Duplicating Restricted Keys

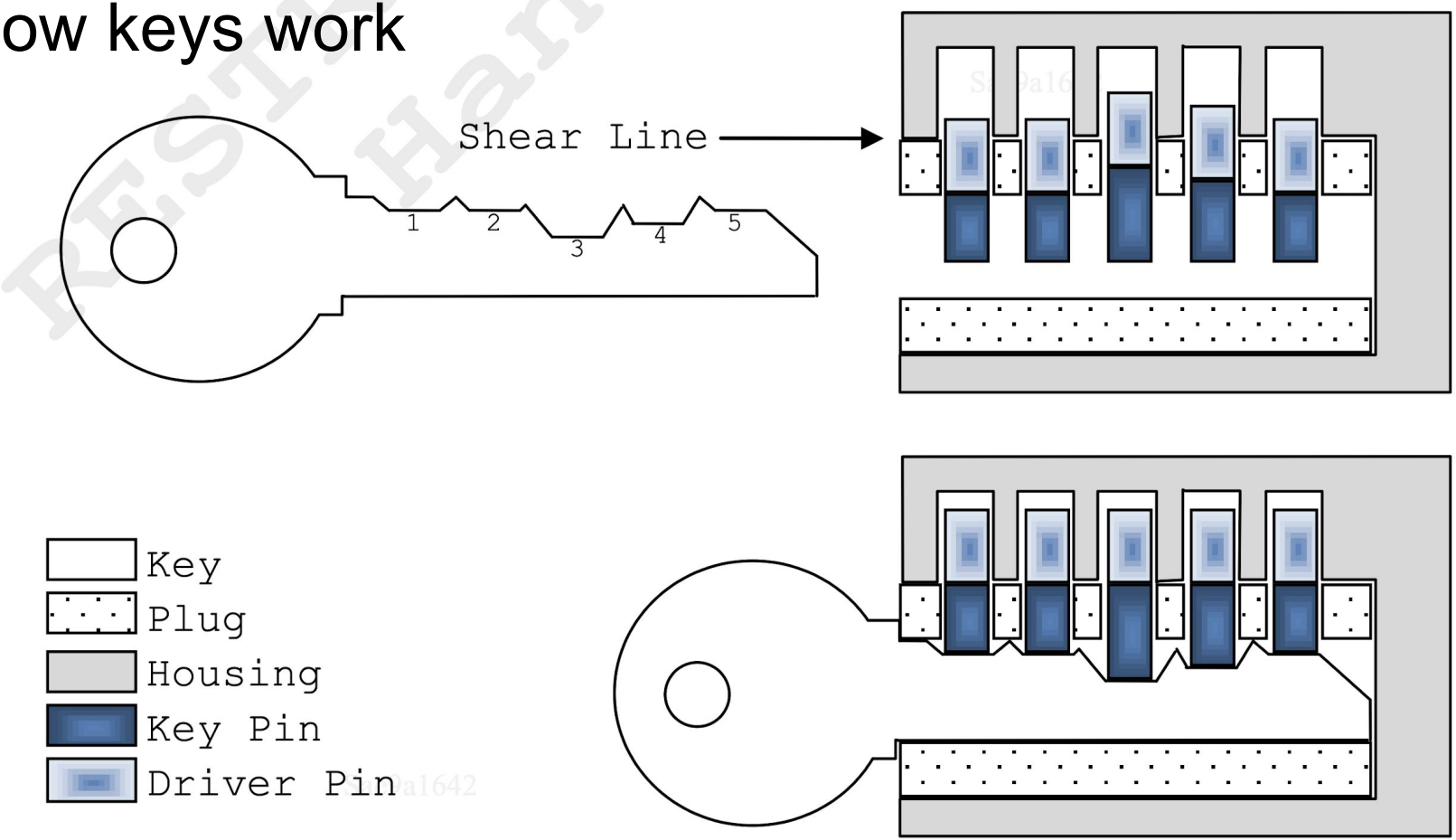
Billy & Bobby Graydon

GGR
SECURITY CONSULTANTS

Outline

1. Keyways
2. Other Stuff

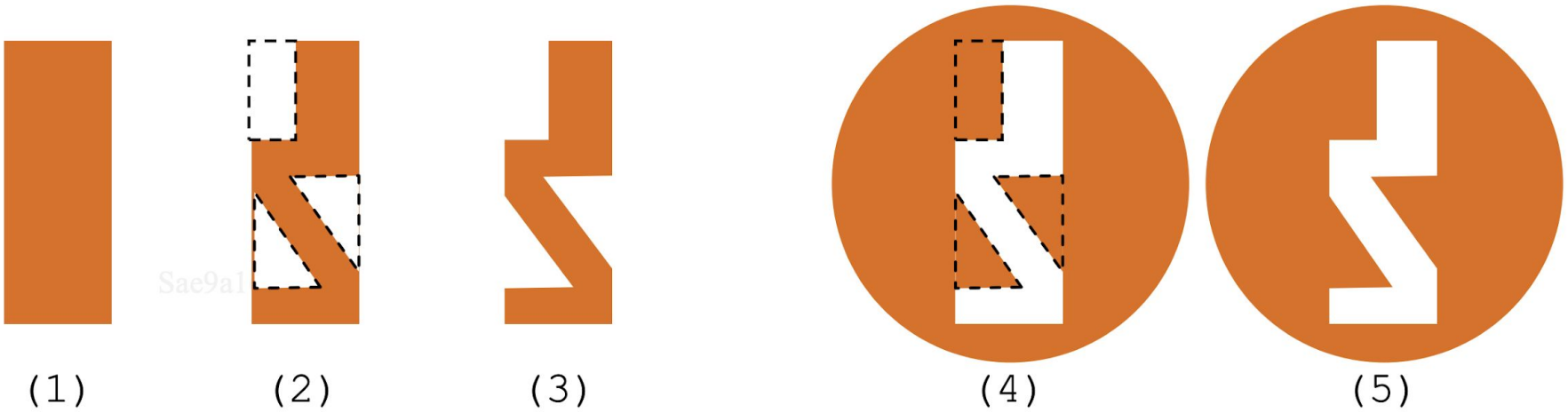
How keys work



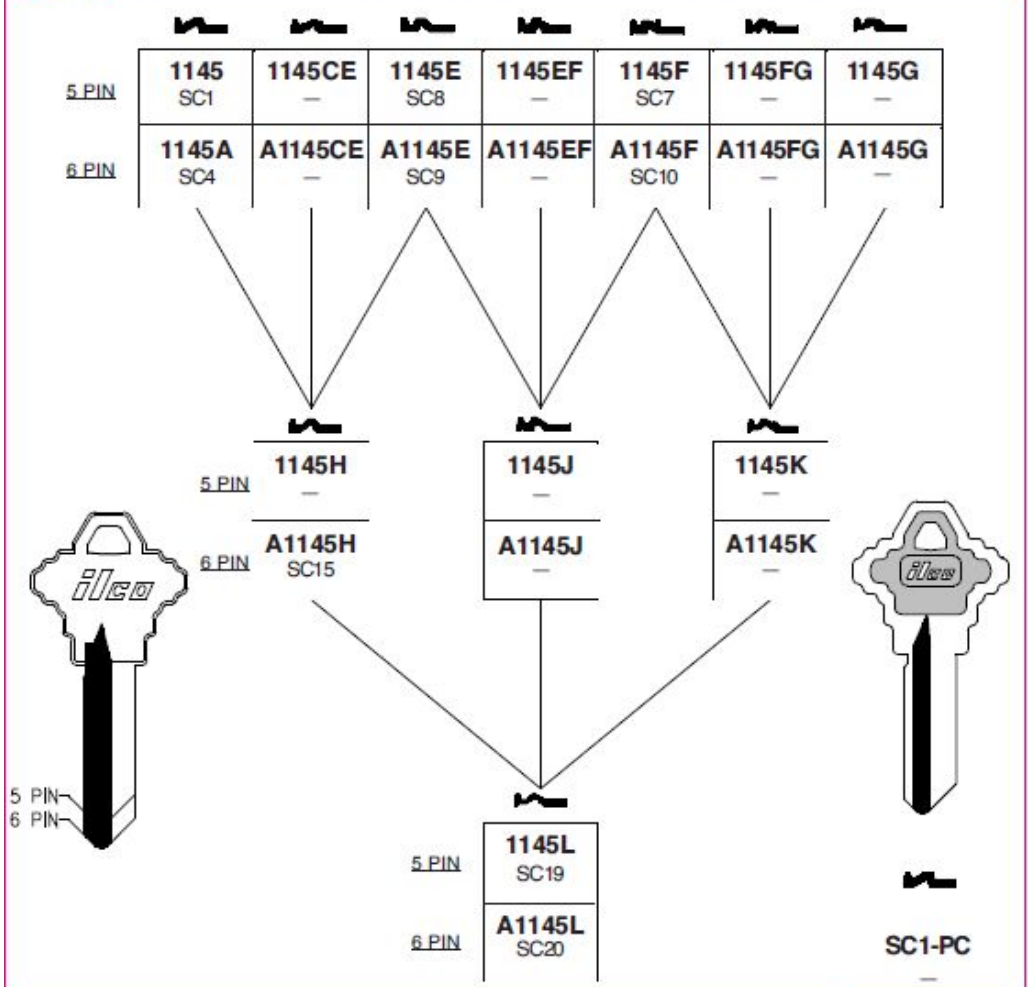
MOTOR DIVISION
ST. LOUIS, MO. U.S.A.

30 MINUTE DUTY
INTERMITTENT

How keyways work



SCHLAGE


5 PIN
6 PIN
1145
SC1
1145CE
—
1145E
SC8
1145EF
—
1145F
SC7
1145FG
—
1145G
—
1145A
SC4
A1145CE
—
A1145E
SC9
A1145EF
—
A1145F
SC10
A1145FG
—
A1145G
—
1145H
—
A1145H
SC15
1145J
—
A1145J
—
1145K
—
A1145K
—
1145L
SC19
A1145L
SC20
SC1-PC
—

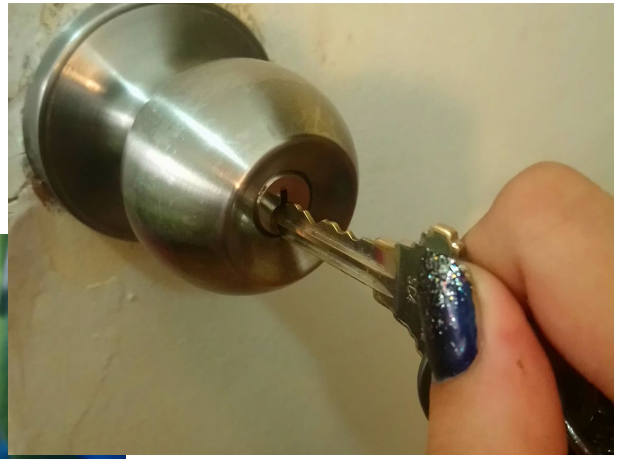



easy entrie
V9.0+
Neusilber
Version
OK
STOP
WWW.KEYMAX.de
Schlüssel ohne Wenn und Aber!





The Old Approach to Keyway Research



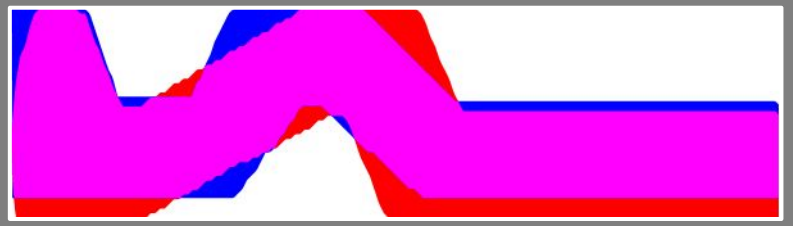




Our Approach to Keyway Research

- Medeco 16S
- Yale Y1
- Abloy AL1
- Kwikset 1176/KW1
- Schlage 1145/SC1



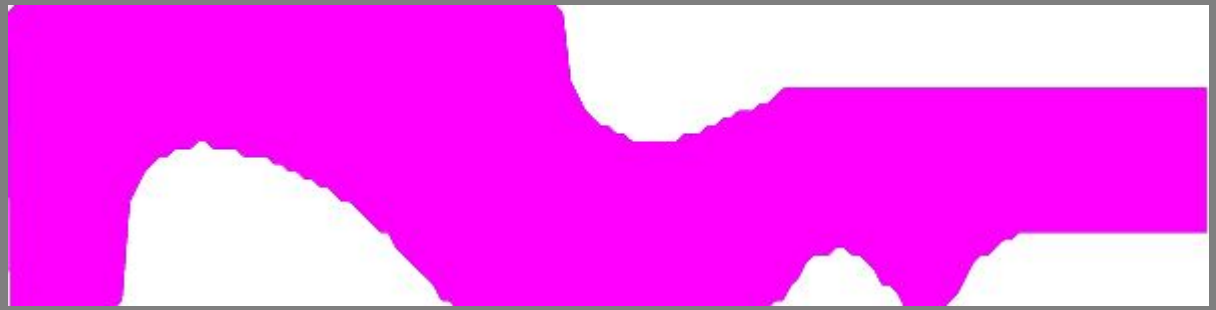


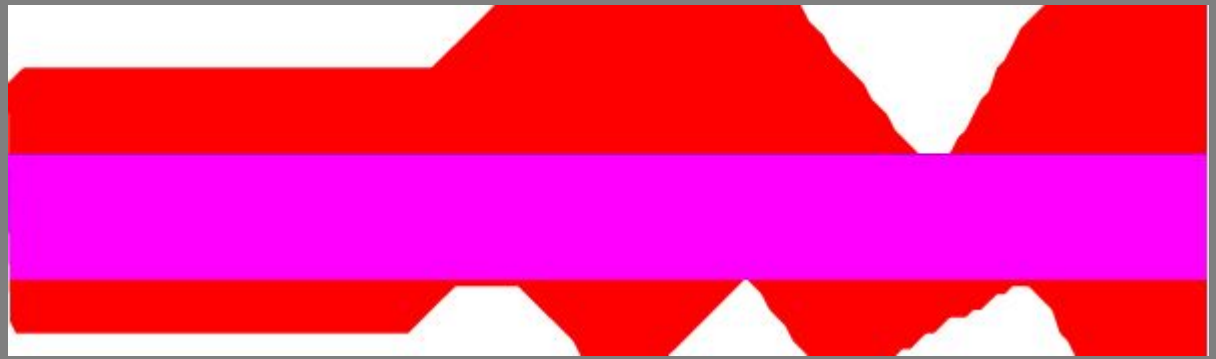
draw Schlage 1145/SC1

compare Schlage 1145/SC1, Schlage 1145E/SC8

compare Sargent 1007RA , reverse Sargent 1007LA

compare Medeco 9S , barstock height: 32 , thick: 298





```
draw Schlage 1145/SC1
draw Schlage 1145E/SC8
draw Schlage 1145F/SC7
draw intersect Schlage 1145/SC1 ∩ intersect Schlage 1145E/SC8 ∩ Schlage 1145F/SC7
draw union Schlage 1145/SC1 ∪ union Schlage 1145E/SC8 ∪ Schlage 1145F/SC7
```

