May 24, 1938. S. ZINGMAN 2,118,635

COMBINATION LOCK AND CHAIN

Filed Nov. 20, 1937 5 Sheets-Sheet 1

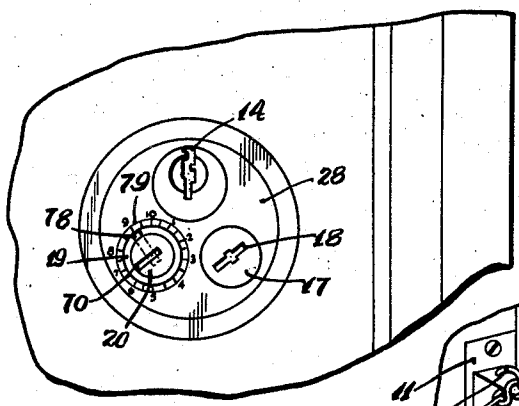


Fig. 1.

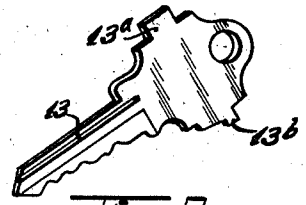


Fig. 2.

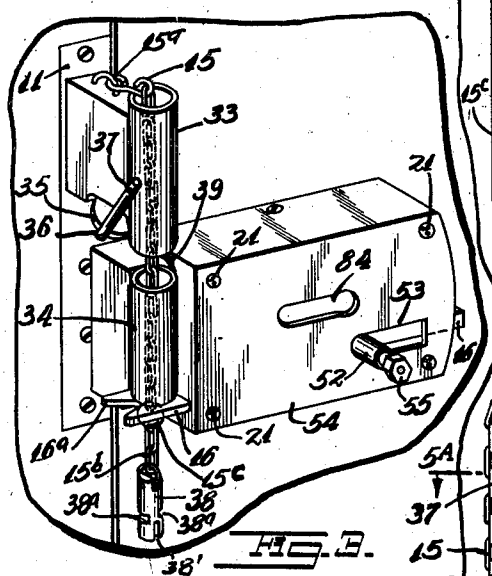


Fig. 3.

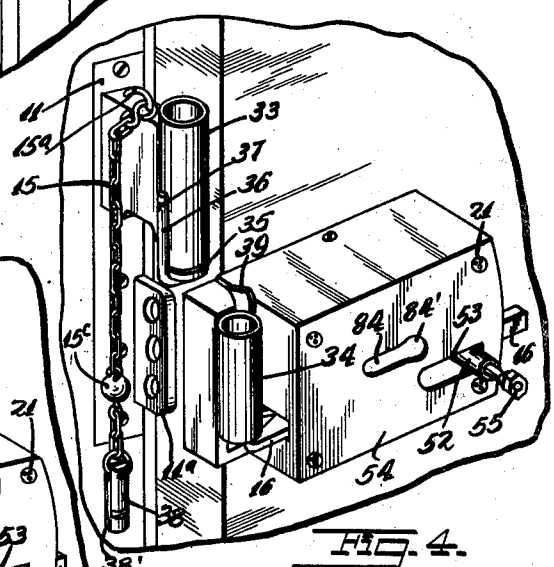


Fig. 4.

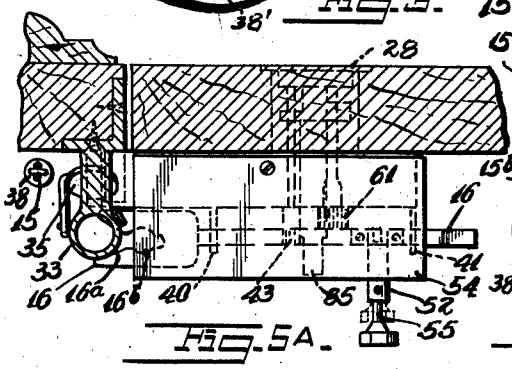


Fig. 5A.

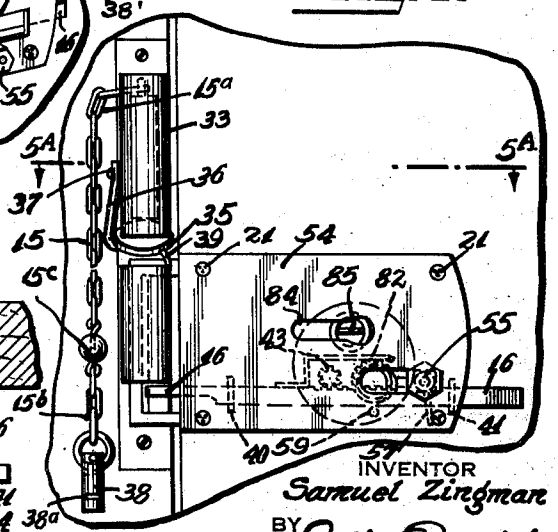


Fig. 5.

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COMBINATION LOCK AND CHAIN

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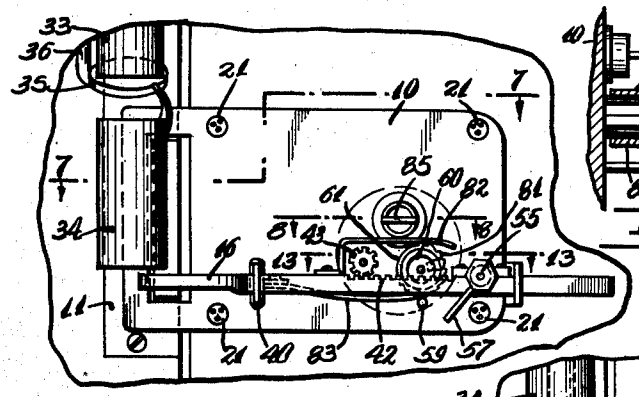


Fig. 6.

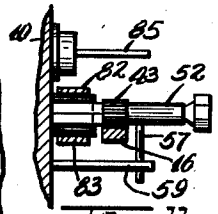


Fig. 11.

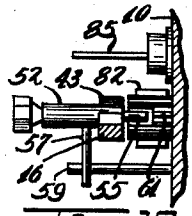


Fig. 12.

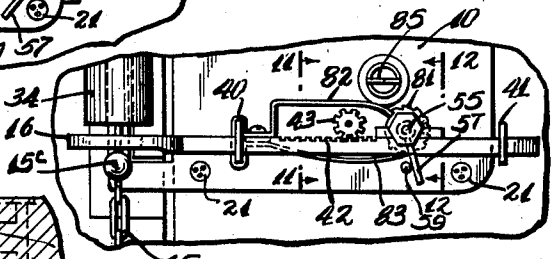


Fig. 9.

