Aug. 23, 1938. L. LEBEAU 2,128,002

LOCK FOR HOUSE DOORS

Filed Aug. 2, 1935 3 Sheets-Sheet 1

fig. 1.

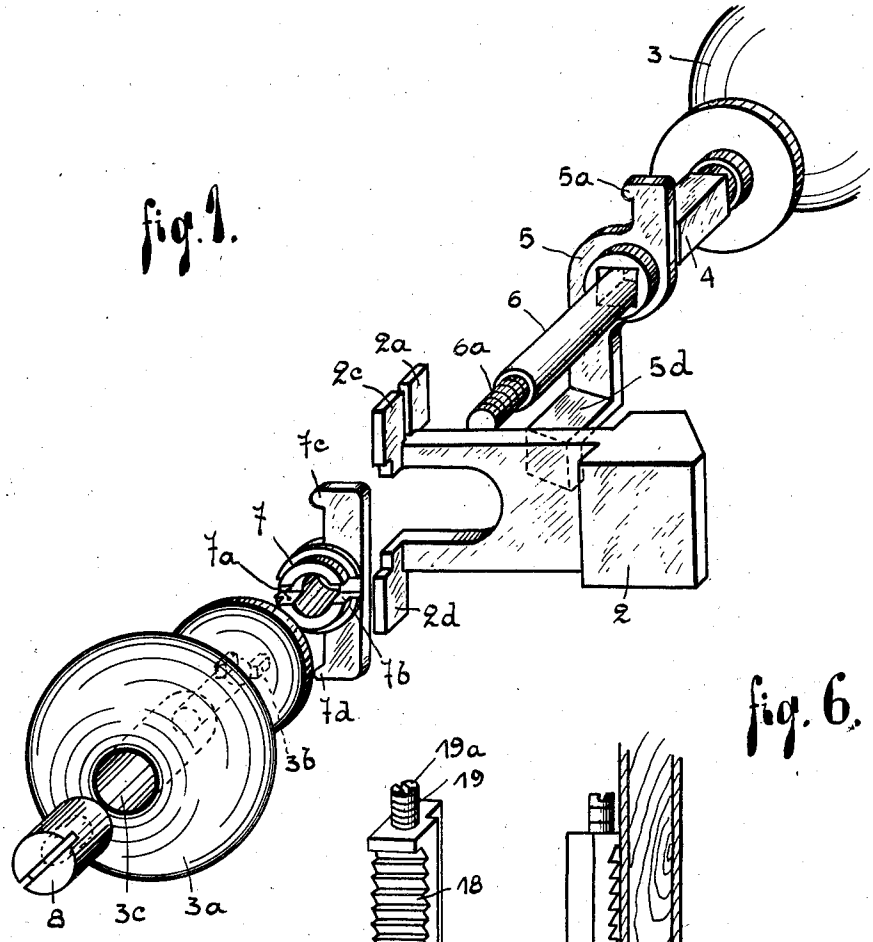


fig. 6.

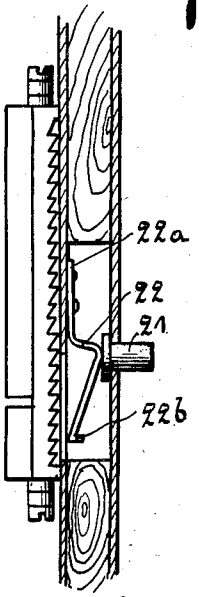
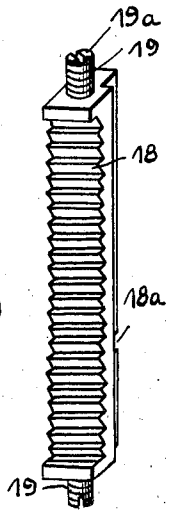


fig. 5



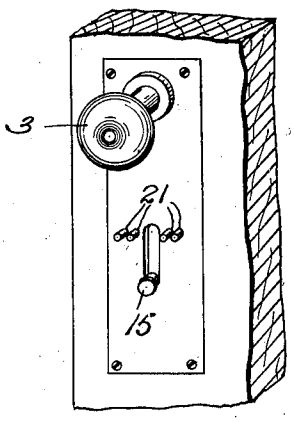


fig. 7.