C:



E:



F:



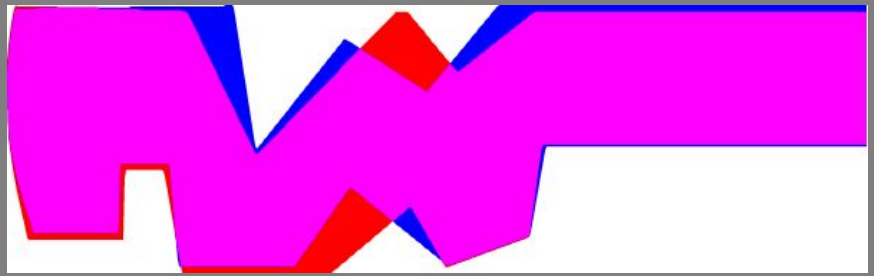
∩:

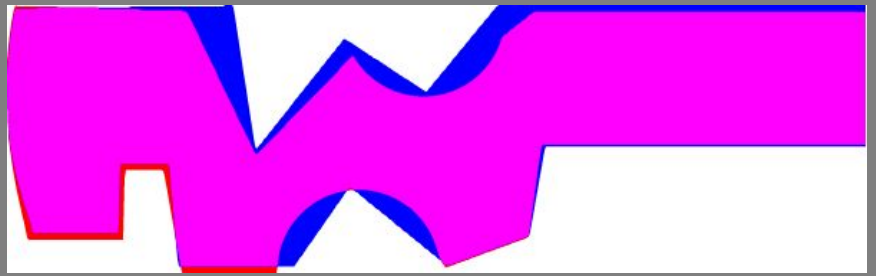


U



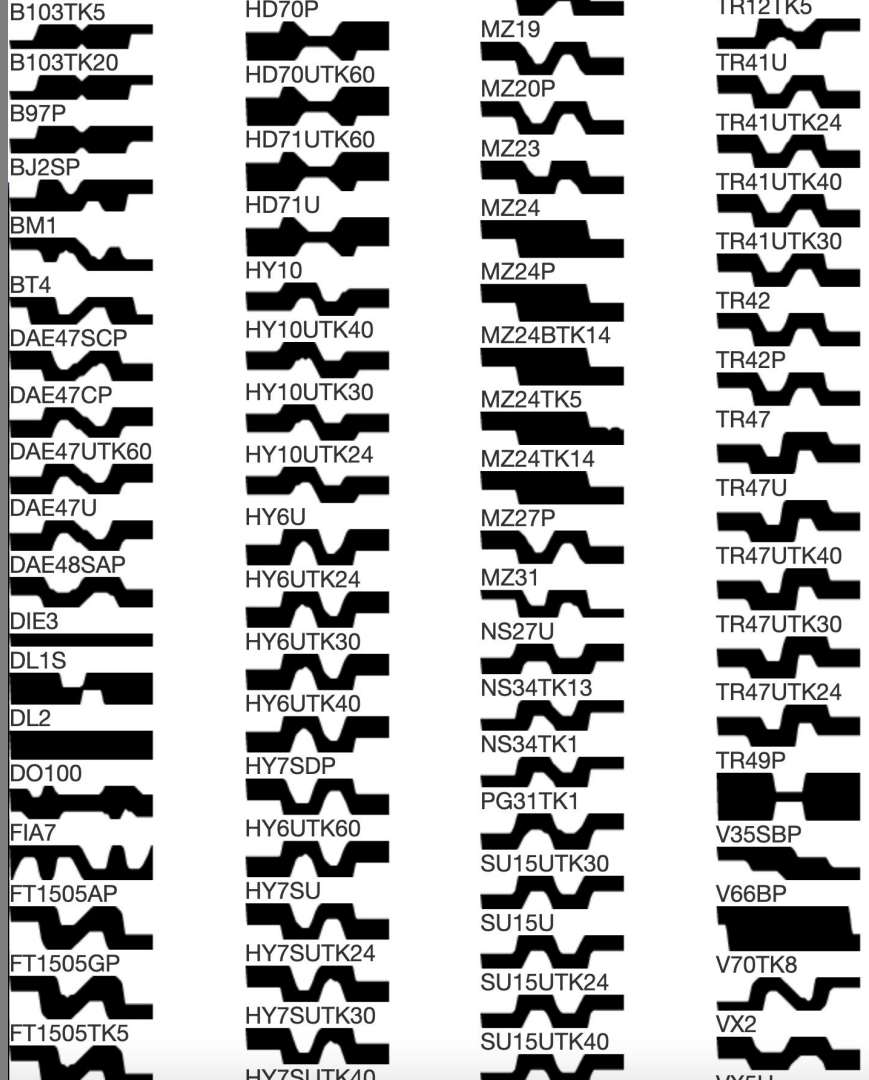
```
set Milled BEST L to BEST L
compare Milled BEST L , BEST M
set Milled BEST L to mill side A of Milled BEST L with 62.5 dia ball cutter , depth: 35 , position: 160
set Milled BEST L to mill side B of Milled BEST L with 62.5 dia ball cutter , depth: 32 , position: 135
compare Milled BEST L , BEST M
```



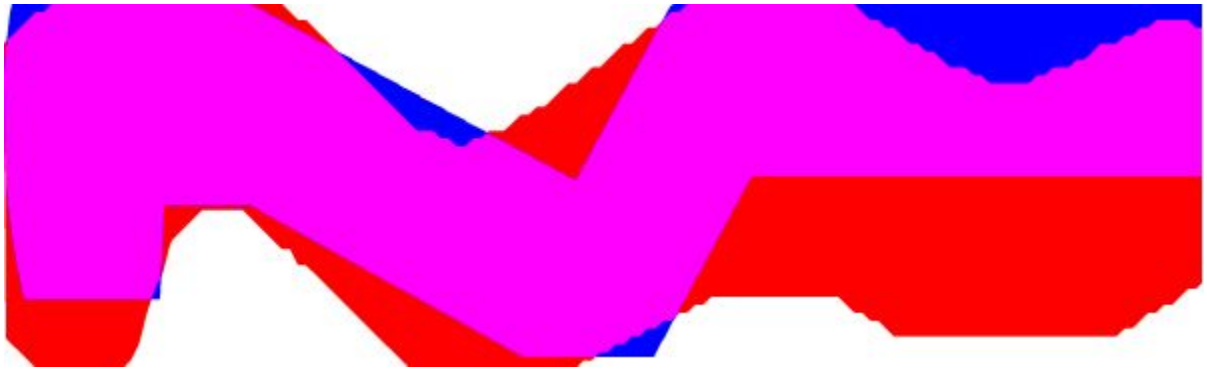


```
for i in all keyways, large DB
    if similarity between i and upside-down i < 10
        write property name of i
        draw i
```



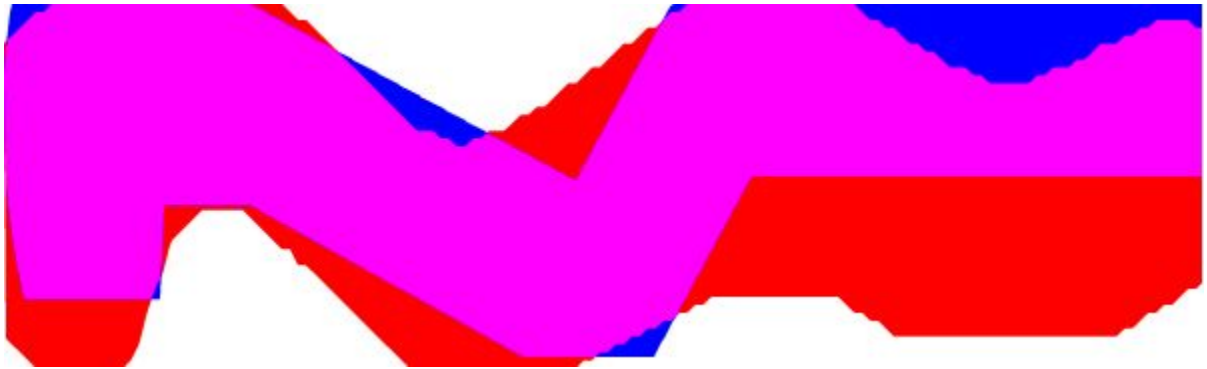


compare Medeco 1515 [redacted], BEST A [redacted]





compare Medeco 1515 [redacted], BEST A [redacted]



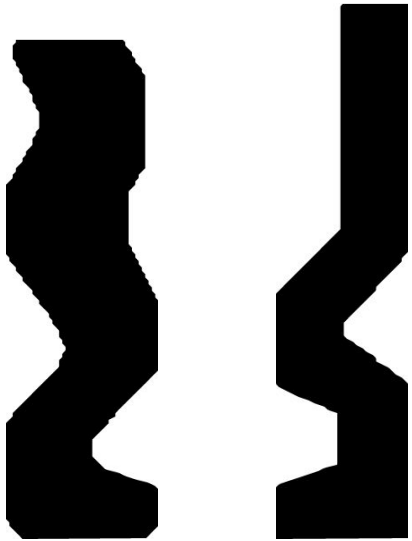


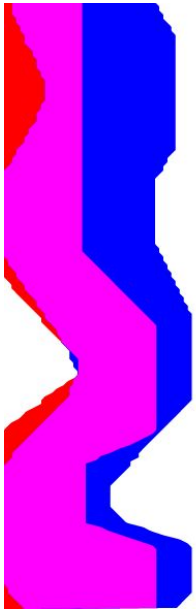

medeco

draw Medeco 1515

draw Schlage 1145E/SC8

compare reverse Schlage 1145E/SC8 , Medeco 1515






DII
PAT. NO.
3499302




medeco


U.S.P.S.
A


LAPD


U.S.P.S.
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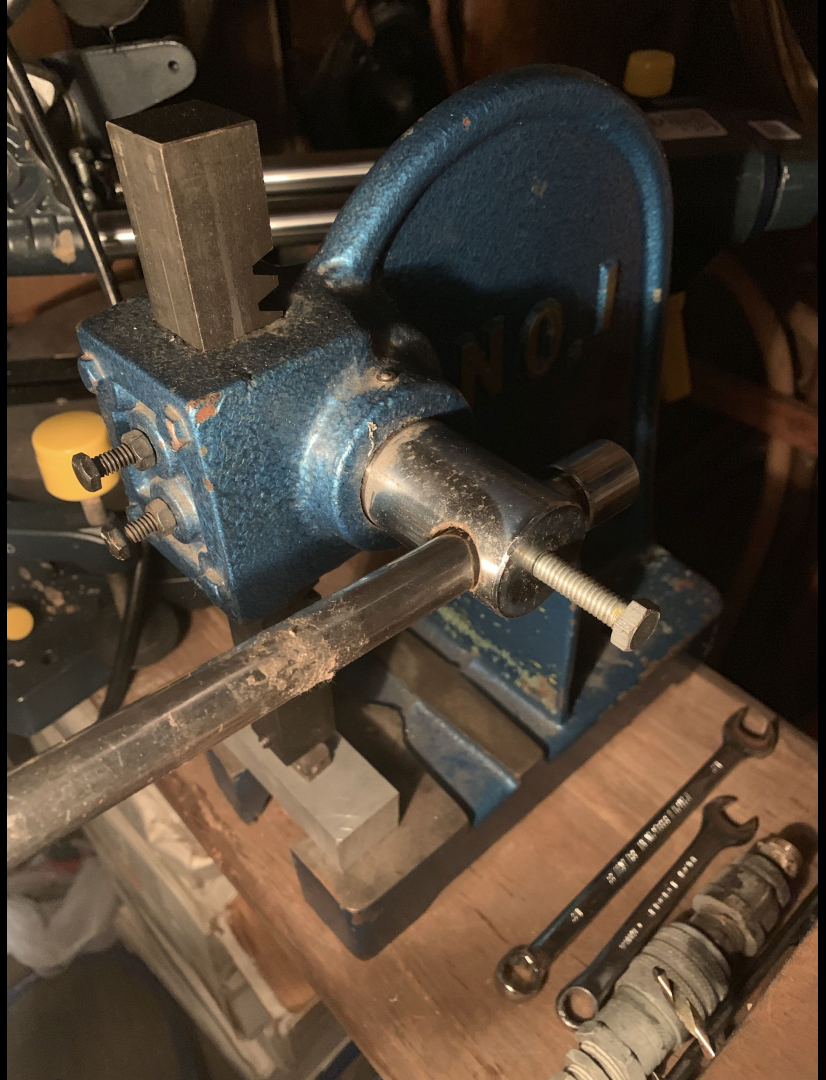