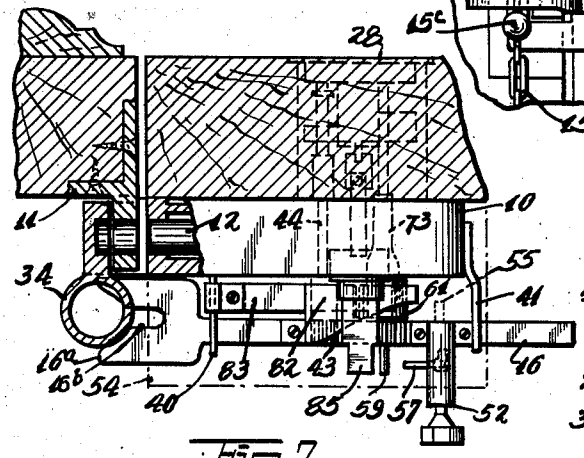


Fig. 7.

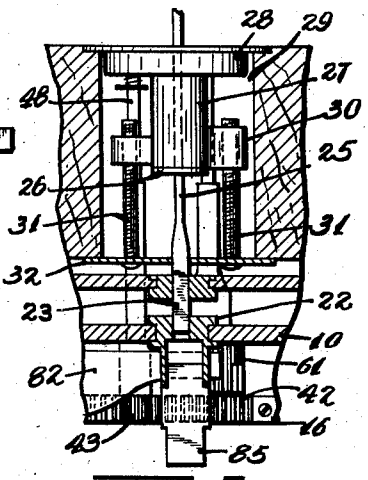


Fig. 8.

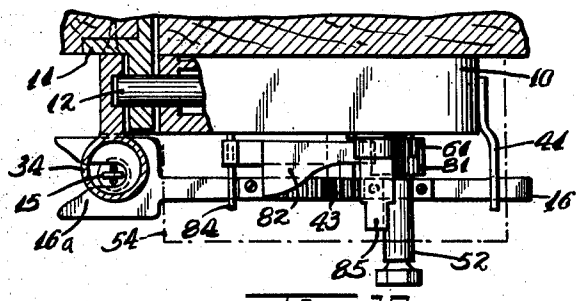


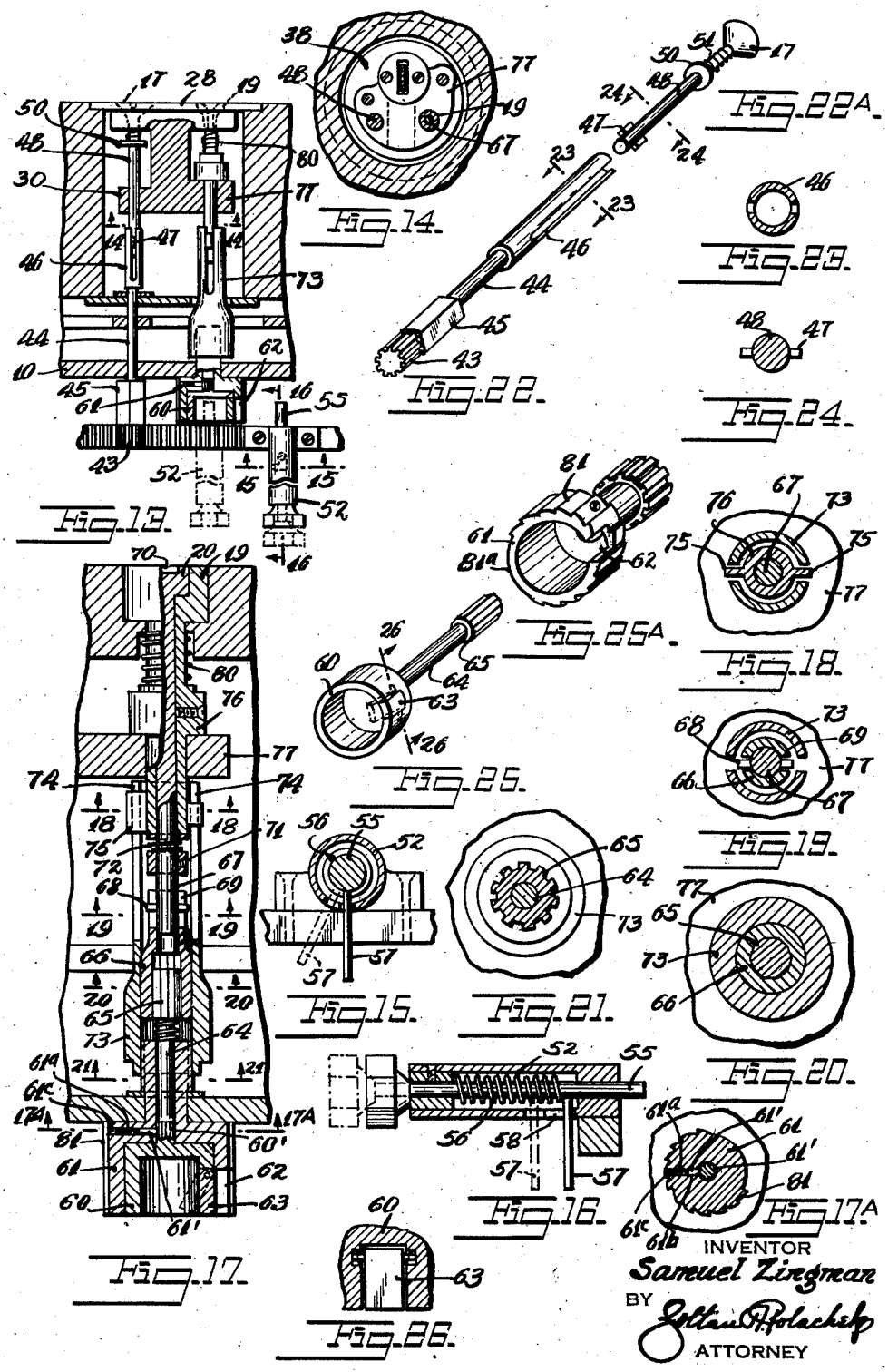
Fig. 10.

