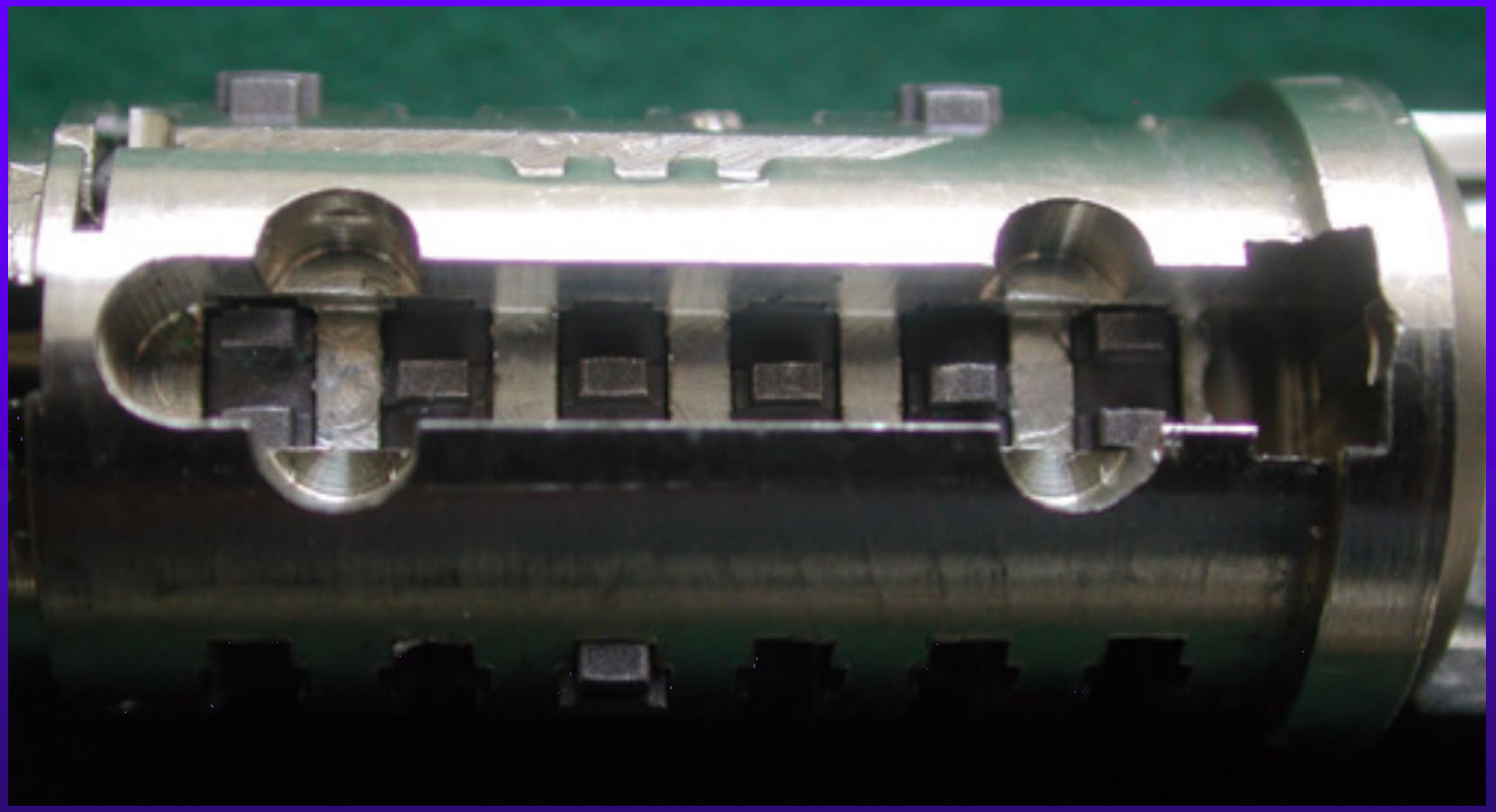
MAGNETIC SIDEBAR

IKON Magnetic Detail

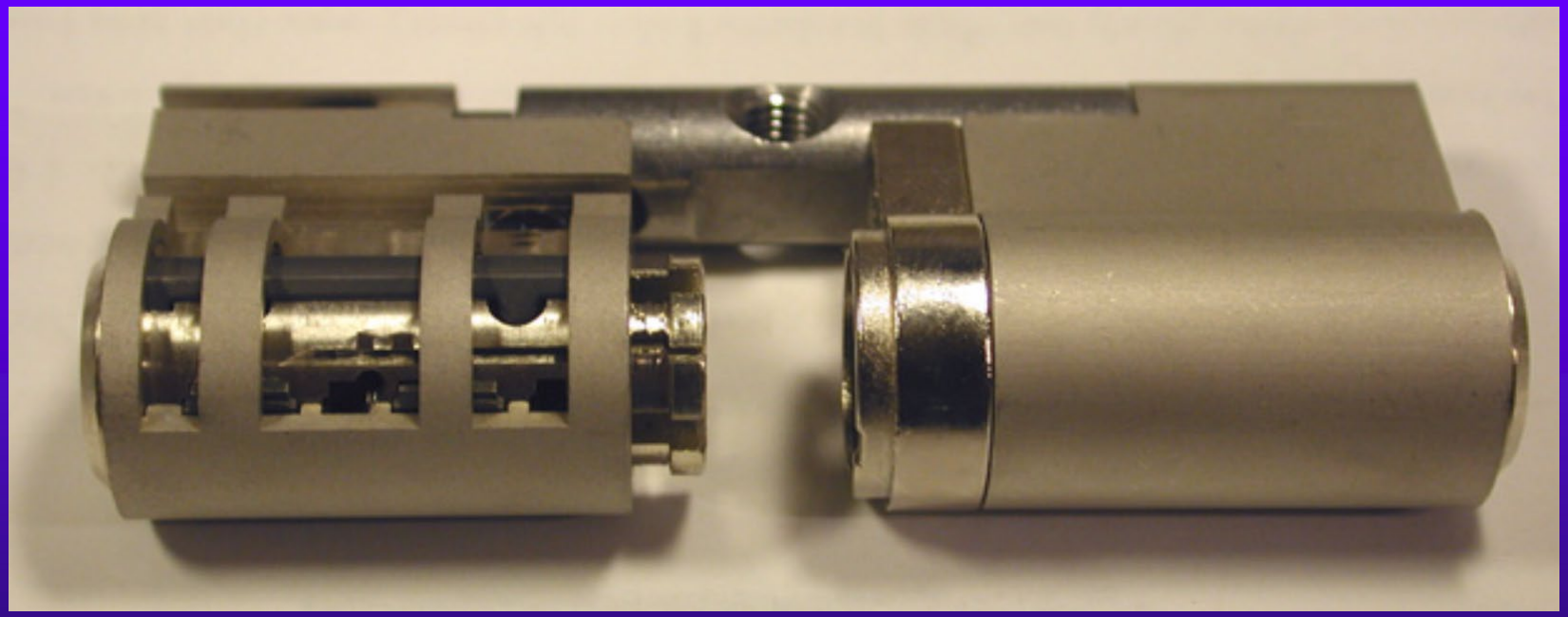


LASER TRACK – EVVA 3KS

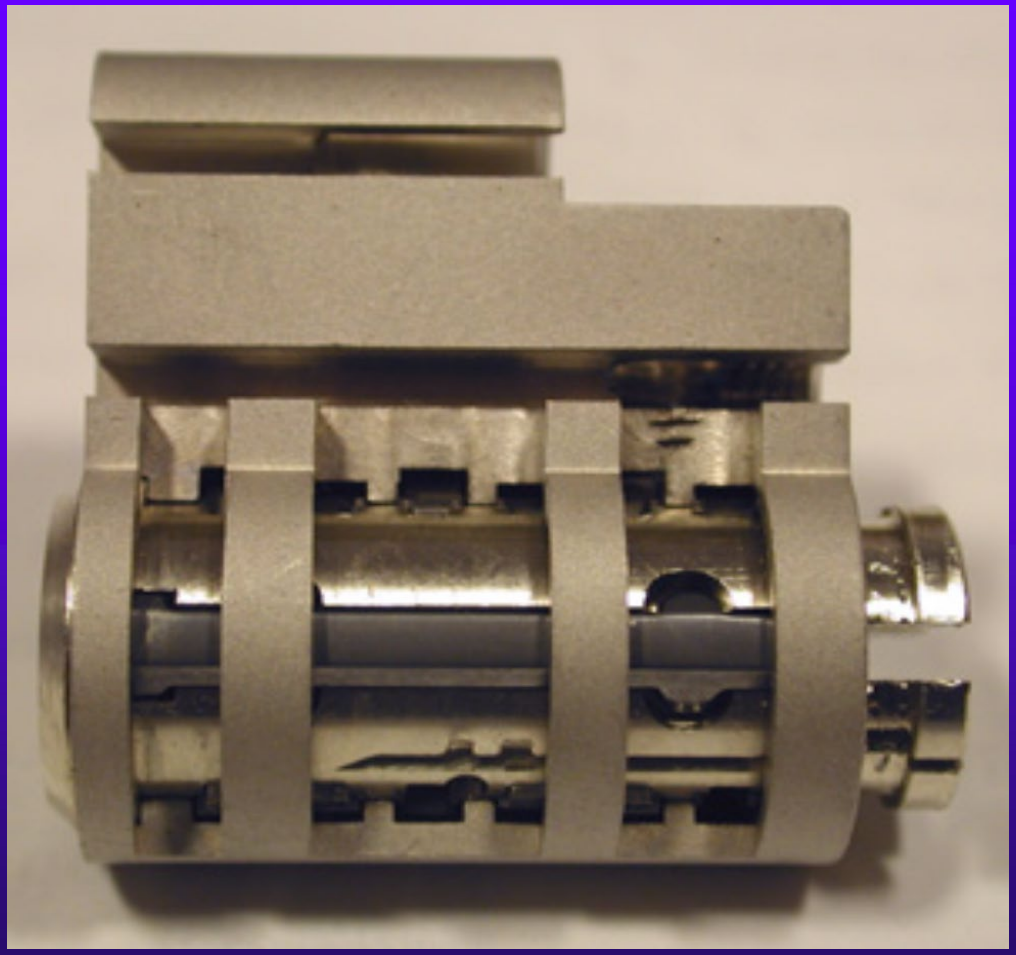
3KS Sidebar Locking Principle



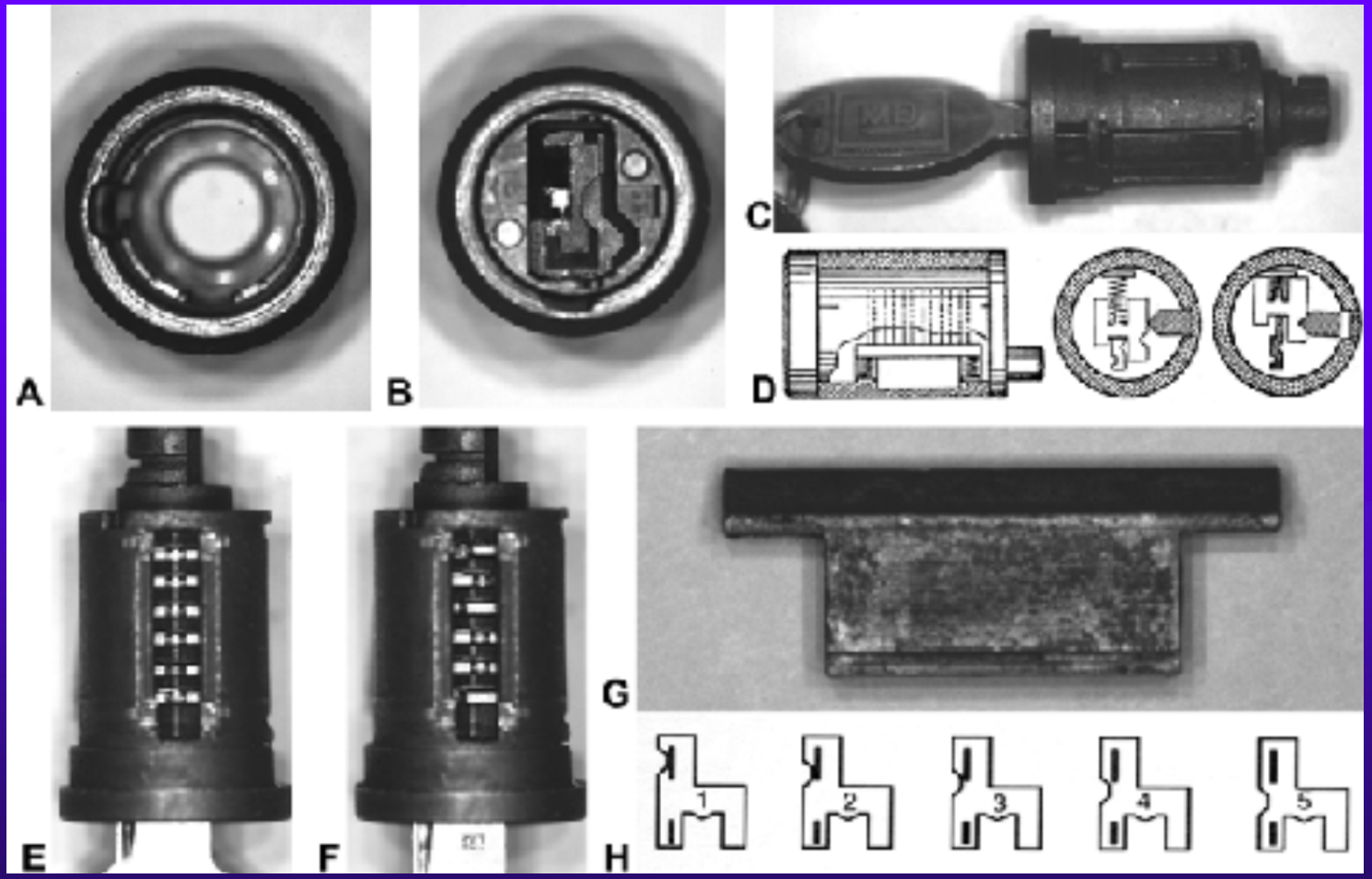
3KS Locked Cylinder



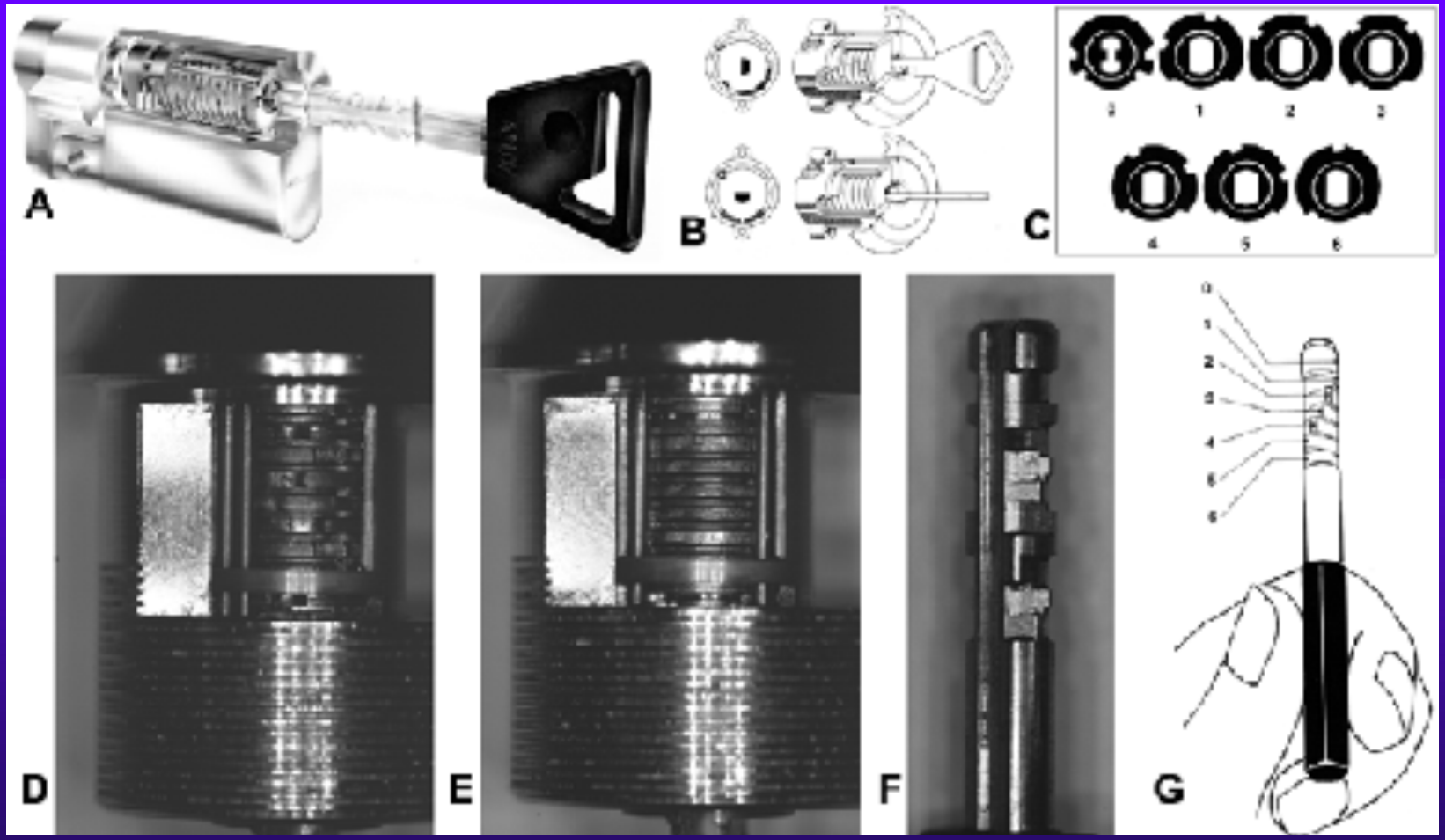
3KS Unlocked Cylinder



G M SIDEBAR



ABLOY ROTATING DISK



BYPASS OF LOCKS

- Many methods
- Sophisticated and simple
- Often Manufacturers do not know of techniques
- Low to high skill
- Never say Never!

PRIMARY BYPASS TECHNIQUES

- Picking
- Decoding
- Impressioning

BYPASS TECHNIQUES

- Mechanical Bypass
- Core Shimming
- Pin and Cam
- Pick and form – foil