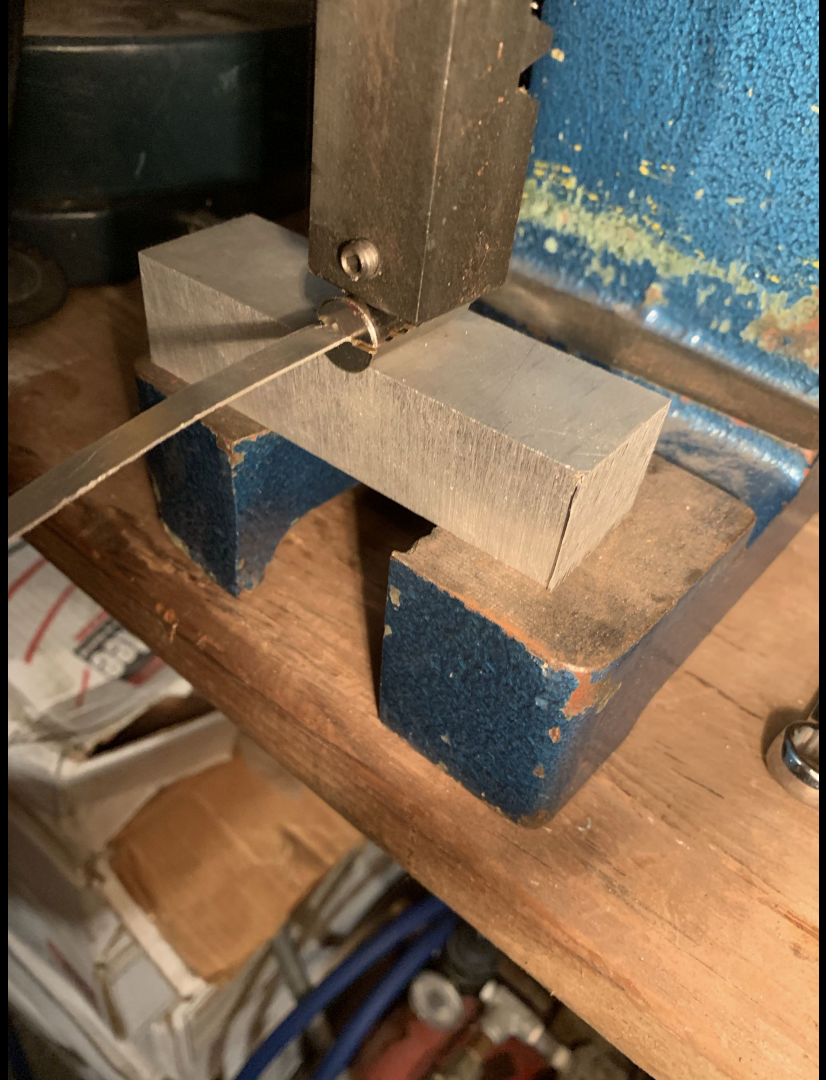



SCHLAGE







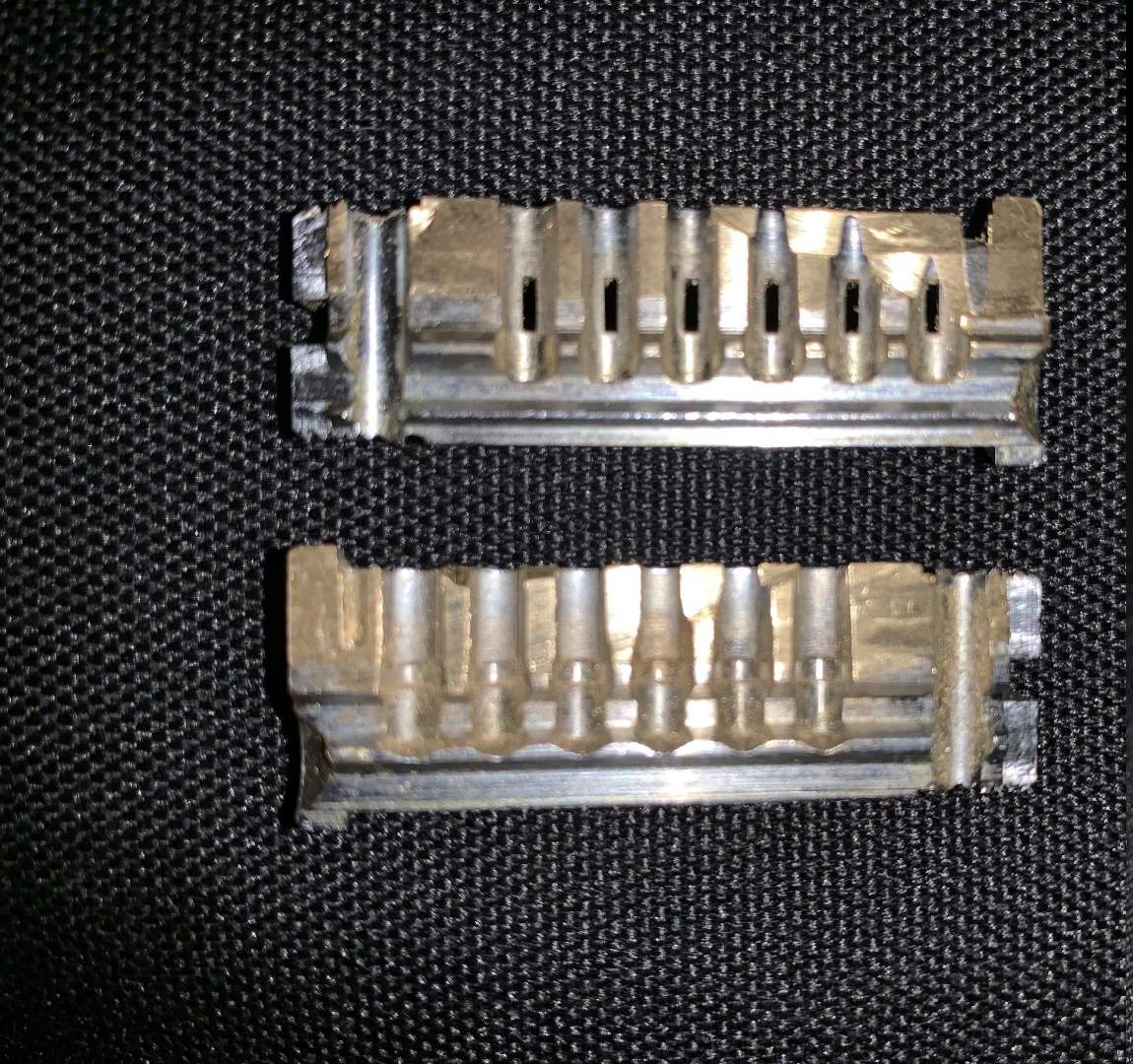


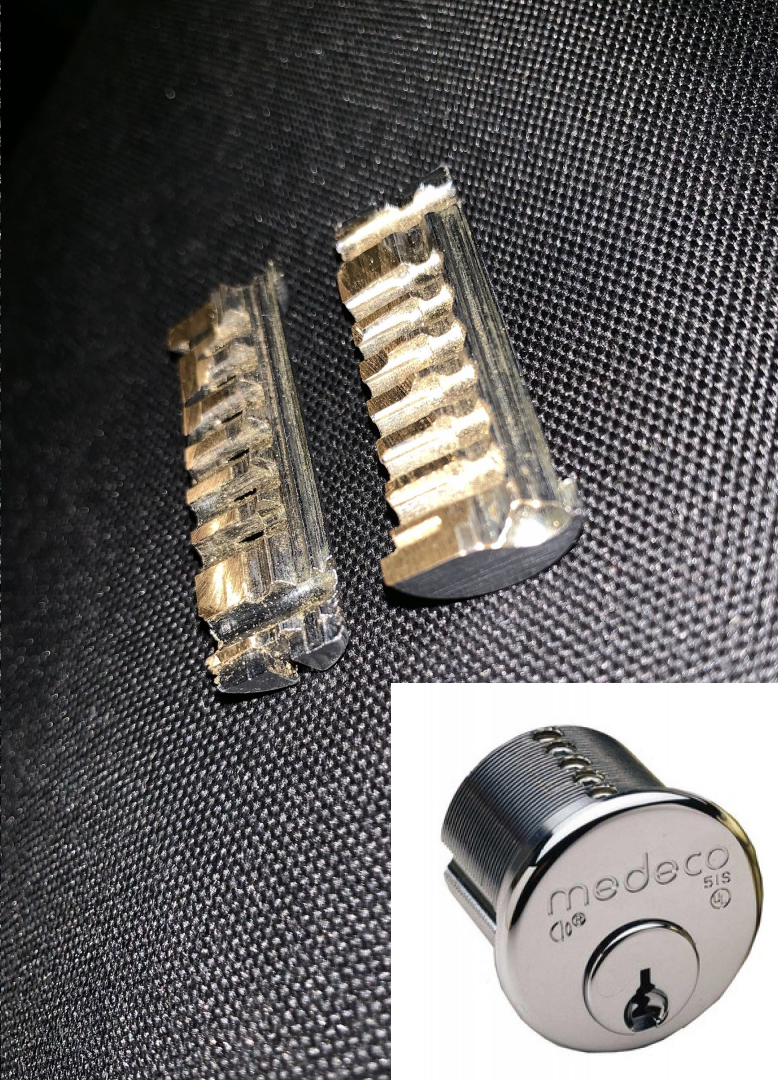

V. 115
A. 4.25
TIME RATING INTMT.
INSUL. CLASS B
CONTINUOUS DUTY - REOIL EVERY YEAR
INTERMITTENT DUTY - REOIL EVERY 2 YEARS
OCCASIONAL DUTY - REOIL EVERY 5 YEARS
REOIL EACH BEARING WITH 150 DROPS
(APPROXIMATELY 1 TEASPOON) SAE 20 OIL
E22922
MFG. NO. MC98C
ASSEMBLED IN MEXICO
WARNING
CAUTION
OVERTIGHTENING WILL
BREAK HANDLES AND / OR
DAMAGE THREADS
NARROW STAN


SCHLAGE




BEST





medeco
5|S

THE WATCHDOGS NEWS CHICAGO

Master keys for O'Hare Airport security acces were lost, costing city in 'five figures'

A set of keys that provides almost total access to O'Hare Airport were lost and never recovered. But there were rare consequences for the employee involved, a Sun-Times investigation found.

By Robert Herguth | Jun 21, 2019, 5:00am CDT

SHARE



A set of keys like these belonging to the Chicago Department of Aviation and allowing high-level security access to O'Hare Airport were lost. | Photo illustration by Ashlee Rezin & Brian Ernst / Sun-Times

It looks like something you'd borrow from the counter of a gas station to get into the

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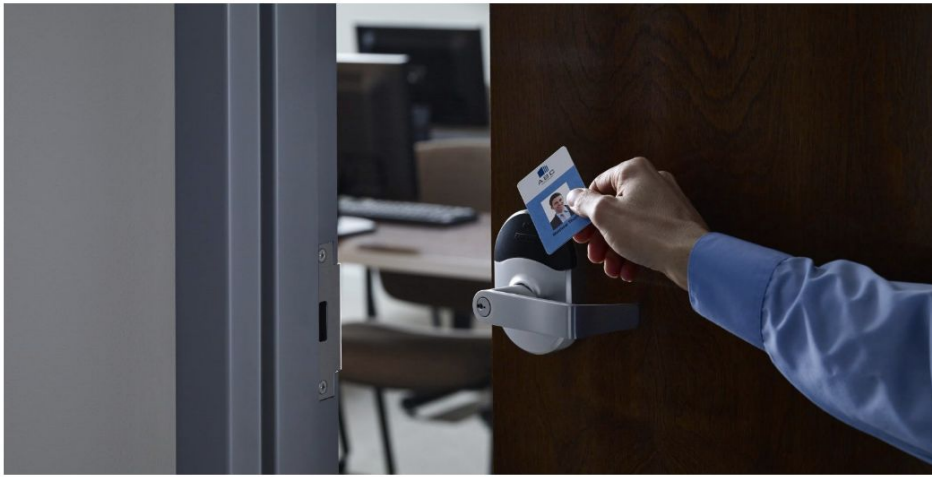

NEWS

Lost, stolen campus master keys too expensive to replace

November 27, 2018 0 view

The master keys at UCA have recently been brought into the light due to an investigation involving a lost key.

The investigation began in June after a theft was reported in Assistant Director of Financial Aid fo Scholarships Andrew Linn's office in McCastlain Hall, Jeff Pitchford, vice president of university and government relations, said.

A thief reportedly broke in and stole four pills out of Linn's office. The key used was a grand

Lost Lock...



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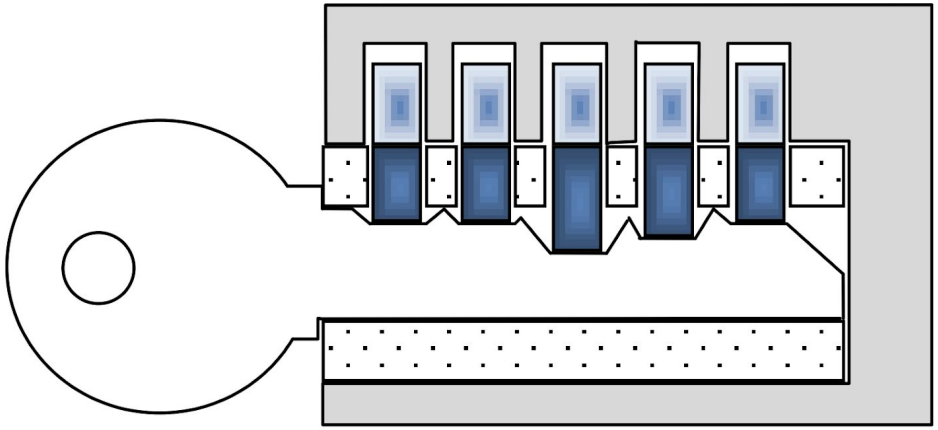

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Lost Lock...