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COMBINATION LOCK AND CHAIN

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COMBINATION LOCK AND CHAIN

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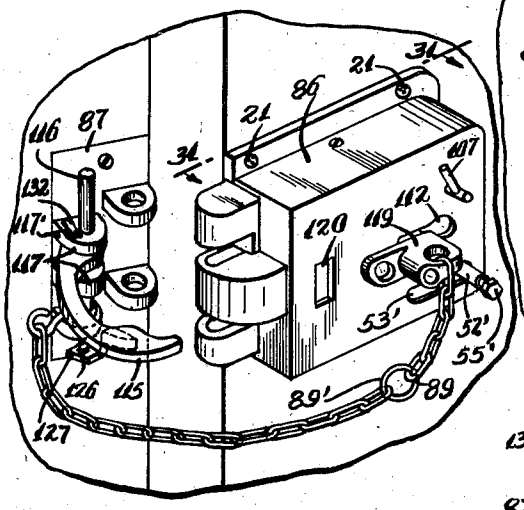


Fig. 27.

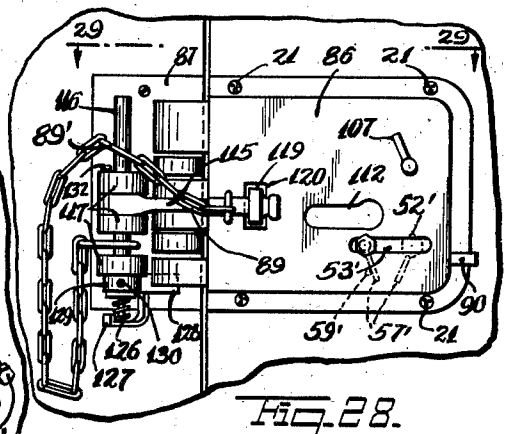


Fig. 28.

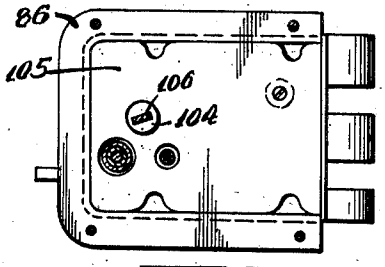


Fig. 31.

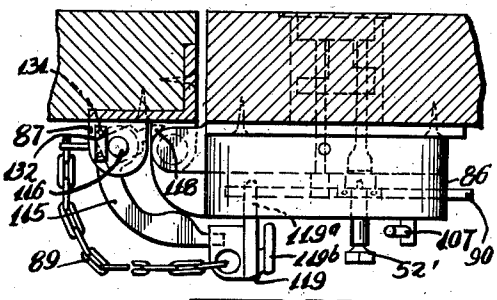


Fig. 29.

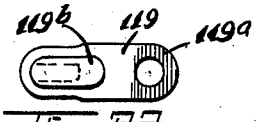


Fig. 32.

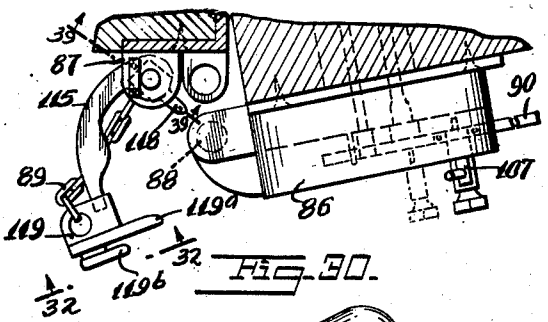


Fig. 30.

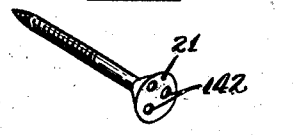


Fig. 43.

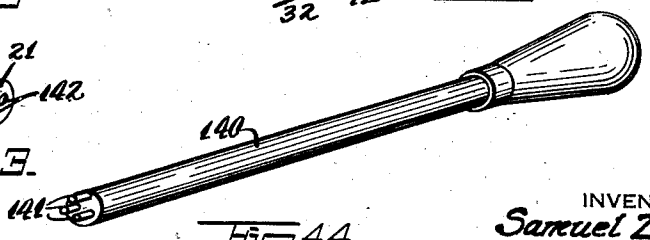


Fig. 44.

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COMBINATION LOCK AND CHAIN

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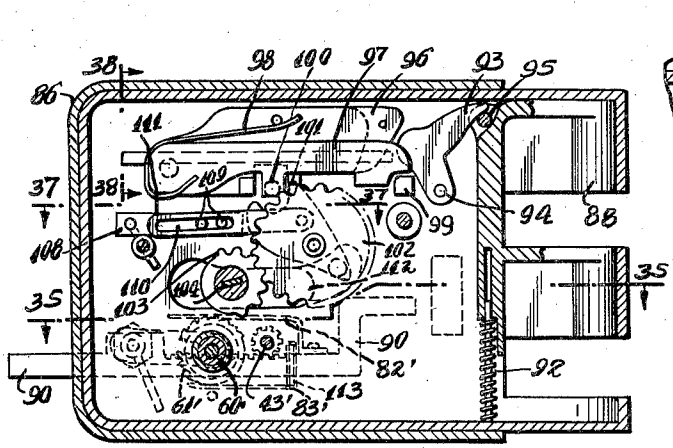


Fig. 33.

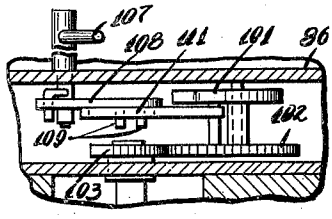


Fig. 37.

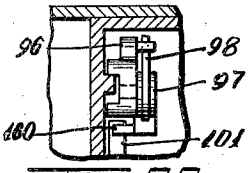


Fig. 38.

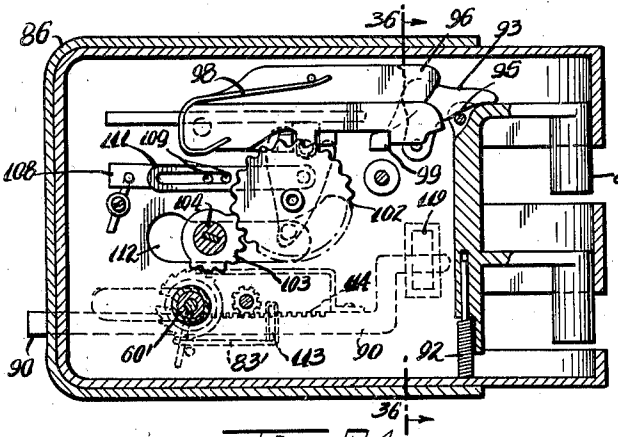


Fig. 34.