- Stack Probing – length of pin stack
- Sac probing – break points

More Bypass Techniques

- Electronic decoding
- Plasticine reading
- Auto impressioning using foil
- Tryout keys
- Shim wire decoding
- Radioscopy
- Borescope

More Bypass Techniques

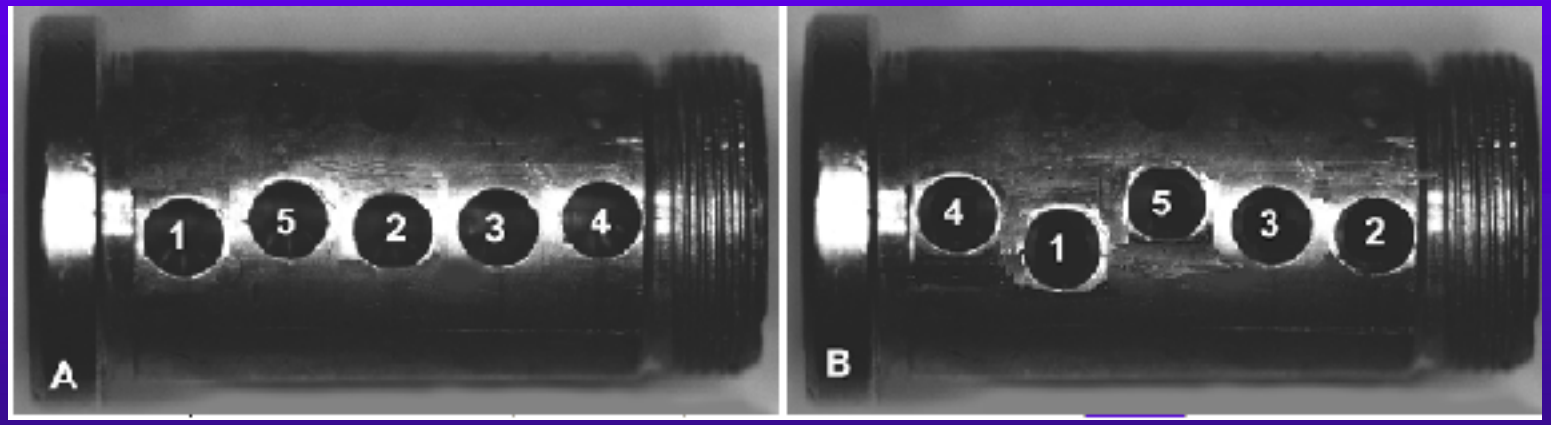
- Belly Reading
- Skeleton keys
- Comb pick
- Rapping
- Scratch reading of levers
- Vibration techniques
- Auto manipulation of components
- Combination of techniques

More Bypass Techniques

- Rocking with computer picks
- Pick guns
- Special pick and decode tools
- Cross keys
- Electronic signature analysis

PICKING TOOLS

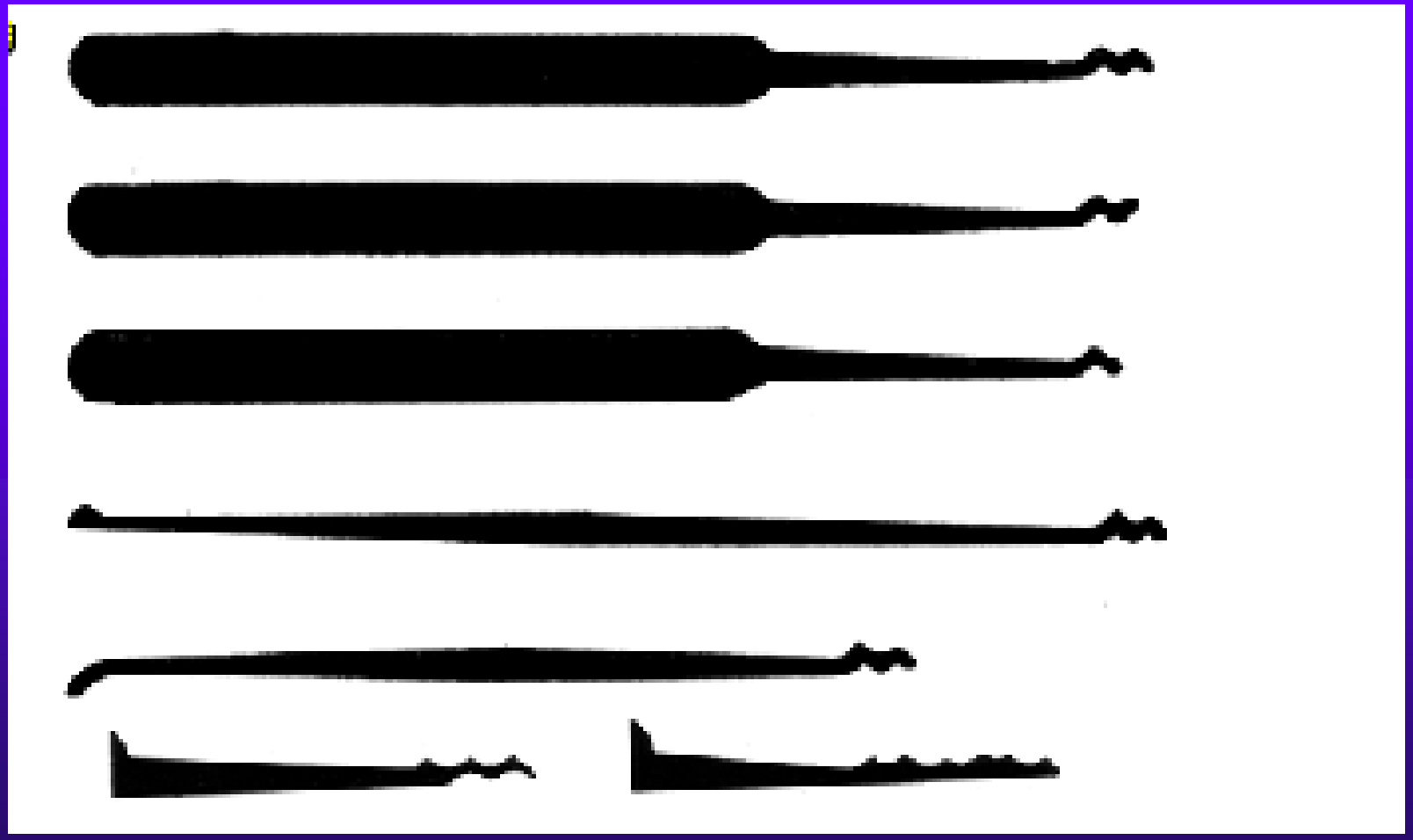
- What is Picking?