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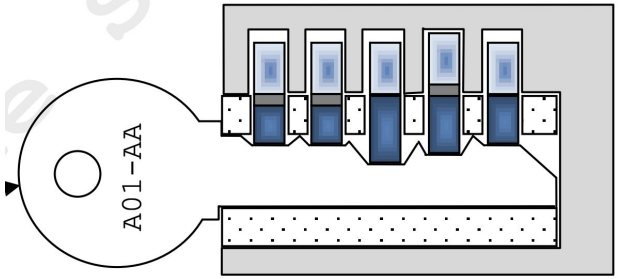

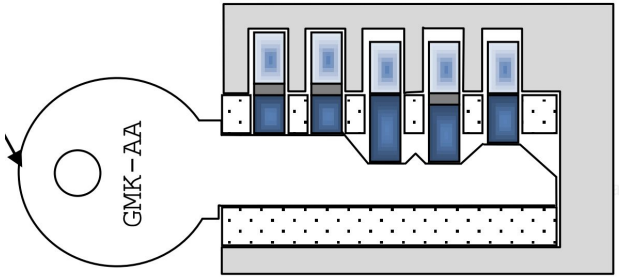

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Starting space - pins: 6 , depths: 6 , numbered NA . Type of system: Biaxial/m3 Decoding:

Top Level Master

Starting Keyspace — Space: 46656; Angle Space: 46656/11390625

Known shear lines: Pin 1: 1,4 Pin 2: 2,3 Pin 3: 2,5 Pin 4: 3,4 Pin 5: 2,6 Pin 6: 1,3 **Non-MK possible** — Space: 64 X

MACS of 2 — Space: 24 X

IC system in pins 3,4 at depth 3 — Space: 4 X

MACS for master control key: 2

Known change key, code 342343 , **No-file** **2-step** **Min spacer size** — Space: 2 X

Remaining Keyspace: 135421 435421 — Space: 2

Depth	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
1	1	0	0	0	0	2
2	0	0	0	0	2	0
3	0	2	0	0	0	0
4	1	0	0	2	0	0
5	0	0	2	0	0	0
6	0	0	0	0	0	0

Lost Lock...



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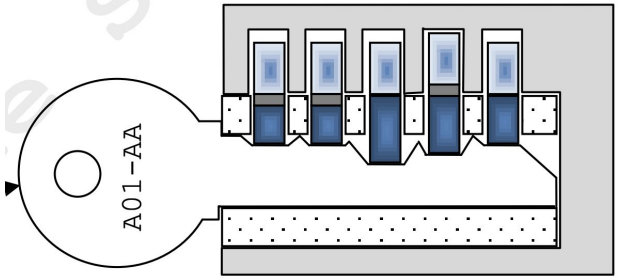

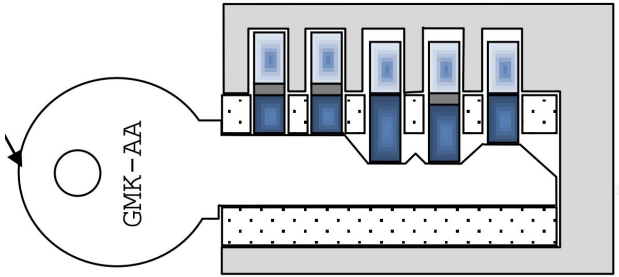

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KeyMark
™

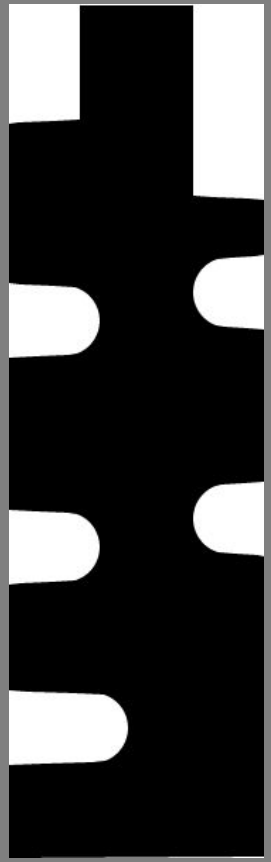

KeyMark


medeco
SIS

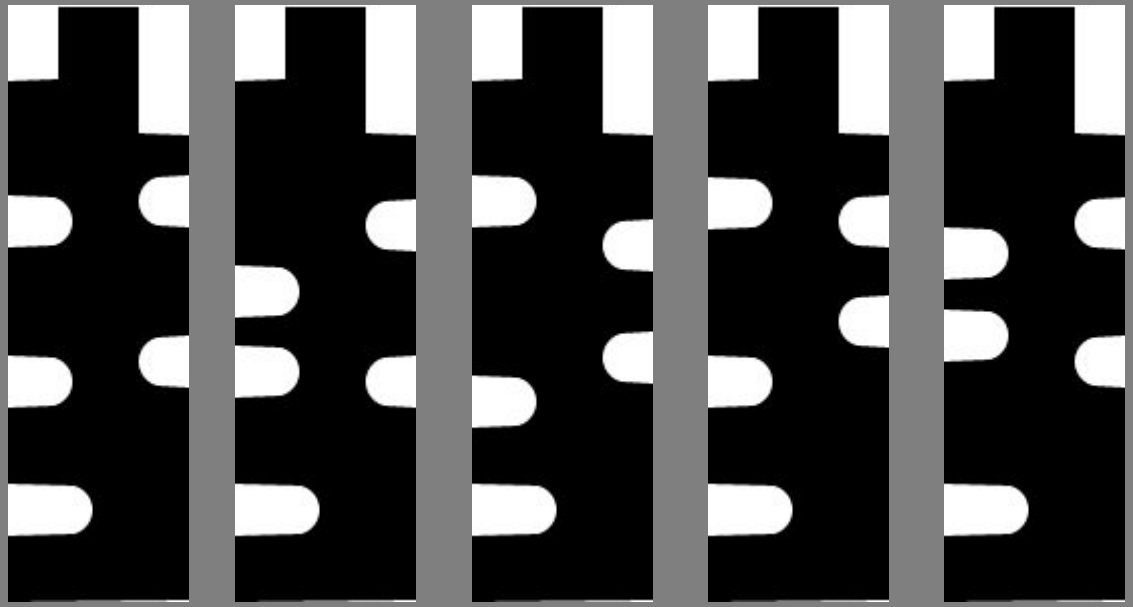

medeco

M3 Blank Manufacturing

```
set output width to 606
set m3 to barstock height: 303, thick: 90
set m3 to mill side B of m3 with 25 dia ball cutter, depth: 42, position: 46
set m3 to mill side B of m3 with 25 dia ball cutter, depth: 32, position: 110
set m3 to mill side B of m3 with 25 dia ball cutter, depth: 32, position: 190
set m3 to mill side B of m3 with 90 dia end mill, depth: 25, position: 306
set m3 to mill side A of m3 with 145 dia end mill, depth: 25, position: 306
set m3 to mill side A of m3 with 25 dia ball cutter, depth: 25, position: 120
set m3 to mill side A of m3 with 25 dia ball cutter, depth: 25, position: 200
set m3 to mill side A of m3 with 125 dia end mill, depth: 0, position: 0
set m3 to reverse m3
draw m3
```



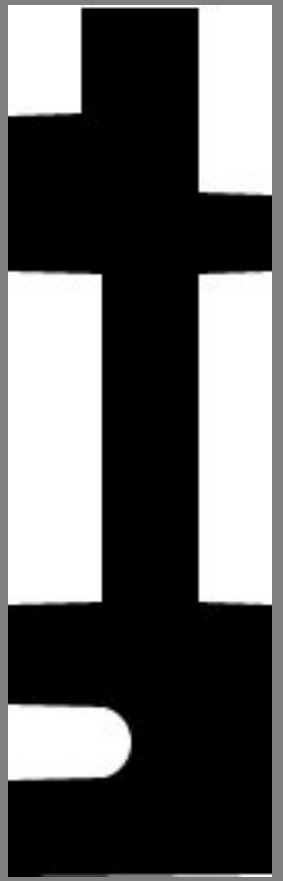
m^3 Variations

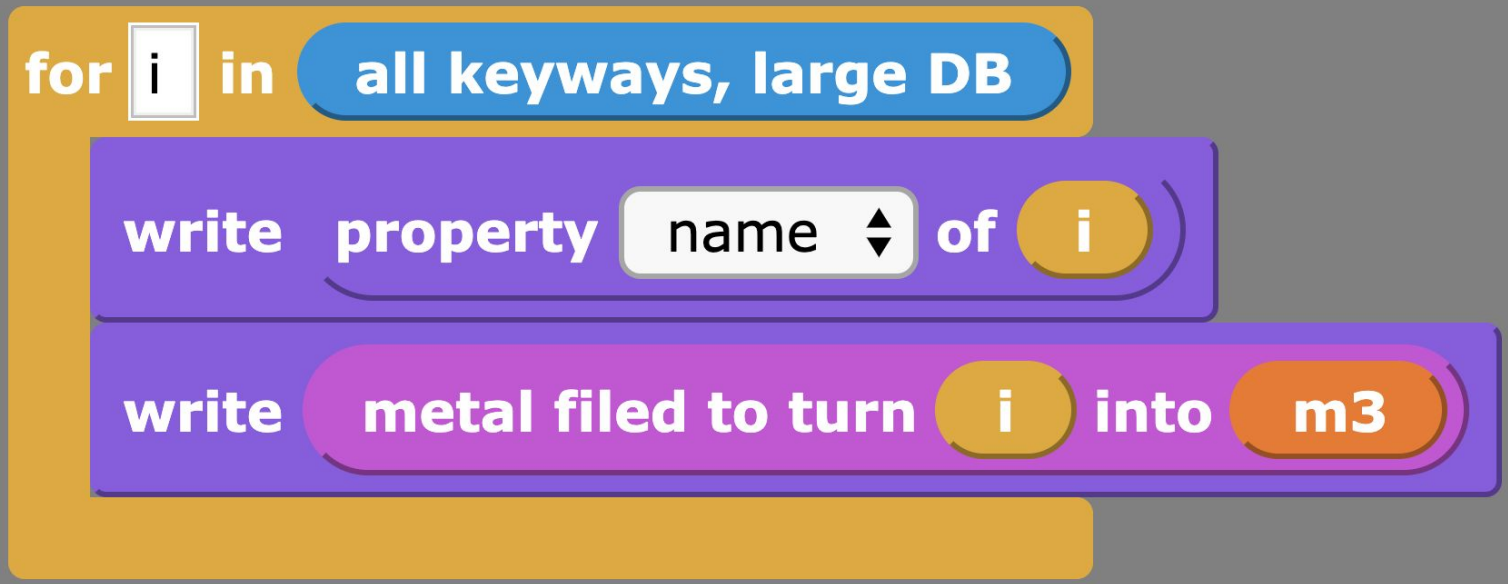




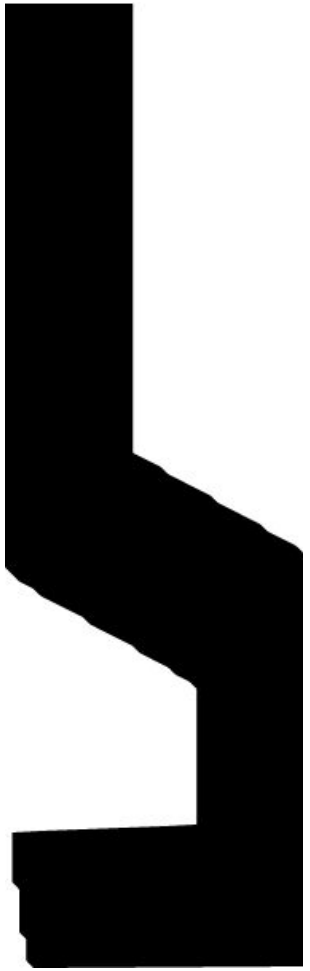
Master m³ Keyway

```
set m3 to barstock height: 298 , thick: 90
set m3 to mill side B of m3 with 25 dia ball cutter , depth: 42 , position: 46
set m3 to mill side B of m3 with 113 dia end mill , depth: 32 , position: 150
set m3 to mill side B of m3 with 90 dia end mill , depth: 25 , position: 306
set m3 to mill side A of m3 with 145 dia end mill , depth: 25 , position: 306
set m3 to mill side A of m3 with 113 dia end mill , depth: 25 , position: 150
set m3 to mill side A of m3 with 125 dia end mill , depth: 0 , position: 0
set m3 to reverse m3
draw m3
```




for i in all keyways, large DB
write property name of i
write metal filed to turn i into m3