Inventor
Leon Lebeau,
By E. F. Wendroth
Atty

Aug. 23, 1938. L. LEBEAU 2,128,002

LOCK FOR HOUSE DOORS

Filed Aug. 2, 1935 3 Sheets-Sheet 2

fig. 2.

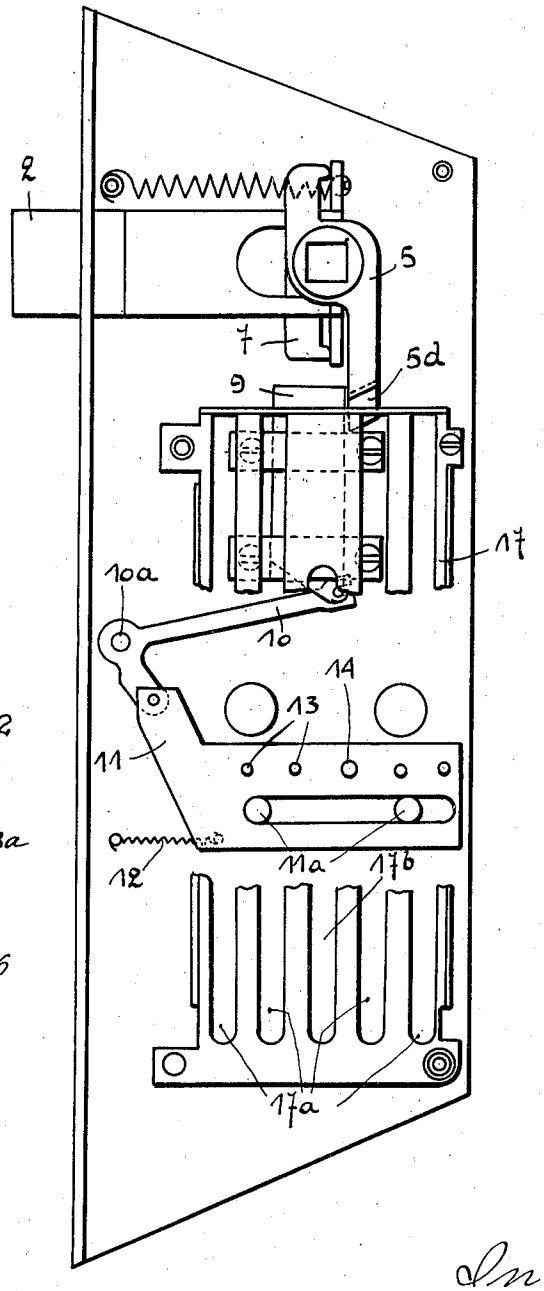
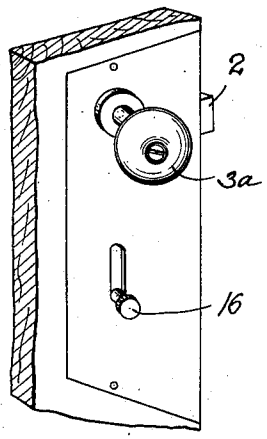


fig. 8.