PICKING A CYLINDER APPLY TENSION

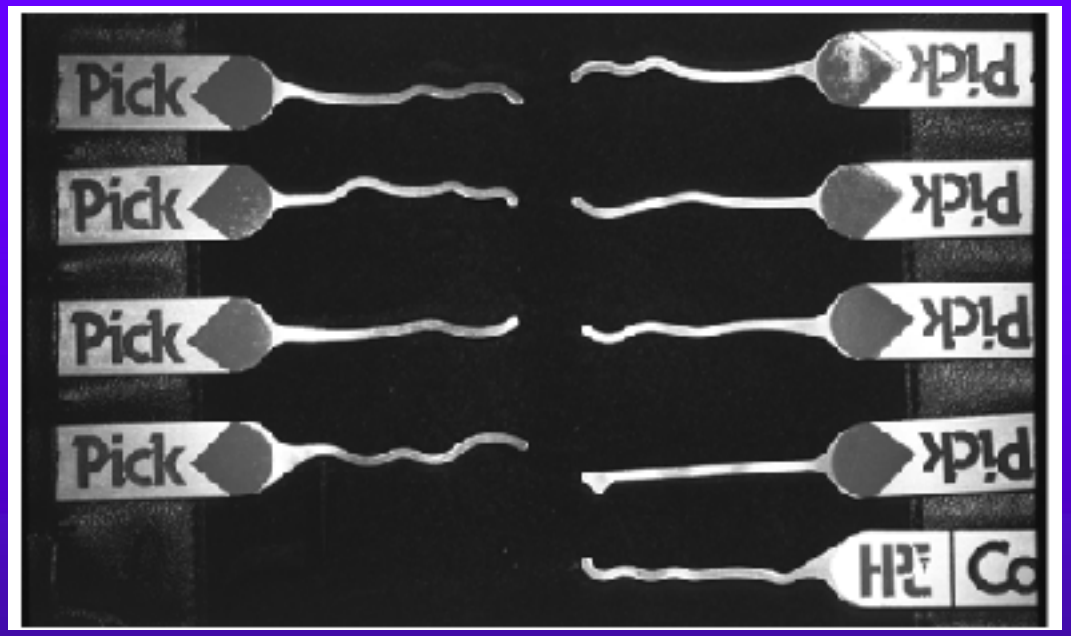
Move Pins with Pick

BASIC PICKS

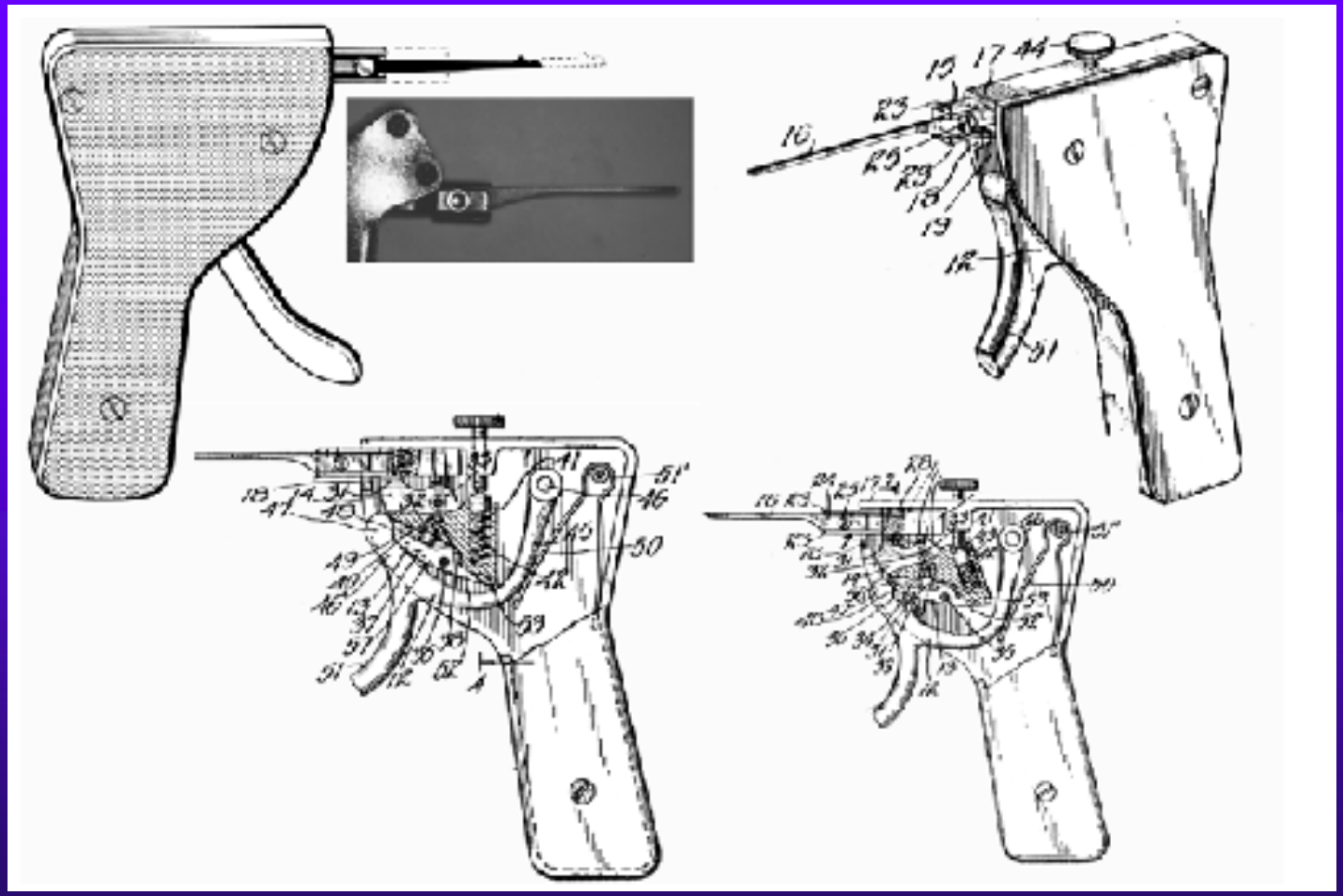


PICK SET – PROFESSIONAL

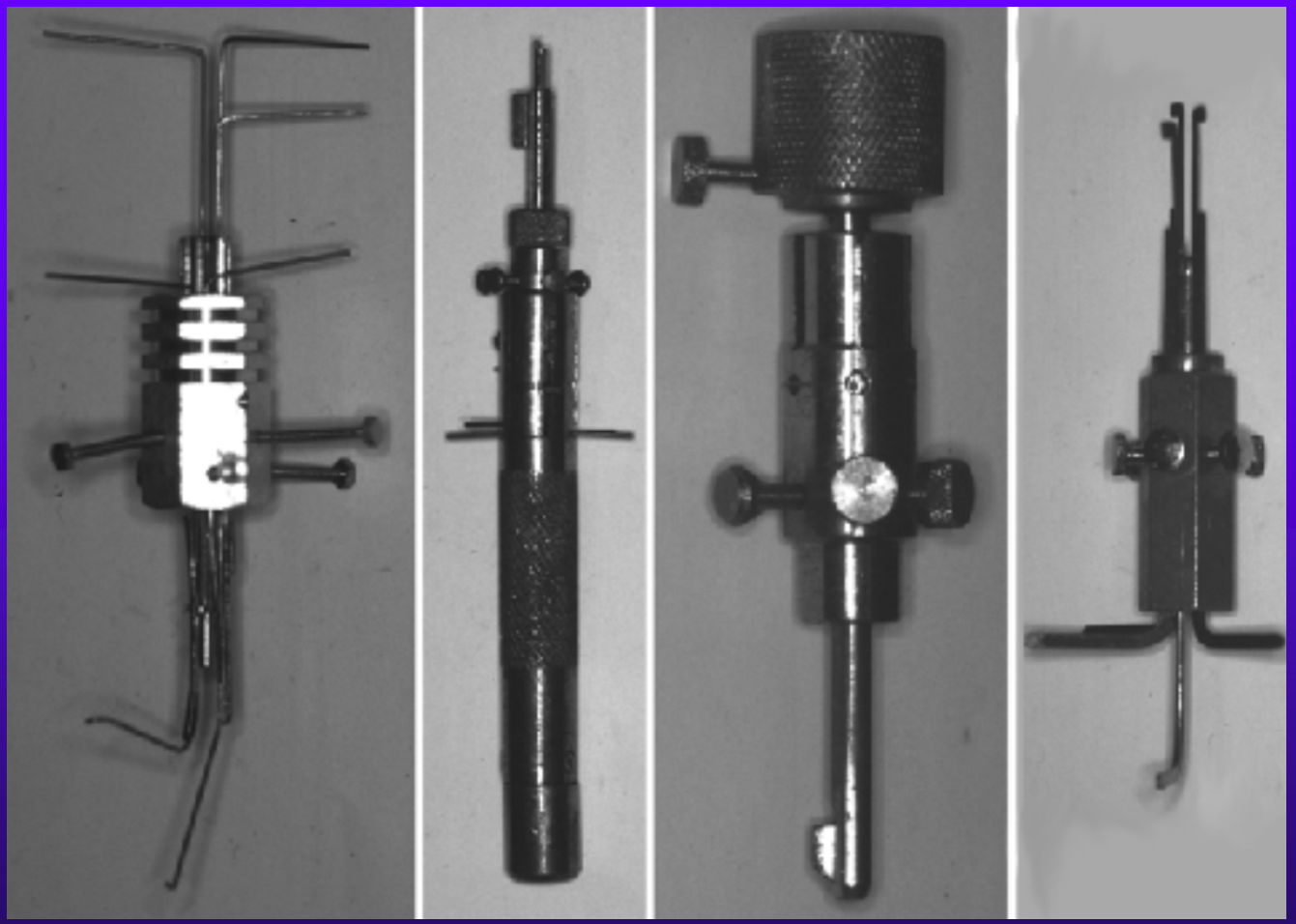
COMPUTER PICKS



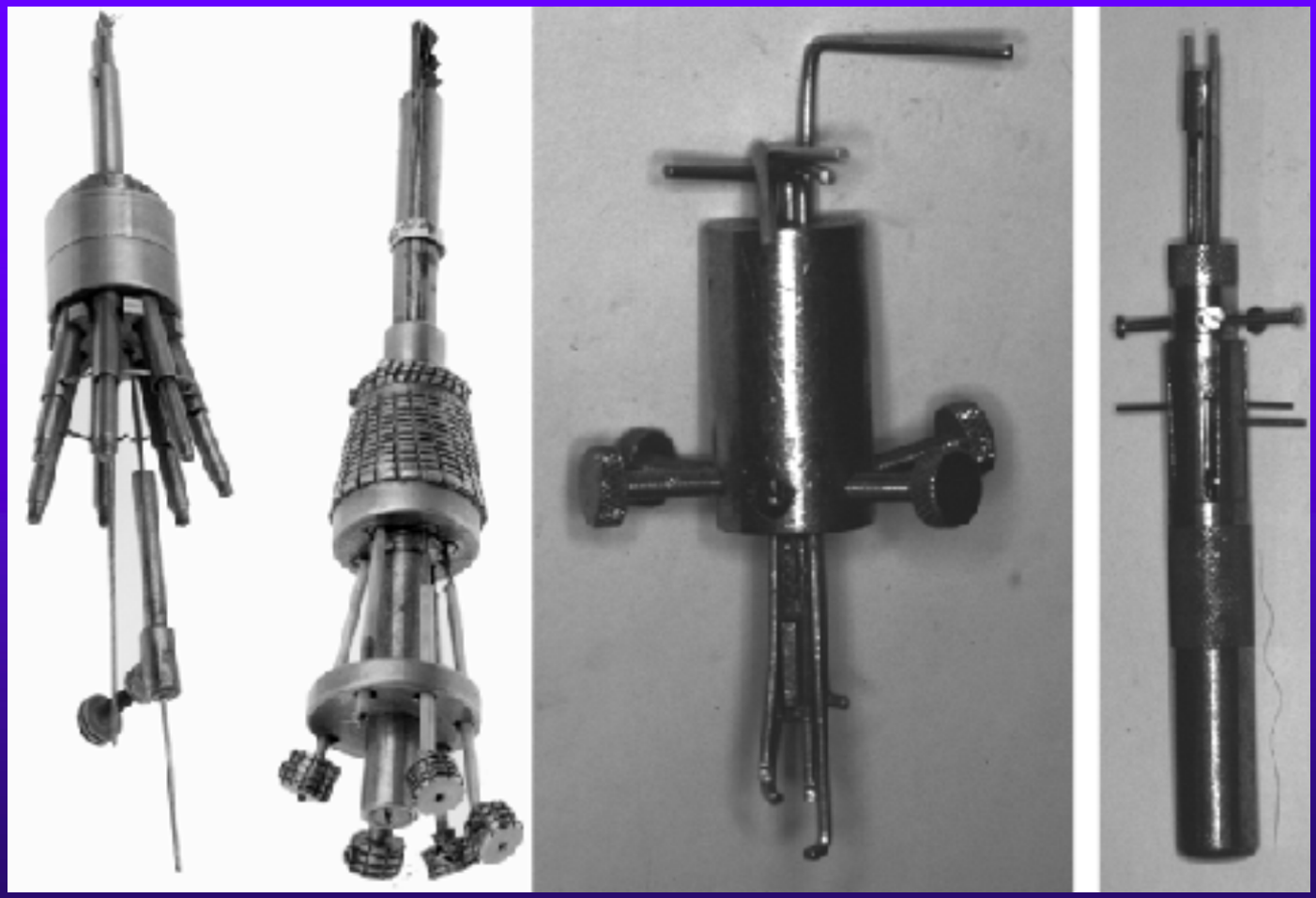
PICK GUNS



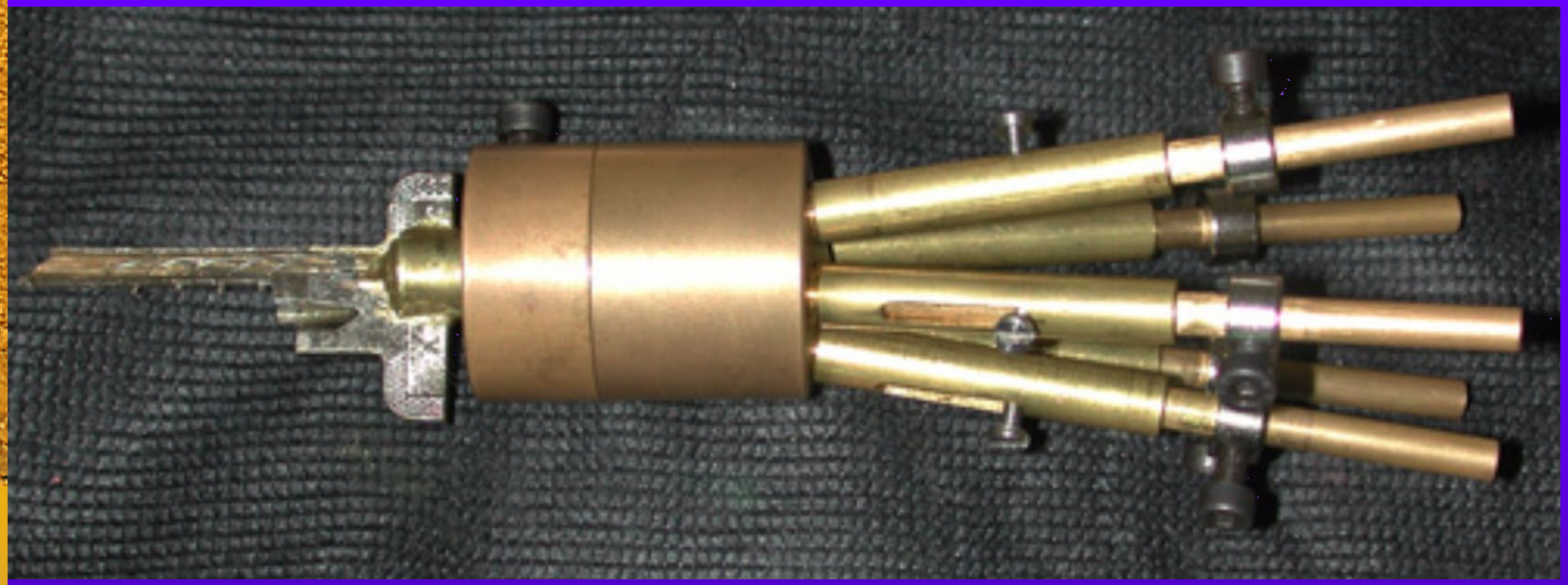
SPECIAL PICKS

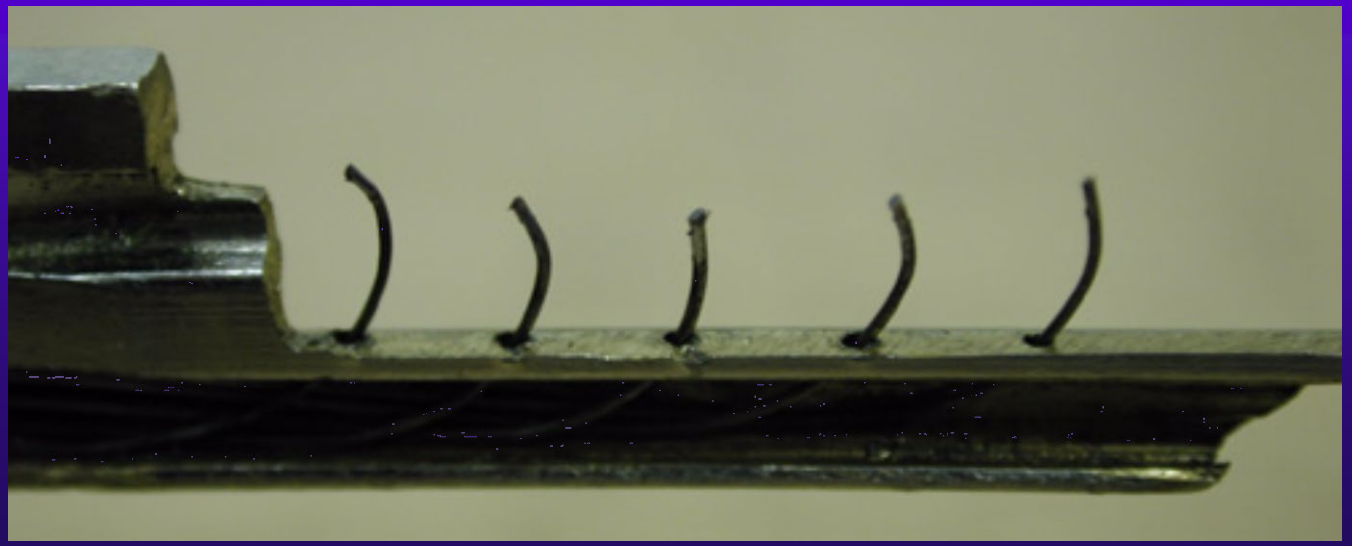


More Special Picks – Europe

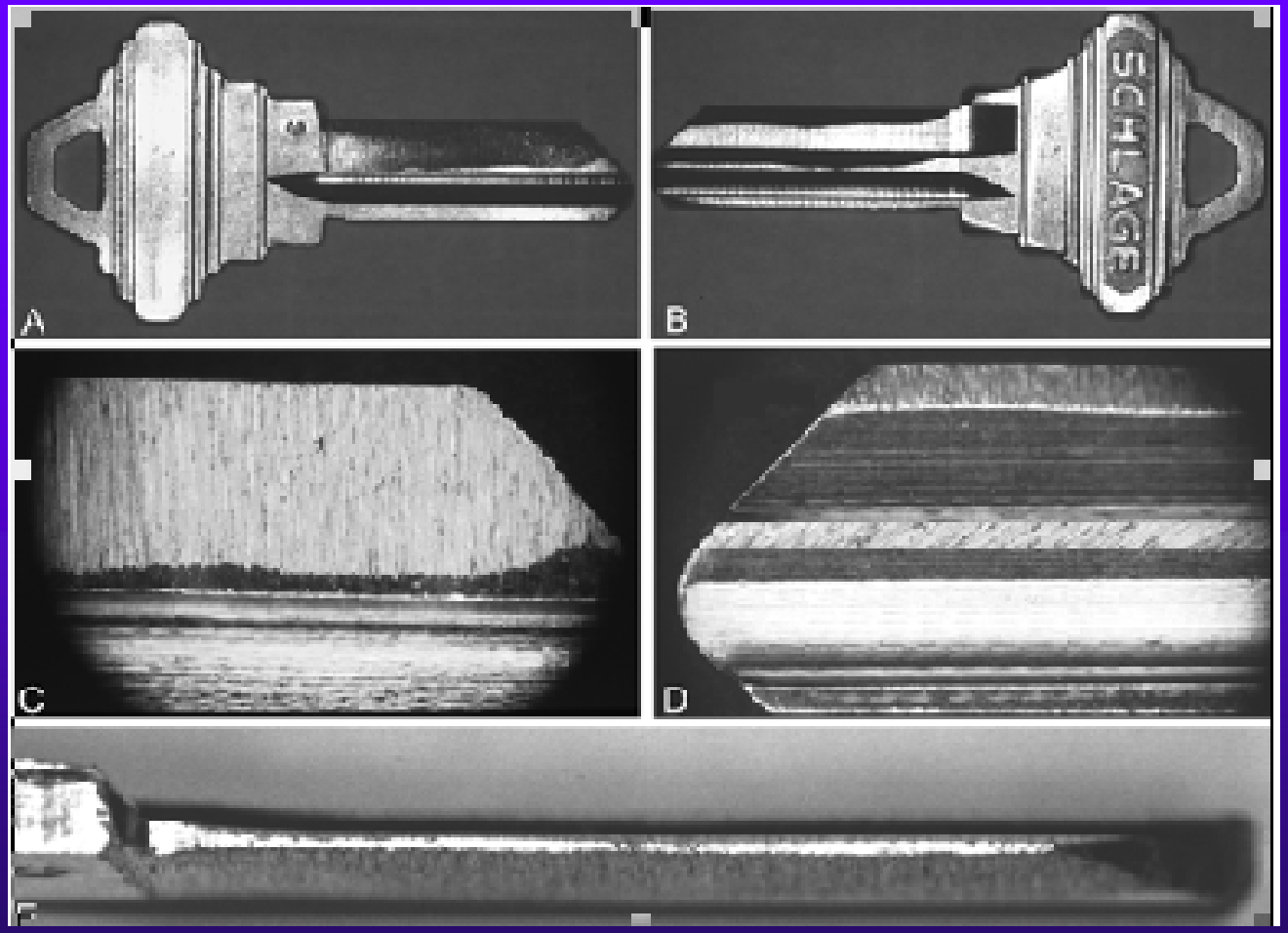