Master

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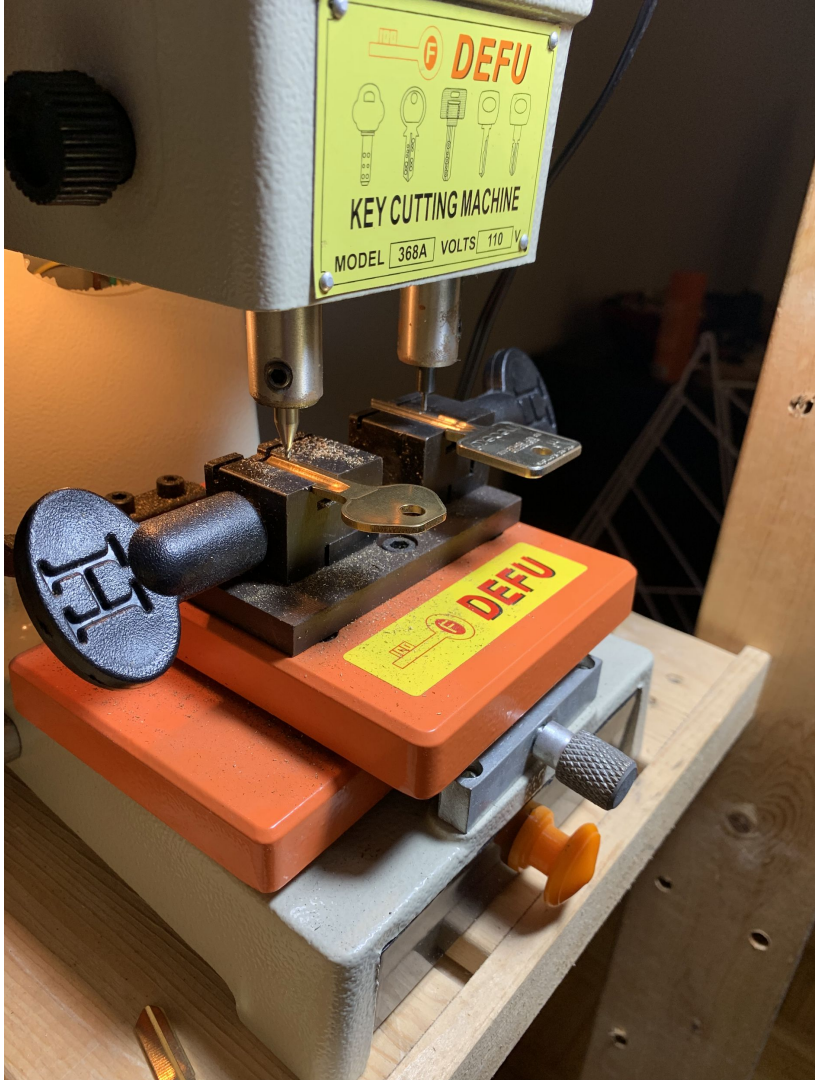
Master
2004


DEFU
KEY CUTTING MACHINE
MODEL 368A VOLTS 110 V
DEFU

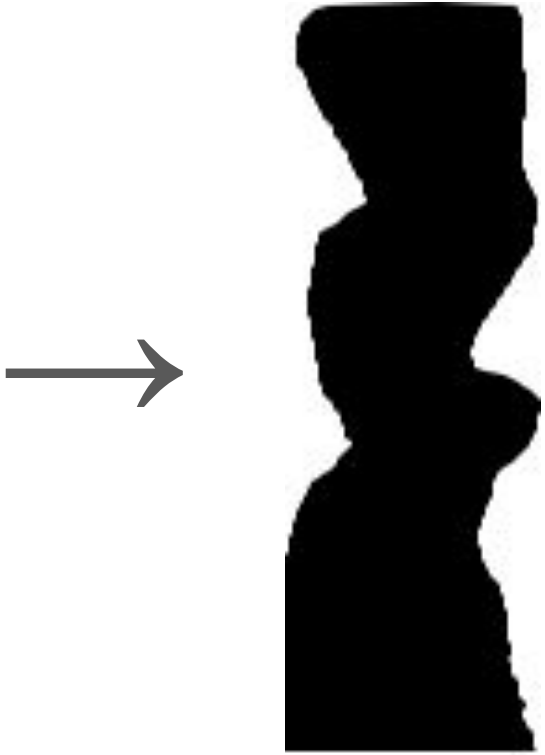




Mobeco
ASSA ABLOY

Photographing a Lock









compare Photo , Medeco 19S



compare Photo , upside-down Medeco 17S

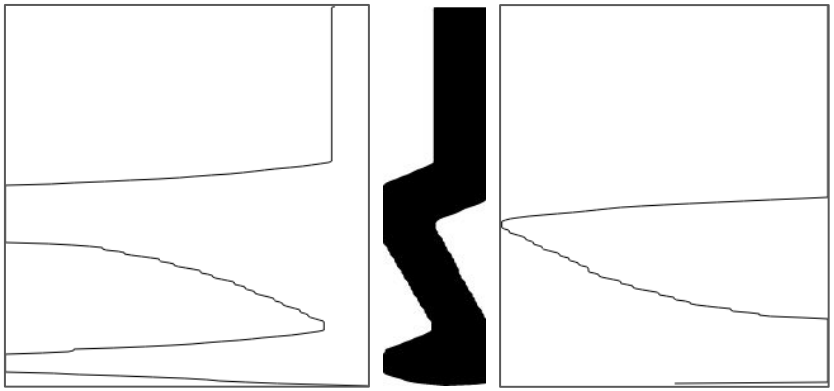


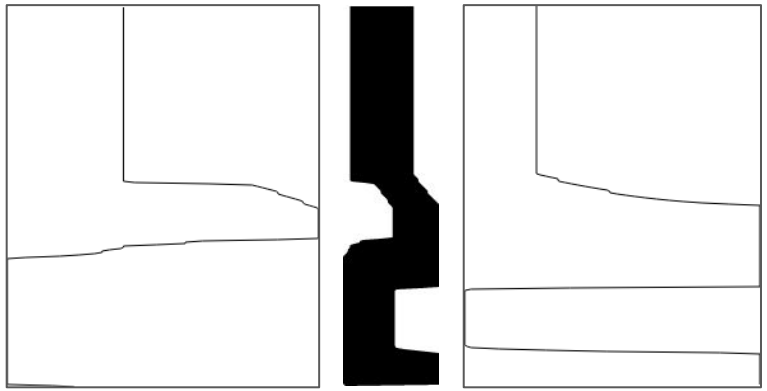
Measuring the Key

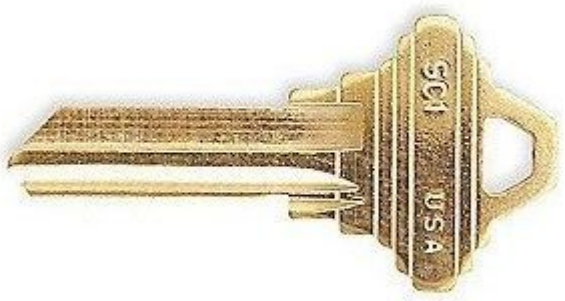



KLOM®
KLOM-3100
The brand of High Quality

Photographing the Key

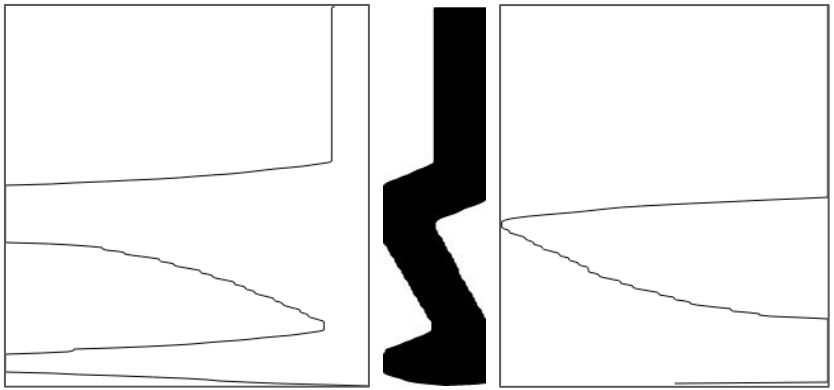






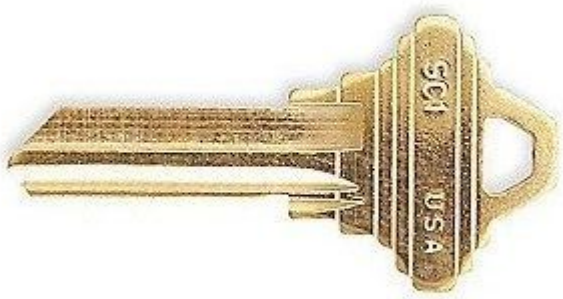


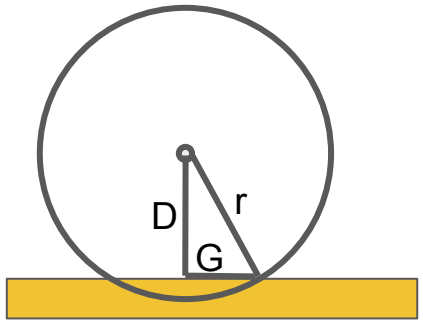
Milling Marks - Shallow Slope Gives Precision

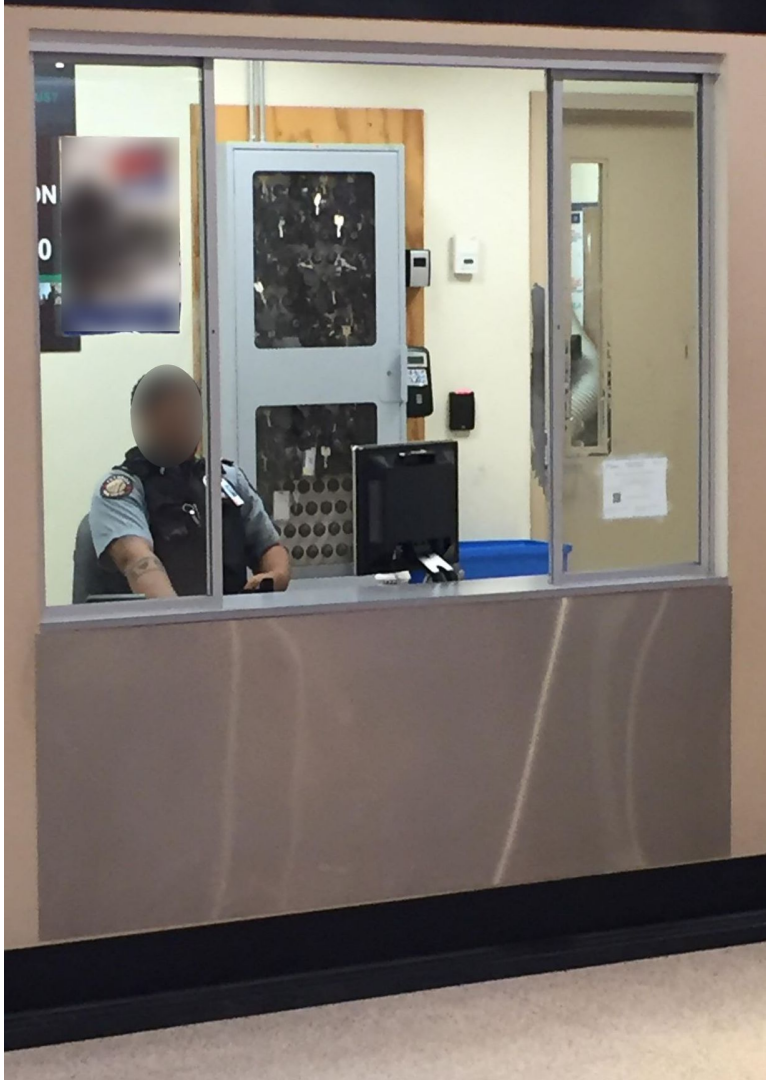


$$G = \sqrt{r^2 - D^2}$$

$$D = \sqrt{r^2 - G^2}$$







Outline

1. ~~Keyways~~
2. Other Stuff
    a. Sidewinder Keys
    b. Primus
    c. Assa
    d. Medeco Angled Cuts
    e. Dimple Locks, Mul-T-Lock
    f. Interactive Components, Mul-T-Lock
    g. Disc Detainer Locks, Abloy
    h. Patents
    i. Duplication Authorisation Cards






