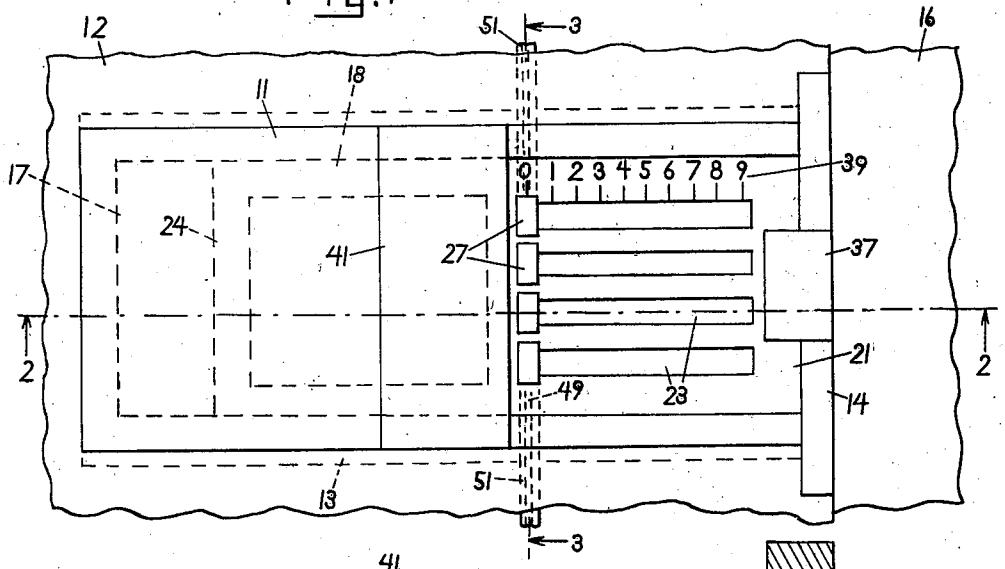
Feb. 11, 1958 M. KAHN 2,822,683

LOCK

Filed Jan. 28, 1957 2 Sheets-Sheet 1

Fig. 1



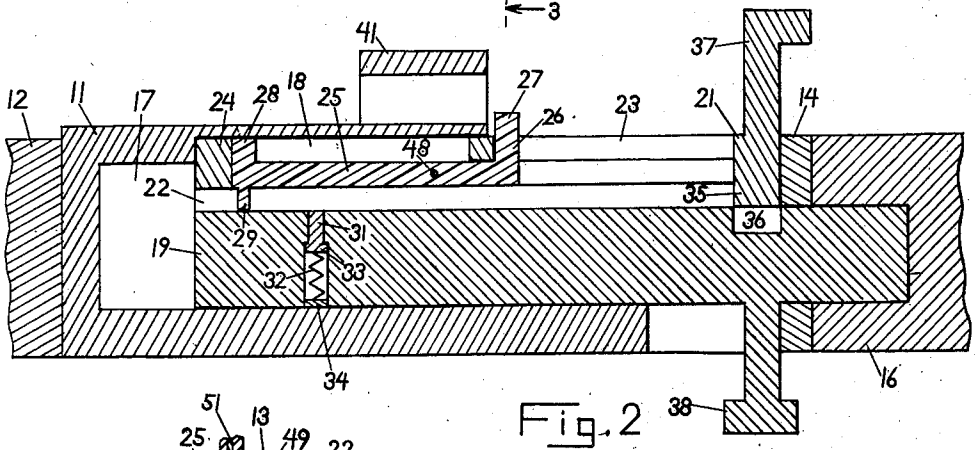


Fig. 2

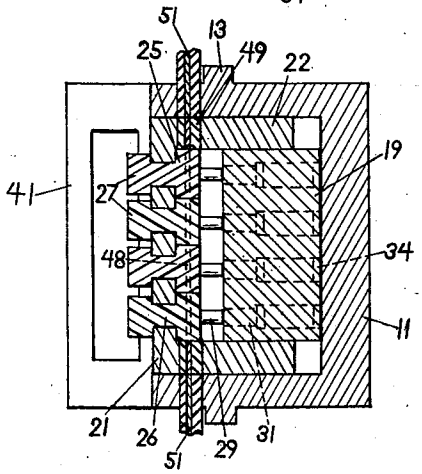


Fig. 3

INVENTOR:
Morris Kahn

BY Maurice Block
Attorney

Feb. 11, 1958 M. KAHN 2,822,683

LOCK

Filed Jan. 28, 1957 2 Sheets-Sheet 2

Fig. 4

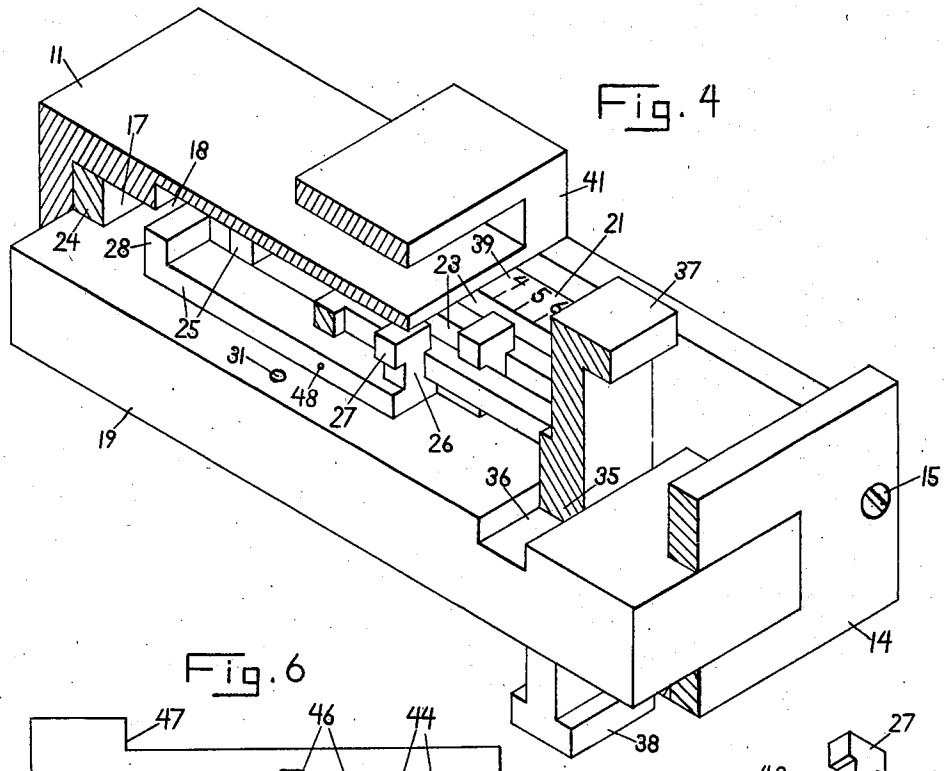


Fig. 6

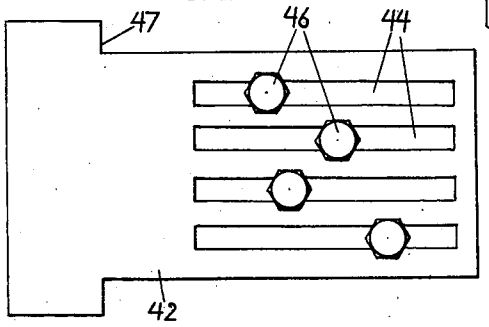


Fig. 5

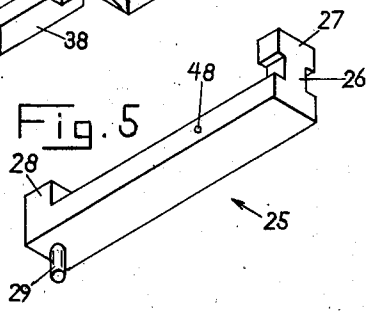


Fig. 7

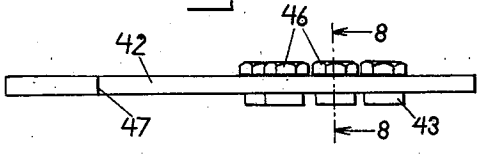
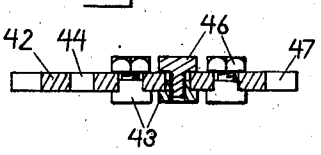


Fig. 8



INVENTOR:
Morris Kahn
BY Manning & Block

United States Patent Office 2,822,683 Patented Feb. 11, 1958

2,822,683

LOCK

Morris Kahn, Brooklyn, N. Y.

Application January 28, 1957, Serial No. 636,700

4 Claims. (Cl. 70—288)

This invention relates to locks or devices which prohibit a certain operation, for example the opening of a door, by persons who have no knowledge of a definite combination or possession of a key incorporating this combination.

