

Nov. 11, 1952

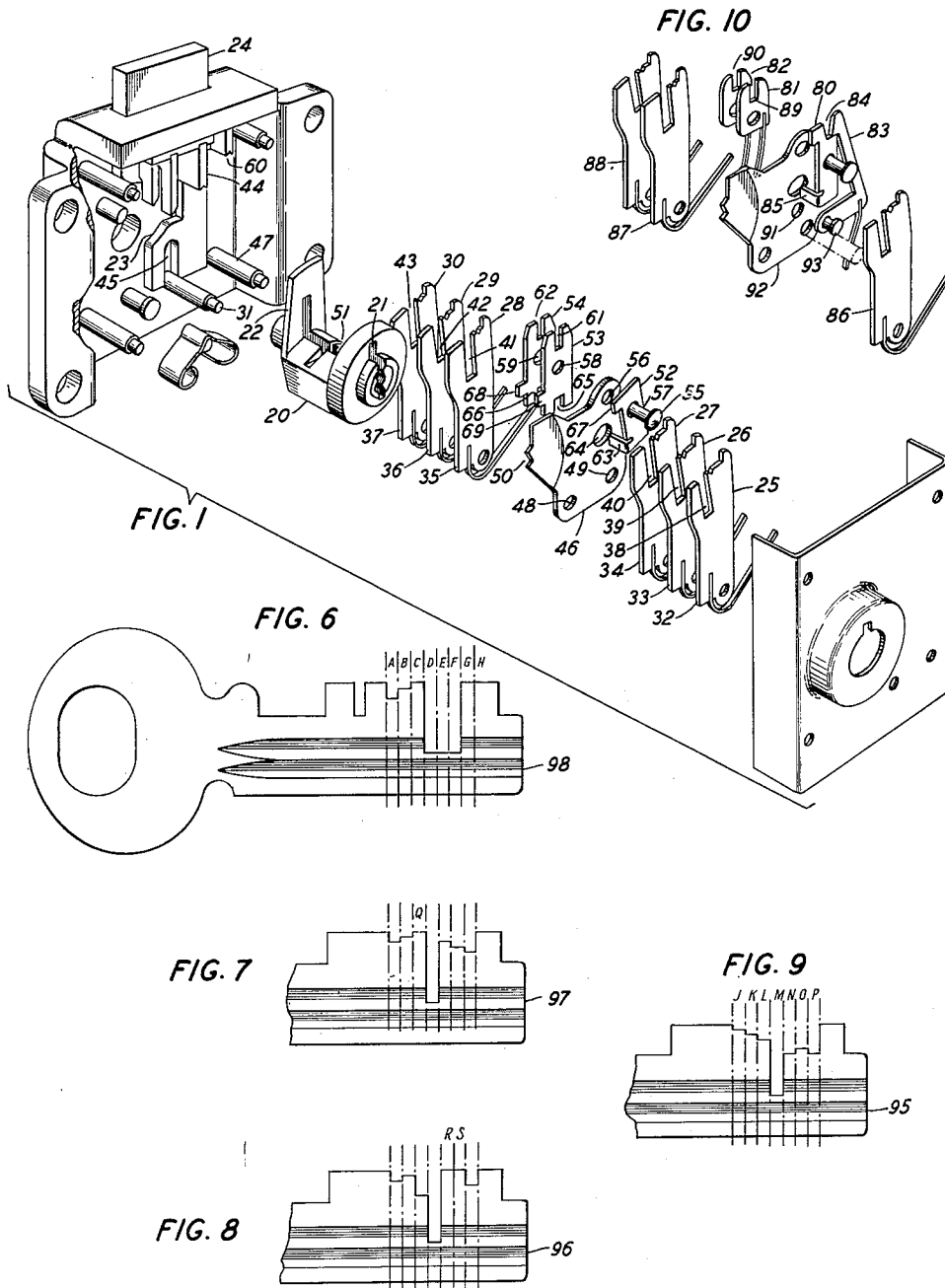
O. A. SHANN

2,617,289

KEY ACTUATED DOUBLE CUSTODY LOCK

Filed Oct. 11, 1946

2 SHEETS—SHEET 1



INVENTOR
O. A. SHANN
BY
J. MacDonald
ATTORNEY

Nov. 11, 1952

O. A. SHANN

2,617,289