medeco
SIS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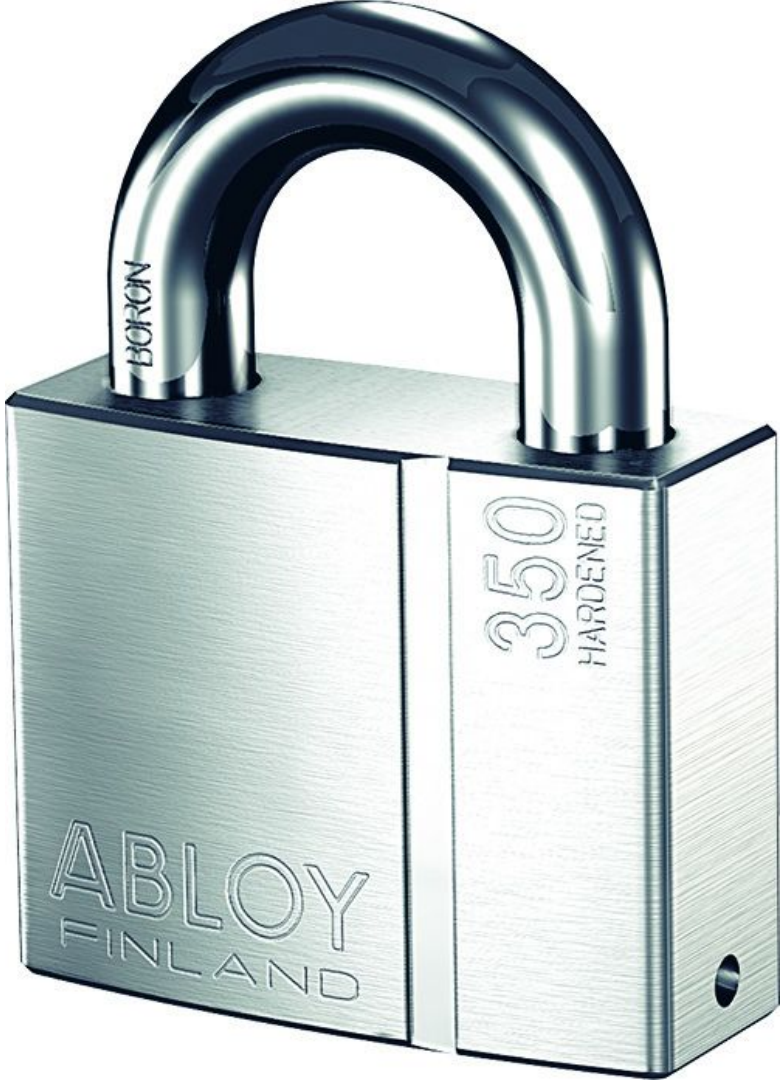
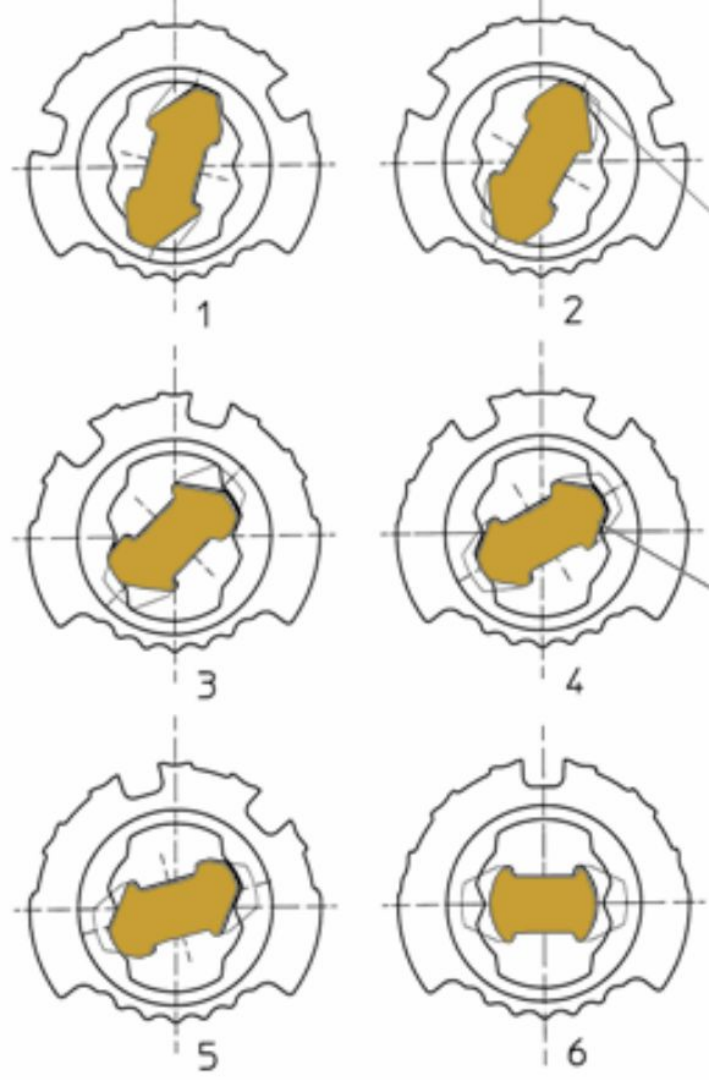
PAT. NO. 4,035,455
medeco
SECURITY LOCKS
PAT. NO. 5,477,875
medeco
SECURITY LOCKS
medeco
HIGH SECURITY LOCKS


ABLOY
HARDENED


BORON
350
HARDENED
ABLOY
FINLAND


ABLOY
PAT
PAT.
ABLOY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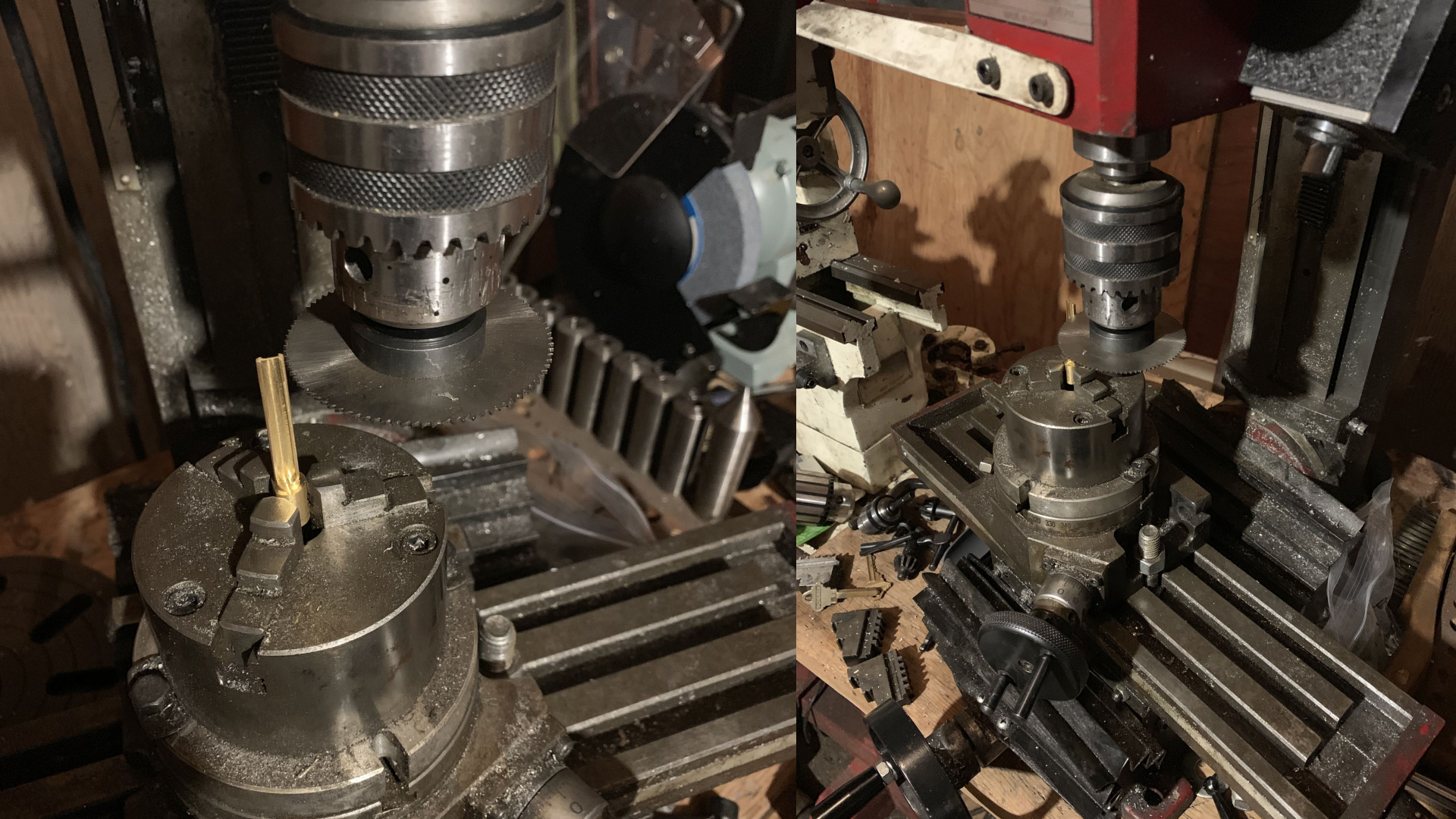
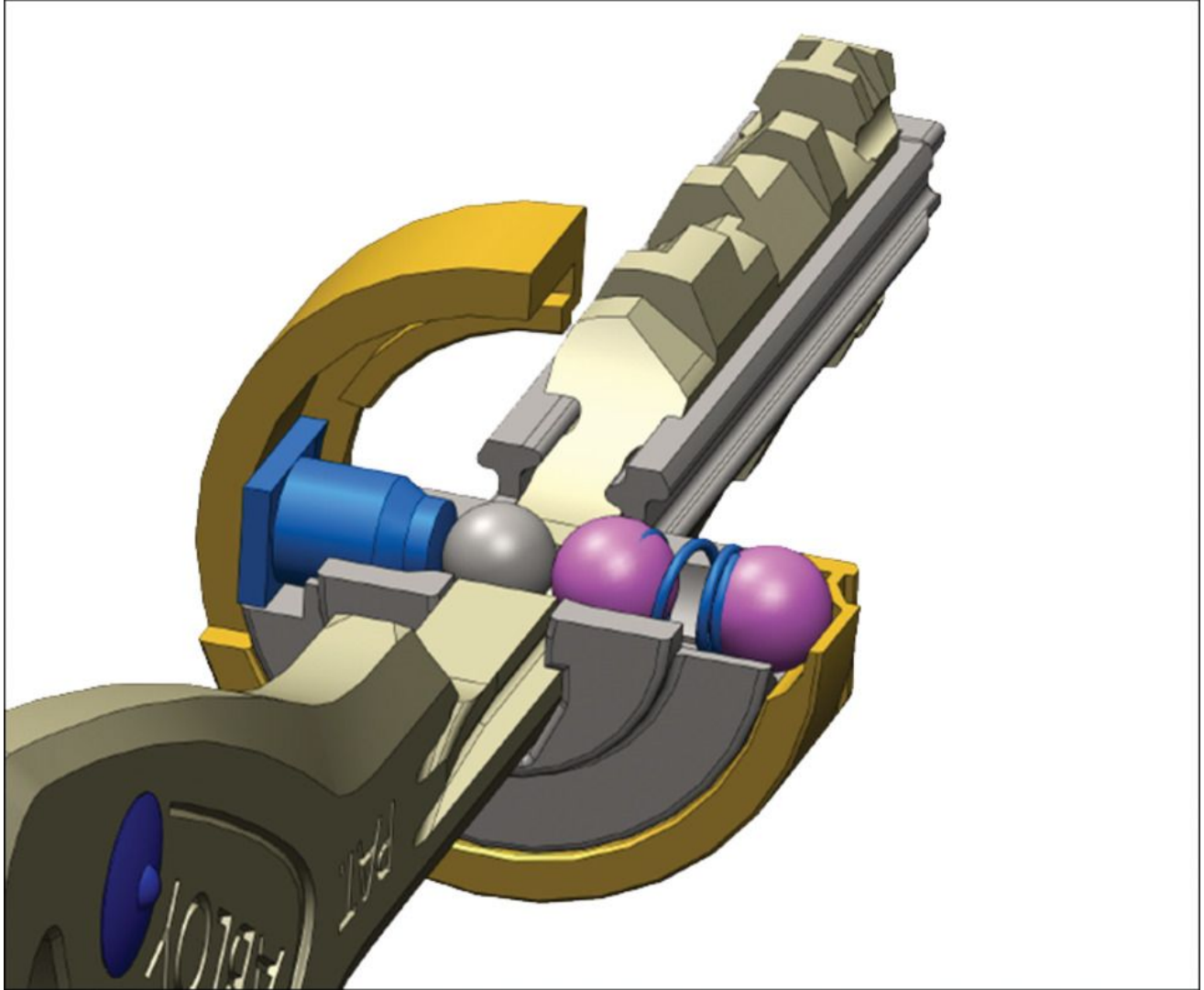
2
3
4
5
6