Objects of my invention are to provide a lock that can be easily adapted for any of a large number of combinations, that requires only the exchange or the modification of a single part for changing the opening combination, that can be conveniently set for this combination by any authorized person, that safely resists operation when set for any other combination, that contains only movable parts moving along simple, preferably straight lines, that can be easily and inexpensively made of few parts, that can not be disassembled in closed condition, and that can be conveniently disassembled in open condition.

Other objects are to provide a lock that can be easily inserted in a door, that can be opened from the outside of the door when set for the correct combination, and that can be opened under all circumstances from the inside of the door whereby no person can be trapped in the locked room.

A further object is to prevent a person from finding the correct combination by feeling.

Still other objects are to set the lock for the desired combination by shifting a number of slidable members, to make the desired operation, for example, the opening of a door, dependent on the simultaneous correct position of all these members, and to close an electric circuit only when all members are in correct position.

Still further objects are to facilitate the setting of the lock by a numbered scale, to use the same scale for all shiftable members, to make possible the setting of the lock with a key, and to make possible to use optionally either the key or the scale for setting the lock.

Still other objects and advantages will appear from the following description of an exemplifying embodiment of my invention, from the appended claims and from the accompanying drawing in which:

Fig. 1 shows a front or outer view of a broken off portion of a door provided with an illustrative embodiment of my invention, represented in locked condition.

Fig. 2 shows a cross-section taken along the line 2—2 in Fig. 1.

Fig. 3 shows a cross-section taken along the line 3—3 in Fig. 1.

Fig. 4 shows a perspective, partially sectional view of the same embodiment in unlocked condition, the sectionally represented parts being cut along the same line as in Fig. 2.

Fig. 5 shows a perspective view of one of the shiftable members of the same embodiment.

Fig. 6 shows a front view of a key to be used for the embodiment shown in Figs. 1 to 5.

Fig. 7 shows a side view of the same key.

Fig. 8 shows a cross-section taken along the line 8—8 in Fig. 7.

The shown embodiment has a housing 11 which is secured to a door 12 in any suitable manner. For example, the housing has ribs 13 inserted in grooves of the door, and has a wall 14 affixed to the door by screws 15 which are not accessible when the door is closed. The wall 14 is adjacent to a part 16 of the frame surrounding the opening closed by the door.

The housing 11 contains a channel which has a narrower portion 17 and a wider portion 18 nearer than 17 to the wall 14. Along one side of this channel, a bolt 19 is slidable. In locking position, this bolt reaches through an aperture of the wall 14 into a recess of the door frame 16.

Along the opposite side of the channel and aside of the bolt, a plate 21 is positioned in the housing. This plate may have top and bottom extensions 22 slidably contacting the bolt. A portion of this plate lies in locked condition of the device completely behind a front opening of the housing and has a plurality of slots 23, for example four slots. The other portion 24 of the plate 21 may form a frame.

Each of the slots 23 is slidably engaged by a member 25 which has an elongated portion extending behind the plate, a neck 26 passing through the slot and a knob or head 27 positioned in front of the plate. This knob may be a little broader than the slot and united with the neck 26 after the latter has been inserted in the slot. The parts 26 and 27 are preferably positioned at the right end of the member 25. The other end has a front projection 28 slidably contacting the front wall of the housing. Near the left end of each member 25, a pin 29 projects rearward toward the bolt 19.

The side of the bolt which faces the plate is provided with a number of holes, one for each pin 29. Preferably, stems 31 are slidable in these holes and are urged by springs 32 into positions in which the front ends of the stems are flush with the mentioned bolt side. In order to secure these positions, the stems have rear ends 33 of larger diameter which are stopped by shoulders of the holes. The rear end of each hole may be closed by a disk 34 firmly affixed to the bolt. Each bolt hole is positioned in a line along which one of the pins 29 moves when its member is shifted. When all members 25 are so positioned that all pins 29 are in line with bolt holes, the plate 21 together with the members can move nearer to the bolt while the pins enter the holes and press the stems 31 back against the tension of the springs 32. In any other position of the members, one or several pins prevent such movement and space the plate from the bolt.

In spaced condition, the combined width of bolt and plate is larger than the width of the narrower channel portion 17 whereby the plate can not move into this channel portion. When plate and bolt are in the nearer position, a projection 35 of the plate engages a recess 36 of the bolt whereby plate and bolt are coupled. In this condition, the combined width of plate and bolt is not larger than the width of the channel portion 17 whereby plate and bolt together can move to the left side so that the bolt is withdrawn from the door frame 16 and the door 12 can be opened.

