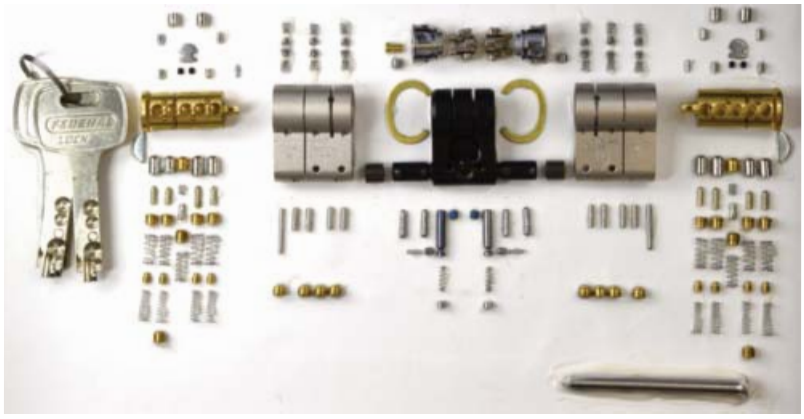
HISTORY OF LOCKS

By Brian Morland

Evolving Technologies

Continuing on the theme from the last article where a few locks were explored that expanded their functions and features in a mechanical or electrical way. Lock-makers weren't slow in exploiting the latest science to both enhance security and to make the operation of devices simpler and at the same time to add additional functions and features; one such enhancement was the ability to know when a lock had been tried. Early examples are locks with bells, counters or detectors; all bring to notice the fact that the lock is being operated either legitimately or nefariously. This theme is continued and culminates with a British combination lock seeking to remove the weakness of the Enigma machine of WWII and its vulnerability to stolen 'code key charts' and 'rotors'.

One security principle on its own is invariably combined with others; sometimes in response to techniques learnt and developed by elements that would try to defeat the principle and may include such diverse interests such as illegal entry to locksmith testing, but more usually, especially in higher security scenarios, the theoretical weakness is taken extremely seriously. A lot can be learnt from an intense assimilation of security related features in a device. For example; one of the earliest locks invented has been continuously developed over thousands of years and to a remarkable degree: the pin-tumbler lock.



A modern cylinder disassembled demonstrating the amazing range of technological solutions embedded within. There are some six box framed similar variations in the MLA HQ Training Room.

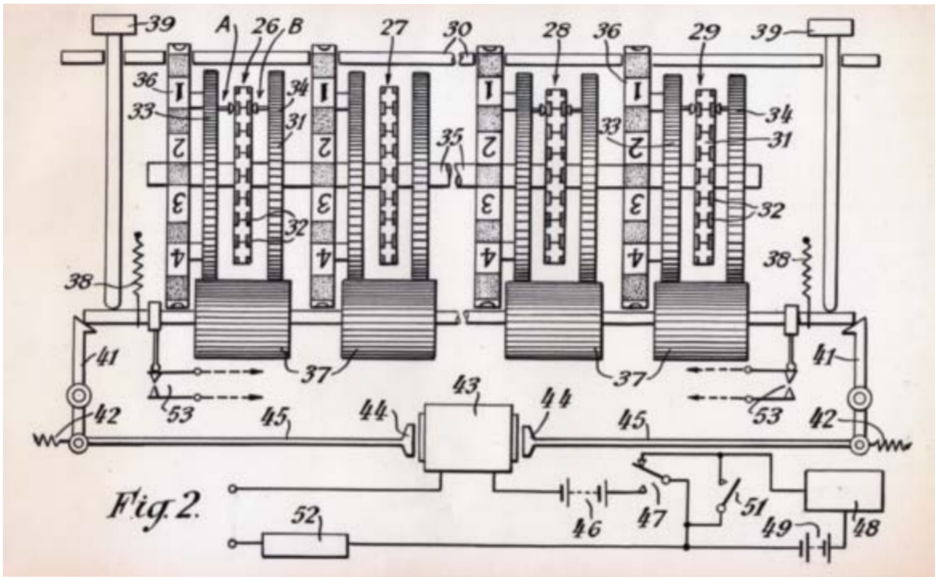
It is often said that there is nothing new under the sun. Often quoted are the ancient 2000 year old wooden locks of the Middle East inspiring Linus Yale Jr. to miniaturise it into the familiar lock we all know today; technologies had reached a point in the 19th century enabling Yale's inventive lateral thinking. Today the pin tumbler cylinder is crammed full of features to defeat very real reading and manipulating techniques as well as theoretically perceived weaknesses. Does bumping for instance ever occur to a lock in situ, are there any instances when criminal entry was obtained using this method? I know when I was a boy just starting in my career it was one of the methods for disassembling a rim cylinder for rekeying, often quicker than shimming, but is an example of a theoretical weakness.

Even earlier, during the 18th century Christopher Polheim spent a lot of time traveling, especially around Europe, to further his ideas and inspiration. One result was his revolutionary lock. It had disc like wards which rotated; at the time it greatly improved security over fixed wards. His lock was also eminently suitable to the cold and wet of the northern latitudes. Interestingly Abloy further developed the lock by adding a side bar bringing it into the 20th century security needs; and Abloy didn't stop there, 21st century chip technologies provide modern app applications whilst still retaining its harsh environment qualities.

An early Abloy factory cutaway cylinder showing the rotating discs with the side bar resting on their peripheries, the key rotates to align slots in the discs to align with the side bar allowing it to drop into the slots thereby providing the drive on further rotation.