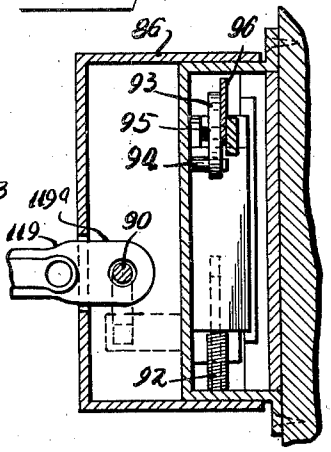


Fig. 36.

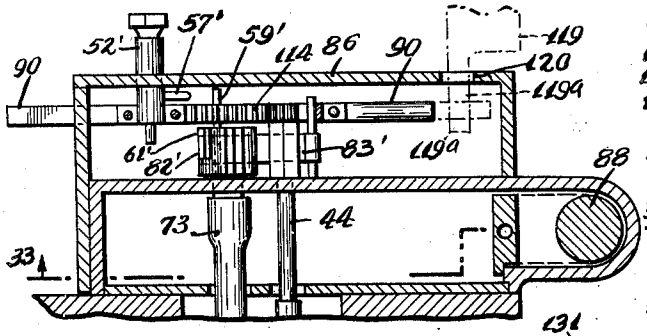


Fig. 35.

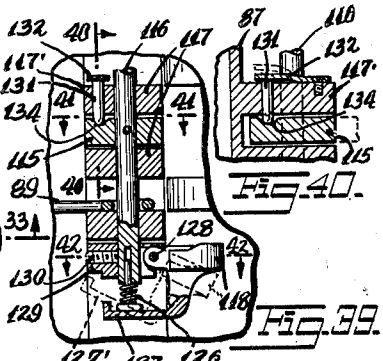


Fig. 39.

Fig. 40.

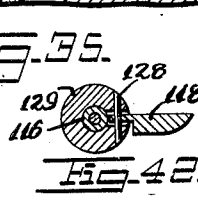


Fig. 42.

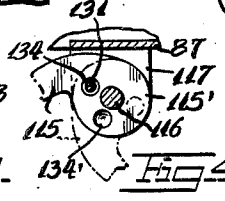


Fig. 41.

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Patented May 24, 1938 2,118,635

UNITED STATES PATENT OFFICE

2,118,635

COMBINATION LOCK AND CHAIN

Samuel Zingman, Brooklyn, N. Y.

Application November 20, 1937, Serial No. 175,647

19 Claims. (Cl. 70—93)

This invention relates to new and useful improvements in a combination lock and chain.

The invention has for an object the application of a chain to a conventional lock and a mechanism for utilizing the chain to assist the lock in its function.

This invention has for a further object a device which will make it very difficult for an intruder to attempt to discover the combination, by the insertion of a special device which will continually foil such attempts.

A further object of the invention is the reduction of the manipulation of the combination in the device to a minimum and having the combination placed only upon the entrance to the apartment.

The invention has for a further object to provide greater protection for women and children when left alone at home, by providing means whereby the persons within, must place the chain in position before the door can be opened.

The invention has for a still further object to provide protection when no one is at home, by utilizing a chain from the outside, which is controlled by a combination device in addition to the key lock. It also provides a chain for this purpose without the manipulation of the combination device.

The invention has for a further object the provision of means for changing the combination at any desired time.

The invention has for a further object the provision of special screws and a special screw driver for the use of changing the combination in apartment houses, where superintendents must have access to apartments; he is therefore enabled to change the combination at the request of tenant, and thus to have knowledge of such change so that he may open the door in emergencies.

More specifically, the invention proposes a lock comprising a body, a keeper, a bolt mounted on said body, and key controlled means for engaging said bolt with said keeper.

In conjunction with this type of lock it is proposed to provide a chain fixedly mounted at one end relative to said keeper; it is proposed to provide an auxiliary bolt mounted on said body for engaging and holding the other end of said chain; it is proposed to provide means for moving said auxiliary bolt, and it is proposed to provide a combination means for locking said auxiliary bolt.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:—

Fig. 1 is a fragmentary elevational view of the outside of a door with a lock constructed according to this invention applied thereto.

Fig. 2 is a perspective view of a key for opening the lock shown in Fig. 1.

Fig. 3 is a perspective view of the inside of the door showing the lock in the closed position.

Fig. 4 is a view similar to Fig. 3 but showing the lock open.

Fig. 5 is an elevational view of Fig. 4.

Fig. 5[a] is a fragmentary horizontal sectional view taken on the line 5[a]—5[a] of Fig. 5.

Fig. 6 is an elevational view similar to Fig. 5 but illustrating certain parts in the front removed.

Fig. 7 is a horizontal sectional view taken on the line 7—7 of Fig. 6.

Fig. 8 is a fragmentary horizontal sectional view taken on the line 8—8 of Fig. 6.

Fig. 9 is a view similar to Fig. 6 but illustrating the auxiliary bolt in its locking position.

Fig. 10 is a plan view of Fig. 9.

Fig. 11 is a fragmentary sectional view taken on the line 11—11 of Fig. 9.

Fig. 12 is a fragmentary sectional view taken on the line 12—12 of Fig. 9.

Fig. 13 is a fragmentary enlarged sectional view taken on the line 13—13 of Fig. 6.

Fig. 14 is a fragmentary sectional view taken on the line 14—14 of Fig. 13.

Fig. 15 is a fragmentary sectional view taken on the line 15—15 of Fig. 13.

Fig. 16 is a sectional view taken on the line 16—16 of Fig. 13.

Fig. 17 is a fragmentary enlarged view of a portion of Fig. 13, but showing additional parts in section.

Fig. 17[a] is a sectional view taken on the line 17[a]—17[a] of Fig. 17.

Fig. 18 is a sectional view taken on the line 18—18 of Fig. 17.

Fig. 19 is a sectional view taken on the line 19—19 of Fig. 17.

Fig. 20 is a sectional view taken on the line 20—20 of Fig. 17.

Fig. 21 is a sectional view taken on the line 21—21 of Fig. 17.

Fig. 22 is a perspective view of a portion of the device shown in Fig. 13.

Fig. 22a is another portion of said device shown in its relation to Fig. 22.

Fig. 23 is a sectional view taken on the line 23—23 of Fig. 22.