SPUTNIK PICK

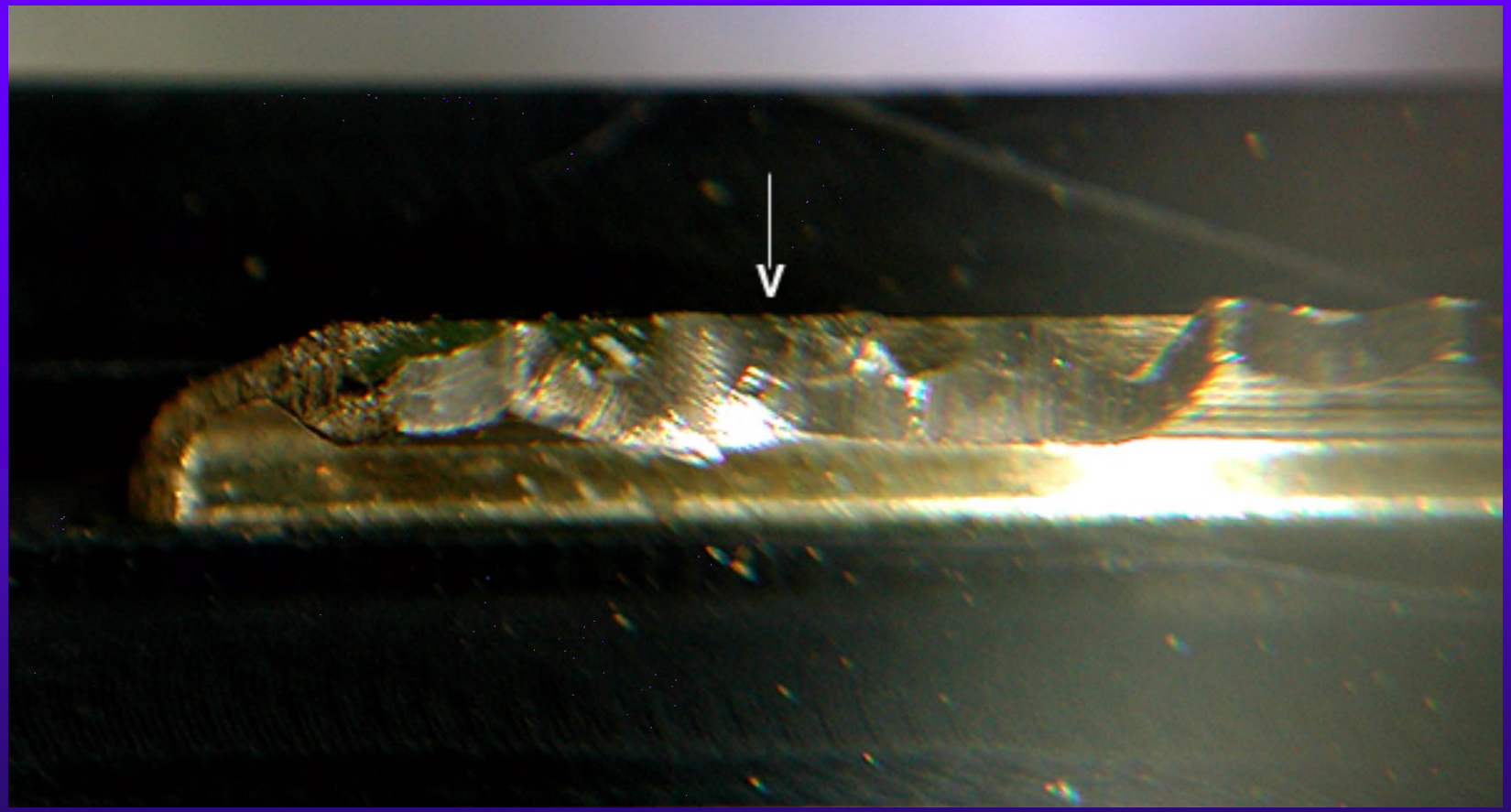




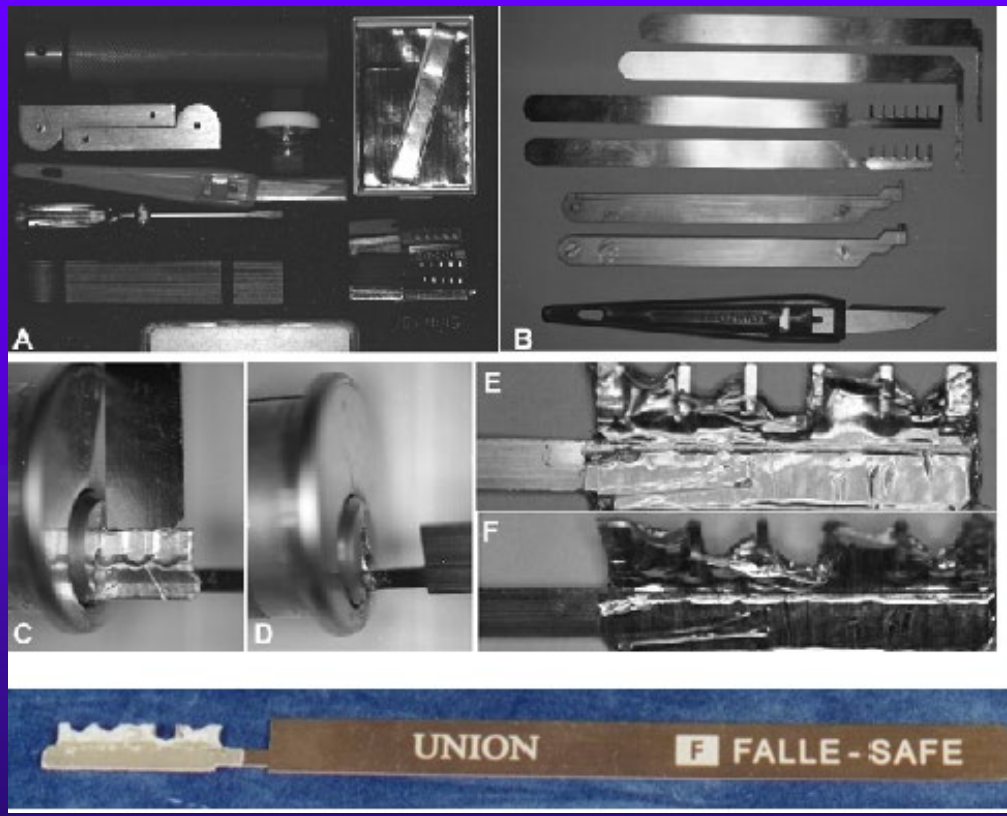
IMPRESSIONING



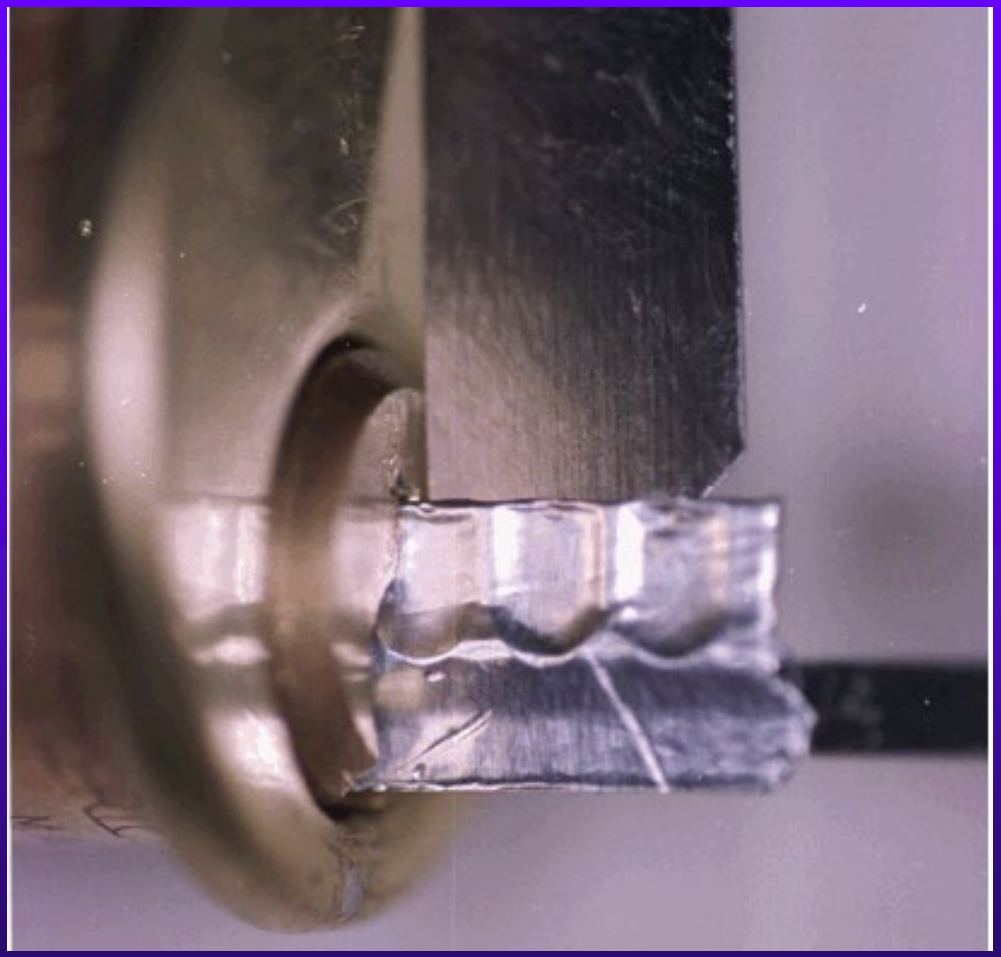
Marks are Produced



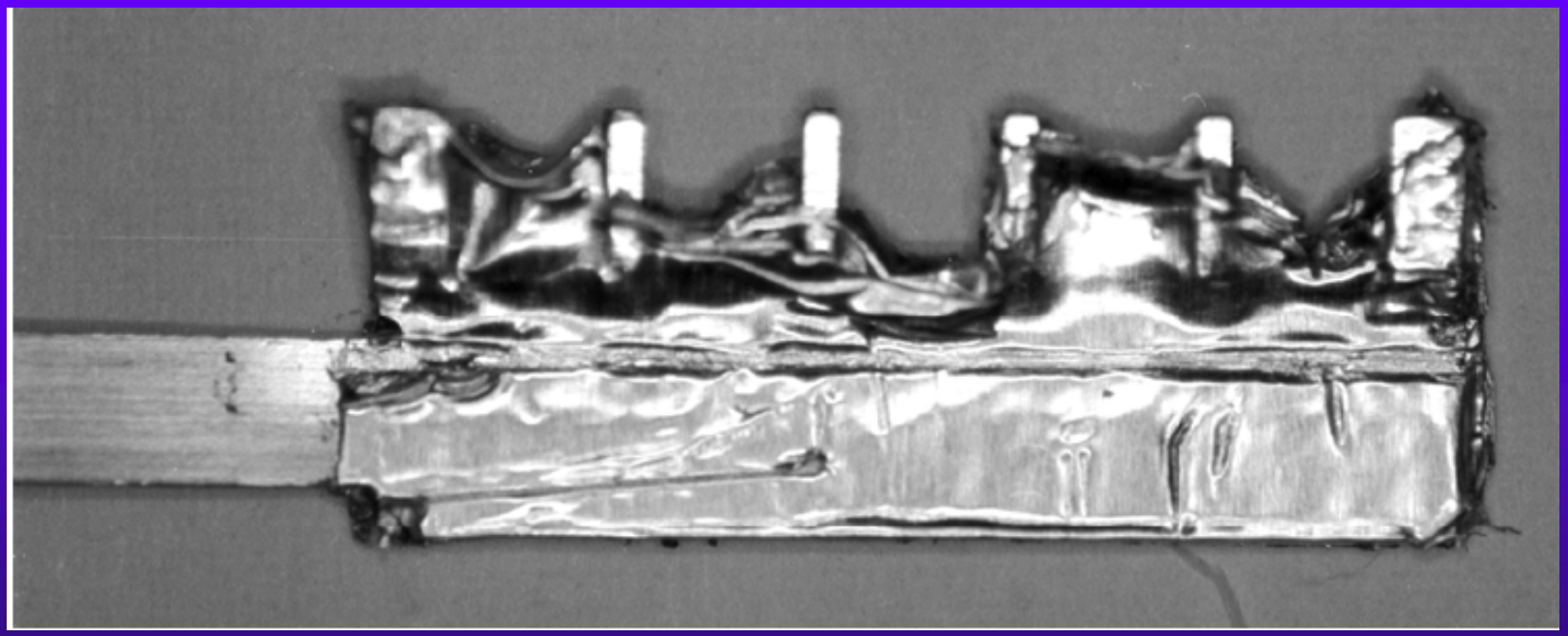
FOIL IMPRESSIONING TOOLS



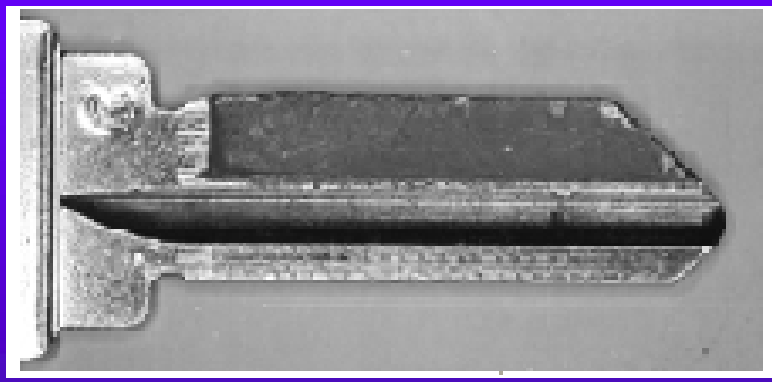
Foil Blank Key is Inserted

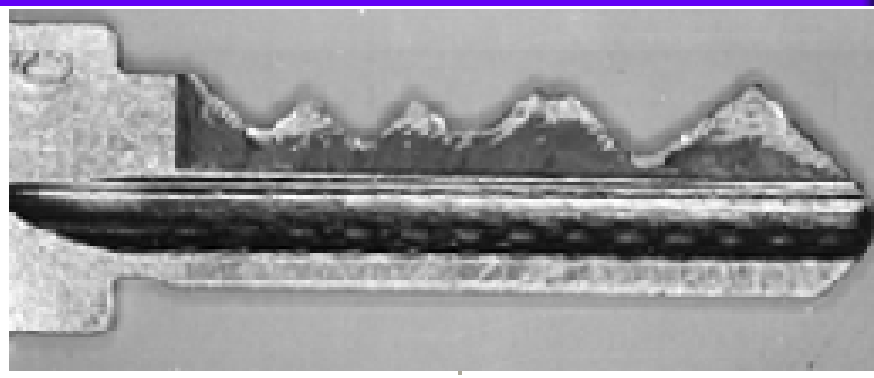


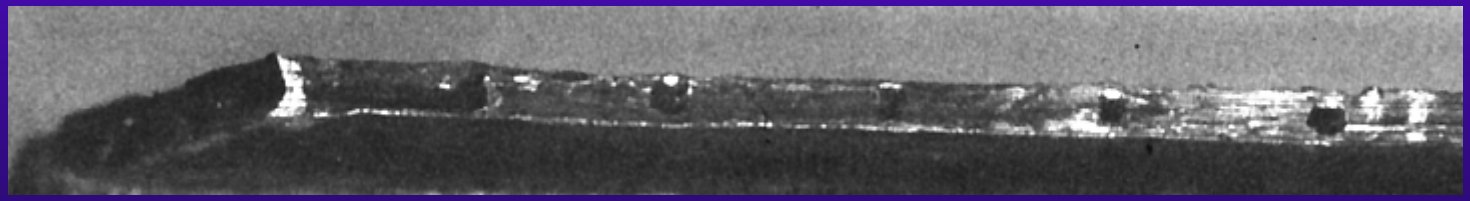
Foil Key is Produced



LEAD COMPOSITE IMPRESSIONING