Inventor:
Leon Lebeau
By E. F. Wendroth
Atty

Aug. 23, 1938. L. LEBEAU 2,128,002

LOCK FOR HOUSE DOORS

Filed Aug. 2, 1935 3 Sheets-Sheet 3

fig. 3

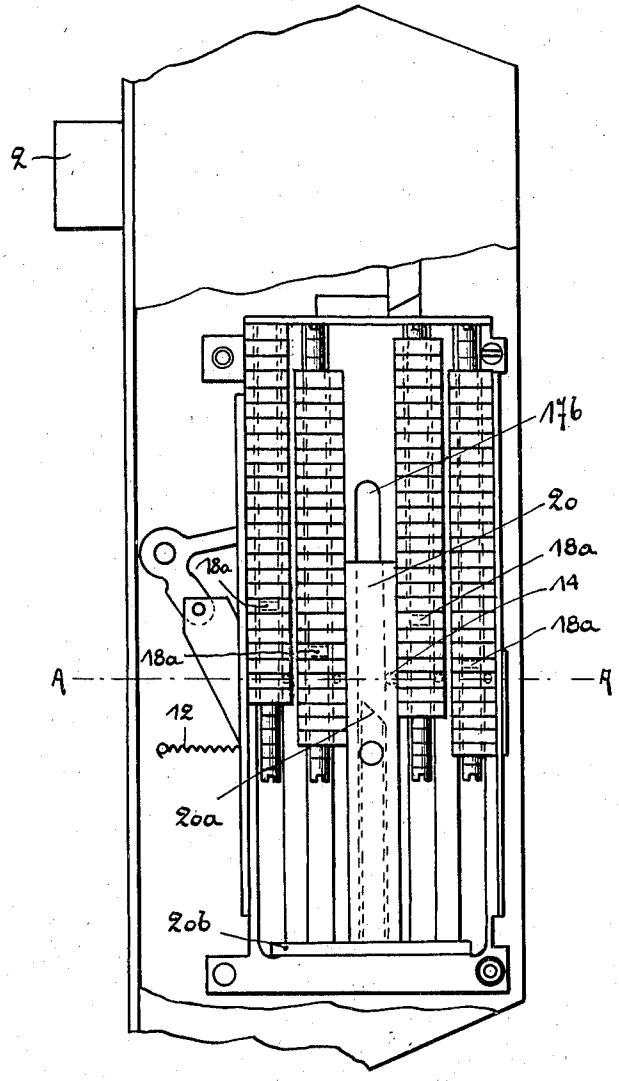
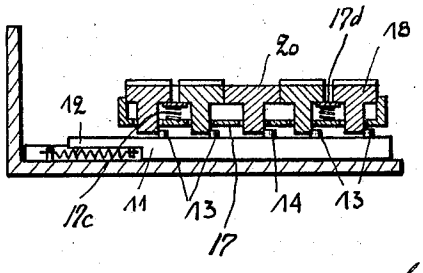


fig. 4



Inventor:
Leon Lebeau
By E. F. Wenderoth
Atty

Patented Aug. 23, 1938 2,128,002

UNITED STATES PATENT OFFICE

2,128,002

LOCK FOR HOUSE DOORS

Léon Lebeau, Brussels, Belgium

Application August 2, 1935, Serial No. 34,469
In Belgium August 9, 1934

6 Claims. (Cl. 70—153)

The present invention relates to locks and is intended to permit the doors of homes and the like to be opened without requiring the use of a key, thus avoiding all drawbacks owing to the loss of the key.

According to my invention, the unlocking of the lock is controlled solely by a combination device, the operating parts of which are non-removable.

Further according to my invention, the operation of the bolt of the lock by means of the knob or handle provided on the outside of the door is dependent on the combination device, while the said bolt is operated independently of this combination device by the inside knob or handle of the door.

In order to avoid the possibility of detecting by sight, when the combination device is actuated, the combination already set, my invention contemplates that the actuation of said parts will be accomplished by successively pushing said operating parts, each part being pushed a predetermined number of times, and these parts being advantageously formed by push-buttons intended to move the elements hereinafter termed "controlling elements", which elements control the unlocking of the lock.

So that the combination device can be scattered readily, according to my invention the displacement of the operating parts of the device is brought about by simultaneously moving all of these parts by means of a knob or the like, or, in the case of house-doors, by means of two knobs or the like connected to each other and provided one on each side of the door.

The button scattering the combination also serves to operate, by the aid of a cam system, a movable bar for locking the roll-back of the lock, which bar is actuated by the outside knob or handle of the door and is provided with yielding means which tends to unlock the roll-back; the actuation of the button scattering the combination is thus without effect upon the opening of the door.

In a preferred embodiment of my invention, the controlling elements of said combination device are formed by racks which are longitudinally moved by pawls (or elastic blades serving as pawls), and which are operated by depressing said push-buttons, whereby said racks, when they all are individually set to a determined position, are disposed out of the path of the locking bar, so that the latter may be moved.

So that identical racks may be used, according to my invention the initial or locking position of the racks, which position is obtained for example by operating the button for scattering the combination, is different for every rack and is dependent on the respective figures of the combination, so that the different racks are brought, by the proper operation of the push-buttons, into an unlocking position, said racks being provided with prolongations of variable and adjustable lengths, for a purpose to be developed hereinafter.