Fig. 24 is a sectional view taken on the line 24—24 of Fig. 22a.

Fig. 25 is a perspective view of another portion of Fig. 13.

Fig. 25a is a perspective view of still another portion of Fig. 13 shown in relation to Fig. 25.

Fig. 26 is a fragmentary enlarged sectional view taken on the line 26—26 of Fig. 25.

Fig. 27 is a perspective view of the inside of the door with a lock mounted thereon constructed according to a modification of the invention.

Fig. 28 is an elevational view of the disc shown in Fig. 27 in its closed position.

Fig. 29 is a sectional view taken on the line 29—29 of Fig. 28.

Fig. 30 is a view similar to Fig. 29 but illustrating the lock in an open position.

Fig. 31 is an elevational view of a portion of the lock seen looking in the direction of the line 31—31 of Fig. 27.

Fig. 32 is an elevational view of a portion of Fig. 30 looking in the direction of the line 32—32 thereof.

Fig. 33 is a transverse sectional view of a portion of the lock shown in Fig. 31.

Fig. 34 is a view similar to Fig. 33 but illustrating the lock in its locked position.

Fig. 35 is a horizontal sectional view taken on the line 35—35 of Fig. 33.

Fig. 36 is a sectional view taken on the line 36—36 of Fig. 34.

Fig. 37 is a horizontal sectional view taken on the line 37—37 of Fig. 33.

Fig. 38 is a fragmentary sectional view taken on the line 38—38 of Fig. 33.

Fig. 39 is a fragmentary vertical sectional view taken on the line 39—39 of Fig. 30.

Fig. 40 is a fragmentary sectional view taken on the line 40—40 of Fig. 39.

Fig. 41 is a horizontal sectional view taken on the line 41—41 of Fig. 39.

Fig. 42 is a horizontal sectional view taken on the line 42—42 of Fig. 39.

Fig. 43 is a perspective view of one of the screws used for attaching the lock.

Fig. 44 is a perspective view of the screw driver for the screw shown in Fig. 43.

The combination lock and chain, according to this invention, comprises a body 10, a keeper 11, a bolt 12 mounted on the body 10, and key controlled means for engaging the bolt 12 with the keeper 11. This key controlled means is operable by engaging a key 13 shown in Fig. 2 in the key opening 14 (see Fig. 1).

A chain 15 is fixedly mounted at one end 15a relative to the keeper 11. An auxiliary bolt 16 is mounted on the body 10 and is for the purpose of engaging and holding the other end 15b of the chain 15 by a ball link 15c which engages a ball seat 16b formed in the forked end 16a of bolt 16. A means is provided for moving the bolt 16 and is controlled by a turnable element 17 (see Fig. 1). This turnable element has a slot 18 into which a side projection 13a of the key 13 may engage. A combination means is provided for locking the auxiliary bolt 16 in its extended position, and this combination means is controlled by a turnable element 19 coaxially arranged with another turnable element 20. These turnable elements 19 and 20 may be manipulated with the key 13, and particularly the portion 13a, and another portion 13b as hereinafter more fully described. Turnable elements 19 and 20 are so constructed to produce a click or other sound at each number when turned. This will make it unnecessary to watch the numbers when locating the combination. This arrangement will also keep the numbers frictionally joined when turned, in locked position.

The body 10 is secured on the inner face of a door by several screws 21. The means for moving the bolt 12 arranged within the body may be of any design or construction generally known in locks, and for this reason will not be explained in detail in this specification. This mechanism is operated by the usual turnable disc 22 found within conventional locks. This disc 22 has a slot into which a finger 23 from the key mechanism may engage. The finger 23 is connected with a projection 25 from the barrel 26 of the key mechanism.

The barrel 26 is rotative in a barrel 27 which is attached to a disc 28 secured on the outside of the door. The disc 23 and the barrel 27 extend through an opening 29 through the door so that the finger 23 may reach the turnable mechanism 22. The barrel 27 has several lugs 30 which are engaged by screws 31 resting against a disc 32 engaging the inner end of the opening 29. Further details of the key operating means will not be given in this specification since it is believed that its operation will be recognized from the cursory description. The arrangement is such that the key 13 may be engaged in the key opening 14 and it is then possible to turn the barrel of the key mechanism so that the finger 23 is turned, which in turn, turns the disc 22. This causes the extension or retraction of the bolt 12.

The keeper 11 is of angular shape (see Fig. 7) and is secured upon a corner of the door jamb. The keeper 11 has a projecting portion 11a which is formed with openings into which the bolt 12 may be extended. At the upper portion of the keeper body 11 there is supported a tubular member 33. This tubular member is adapted to extend over a complementary tubular member 34 which is supported on the door. These tubes are in alignment with each other when the door is closed. The tubular member 33 has a cover 35 extending across its bottom end. This cover is supported by arms 36 which are pivoted at the points 37. The chain 15 has a weight 38 at its free end and this end of the chain may be dropped into the tube 33 and rested on the cover 35. A member 39 is mounted on the door and is adapted to strike the cover 35 when the door is closed to pivot the cover into an opening position. In this latter position the weight 38 and the chain will fall through the tube 34.

The keeper 16 passes immediately adjacent the lower end of the tube 34 and is formed with a forked end 16a and a ball seat 16b, adapted to engage the chain 15 to lock the chain, that is, it is capable of gripping the chain so that the chain cannot be pulled up through the tubular member 34. When the bolt 16 is so extended the door is secured closed by the auxiliary locking action of the chain 15.

The means for moving the auxiliary bolt 16 may be recognized by noting the following: The bolt 16 is slidably supported in brackets 40 and 41 which are mounted on the body 10. A portion on the bolt 16 is formed with rack teeth 42 which are engaged by a pinion 43. This pinion 43 is fixed upon a shaft 44 which has a square portion 45 immediately adjacent the

pinion 43 (see Fig. 22). The shaft 44 extends into the opening 29 in the door (see Fig. 13) and its inner end is formed with a coupling element 46. This coupling element is cooperative with a complementary coupling element 47 of a shaft 48. This shaft 48 is rotatively supported in a portion of one of the lugs 30.

The shaft 48 extends to the exterior of the disc 29, and at the exterior ends is provided with a conical shaped head 17, the outer face of which is formed with the slot 18 (see Fig. 1). A collar 50 is secured upon an inner portion of the shaft 48, and an expansion spring 51 acts between the collar 50 and the portion of the disc 28 to normally urge the shaft 48 inwards. The arrangement is such that when the element 17 is turned the shaft 48 will turn and the rotation will be transmitted to the shaft 44, the pinion 43, and so to the rack 42.