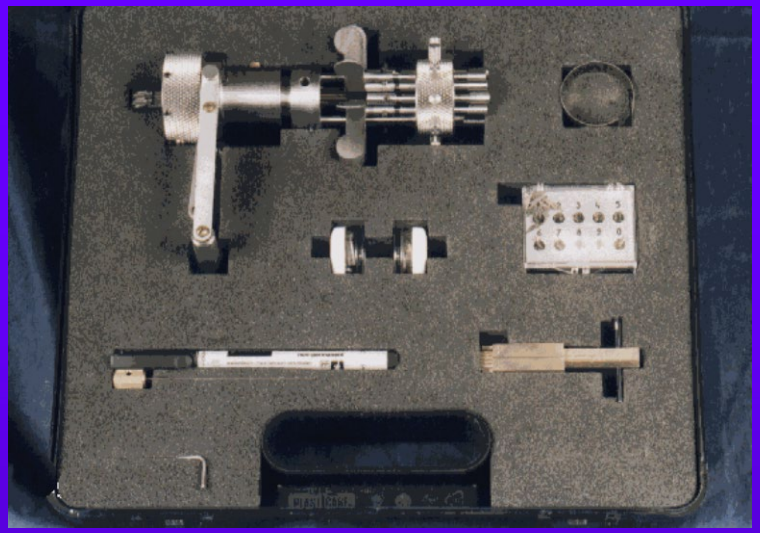
DECODING OF LOCKS

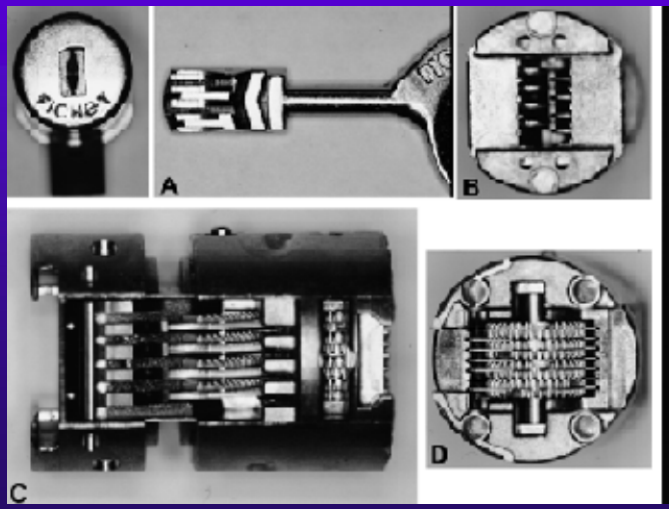
Many techniques

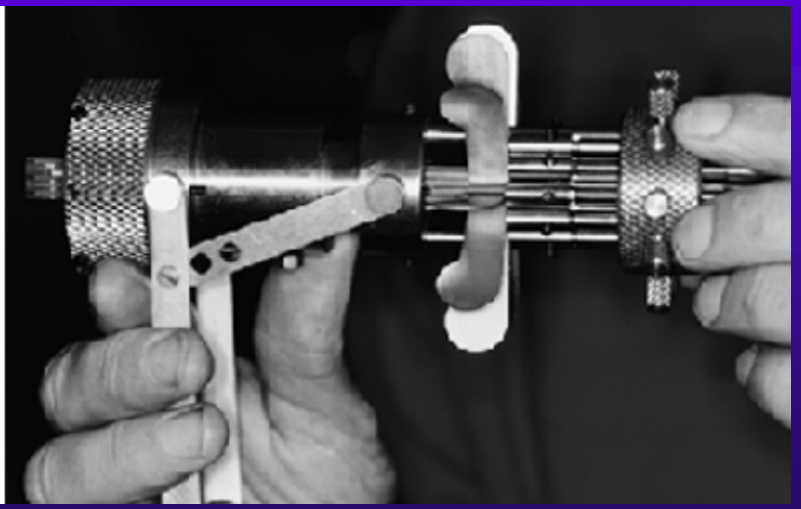
Many specialized tools

Derive key codes to simulate or generate a key

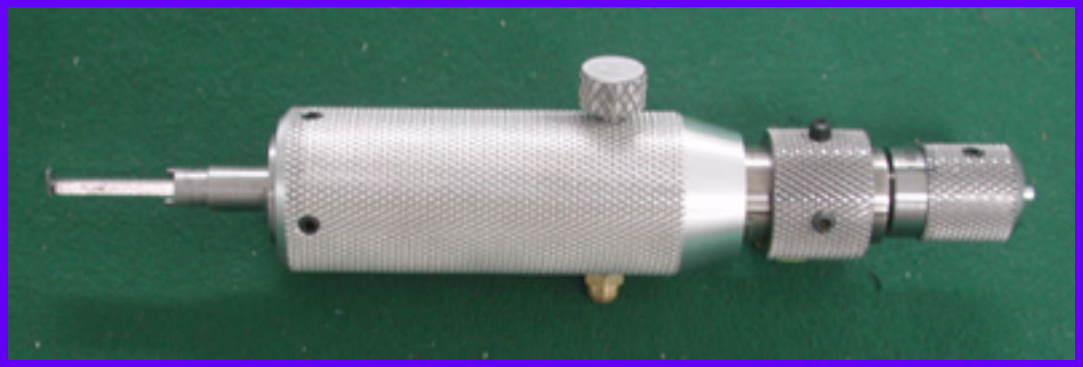
DECODING OF LOCKS

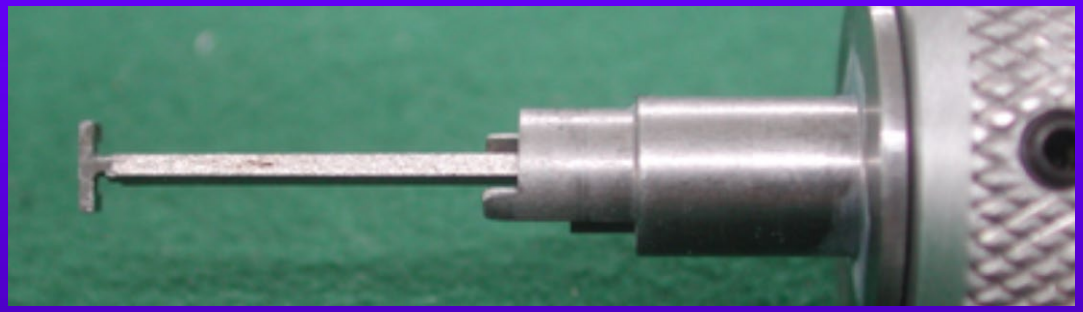




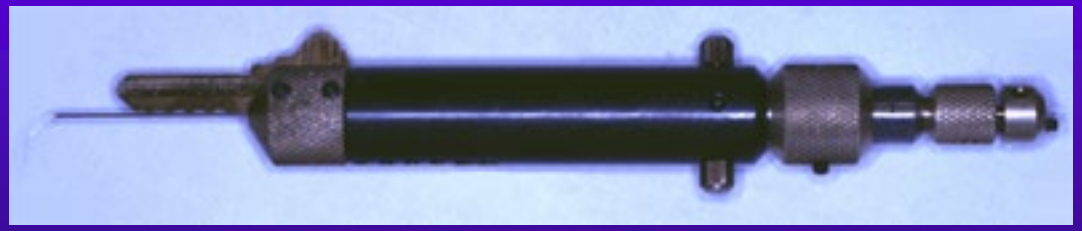


DECODING OF LOCKS





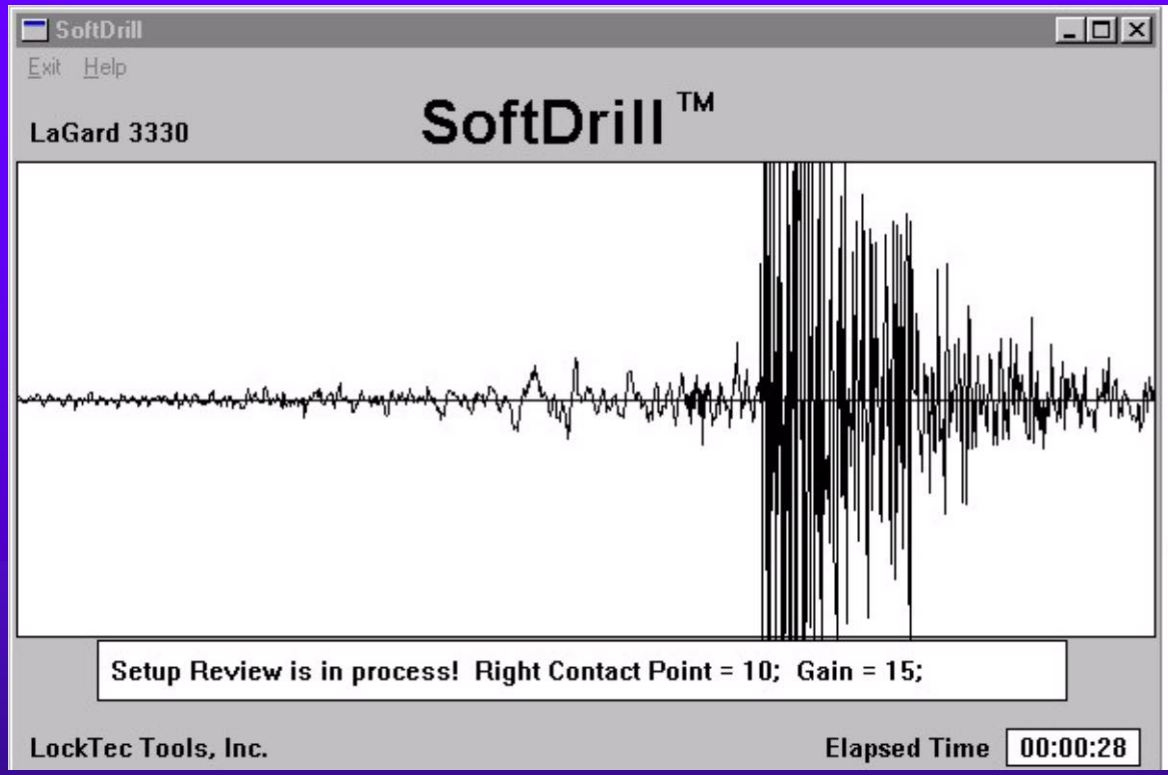
DECODING OF LOCKS