Another global traveller researching ideas and methods was Theodor Kromer. He travelled the world in the 19th century probing and learning how others solved the security problems and the merits and weaknesses of their solutions. This mind-set and constant evaluation made Kromers' locks the first choice for many safe makers in Europe including Tann in the UK. Springing has always been an issue with lock makers but Kromers' double bitted key, extremely close tolerance with its pull-push action on a centrally pocketed lever, together with other lock enhancements made it the first choice for many top of the range safes. Later in the 20th century mixture of an electric keypad and conventional 4 wheel combination lock, the Duplex produced primarily for the German Bundesbank, had Enigma qualities

The Kromer Duplex with its electrical, Enigma inspired, keypad. The input keys were randomised for every input digit and automatically scrambled after a few seconds. One advantage of this motor driven dialer is that it could be used on any 3 or 4 wheel mechanical combination lock.



Schematic from Tann Patent titled “Improvements in or relating to Electrical Combination Locks”.

to the circuitry. The lock was capable of stand-alone operation but also had sophisticated remote monitoring facilities reporting lock status.

Another electric combination lock, developed by Tann in the 1960, had Enigma like qualities. No doubt the successes at Bletchley Park in cracking the German army, air force and eventually the navy highly encrypted messages was still fresh; the success though was due to the capture of ‘code keys’ and ‘rotors’. The Tann device sought to remove this possibility.

Patented in Britain, Australia, Canada, France, USA and Germany. The brief entitled “Random Selection Combination Switch”, lists its criteria as follows:-

“There must be no key or similar device which could be stolen, bartered or copied.

There must be no pre-set combination which could be discovered and imparted to a potential intruder.

The number of alternative combinations must extend into millions if necessary, and in high security military applications, provision must be made for more than one person to participate in the combination selection, so that both parties must be present when the condition is changed

An alarm must operate if an attempt is made to change the condition on any but the precise combination sequence.

The locked condition must not be dependent upon any form of power supply.”

The brief continues:-

“The switch has been designed in various forms to suit particular applications and the degree of security demanded, and range from a simple on-off device, to a fully protected missile firing control, its reliability being enhanced by its very simplicity.”

And so mechanical meets electric and soon to meet electronic… An interesting thought occurred to me; our trade is both fascinating and rewarding, the fruits of our labours are constantly tried and tested by the legitimate and not so legitimate users, a wonderful resource for the R&D department! And so the products endlessly evolve.

A security enclosure, whether it’s a safe or strongroom, a building such as a home, office or commercial plant facility or even institutional, research and government facilities all benefit from a multi-level modular application of technologies. Today’s locksmith is trained to bring together the many modular elements, sometimes of different manufacturers, into a practical solution to meet his clients’ needs; and that increasingly incorporates electric, electronic monitoring and app facilities.

Brian Morland, curator of the MLA Heritage Room, HoL Archive and the HoL Collection of Locks and Keys, welcomes comments and corrections on historical aspects of locks and keys. Brian can be contacted by email: brian@emorlands.com

Heritage Room News

The ongoing and still evolving pandemic means that the Heritage Room remains closed; a great deal of thought has gone into how the historic nature of our trade can continue to be accessed. Those of you that have visited the Heritage Room at HQ in Rugby or indeed the Archive in Bournemouth will appreciate the scope of the material in our care. Our Archive in particular is probably the most significant from a global perspective. The Archive is very heavily referred to when writing in Keyways, The Locksmith and other magazines thus ensuring writing based on the content of documents and illustrations from our reference collection of artefacts.

The shelf footage of the Archive has never been calculated but must be in terms of 100's of metres rather than just metres. The lockdown has given the opportunity to start work on indexing the vast amount of material in our care. Most of this material is also available to you to assist in your own studies/research.

You can already download the 'Itinerary' of the artefacts on display in the Heritage Room; go to www.locksmiths.co.uk/public/about-us/heritage-room. Even though the room is closed, the artefacts on display are still evolving; the latest additions include the impressive painting of the 1st Lord Hayter Chubb, the latest file version uploaded to reflects the latest changes in the room.

A second file soon to be added for you to download; 'Archive Index'. This download, although only a few pages at the moment, will be regularly updated as the digitising proceeds and the pages increase; so check back often for the latest version. The index itself is quite informative in relation to the scope of the document it represents; each entry also includes a thumbnail image of the document it represents and gives an indication to the user/researcher with comments, keywords and captions. Do contact curator@emorlands.com to request detail scans. In the meantime we are happy to look up dating information for Chatwood, Chatwood-Milner, Chubb, Hobbs Hart, Milner and Tann, simply send an image of the lock/safe and a close up of the serial number with your request. If there is more info in the archive we will advise of further documents.

It's hoped that in some small way these downloads help you with the historical side of our trade and can still be studied and enjoyed in these 'new normal' times.

WORST WORK COMPETITION

This issue's Worst Work Entry is from Alan Parker of 1st Express Locksmiths

He told me "I was called out by letting agent to change a cylinder.

"Can you just pop out & change the cylinder as the key's snapped and the landlord's handyman has removed the key but can't unlock the door" said the agent.

When I got there the internal side of the euro didn't look right so it took the handle off and it just fell out. The gearbox was bent into all kind of shapes and the middle of euro was still held in by the screw. The inside of the euro had been glued back in with mastic and expanding foam!

God bless the handyman' it looks like he had a mare