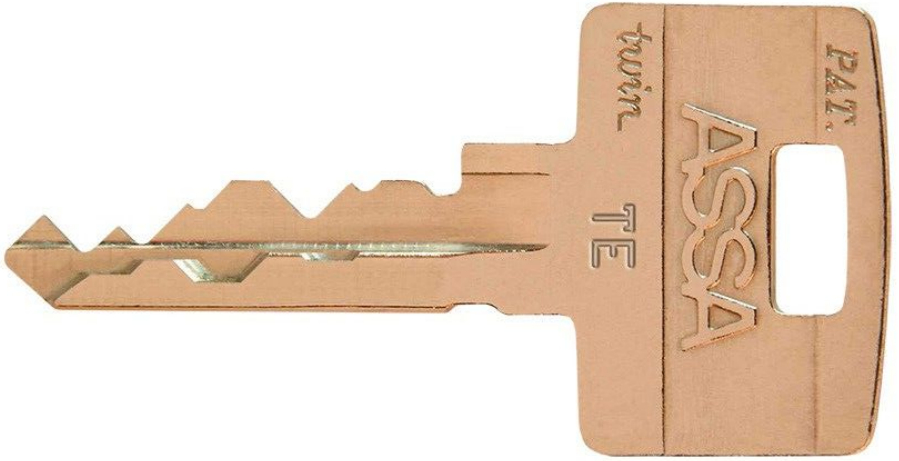





SCHLAGE
PRIMUS


ASSA
ASSA


PRIMUS
SCHLAGE


PAT.
twin
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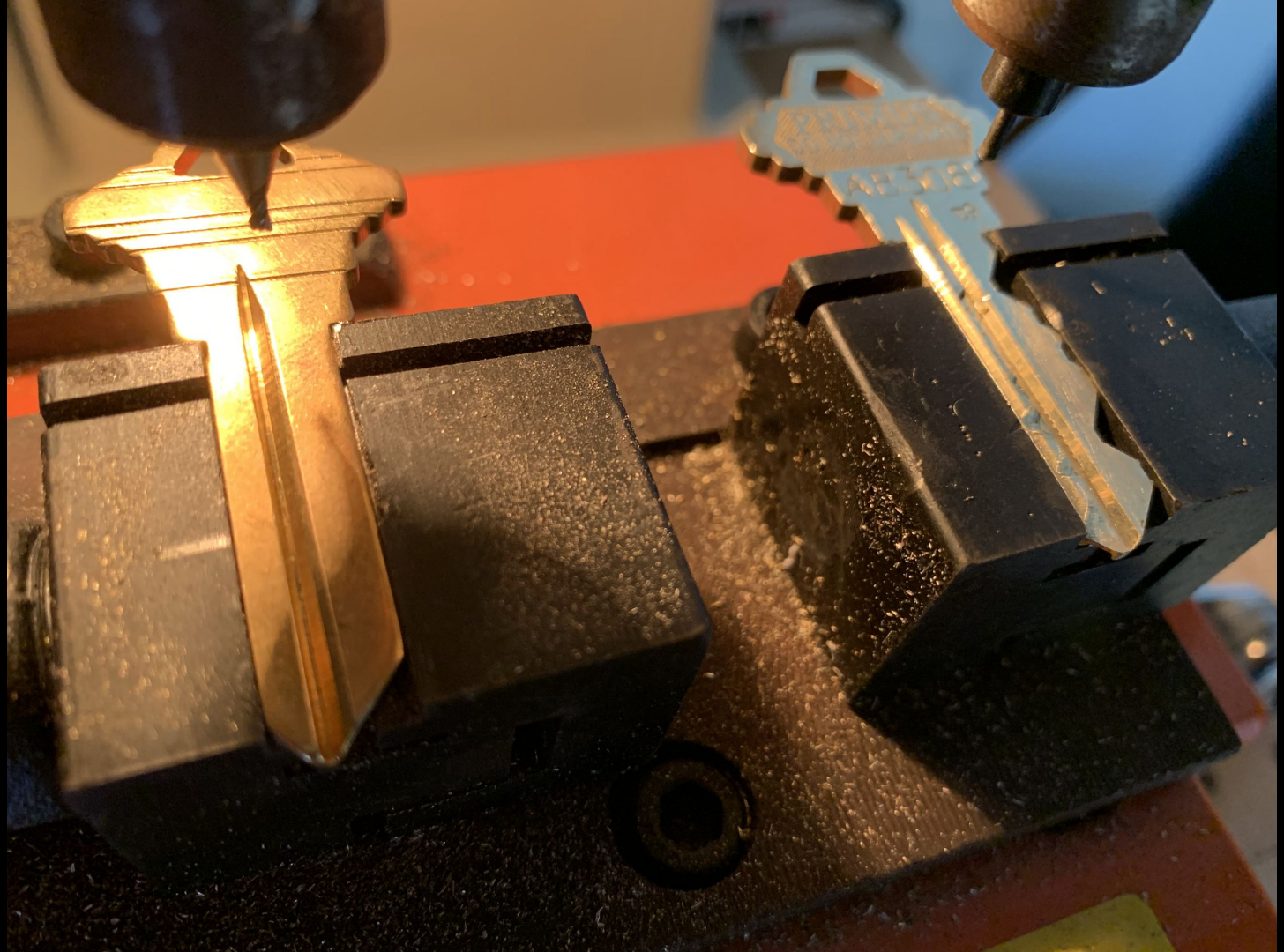
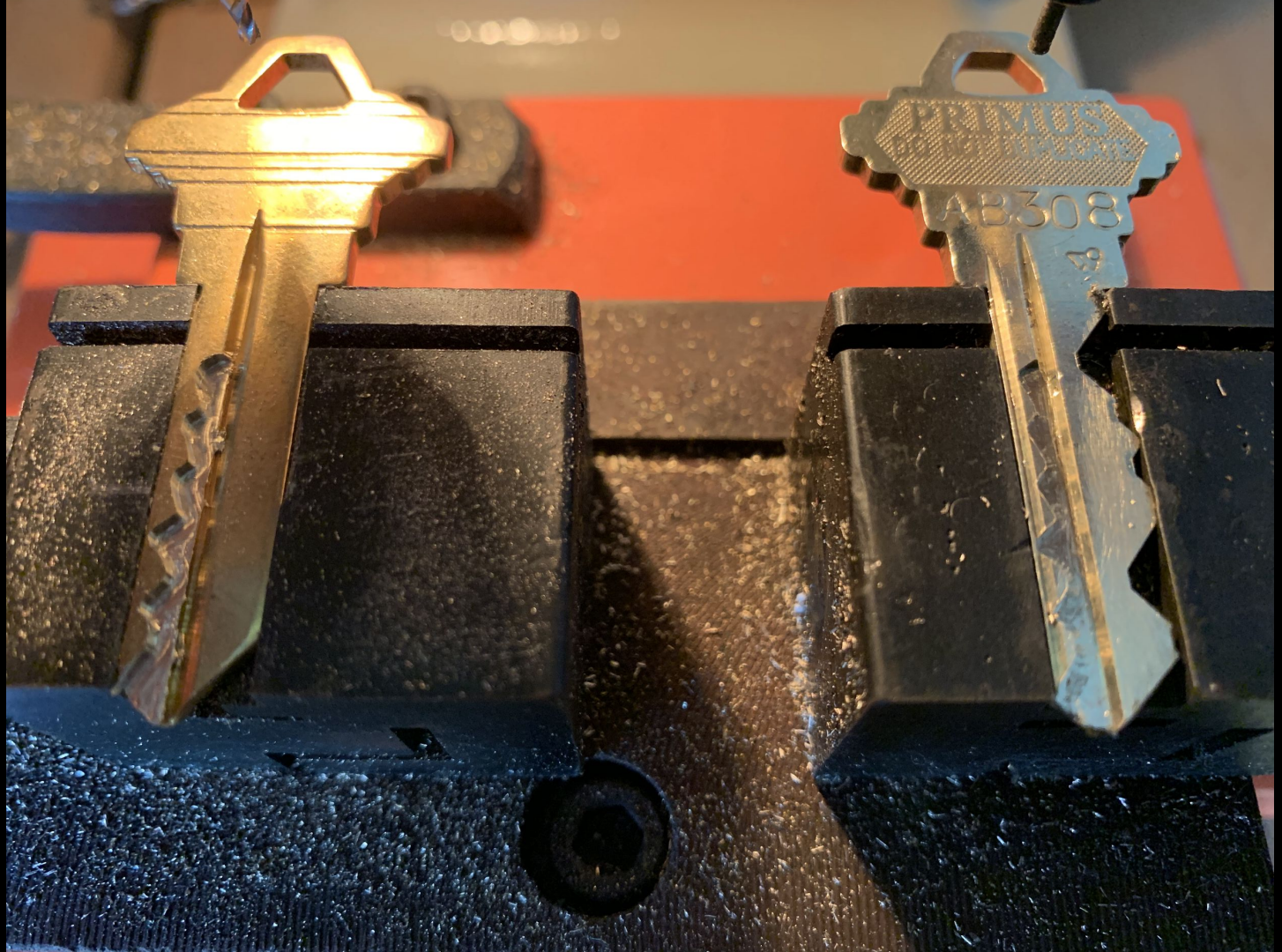


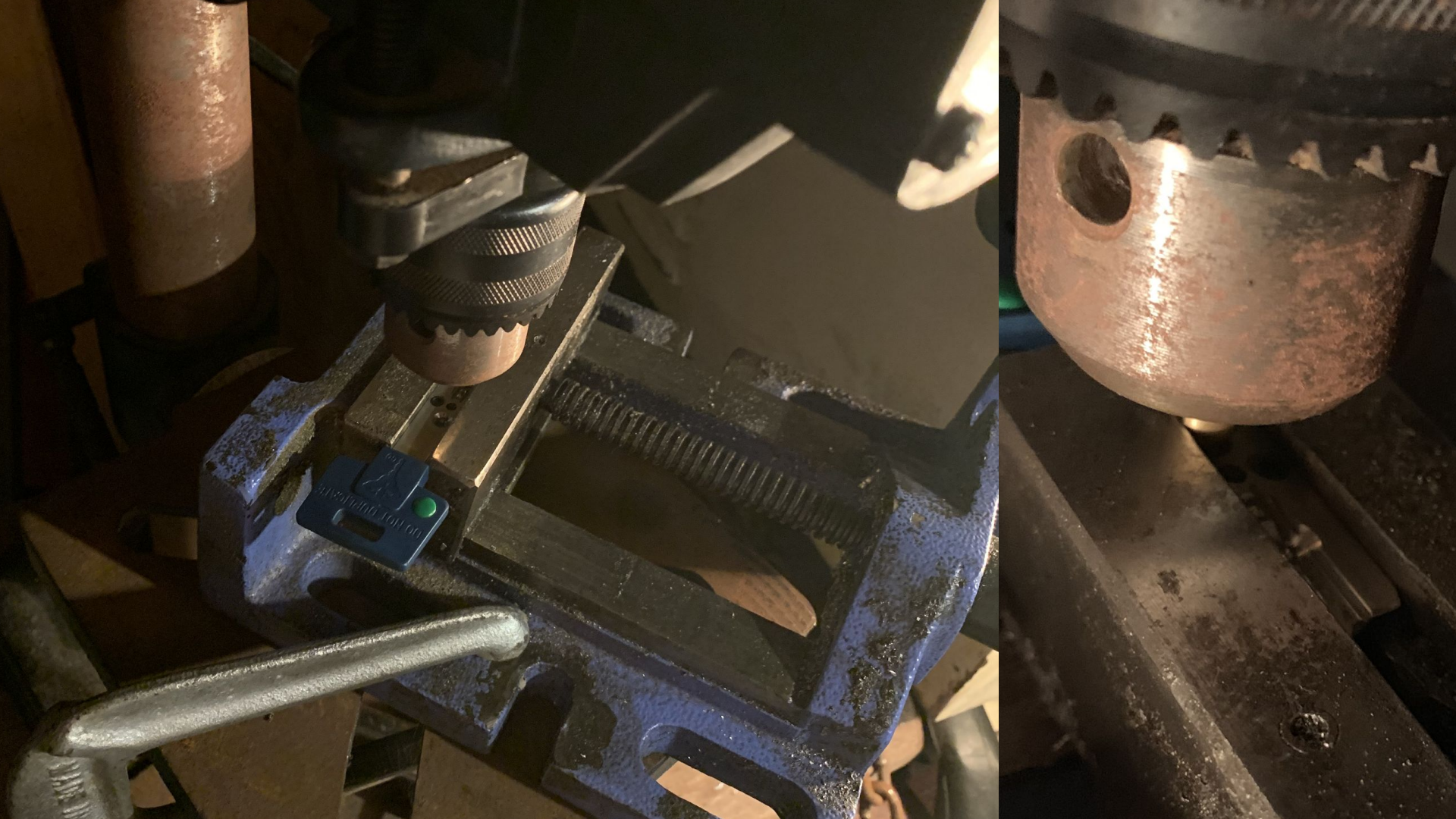

PRIMUS
AB308


MUL-T-LOCK
UL


MUL-T-LOCK


MUL-T-LOCK
INTERACTIVE+
DO NOT DUPLICATE
MT5


Mastercraft







MUL-T-LOCK INTERACTIVE 264B KEYWAY PROFILE KEY BLANKS LOCKSMITH SUPPLY 10 pcs

Be the first to write a review.

Condition: **New**

Sale ends in: 06d 02h 26m

Quantity: 1 — 2 available / 1 sold in 1 hour

Was: ~~US $59.90~~

You save: $3.00 (5% off)

Price: **US $56.90**

Buy another

Add to cart

Best Offer:

Make Offer

♡ Add to watch list

A seller you've bought from	Limited quantity remaining	More than 70% sold

Shipping: **FREE** Economy International Shipping | See details

International items may be subject to customs processing and additional charges.

Item location: israel, Israel

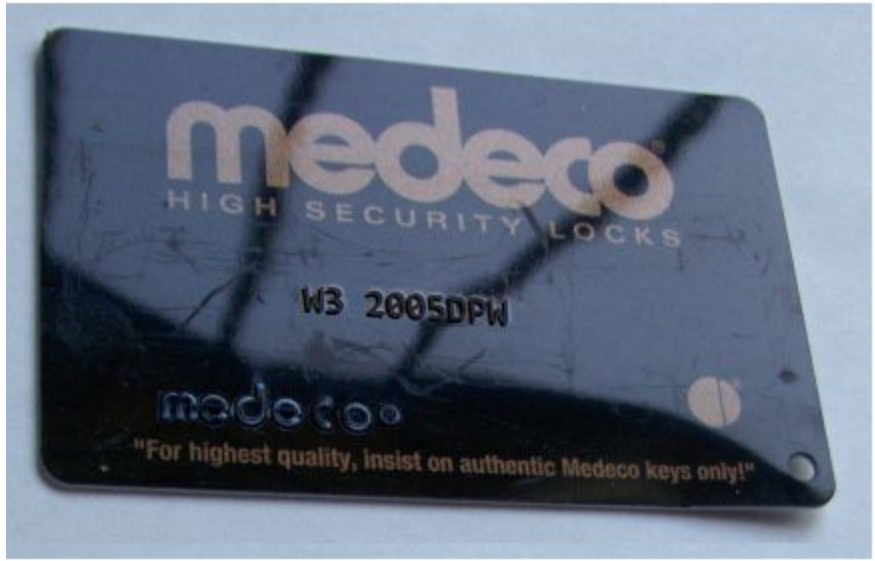
Ships to: Worldwide See exclusions

$ Have one to sell? Sell now

MT5 Patent = No ebay blanks



Generate code card for angles D B S M K Q ▾ and depths 243246 ▾
on keyway W3 Generate



