About electronically controlled locking systems

Below is a brief description of how the design of the innovative ***Lock*-security** device differs from the designs of the most well-known commercially available electronically controlled locking systems*).

The bolt of the **Filin** invisible lock is moved by a miniature electric drive built-in the lock, which has a gear, by the commands received by the lock control unit (*CU*) from RFID charms, radio charms or from a mobile phone over a GSM channel (see http://zamok-nevidimka.com.ua/menus/view/214/). And since the *CU* is placed outside the lock case, a wire loop laid on or inside the leaf door is needed to control the electric drive.

For emergency unlocking from inside the room, the lock has a handle rigidly connected to the bolt, which handle is movable along a horizontal slit hole made on the inside of the door leaf. This deteriorates the appearance of the latter and increases the risk of damaging the reducer when the handle is moved by hand.

All of the other locks, the bolt of which is moved by a micro drive built into the lock, have similar disadvantages.

The operation of the **RedLock** lock is based on the interaction of two relatively powerful springs associated with the bolt and working in counterphase (see https://redlock.com.ua). The electromechanical latch, which lиocks them when closing/opening the lock, is also controlled by a *CU* placed outside the lock and almost by the same command devices + a smart with a narrow directional coded IR beam.

The main disadvantage of both locks is the ease of their unauthorized opening from the outside of the door when the *CU* is completely de-energized. Another disadvantage of both locks is a small protrusion of the bolt, which limits the use of such locks as the only lock on the entrance door. And furthermore, the **RedLock** lock, if handled incorrectly, can leave the user who has come out to the mailbox behind the closed door.

There are a number of other commercially available locks that are controlled or monitored electronically, such as, for example, **PERCo** locks (https://www.perco.ru/novosti/unikalnaya-konstrukciya-novyh-zamkov-perco.php), the **Buldog-14** electronic lock (http://cyberdog.su/index-b14.html), METTEM invisible locks with a GSM module (ЗВ ЭМ 01.02 с GSM), **Fort**, **Titan** locks and others (see, for example, *Locks* on the I. Omelchenko's Forum).

As compared to traditional locks, all of them have additional miniature mechanical parts of a relatively complex design, the use of which leads to a noticeable increase in the cost of locks and reduces the reliability of their work during long-term service.

At the same time:

The blocking element of the ***Lock*-security** device is configured in the form of a cylindrical rod of relatively large dimensions, in which permanent magnets of high quality ferromagnetic are embedded. The rod can move freely (and even with backlash!) through the axial hole of the electromagnet (*EM*) coil, which ensues the possibility of its small (up to 10 mm) vertical movement when a direct current of a certain polarity appears in it. When the *EM* power supply is switched off, the rod goes down under the action of gravity.

The rod can be put out of operation by lifting it up by hand (using the handle attached to it) until it abuts the ferromagnetic cover of the blocker body, as a result whereof it will be securely fixed to this cover in the extreme upper position by forces of magnetization. Again, the rod can be put back into operation only by hand by slightly moving/pushing its handle downwards.

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*) In our opinion, it would be more correct to refer to the lock controlled by electrical signals through a wired loop from the electronic control unit (*CU*) placed outside its case not as the traditional term *lock*, but rather *the locking system*.

Thus, in the ***Lock*-security** blocking device there is not only a micromotor and reducer, but even banal springs, levers and latches. And if we consider that the coils of the lacquer-impregnated EM winding are reliably protected from dynamic shifts, which can provoke their breakage, it is impossible to deny the simplicity of the mechanism of the innovative device, which guarantees its high reliability in the process of long-term service.

It is hard to believe that there is a mortise lock whose locking mechanism is simpler than the locking mechanism of the ***Lock*-security** device. Except for an ordinary latch.…

As far as the functionality of the control unit of the innovative device is concerned (for more detail, see 5), it is far superior to any of the known electronically controlled locks (see, for example, 6).