There is another way of moving the auxiliary bolt 16, characterized by a tubular member 52 fixedly mounted on a portion of the bolt 16. This tubular member extends out through a slot 53 in a cover 54 engaging the combination lock mechanism on the inner side of the door. It is possible to move the bolt 16 by gripping the tubular member 52 and moving the same.

The combination means for locking the auxiliary bolt previously mentioned includes a lock pin 55 slidably engaged through the tubular member 52. A spring 56 disposed within the tubular member 52 normally urges the lock pin inwards into operative position. The lock pin may be held outwards by a lateral pin 57 which works in a bayonet slot 58 in the side of the tubular member 52. This bayonet slot has a longitudinally extending portion in which the pin 57 is shown disposed in Fig. 16 and has a laterally extended portion in which the pin 57 is shown extended in by dot and dash lines. In the latter position the locking pin 55 is retracted.

The pin 57 is automatically released from its locking position by a stop pin 59. This stop pin is mounted on the body 10 and is at a location so that the bolt 16 is in its locked position when the locking pin 55 is aligned with a cup-shaped member 60. This cup-shaped member 60 is rotative within an outer cup-shaped member 61. The two members are connected by a ratchet 60' and plunger pin 61' which is pressed against the ratchet teeth 60' by a coil spring 61a in the radial opening 61b. A screw plug 61c is provided to keep the plunger pin 61' under variable tension. The outer member 61 has a slot 62 at one side. The inner cup-shaped member 60 has a resiliently held hinged door 63 alignable with the slot 62 and then capable of pivoting to permit the locking pin 55 to pass out as hereinafter more fully described.

The inner cup 60 is fixed on a stem 64 which has at its inner end a clutch head 65. This clutch head is engaged with a complementary clutch head 66. A stem 67 is slidably engaged in the complementary clutch head 66 and has a pin 68 engaging diametrically opposite slots 69 in the clutch head. The clutch members 65 and 66 have ten sides to correspond with the numbers 1 to 10 to permit a changing of the combination of the lock mechanism by removing the male clutch member 65 from the female member 66, and thereafter reinserting same at different relative positions with respect to their sides. The shaft 67 extends to the front of the door and terminates in the interior element 20. This interior element has a slot 70 which may be engaged by the key portion 13a to turn same. A collar 71 is attached on the shaft 67 and a spring 72 acts against this collar and a relatively stationary part to urge the shaft 67 inwards. The arrangement is such that when the element 20 is turned the rotations will be transmitted to turn the inner cup 60.

The outer cup 61 is connected by a coupling with a tubular member 73, which in turn is connected by slots 74 to lugs 75 on a tubular member 76. This tubular member is normally supported on an element 77. The tubular member 76 extends to the exterior of the door and terminates in the annular element 19. This annular element 19 has a slot 78 which may be engaged by the key portion 13b. By inserting the key portion in this slot it is possible to turn the annular member 19. Immediately adjacent the annular member 19 and inscribed on the material of the disc 38 there is a scale 79 inscribed from 1 to 10. A spring 80 acts between a portion of the tubular member 76 and the disc 28 to urge the tubular member 76 inwards. The arrangement is such that when the annular member 19 is turned rotations will be transmitted to turn the outer cup 61. The outer cup is formed with a plurality of ratchet teeth 81 on the periphery thereof except at one blank area 81a (see Fig. 25a). A spring 82 is mounted at one end on the bolt 16 and its other end engages the teeth 81 to rotate the outer cup 61 as the bolt 16 is oscillated, in one direction until the blank area 81a is reached. Another spring 83 is mounted upon a stationary pin 84 and engages certain of the teeth 81 to hold the cup member 61 against accidental turning.

The pin 55 is adapted to engage in the interior of the inner cup-shaped member 60, but since the pin 55 is of a much smaller diameter than the interior diameter of the cup-shaped member 60, it is possible to oscillate the bolt 16 through a small amplitude. This amplitude is insufficient to unlock the bolt from the chain but it is sufficient to cause the outer cup-shaped member 61 to turn. In this manner an intruder wishing to set the proper combination of the lock to open same will be continually foiled by the combination changing on him to a wrong position.

The cover 54 is formed with a slot 84 through which a key 85 may be reached. This key 85 is engaged in the rotative member 22 (see Fig. 8). The weight 38 on the free end of the chain 15 comprises a key-way 38' which may be engaged upon the key 85 so that the bolt 12 may be opened from the inner side of the door. Surface grooves 38a are provided to guide the weight 38 in slot 84 and to prevent the weight to be removed from the slot, except at the enlarged portion 84'.

The operation of the device is as follows:—

Assume the lock to be closed. The lock may be opened from the outside of the door with the key 13. First the key is inserted in the key opening and turned to retract the bolt 12. The key portion 13a is then engaged in the slot 70 to properly fit the inner cup-shaped member 60. The key portion 13b is engaged in the opening 79 to properly set the outer cup-shaped portion 61. In the proper setting of these cup-shaped portions the hinged door 63 is aligned with the slot 62, and the slot 62 is on an elevation which will permit the pin 55 to pass through when the bolt 16 is moved to its open position. The key portion 13a is next engaged in the opening 18 of turnable member 17 and the latter member is turned. This will

rotate the pinion 43 and move the bolt 16 to its open position. The door may now be opened.

From the inside of the door it is possible to open the lock in the following manner: First the key 85 may be turned to open the bolt 12. Then the locking plunger 55 may be pulled outwards from its locking position to disengage from the cup-shaped members 60 and 61. Still holding the head of the locking pin 55 it is possible to move the tubular member 52 along in the slot 53 and so open the bolt 16.

The door may be locked when a person leaves, in the following manner: The chain 15 with the weight 38 is dropped in the tubular member 33. The locking pin 55 is pulled outwards and turned so that the radial pin 57 engages the lateral portion of the bayonet slot 58. The person may now go out through the door and on closing the door the cover 35 of the tubular member 33 will be opened and the chain will drop through the tubular member 34. The key portion 13a is then engaged in the slot 18 and the element 17 turned so that the pinion 43 is turned and the bolt 16 is extended to its locking position. As it reaches its locking position the outer fork end of the bolt will grip the chain 15. Simultaneously, the radial pin 57 will strike the stationary pin 59 so that the locking pin 55 is turned and the spring 56 shoots it inwards so that it engages into the cups 60 and 61. The combination set on the dial is then shifted by turning the parts 19 and 20 if desired, though this is not necessary since the element 17 may be slightly turned forward and rearwards to oscillate the bolt 16 so that the spring 82 will turn the outer cup-shaped member 61 from its open position.