KEY ACTUATED DOUBLE CUSTODY LOCK

Filed Oct. 11, 1946

2 SHEETS—SHEET 2

FIG. 2

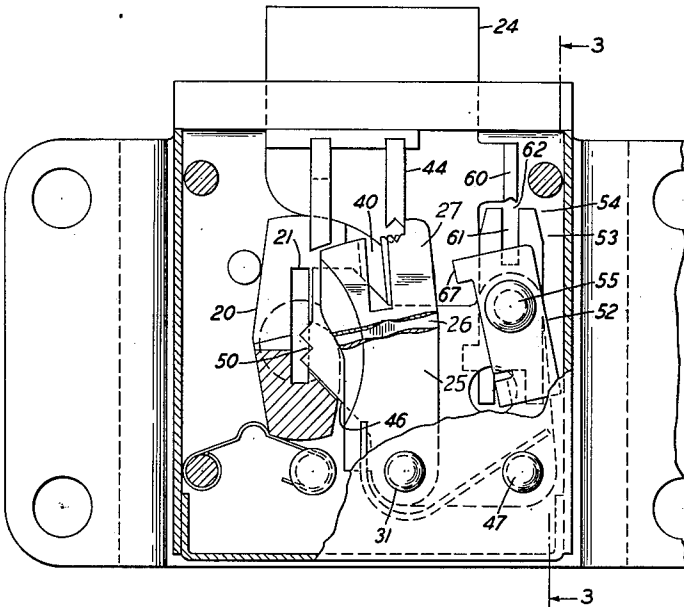


FIG. 3

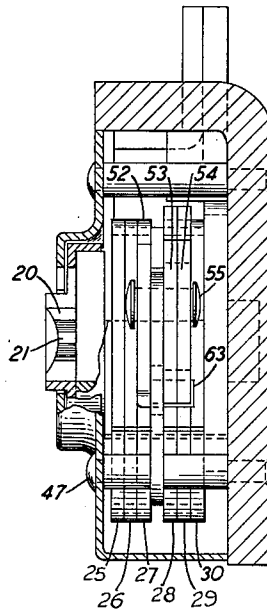


FIG. 4

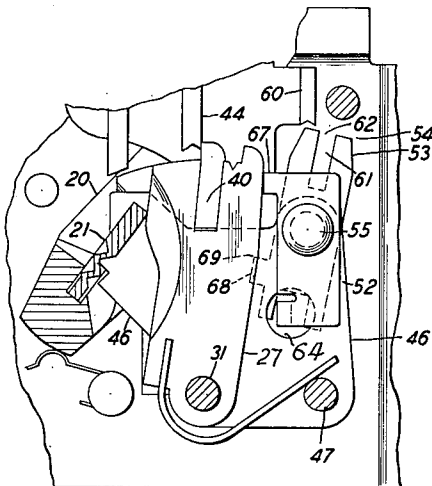
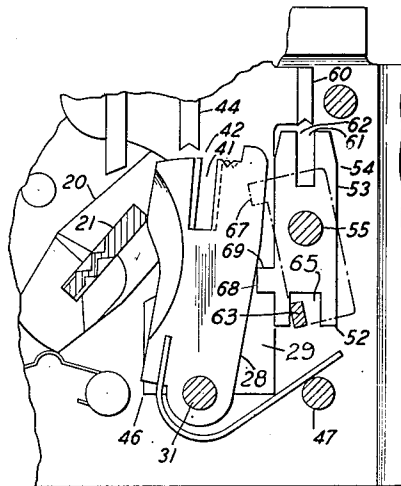