A slide adapted to move transversely with respect to said racks and to transmit its own motion to the locking bar, for instance by means of a lever-system, is provided with a series of studs which lie in a straight line and, when the bolt is in its locked position, these studs are disposed between said racks, said studs being restrained against sidewise movement by the lateral sides of the racks, and being adapted to slide, together with the locking bar, to a position in which the locking bar releases the locking bolt, in grooves cut transversely across a predetermined point along the length of the racks. This locking bar has a projection cooperating with an inclined portion provided on a movable plate operated by the button or buttons for scattering the combination, whereby the bolt is locked when the combination is scattered.

In a preferred embodiment of the invention, one end of each of the said elastic blades which serve as pawls, is fixed, and the blades are provided with a curved portion positioned between said fixed end and the movable end of the blade, which latter enters the teeth of the rack, the push-buttons bearing on the curved portions of said blades, tending to elongate them flat, so that they will advance the corresponding racks.

The accompanying drawings illustrate by way of example a practical embodiment of the invention, but the construction shown therein is to be understood as illustrative only and not as defining the limits of the invention.

Fig. 1 is a diagrammatic view of different parts operating the bolt of the lock, said parts being shown in the position for mounting.

Fig. 2 is a plan view of a portion of the lock intended for operating the bolt of the lock and the locking bar.

Fig. 3 is a plan view of the lock showing the racks and the locking slide.

Fig. 4 is a section on the line A—A of Fig. 3.

Fig. 5 is a diagrammatic view of a rack.

Fig. 6 is a transverse section of a detail showing the arrangement for operating a rack.

Fig. 7 is a view of the lock as seen from the outside of the door.

Fig. 8 is a view of the lock as seen from the inside of the door.

Referring to Fig. 1 it will be seen that the bolt **2** of the lock is actuated by two knobs or handles **3** and **3***a* provided respectively on the outside and the inside of the door. The knob **3** is secured on a shaft having a square portion **4** on which is fitted a roll-back **5**, as well as a cylindrical portion **6** which is loosely engaged in the inside knob **3***a*. The knob **3***a* is provided with two pins **3***b* (Fig. 1) engaging recesses **7***a* and **7***b* provided on a second roll-back **7**. An internally-threaded stud **8** is fitted inside of the hollow space **3***c* of the knob **3***a* so that it can be screwed on the threaded end **6***a* provided on the cylindrical portion **6**. When the knob **3** is rotated, the roll-back **5**, which possesses a shoulder **5***a*, operates, by means of this shoulder, a projection **2***a* of the bolt, while the roll-back **7** engages by means of shoulders **7***c* and **7***d* respectively, the projections **2***c* and **2***d* of the bolt.

After the bolt has been locked, as set forth hereinafter, by locking the shoulder **5***d* of the roll-back **5**, it is obvious that the actuating of the bolt **2** by the knob **3***a* is independent of the locking of the lock. This is because the inside knob **3***a*, when turned, slides on the cylindrical portion **6** and thus has no effect on the roll-back **5**. At the same time, since its pins **3***b* engage the recesses **7***a* and **7***b* of the roll-back **7**, the latter contacts the bolt **2** by means of the engagement of the surfaces **7***c* and **7***d* with the surfaces **2***c* and **2***d*, moving the bolt out of its keeper.

The immobilization of the shoulder **5***d* of the roll-back **5** in its inoperable position is accomplished (Fig. 2) by a locking bar **9** adapted to move longitudinally so as to clear the trajectory of said shoulder **5***d*. This locking bar **9** is acted on by a lever **10** fulcrumed at **10***a* and connected to a slide **11** mounted for transverse displacement with respect to the lock guided by pins **11***a*. The displacement of the bar **9** so that the shoulder **5***d* can be rotated by the outside handle **3** for unlocking is brought about by a spring **12** which biases the slide **11**, as soon as the pins such as are shown at **13**, are allowed to move. Movement of the slide **11** to the left rocks the lever **10**, pulling the upper arm downwardly, and with it the slide **9**, out of the path of the roll-back **5**. The slide **11** is also provided with a pin **14**, the function of which is to cause said slide **11** to move in the direction corresponding to the raising of the locking bar **9** (to the right in Fig. 2) when operated by the buttons for scattering the combination, such as are shown at **15** and **16** in Figs. 7 and 8.