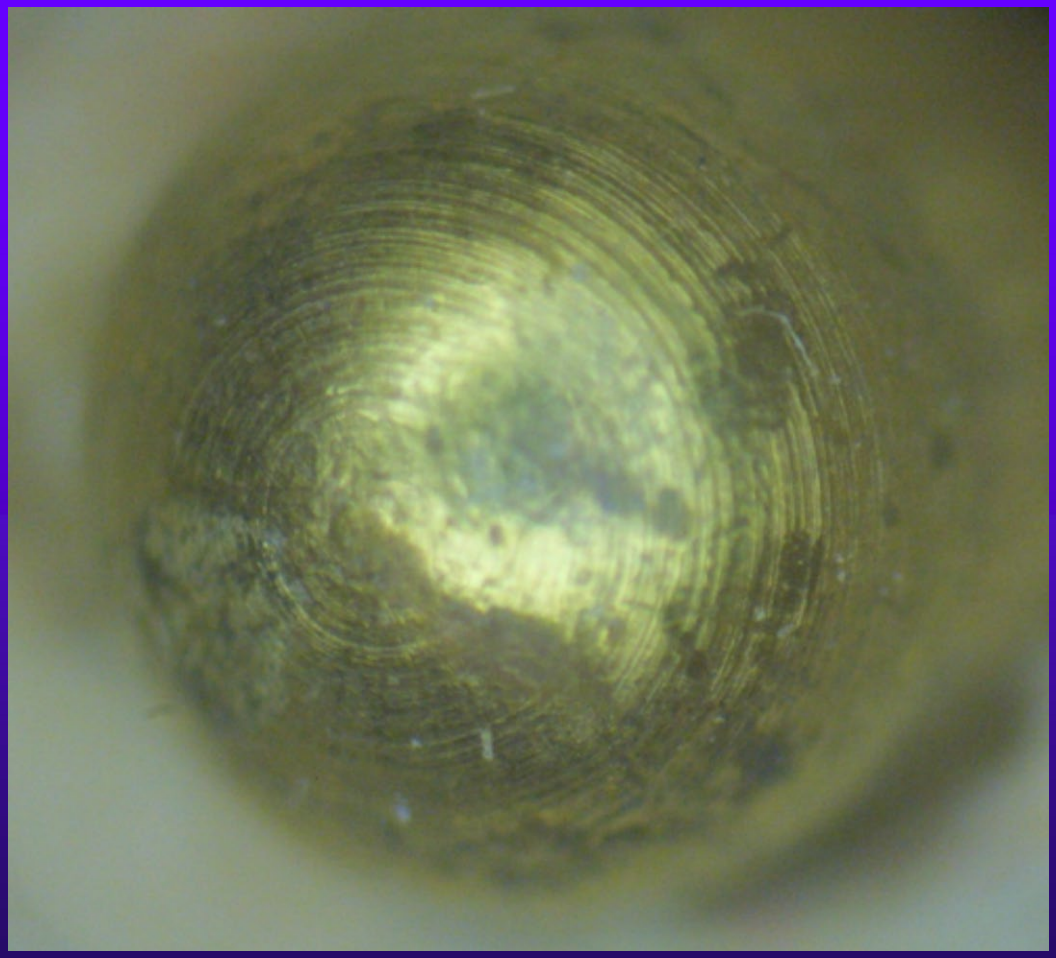
Variable Key Generation

MANIPULATION OF COMBINATION LOCKS

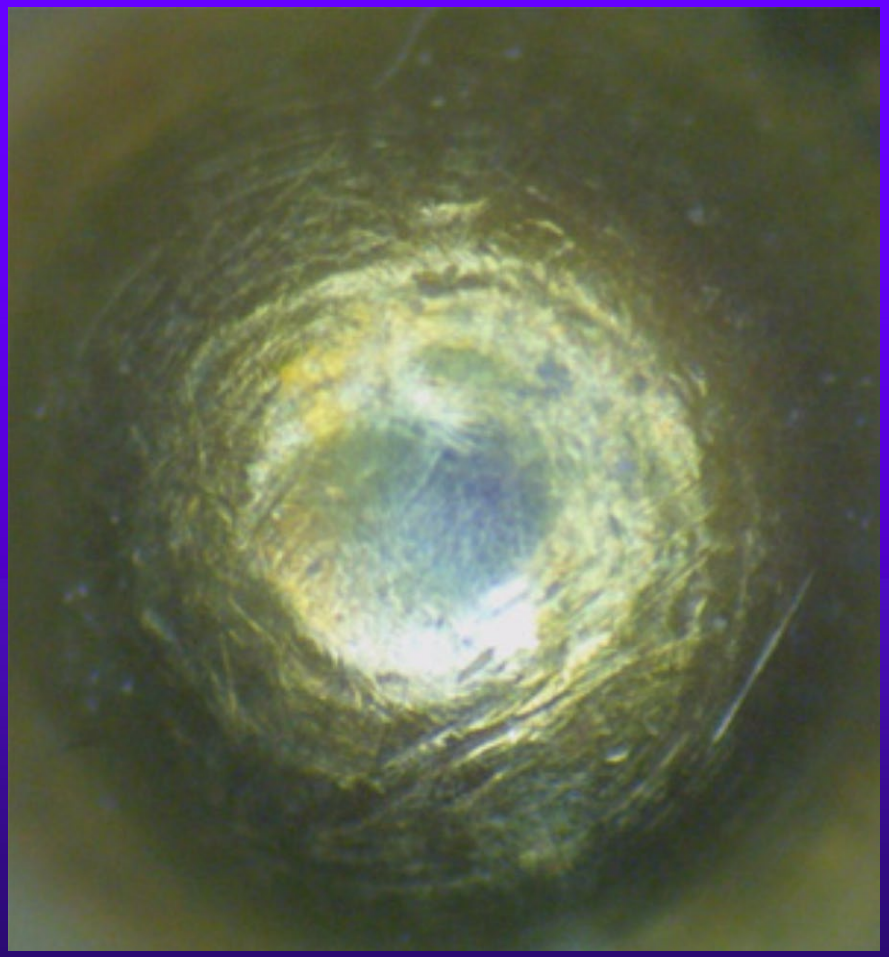
Soft Drill Output Data

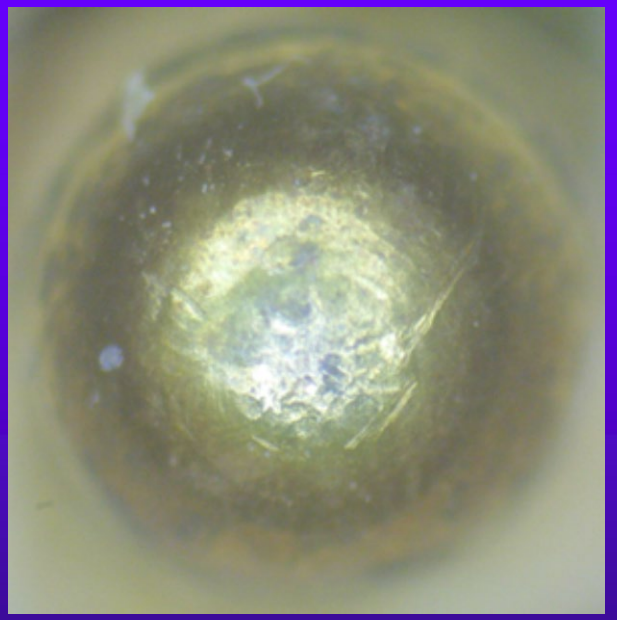


FORENSIC INDICIA OF BYPASS

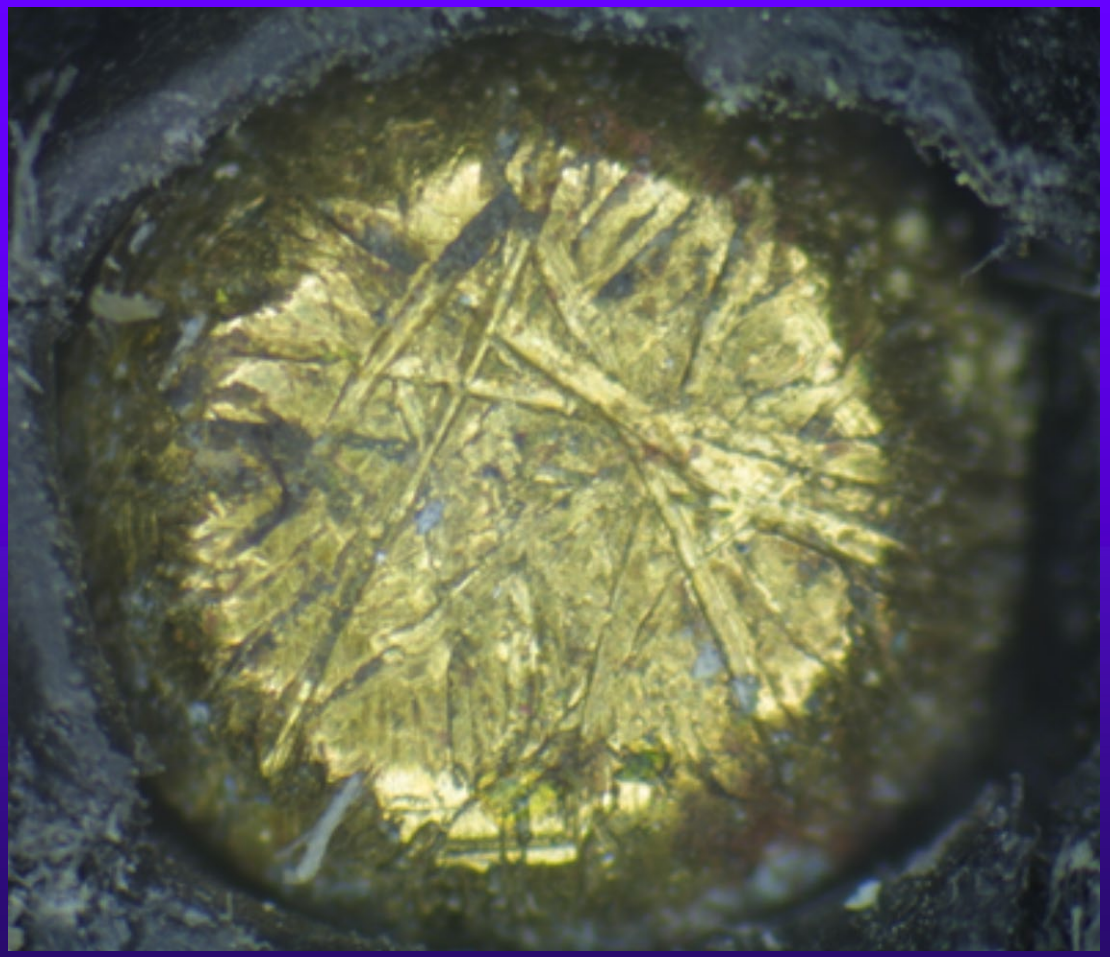


Pick Marks on Pin

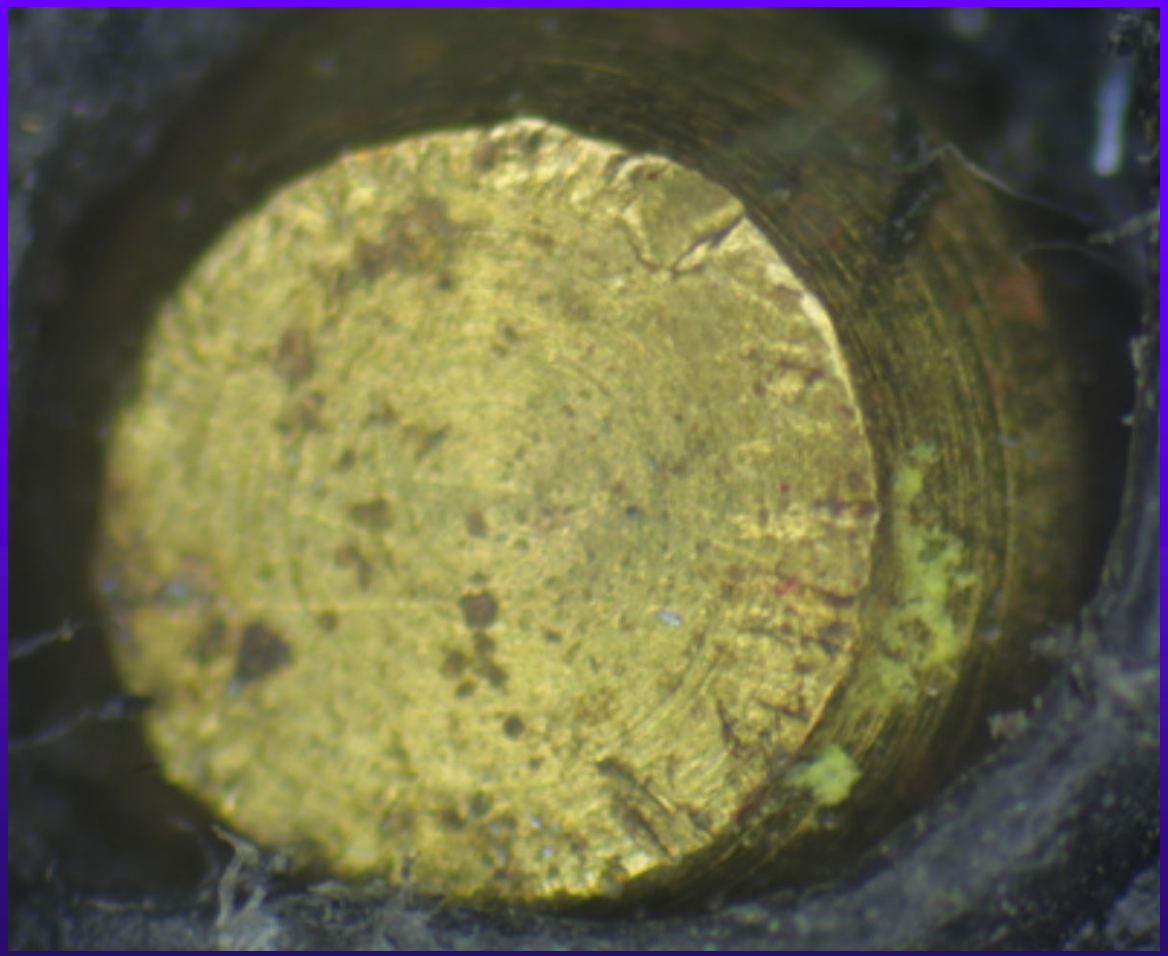




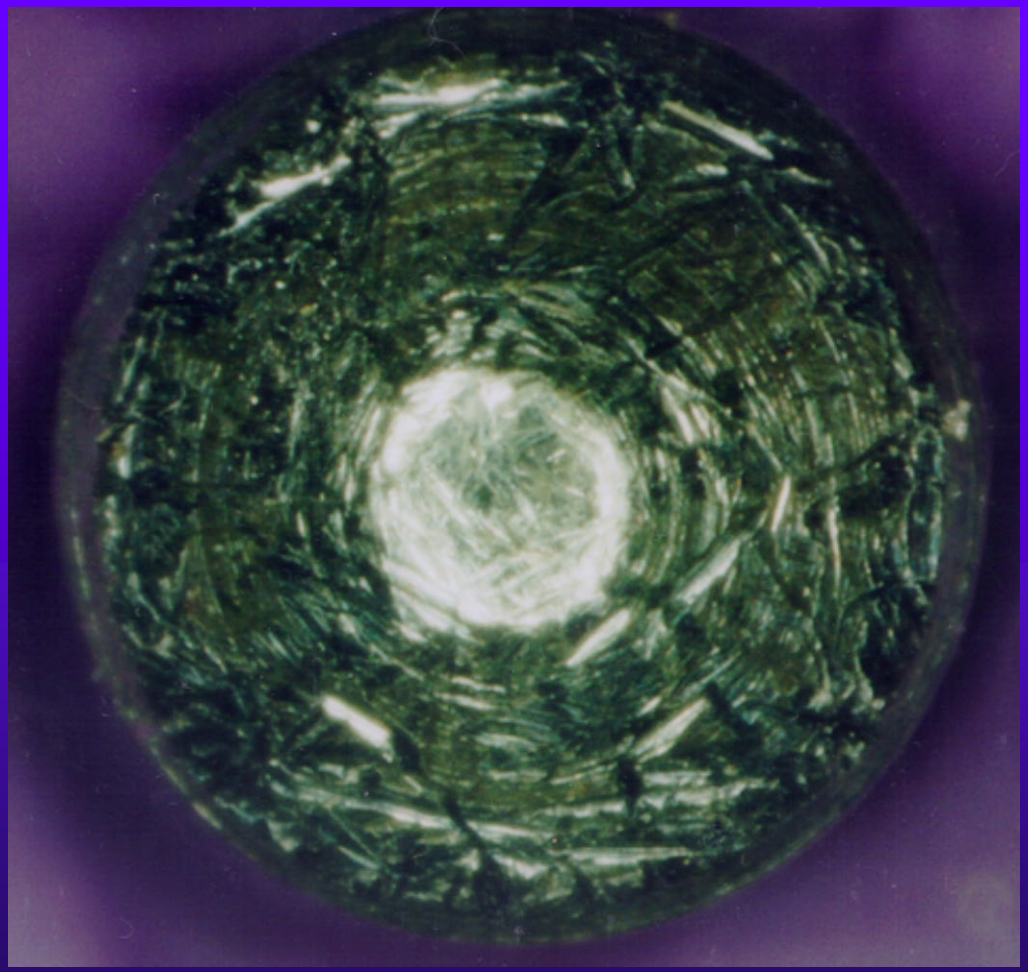
Marks from Pick Gun



Pick Gun Markings

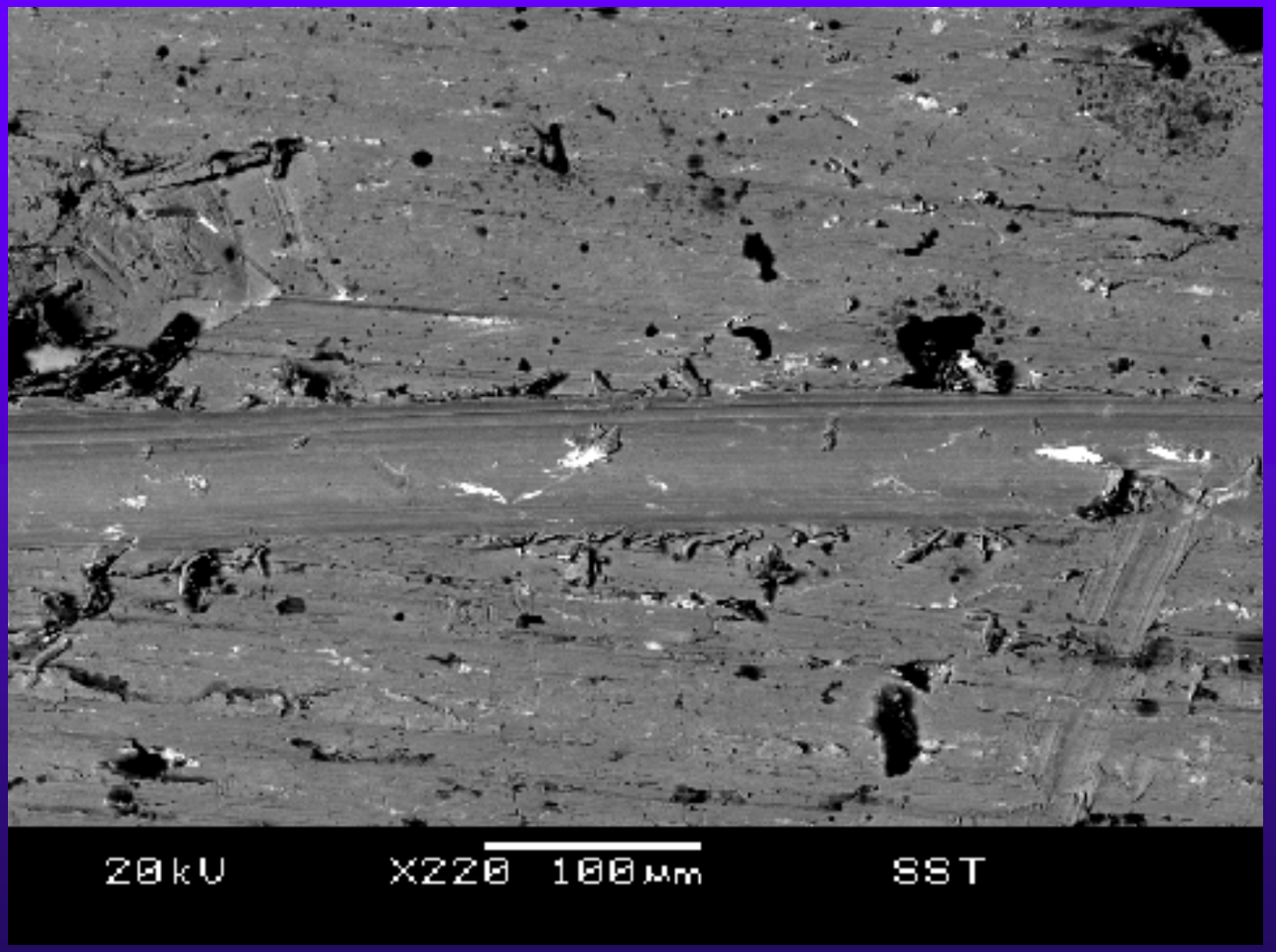