For convenient operation of the plate 21, the same is provided with a handle 37 which projects to the front. Preferably, the bolt 19 is provided with a handle 38. The latter handle projects to the rear through a slot of the housing 11 and makes it possible to move the bolt from the inside of the door, whether or not the plate is coupled with the bolt.

In the condition shown in Figs. 1 to 3, the door can not be opened from the outside. For unlocking, it is

necessary to shift each member to a definite predetermined place. The shift to a definite place is facilitated by a scale 39 marked on the outside of the plate 21 and extending along the slots 23. In the shown embodiment, the unlocking combination is characterized by the number 2537, that is, the holes in the bolt are so arranged that, when the knob 27 over the first slot under the scale is set under numeral 2, and the other knobs, respectively, under the scale numerals 5, 3 and 7, each pin 29 projects toward a bolt hole. Only then, the handle 37 and the plate can be pushed back, whereupon the handle together with the plate and the bolt can be shifted in the direction from the wider to the narrower channel portion. This brings the lock in the unlocked condition shown in Fig. 4.

In order to lock the door again, the handle 37 is moved back to the right side and is drawn to the front whereby the pins 29 and the projection 35 are disengaged from the bolt. Then the members 25 are shifted into any other places, for example, into the zero-positions as shown in Fig. 1.

If a person wants to lock the door for outsiders, but himself to remain inside, he swings the door out of its frame, moves the handle 37 and the members 26 as described in the foregoing paragraph, moves the handle 38 and thereby the bolt to the left side, shuts the door and moves the handle 38 back to the right side.

A key may be provided, instead of or in addition to the scale 39, for setting the members 25 into the combination of places necessary for unlocking. The housing 11 may have a front projection 41 forming a channel in which the key is conveniently guided. This key may be formed as a flat plate 42 to which projections 43 are affixed. Preferably, the plate 42 has slots 44 which are slidably engaged by extensions of the projections 43. After being shifted into the proper places, these projections are immovably fastened on the plate 42 by screws 46.

The key is inserted in the channel of the house projection 41 from the left side and is shifted to the right side until a shoulder 47 of the plate 42 contacts the projection 41. During this shift, each projection 43 meets one of the knobs 27 and shifts the same and its member 25 into the predetermined place whereby all pins 29 are simultaneously set for the opening combination.

The described slotted structure of the key makes it easy to adapt the key for another combination. Change of the combination requires only the exchange of one part, the bolt 19. The production of bolts for different combinations can be simplified by making identical bolts provided with holes for all combinations and by filling, in each case, the not needed holes with firmly inserted blanks of the shape of the holes.

While the above description exemplifies the use of the invention in a door, the same device may be used for other purposes. For example, other operations than the locking and unlocking of a door may be derived from the movement of the bolt 19. In some cases, some parts of the described device may be omitted. For example, if the setting of the predetermined combination is intended to result in the closure of an electric circuit, this purpose may be achieved in the following manner:

The members 25 are made of insulating material and contact each other slidably. Each member carries a conductor which may be a wire 48 inserted in a bore of the member. These conductors cross the longitudinal direction of the members in the direction from one member to another member. The distances of the conductors 48 from the ends of the members are so dimensioned that, when the members are set for the predetermined combination, the conductors 48 of all members are in line, contact each other in series and form an electric connection between insulated conductors 49 passing through the parts 22 which, in turn, connect with insulated wires 51 passing through the wall of the housing 11. The two wires 51 emerging from the housing may be connected with each other in well known manner by a circuit which comprises an electric power source and any electrically operated device, for example, an electrically operated lock or an alarm signal.

The setting of the members 25 may simultaneously control the operation of the bolt 19 and the electric operation. If only the latter operation is desired, the device may be simplified by omitting the bolt, the stems 31 and the pins 29 and by making the slotted plate a stationary part of the housing.

I desire it understood that my invention is not confined to the particular embodiment shown and described, the same being merely illustrative, and that my invention may be carried out in other ways within the scope of the appended claims without departing from the spirit of my invention as it is obvious that the particular embodiment shown and described is only one of the many that may be employed to attain the objects of my invention.