The locking bar **9**, the lever **10** and the slide **11** (Fig. 2) are covered by a plate **17** provided with slots **17***a* for guiding the racks in a manner to be described hereinafter, and with a slot **17***b* for guiding the locking slide **20** (Figs. 3 and 4).

As shown in Fig. 5, the racks such as **18** are of T-cross section (Fig. 4) and are adapted to slide by means of their thin middle portion in slots **17***a* of the plate **17**. As shown in Fig. 4, the racks **18** may be held against undesired movement by means of spring means **17***c* bearing against washers **17***d*, whereby the racks are pressed pairwise against the cover of the lock.

Each of the racks is provided at the same position along its length with a groove **18***a* (Fig. 3), designed to permit the passage of pins such as indicated at **13** (Fig. 2); and these racks are each prolonged by a series of superposed small discs **19**, the number of which is modified in accordance with the code number to be set up in the racks. The discs are supported by a central screw-bolt **19***a*.

As shown in Fig. 3 and as suggested above, the prolongations of the different racks are not of the same length. Referring to Fig. 3, it can be seen that if the racks are moved out of the position shown through predetermined distances, say respectively six, three, five and two steps (the code number 6352 being employed), all the transverse grooves **18***a* will register in front of the pins **13** shown in dotted lines in Fig. 3, so that these pins, together with the slide **11**, can move across said grooves under the action of the spring **12**. It is to be noted, however, that this lateral movement of the slide **11** is not possible unless the locking plate **20**, which is slidably guided in the slot **17***b*, has disengaged the pin **14** of the slide. The locking plate **20** is operated by moving the buttons **15** and **16**.

Assuming the different racks to be in the position shown in Fig. 3, then in order to unlock the door, different buttons such as **21** (Fig. 7), are successively depressed as many times as corresponds to the different digits of the combination.

The successive pressures thus exerted cause the racks to advance step-by-step, owing to the device shown in Fig. 6. This device comprises a flexible blade **22** which is secured at **22***a* to the door frame, and the free end **22***b* of which engages, at each depression of the button **21**, a tooth of the rack so as to cause this rack to advance a step. As soon as each rack has advanced a number of steps corresponding to a figure of the combination (as, for instance, 6352 in the case of Fig. 3), the slide **11** will be free to move under the action of the spring **12** with the result that the locking bar **9** will be disengaged from the shoulder **5***d* and the operation of the roll-back **5** by the outside knob **3** is possible.

In order to lock the door, the plate **20** with which the buttons **15** and **16** for scattering the combination are adapted to cooperate, will be raised so that the pin **14** of the slide **11** will first be pushed aside (to the right in Fig. 3) by the action of the inclined surface **20***a* (Fig. 3) (the plate **20** thus constituting a cam plate), provided on the outer face of said plate **20** in order to raise the slide **9** to its locking position. Owing to the transverse part **20***b*, said plate **20** will then operate the racks so as to bring them into the position illustrated in Fig. 3.

The present invention is not limited to the embodiment described by way of example, but the invention is to be understood as fully commensurate with the appended claims.

What I claim is:

1. A combination lock, adapted particularly for household use, comprising a bolt, a knob for said bolt, a roll-back removably secured to said knob and adapted to engage and operate said bolt, means for locking said roll-back, means for manipulating said locking means, racks controlling the displacement of said manipulating means, means operable according to a code for bringing said racks into a position wherein the manipulating means, and hence the locking means, are released, whereby the roll-back is unlocked and can be manipulated by said knob, and means adapted to act simultaneously on the manipulating means and on the racks so as to bring the locking means into its locking position and to hold it there.

2. A combination lock, adapted particularly for household use, comprising a bolt, a knob for said bolt, a roll-back removably secured to said knob and adapted to engage and operate said bolt, a locking bar for locking said roll-back, a slide and a system of levers connected thereto and to said locking bar, a plurality of racks controlling the displacement of said slide and said system of levers, and hence of the locking bar, a plurality of push buttons disposed in such manner as, when actuated according to a code, to displace the racks into a position wherein the slide, the system of levers and locking bar unlock the roll-back so that the latter can be rotated by said knob, and a cam plate adapted to act simultaneously only on the slide and system of levers, and on the racks, so as to bring the locking bar into its locking position and to hold it there.