In Figs. 27–35 inclusive a modification of the invention has been disclosed. In this modification the combination of the various subcombinations making up the lock, are identical in operation, though each sub-combination is slightly different in construction and operation. In this form of the invention there is a lock body 86, a keeper 87, a bolt 88, and key controlled means for moving said bolt into engagement with said keeper. A chain 89 is fixedly mounted at one end relative to the keeper. An auxiliary bolt 90 is mounted on the body 86 and is adapted to engage and hold the other end of the chain. A means is provided for moving the auxiliary bolt 90, and a clutch means is provided for locking the auxiliary bolt in its operative position. Thus the broad combination is idential to the prior form.

The lock body 86 is mounted upon the interior of the door by screws 21. The bolt 88 is of the type that moves laterally to engage its keeper. It is urged in one direction by a spring 92. It is moved into its locking position by a dog 93. This dog is pivotally supported by a pin 94. The dog 93 is engaged by a slide 96. This slide is slidably mounted on the body 86 and is controlled by a latch 97. A spring 98 acts between the slide 96 and the latch 97 to urge the latch into a locking position. In its locked position the front end of the latch 97 abuts a stop 99 so that it cannot move.

The latch 97 has a projecting pin 100. This pin is engageable by a fork shaped member 101 which is capable of lifting the pin to open the latch, and then is capable of moving the pin laterally to slide the slide 96 which then abuts and operates the dog 93. The fork shaped member 101 is fixed radially upon a gear 102. This gear is rotatively supported on the body 86. A segmental gear 103 is capable of meshing with the gear 102 and is fixed upon a rotative element 104 rotative on the back plate 105 of the lock. This element 104 has a slot 106 for the turning finger of a key mechanism similar to that shown in Fig. 8. Thus the bolt 88 may be opened and closed by having a key mechanism turn the member 104.

From the inside of the door the lock may be closed by turning a crank 107. This crank moves an arm 108 which has a pair of pins 109 working in a slot 110 in a lever 111 mounted eccentrically on the gear 102. It is possible to turn the crank 107 to move the bolt 88 into its locking position. When the crank 107 is turned back the pins 108 will idle in the slot 110 so that the bolt 88 cannot be opened by this manipulation. Instead, a slot 112 is formed in the body 86 and this slot is in a position through which the tail end of the fork 101 may be reached. It is proposed that an implement be engaged into the slot 112 to pivot the fork member 101 back to its original position which will work to open the bolt 88 of the lock.

The auxiliary bolt 90 is slidably mounted in a bracket 113. The auxiliary bolt 90 has a rack portion 114 which is engaged by a pinion 43' of a mechanism very similar to that shown in Figs. 17 and 22. The arrangement is such that the pinion 43 may be turned from the outside of the door to move the rack 90. Mounted on the rack 90 at one point there is a projecting tubular member 53' which is similar to the tube and has the same mechanism associated with it. This tubular member 52' extends out from a slot 43' in the body 86 by which the bolt 90 may be manually moved. The tubular member 52' has a locking pin 55' which is cooperative with cup-shaped members 60' and 61'. The cup-shaped member 61' is turnable by a spring 82' mounted on the bolt 90. A spring 83' holds the cup-shaped member 60' from accidental turning. A lateral pin 57' projects from the locking pin 55' and is engageable with a stationary pin 59' to release the locking pin 55' similar to that previously described.

Mounted on the keeper 87 there is an arm 115 fixed upon a rod 116 turnably mounted on several lugs 117. This rod 116 is also provided with a pivoted arm 118 arranged in the path of motion of the body 86 when the door is closed to cause the pivoting of the arms 115. This may be better understood by noting Figs. 29 and 30. In Fig. 30, the body 86 is ready to strike the projecting portion 118. In Fig. 29, the door is closed and the radial arm 115 is extended inwards. The chain 89 on its free end has an auxiliary keeper element 119 which has a portion 119a extendable into an opening 120 in the body 86. In the engaged position of these parts the portion 119 is in direct line with the bolt 90 (see Figs. 34 and 36). A spring 126 is coaxially arranged on the rod 116 and serves to normally urge the arm 127 downward. This arm is pivoted at 128 and is formed with the arm 118, which is normally in the path of motion of the body 86. The pivot point 128 is located at one side of an adjustable collar 129. The latter is secured to rod 116 by a set screw 130. The pivoted arm 118 may be disengaged from the body 86, when the door is closed by pushing the arm 127 upwardly as indicated by the dot and dash lines, then the arm 115 may be swung into inoperative position and held there by a pin 131 actuated by a spring 132 on the upper lug 117', since pin 131 is adapted to engage in a cavity 134 on the upper face of the circular portion 115' of arm 115. Another cavity 134' is also provided on portion 115' to frictionally hold the arm 115 in

another extended position. The member 119 has a head 119b on one side which may be used as the tool is engaged into the opening 112 to strike against the tail end of the fork 101 to move the bolt 88 to its open position. This is the condition of the device shown in Fig. 27. In this position the door may open a limited amount until the chain 89 is drawn taut. A large link 89' is provided, which may be used to slide over rod 116 when the door is locked.

The operation of this form of the device is as follows:—

The door may be locked when one is leaving by placing the element 119 upon the end of the arm 115 as shown in Figs. 29 and 30. Then as the door is closed the rod 116 will be turned and the arm 115 will be pivoted to a position shown in Fig. 29 in which the keeper 119 is engaged into the opening 120. The auxiliary bolt 90 is then moved to its locking position, in which position the radial pin 57 will strike the pin 59' to release the locking pin 55 which will engage the interior of the inner cup-shaped member 60'. A key must be engaged in a key mechanism to turn the member 104 to lock the bolt 88. The door is now locked.

The door may be opened by properly setting the cup-shaped members 60 and 61 as described relative to the first form of the invention; then opening the bolt 90, and finally opening the bolt 88.

A further detailed explanation is thought unnecessary in view of the similarity in construction and operation of this form of the invention to the previous form.