Having described the nature of my invention, what I claim and desire to protect by Letters Patent is:

1. A lock comprising a housing forming a channel having a wider and a narrower portion and having an aperture at the end of said wider portion, a bolt slidable along said channel and, in one extending position, reaching through said aperture, a plate extending in said channel aside of said bolt and being movable between a position spaced from said bolt and a position near to said bolt, the combined width of said bolt and plate being, in said spaced condition, larger than the width of said narrower channel portion and, in said near condition, not larger than said latter width, said bolt having a side facing said plate and provided with holes and with a recess, said plate having a plurality of slots, and a plurality of members, each slidably engaging one of said slots whereby each member can be positioned at any of a number of places, each of said members having a pin projecting toward one of said holes when the member is in one of said places and, when the member is in any other place, spacing said plate from said bolt whereby said plate can be moved toward said bolt only when all pins are in line with bolt holes, said plate having a projection engaging said bolt recess when said plate moves toward said bolt whereby plate and bolt are coupled and can move together in the direction from said wider to said narrower channel portion.

2. A lock comprising a housing forming a channel having a wider and a narrower portion and having an aperture at the end of said wider portion, a bolt slidable along said channel and, in one extreme position, reaching through said aperture, a plate extending in said channel aside of said bolt and being movable between a position spaced from said bolt and a position near to said bolt, the combined width of said bolt and plate being, in said spaced condition, larger than the width of said narrower channel portion and, in said near condition, not larger than said latter width, said bolt having a side facing said plate and provided with holes and with a recess, said plate having a plurality of slots, and a plurality of members, each slidably engaging one of said slots whereby each member can be positioned at any of a number of places, each of said member having a pin projecting toward one of said holes when the member is in one of said places and, when the member is in any other place, spacing said plate from said bolt whereby said plate can be moved toward said bolt only when all pins are in line with bolt holes, said plate having a projection engaging said bolt recess when said plate moves toward said bolt whereby plate and bolt are coupled and can move together in the direction from said wider to said narrower channel portion, said plate having an extension forming a handle projecting through a lateral opening of said housing.

3. A lock comprising a housing forming a channel having a wider and a narrower portion and having an aperture at the end of said wider portion, a bolt slidable

along said channel and, in one extreme position, reaching through said aperture, a plate extending in said channel aside of said bolt and being movable between a position spaced from said bolt and a position near to said bolt, the combined width of said bolt and plate being, in said spaced condition, larger than the width of said narrower channel portion and, in said near condition, not larger than said latter width, said bolt having a side facing said plate and provided with holes and with a recess, said plate having a plurality of slots, and a plurality of members, each slidably engaging one of said slots whereby each member can be positioned at any of a number of places, each of said members having a pin projecting toward one of said holes when the member is in one of said places and, when the member is in any other place, spacing said plate from said bolt whereby said plate can be moved toward said bolt only when all pins are in line with bolt holes, said plate having a projection engaging said bolt recess when said plate moves toward said bolt whereby plate and bolt are coupled and can move together in the direction from said wider to said narrower channel portion, said plate having an extension forming a handle projecting through a lateral opening of said housing, said bolt having an extension forming a handle projecting through a slot of said housing in the direction opposite to the projecting direction of said first mentioned handle.

4. A lock comprising a housing forming a channel having a wider and narrower portion and having an aperture at the end of said wider portion, a bolt slidable along said channel and, in one extreme position, reaching through said aperture, a plate extending in said channel aside of said bolt and being movable between a position

spaced from said bolt and a position near to said bolt, the combined width of said bolt and plate being, in said spaced condition, larger than the width of said narrower channel portion and, in said near condition, not larger than said latter width, said bolt having a side facing said plate and provided with holes and with a recess, stems, each slidable in one of said holes to an end position in which an end of the stem is flush with said bolt side, springs positioned in said holes and urging said stems into said end positions, said plate having a plurality of slots, and a plurality of members, each slidably engaging one of said slots whereby each member can be positioned at any of a number of places, each of said members having a pin projecting toward one of said holes when the member is in one of said places and, when the member is in any other place, spacing said plate from said bolt whereby said plate can be moved toward said bolt only when all pins are in line with bolt holes, said plate having a projection engaging said bolt recess when said plate moves toward said bolt whereby plate and bolt are coupled and can move together in the direction from said wider to said narrower channel portion.

References Cited in the file of this patent

UNITED STATES PATENTS

17,714	Baier	June 30, 1857
57,249	Decker	Aug. 14, 1866
68,685	Basch	Sept. 10, 1867
690,191	Saxe	Dec. 31, 1901
1,473,463	Chandler	Nov. 6, 1923
1,704,582	Stephenson	Mar. 5, 1929