3. A combination lock, adapted particularly for household use, comprising a bolt, a knob for said bolt, a roll-back removably secured to said knob and adapted to engage and operate said bolt, a locking bar for locking said roll-back, a slide and a system of levers connected thereto and to said locking bar, a plurality of racks controlling the displacement of said slide and said system of levers, and hence of the locking bar, prolongations disposed on each rack, the said prolongations being of variable length regulable according to a code, a plurality of push buttons disposed in such manner as, when actuated according to said code, to displace the racks into a position wherein the slide, the system of levers and the locking bar unlock the roll-back so that the latter can be rotated by said knob, and a cam plate adapted to act simultaneously on the slide and system of levers, and on the racks, so as to bring the locking bar into its locking position and to hold it there.

4. A combination lock, adapted particularly for household use, comprising a bolt, a knob for said bolt, a roll-back removably secured to said knob and adapted to engage and operate said bolt, a locking bar for locking said roll-back, a slide and a system of levers connected thereto and to said locking bar, a pin on said slide, a spring constantly tending to move said slide into a position wherein the locking bar is caused to unlock the roll-back, racks controlling the displacement of the slide and system of levers, and hence of the locking bar, prolongations disposed on each rack, the said prolongations being of variable length regulable according to a code, a plurality of push buttons disposed in such manner as, when actuated according to said code, to displace the racks into a position wherein the slide, the system of levers and the locking bar unlock the roll-back so that the latter can be rotated by said knob, and a manually operable cam plate having a cam portion and a plate portion, and adapted to act simultaneously, by its cam portion on said pin of the slide, and by its plate portion on the prolongations of the racks, in order to bring the locking bar into its locking position and to hold it there.

5. A combination lock, adapted particularly for household use, comprising a bolt, a knob for said bolt, a roll-back removably secured to said knob and adapted to engage and operate said bolt, a locking bar for locking said roll-back, a slide and a system of levers connected thereto and to said locking bar, a plurality of small pins on said slide, another pin on said slide, a spring constantly tending to move said slide into a position wherein the locking bar is caused to unlock the roll-back, racks acting on said small pins and thereby controlling the displacement of the slide and the system of levers, and hence of the locking bar, the said racks each having a groove disposed in the same corresponding position along the length of the rack with which grooves said small pins cooperate, prolongations disposed on each rack, the said prolongations being of variable length regulable according to a code, a plurality of push buttons disposed in such manner as, when actuated according to said code, to displace the racks into a position wherein the slide, the system of levers, and the locking bar unlock the roll-back so that the latter can be rotated by said knob, and a manually operable cam plate having a cam portion and a plate portion, and adapted to act simultaneously, by its cam portion on said other pin of the slide, and by its plate portion on the prolongations of the racks, in order to bring the locking bar into its locking position, and to hold it there.

6. A combination lock, adapted particularly for household use, comprising a bolt, a knob for said bolt, a roll-back removably secured to said knob and adapted to engage and operate said bolt, a locking bar for locking said roll-back, a slide and a system of levers connected thereto and to said locking bar, a plurality of small pins on said slide, another pin on said slide, a spring constantly tending to move said slide into a position wherein the locking bar is caused to unlock the roll-back, racks acting on said small pins and thereby controlling the displacement of the slide and the system of levers, and hence of the locking bar, the said racks each having a groove disposed in the same corresponding position along the length of the rack with which grooves said small pins cooperate, prolongation disposed on each rack, the said prolongations being of variable length regulable according to a code, a plurality of push buttons, elastic blades adapted to contact in the teeth of said racks, and each blade having a bent portion, the said blades being disposed between said push buttons and said racks, depression of said push button a given number of times according to said code causing the corresponding blade to contact the corresponding rack, and under the elongation of its bent portion, to move the rack a predetermined number of steps, to displace the racks to a position wherein the slide, the system of levers, and the locking bar unlock the roll-back, so that the latter can be rotated by said knob, and a manually operable cam plate having a cam portion and adapted to act simultaneously, by its cam portion on said other pin of the slide, and by its plate portion on the prolongations of the racks, in order to bring the locking bar into its locking position and to hold it there.

LÉON LEBEAU.