In Fig. 43 a perspective detailed view of one of the screws is shown. In Fig. 44 a screw driver 140 is shown provided with several projecting pegs 141 adapted to engage in openings 142 in the head of the screw 21. The screw 21 has no slot, only these openings, and the screw driver may connect with the screw by the inter-engagement of these parts. The purpose of this special screw and screw driver is to prevent the tenant in an apartment house to change the combination of the lock. The screw driver may be held by the superintendent of the building, who must have access to the apartments, and therefore must know the combination of the lock. In order to change the combination, the tenant requests the superintendent to supply the specially built screw driver and when the combination is changed the superintendent of the building keeps a record of the new combination of the lock so that he may open the door in emergencies.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:—

1. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said chain being engageable into a tubular member having a pivoted bottom cover, a complementary tubular member mounted upon said body and in the closed position of the door disposed beneath said tubular member, and an element for opening the closed cover of the top tubular member to drop the chain through the bottom tubular member when the door is closed.

2. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said chain being engageable into a tubular member having a pivoted bottom cover, a complementary tubular member mounted upon said body and in the closed position of the door disposed beneath said tubular member, and an element for opening the closed cover of the top tubular member to drop the chain through the bottom tubular member when the door is closed, and said auxiliary bolt having a forked end engageable beneath the bottom tubular member to grip the chain.

3. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said chain being engageable into a tubular member having a pivoted bottom cover, a complementary tubular member mounted upon said body and in the closed position of the door disposed beneath said tubular member, and an element for opening the closed cover of the top tubular member to drop the chain through the bottom tubular member when the door is closed, said cover being supported by pivotal arms, and said element being adapted to pivot said arms.

4. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said auxiliary bolt having a toothed portion, a pinion engaging said teeth, and a connection from said pinion to a rotative element on the outside of the door and engageable and turnable with a key.

5. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said auxiliary bolt having a toothed portion, a pinion engaging said teeth, and a connection from said pinion to a rotative element on the outside of the door and engageable and turnable with a key, said combination means including a locking pin mounted on said bolt and engageable in cup-shaped members adapted to be adjusted according to a predetermined combination.

6. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key

controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said auxiliary bolt having a toothed portion, a pinion engaging said teeth, and a connection from said pinion to a rotative element on the outside of the door and engageable and turnable with a key, said combination means including a locking pin mounted on said bolt and engageable in cup-shaped members adapted to be adjusted according to a predetermined combination, said cup-shaped members having elements through which the locking pin may pass in predetermined positions thereof.

7. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said auxiliary bolt having a toothed portion, a pinion engaging said teeth, and a connection from said pinion to a rotative element on the outside of the door and engageable and turnable with a key, said combination means including a locking pin mounted on said bolt and engageable in cup-shaped members adapted to be adjusted according to a predetermined combination, said cup-shaped members having elements through which the locking pin may pass in predetermined positions thereof, and said locking pin being resiliently mounted and adapted to be drawn from its operative position from the inside of the door.

8. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said auxiliary bolt having a toothed portion, a pinion engaging said teeth, and a connection from said pinion to a rotative element on the outside of the door and engageable and turnable with a key, said combination means including a locking pin mounted on said bolt and engageable in cup-shaped members adapted to be adjusted according to a predetermined combination, said cup-shaped members having elements through which the locking pin may pass in predetermined positions thereof, and means for automatically turning one of said cup-shaped members as attempts are made to move said auxiliary bolt.

9. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said auxiliary bolt having a toothed portion, a pinion engaging said teeth, and a connection from said pinion to a rotative element on the outside of the door and engageable and turnable with a key, said combination means including a locking pin mounted on said bolt and engageable in cup-shaped members adapted to be adjusted according to a predetermined combination, said cup-shaped members having elements through which the locking pin may pass in predetermined positions thereof, and means for automatically turning one of said cup-shaped members as attempts are made to move said auxiliary bolt, including a spring mounted on the bolt and engageable with teeth formed on said cup-shaped member.

10. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said auxiliary bolt having a toothed portion, a pinion engaging said teeth, and a connection from said pinion to a rotative element on the outside of the door and engageable and turnable with a key, said combination means including a locking pin mounted on said bolt and engageable in cup-shaped members adapted to be adjusted according to a predetermined combination, said cup-shaped members having elements through which the locking pin may pass in predetermined positions thereof, and means for automatically turning one of said cup-shaped members as attempts are made to move said auxiliary bolt, including a spring mounted on the bolt and engageable with teeth formed on said cup-shaped member, said lock body being formed on the inside with a slot through which said locking pin projects and formed with another slot through which said first-mentioned bolt may be operated.

11. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, a disc for mounting on the exterior of the door and having a key mechanism member for operating said second bolt, an element for operating the second-mentioned bolt, and concentric elements for controlling said combination means.

12. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said combination means being characterized by a construction by which the combination may be changed.

13. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, an arm pivotally mounted on said keeper, a keeper element mounted on the free end of said chain and mountable on said arm, and means for moving said arm when the door is

closed to engage said keeper element into a locking position on said body.

14. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said auxiliary bolt being adapted to engage said keeper element in the latter position.

15. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said auxiliary bolt being adapted to engage said keeper element in the latter position, resilient means for urging said arm into an open position.

16. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said bolt being adapted to move laterally into locking position, a fork member for indirectly controlling said bolt, an eccentric arm connected with said fork member and having a slot, pins engaging said slot, and a crank supporting said pins.

17. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said bolt being adapted to move laterally into locking position, a fork member for indirectly controlling said bolt, an eccentric arm connected with said fork member and having a slot, pins engaging said slot, and a crank supporting said pins, said fork engageable against a latch element controlling a slidable member.

18. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said bolt being adapted to move laterally into locking position, a fork member for indirectly controlling said bolt, an eccentric arm connected with said fork member and having a slot, pins engaging said slot, and a crank supporting said pins, said fork engageable against a latch element controlling a slidable member, said slidable member being engageable with a dog adapted to urge said bolt in one direction.

19. A combination chain lock comprising a body, a keeper, a bolt mounted in said body, and key controlled means engaging said bolt with said keeper, a chain fixedly mounted at one end relative to said keeper, an auxiliary bolt mounted on said body for engaging and holding the other end of said chain, means for moving said auxiliary bolt, and combination means for locking said auxiliary bolt, said bolt being adapted to move laterally into locking position, a fork member for indirectly controlling said bolt, an eccentric arm connected with said fork member and having a slot, pins engaging said slot, and a crank supporting said pins, said fork engageable against a latch element controlling a slidable member, said slidable member being engageable with a dog adapted to urge said bolt in one direction, and resilient means for urging said bolt back to its original position.

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