Impact Pick Marks

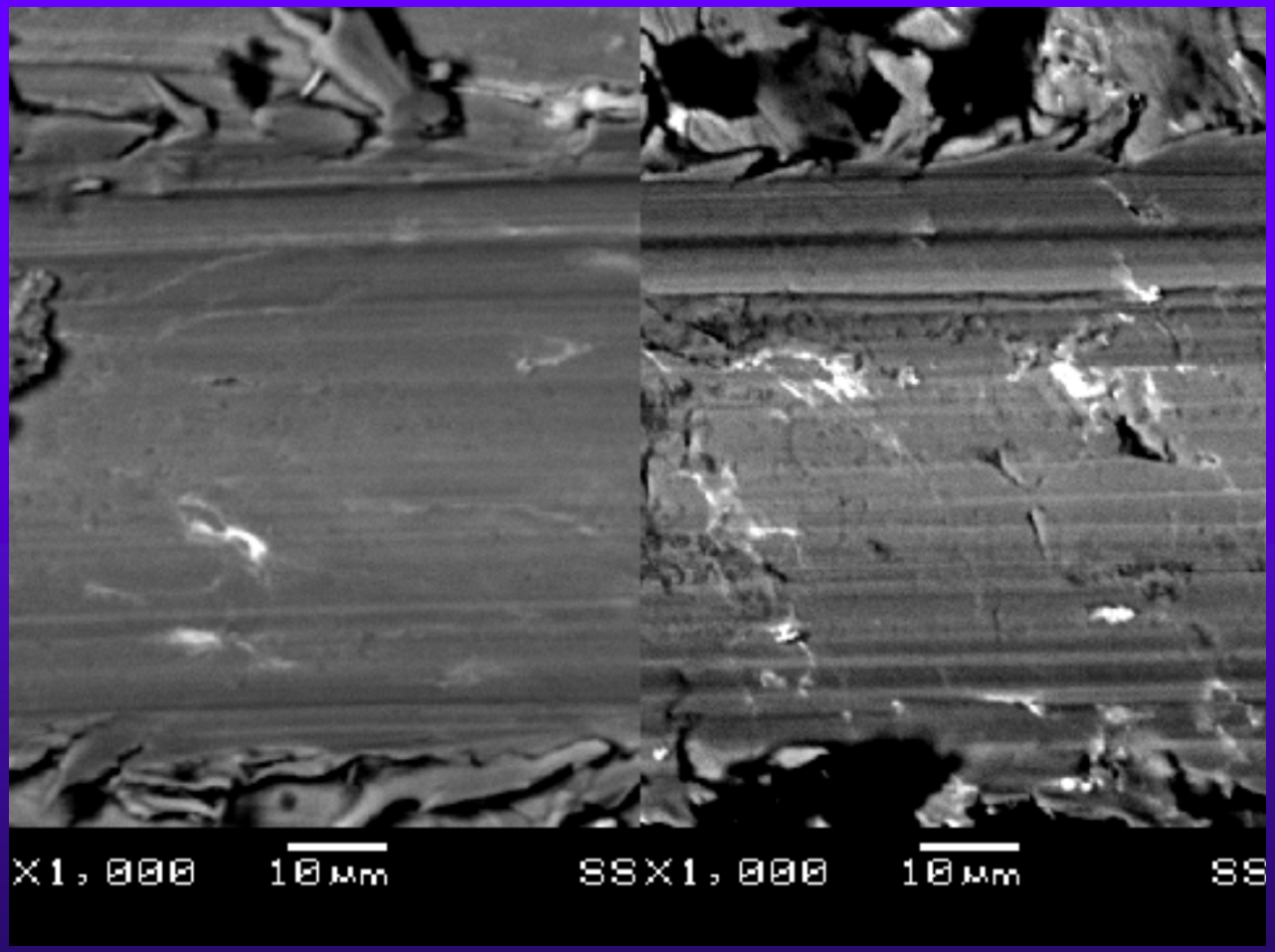


USE OF S E M

Pick Tracks

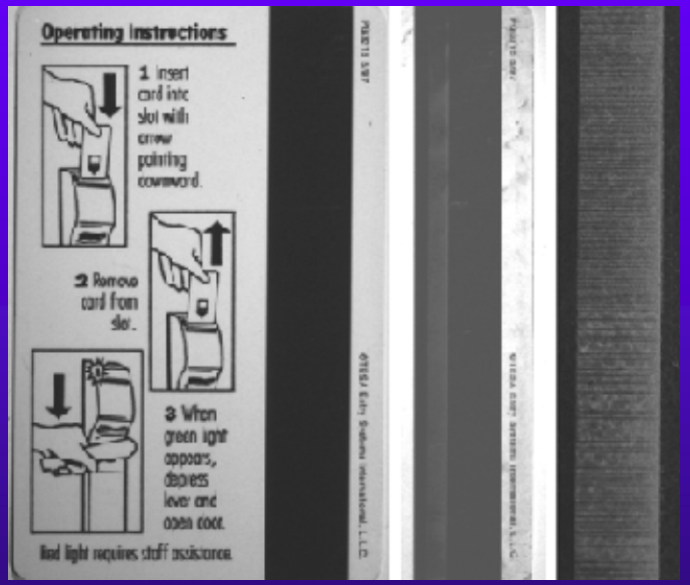


SEM Pick Track Comparison



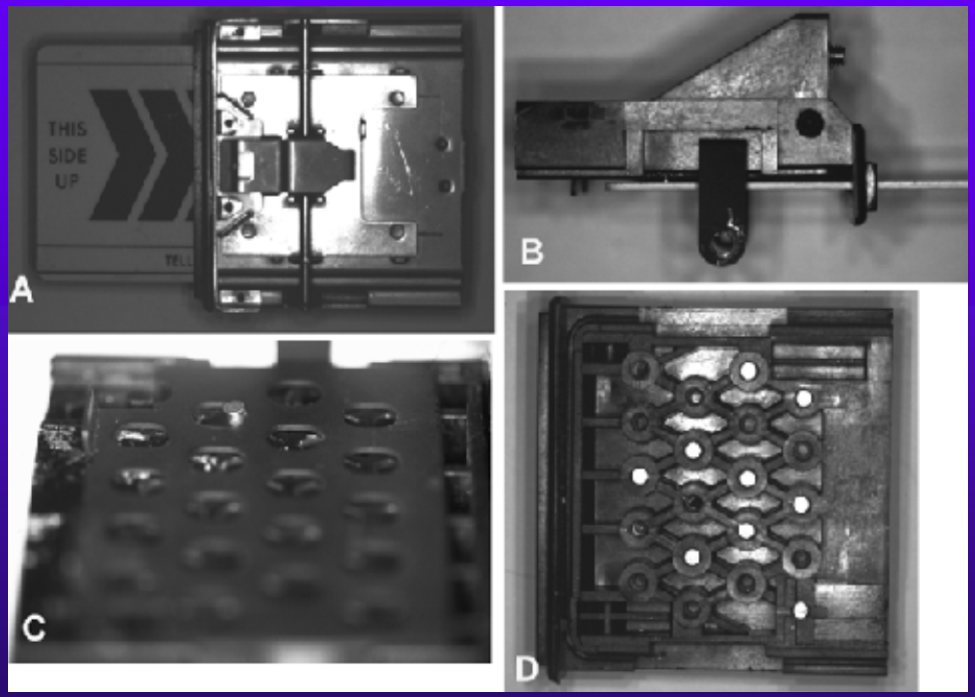
CASE #1: OMEN SAFE

- Magnetic Card Lock on Safe



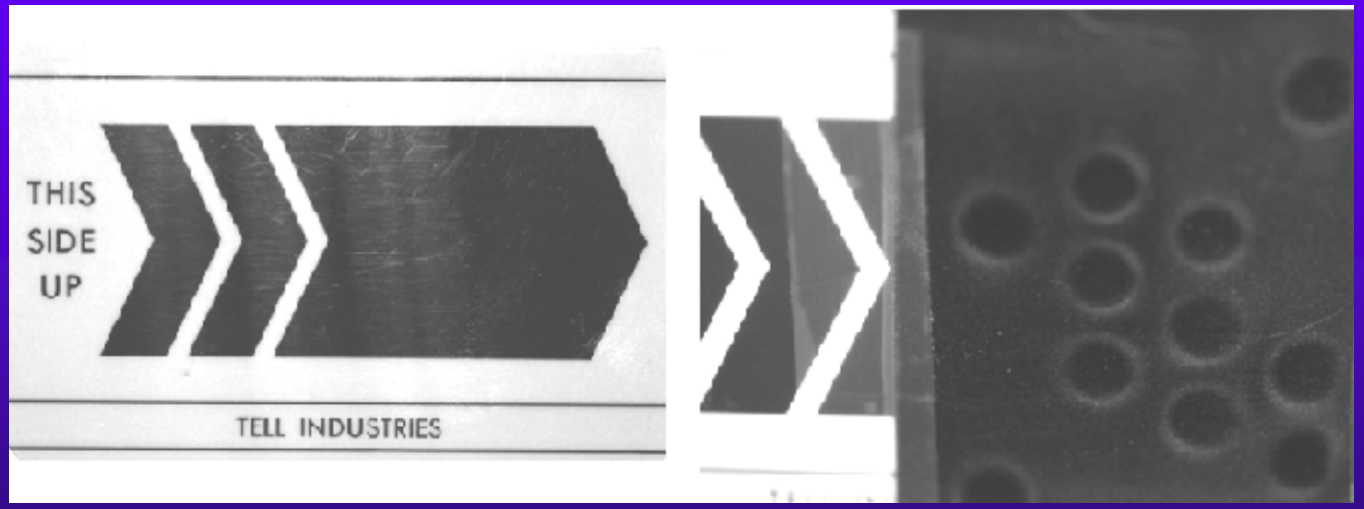
CASE #2: Showa Magnetic

Magnetic Domain Lock



Magnetic Domains

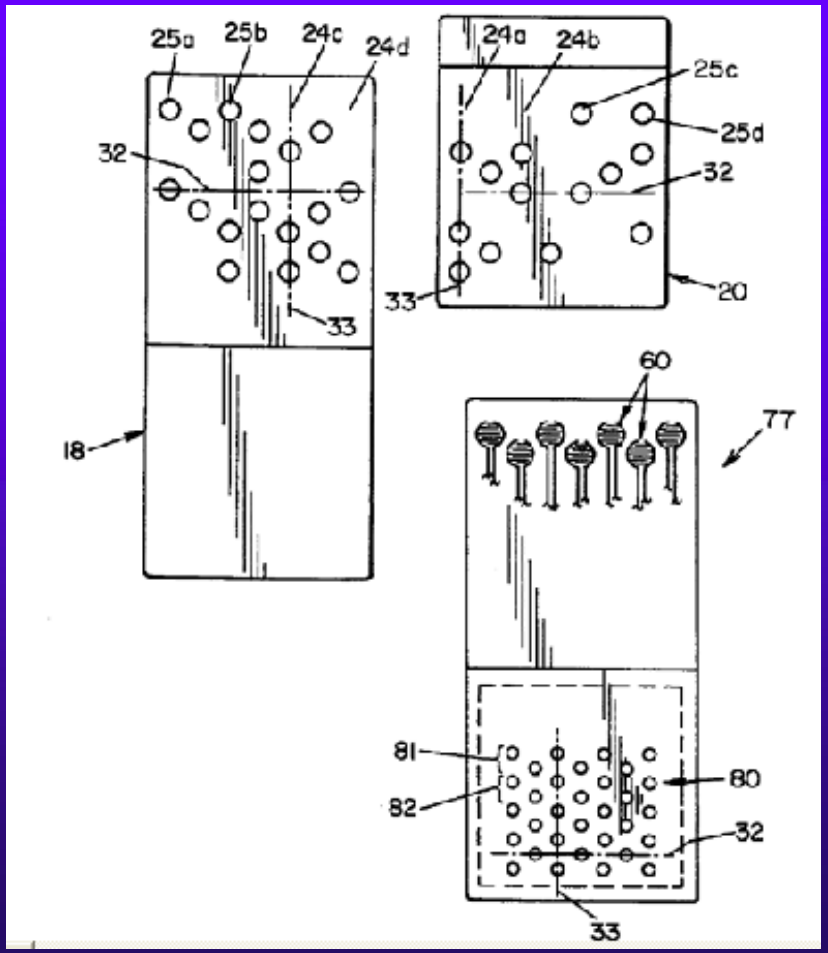
- Reading location and polarity of magnetic domains