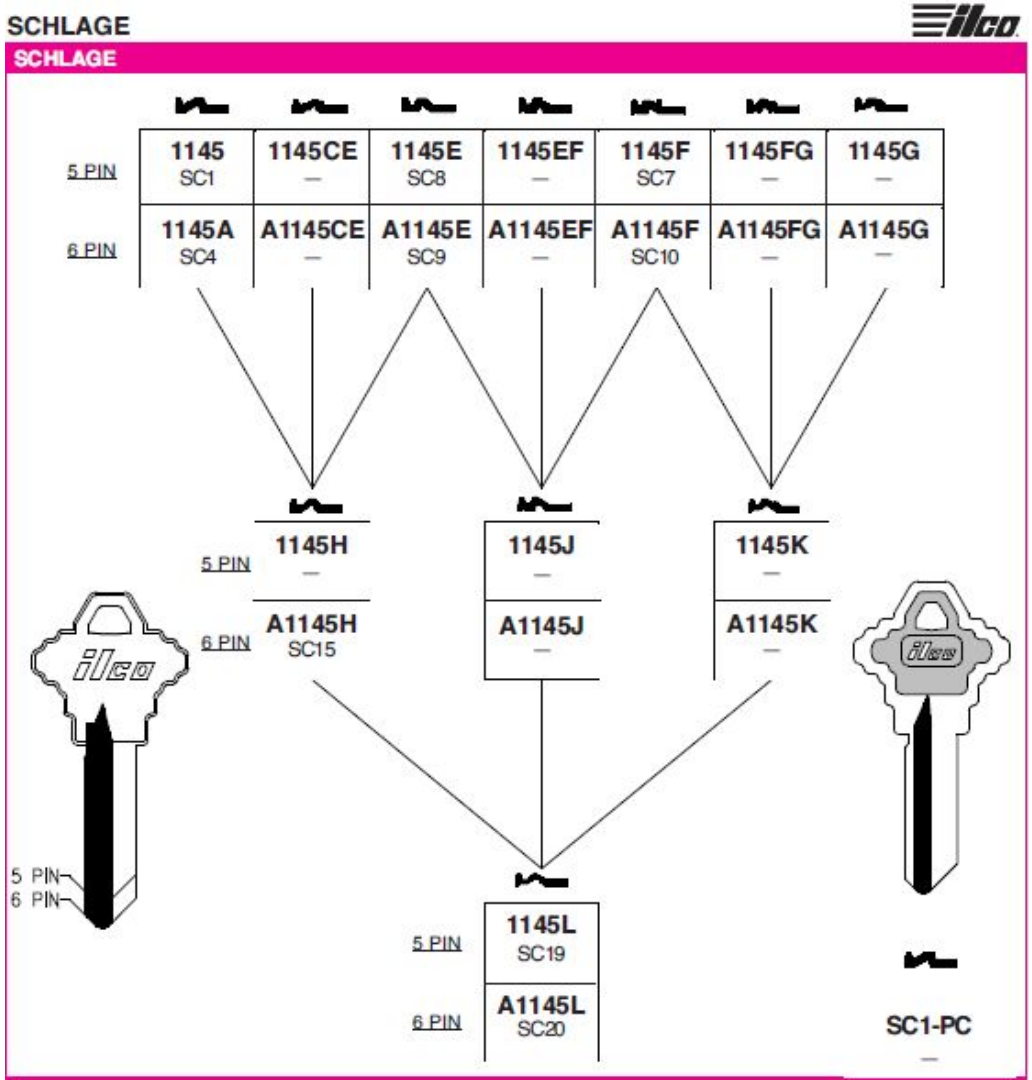
Outline

1. ~~Keyways~~
2. ~~Other Stuff~~
3. Bonus! Remediation

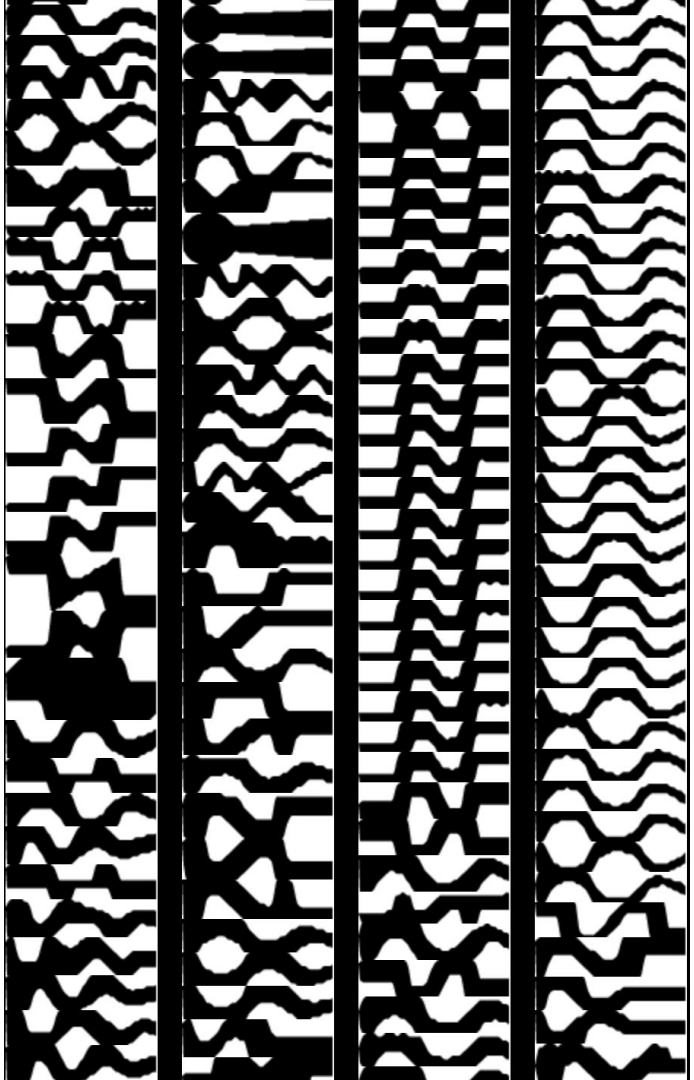
Lost Lock = Lost GMK



Sectional keyways - great as an extra security control. Bad as the only one.



Restricted keyways - great as an extra security control. Bad as the only one.

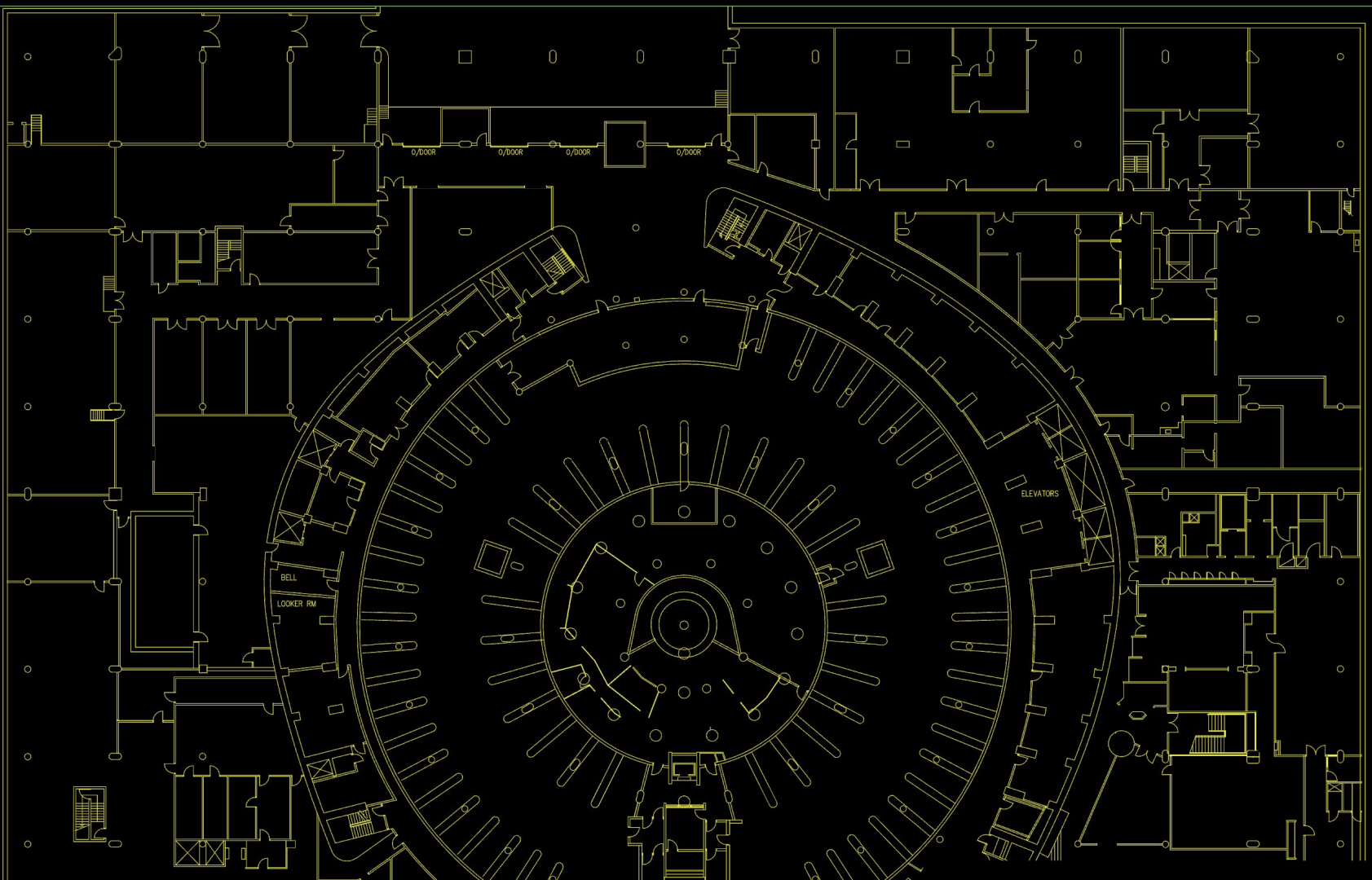


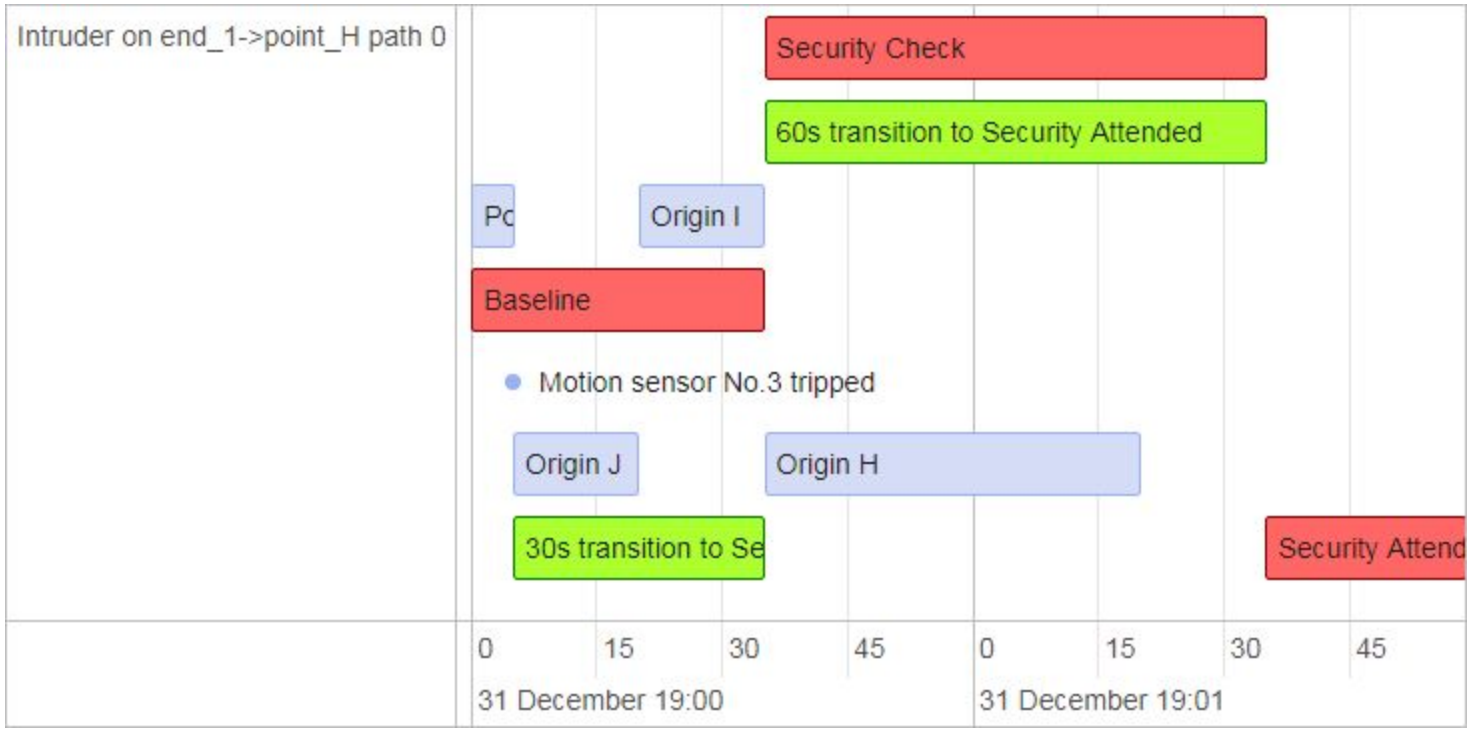
“physical keys are dead hurr durr”

“physical keys are dead hurr durr”



Understand your threat model.


O/DOOR
O/DOOR
O/DOOR
O/DOOR
BELL
LOOKER RM
ELEVATORS


Intruder on end_1->point_H path 0
Security Check
60s transition to Security Attended
Pc
Origin I
Baseline
Motion sensor No.3 tripped
Origin J
Origin H
30s transition to Se
Security Attend
0
15
30
45
0
15
30
45
31 December 19:00
31 December 19:01

4N6

Microscopy



Questions!

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r.graydon@ggrsecurity.com