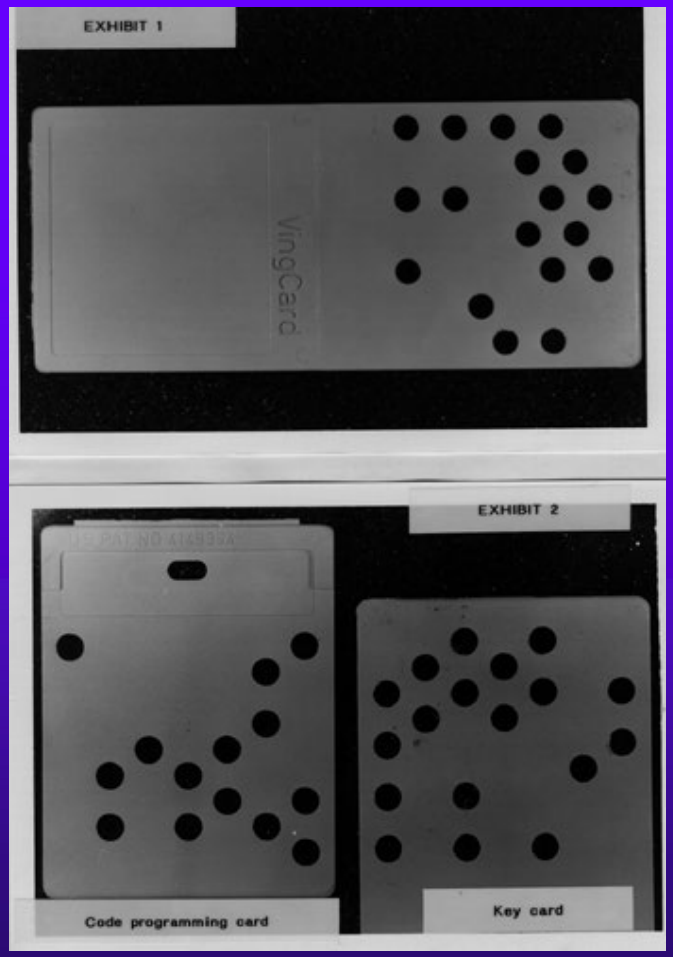
CASE #3: VINGCARD

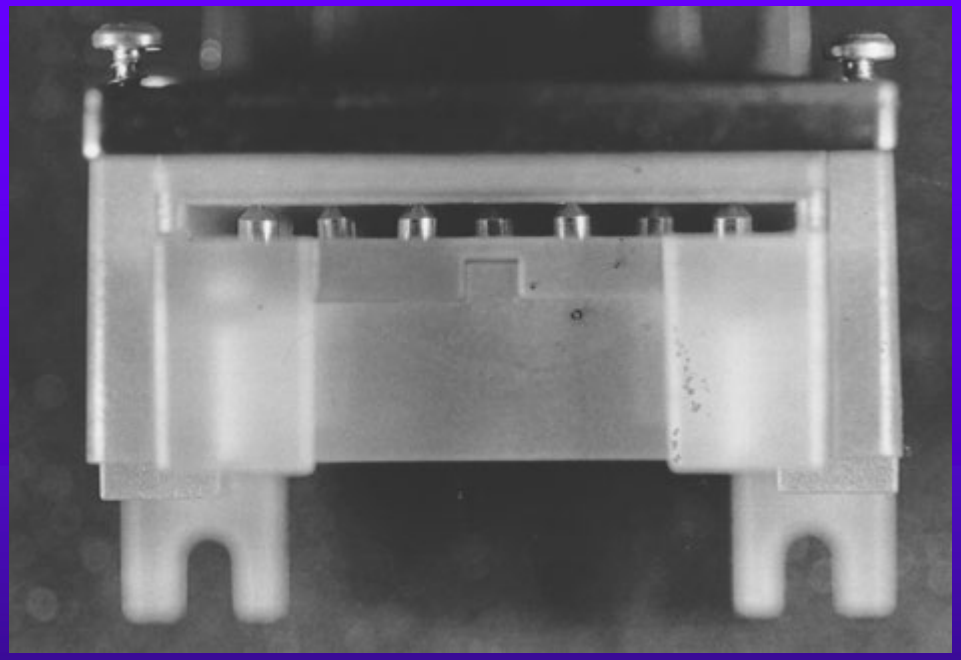
Pin Tumbler Lock used in Hotels

Conductive Ink Decoder for Vingcard Lock

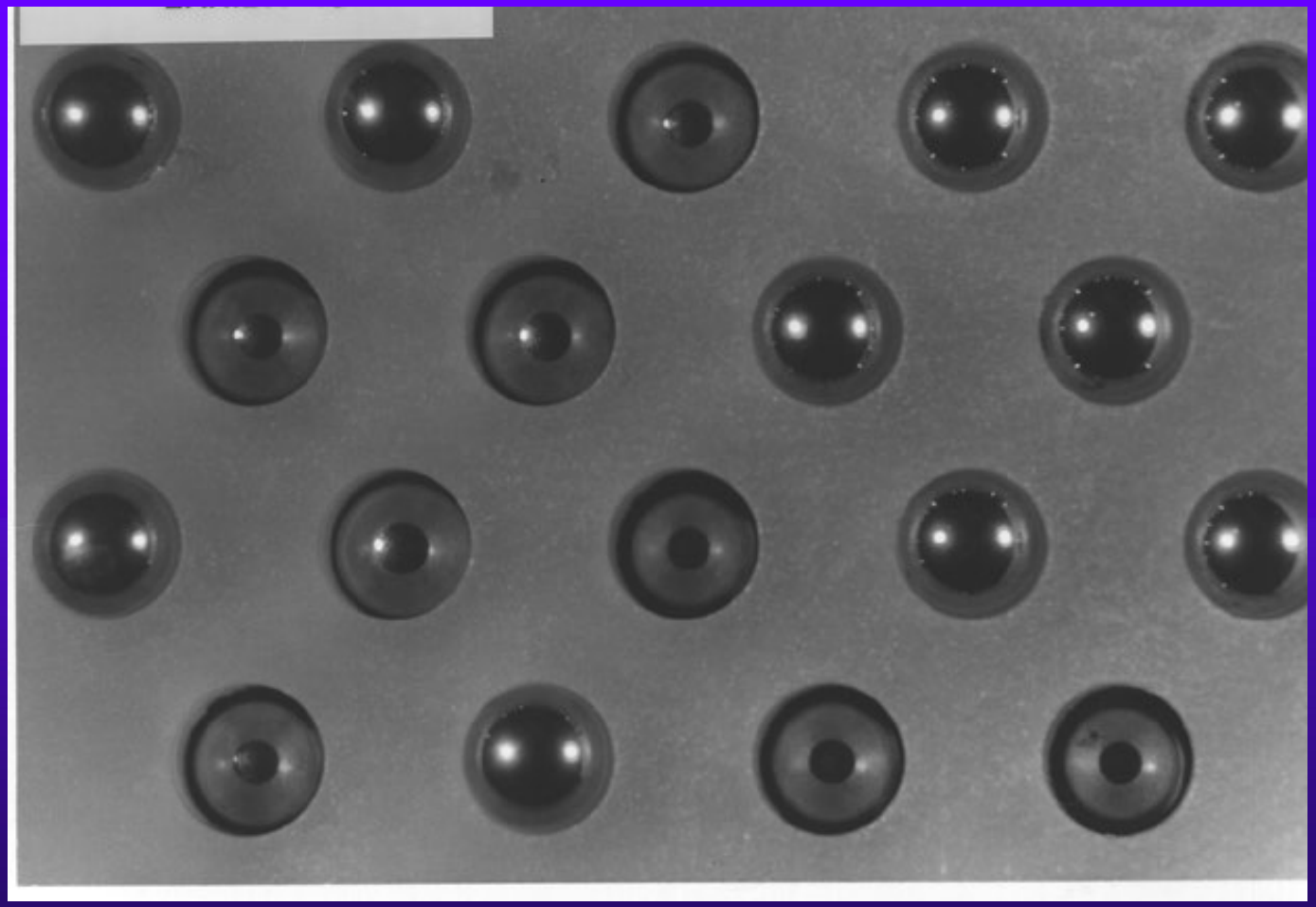


Vingcard keys and lock



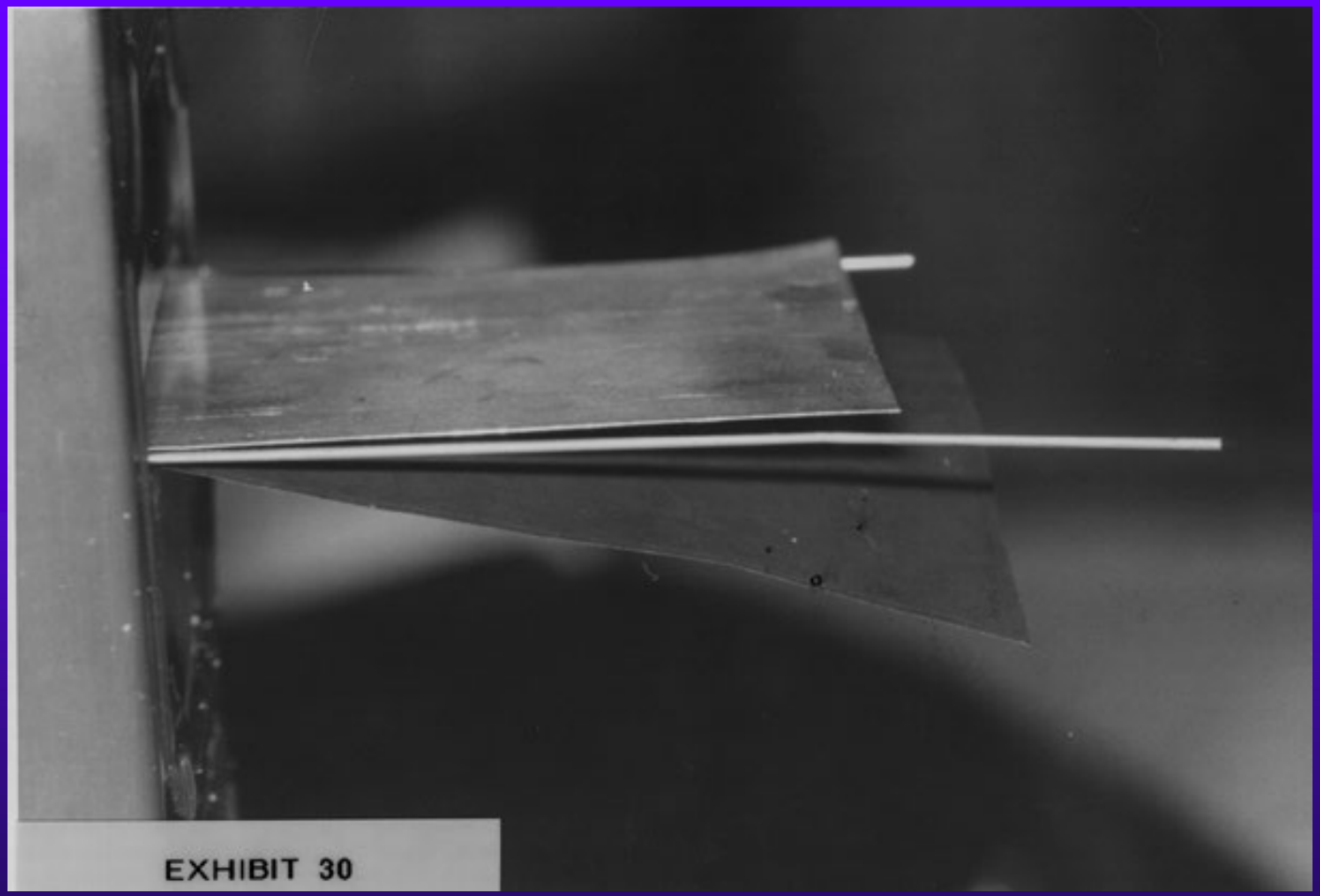


Vingcard pin tumblers

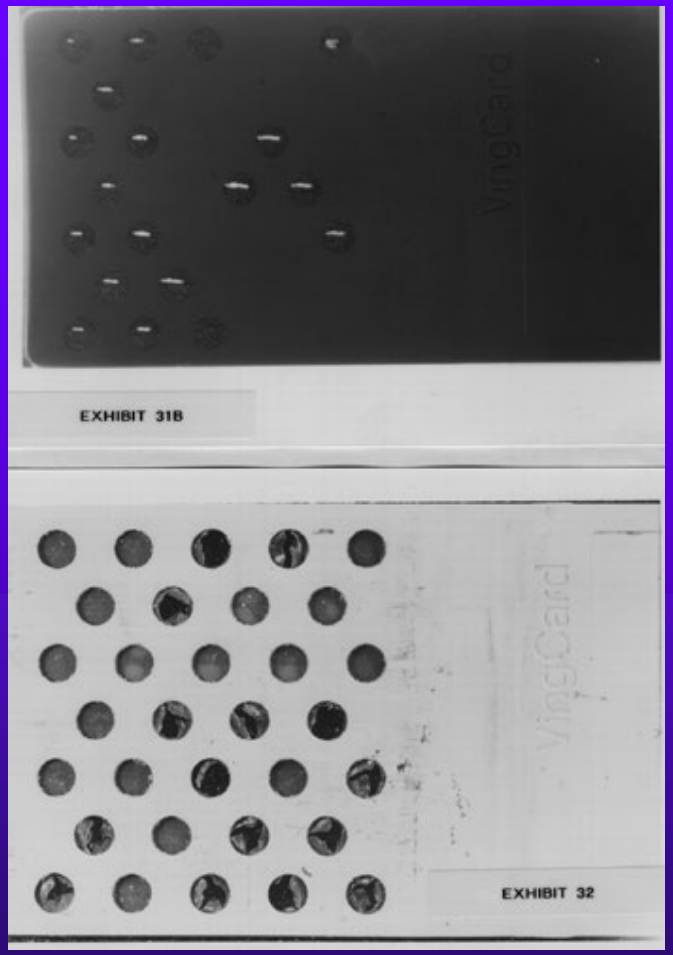


Mechanical decoding with wire

Insert carbon paper and wire



Picture of Key in carbon paper



CASE #4: ELSAFE

In Room Hotel Safe

ELSAFE

- Mechanical bypass using paper clip
- Electronic bypass using RF to accelerate the timing lockout

LOCKS, SAFES, AND SECURITY

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