FIG. 5



INVENTOR
O. A. SHANN
BY
J. MacDonald
ATTORNEY

UNITED STATES PATENT OFFICE

2,617,289

KEY ACTUATED DOUBLE CUSTODY LOCK

Oscar A. Shann, Short Hills, N. J., assignor to
Bell Telephone Laboratories, Incorporated, New
York, N. Y., a corporation of New York

Application October 11, 1946, Serial No. 702,812

5 Claims. (Cl. 70-338)

1

This invention relates to locks and particularly to locks of the key-operated type.

While in its generic aspects the invention has for its object certain improvements in locks of general application, its primary object is to provide means whereby the operation of a lock by its proper key may be permitted or prevented, and more particularly to provide mechanism requiring the successive operation in the same key slot of two different keys before the unlocking of the lock may be accomplished.

Other objects will be apparent from a study of the written description and drawings.

The invention is particularly applicable to tumbler-type locks, such as the type illustrated, for example, in the O. A. Shann United States Patent No. 1,793,254, issued February 17, 1931. For such a lock the operating key has notches of different depths cut into its face for controlling a series of pivoted tumblers or levers having faces of different widths to correspond to the notches on the key, whereby the operation of the levers by the key will align them so that the key will be enabled to retract the locked bolt.

In the preferred embodiment of the invention, a stationary wall or partition is inserted between two of the series of key-operated tumblers on which wall are pivotally mounted one or more supplementary levers. These levers are adapted to occupy a bolt-obstructing and a bolt-freeing position. These supplementary levers are normally in a bolt-freeing position and, therefore, are not adapted to be actuated by the regular key. However, a special key is provided which will enable these supplementary tumblers to be actuated to a bolt-obstructing position, whereby the regular key will be prevented from unlocking the lock until some later time when the supplementary tumblers are restored to their bolt-freeing position.

The invention as above described is of special advantage as applied to the lock for the cash compartment of a telephone coin collector to frustrate attempts to pilfer the cash box by any person who for fraudulent purposes has secured a duplicate of the regular key for the lock. The improvement provided by this invention is advantageous in that there is no external indication that the lock structure differs in any respect from the usual cash compartment lock for the keyway remains unchanged and the lock retains an external appearance similar to others of the same type.

A complete understanding of the invention may be obtained from a consideration of the fol-

2

lowing detailed description in connection with the attached drawings, in which:

Fig. 1 is an exploded view of a lock constructed in accordance with this invention;

Fig. 2 is a perspective view of the lock of Fig. 1, the cover being removed to show the lock's interior;

Fig. 3 is a sectional view of the lock taken along the line 3-3 of Fig. 2;

Fig. 4 is a view similar to that of Fig. 2 except that the regular levers due to key actuation have actuated certain supplementary levers into a bolt obstructing position;

Fig. 5 is a view similar to that of Fig. 2 except that the regular levers due to key actuation have restored the supplementary levers into a bolt-freeing position;

Fig. 6 is a view of a control key for controlling the setting of the supplementary levers into both bolt-obstructing and bolt-freeing position.

Fig. 7 is a view of a key which controls the positioning of the supplementary levers into a bolt-obstructing position;

Fig. 8 is a view of a key which controls the positioning of the supplementary levers into a bolt-freeing position;

Fig. 9 is a view of a key which controls the lock's normal operation, when the supplementary latching mechanism is not in use; and

Fig. 10 discloses an alternative form of the invention.

Referring to the drawings, a lock is shown by way of illustration of a type similar to that described in said United States Patent 1,793,254. The earlier portions of the following description will be primarily directed to features of the accompanying drawings which are similar to the lock construction disclosed in said patent.

Referring to Fig. 1: In the rotatable barrel 20 there is a key slot 21 into which slot the various keys shown in Figs. 6, 7, 8 and 9 are adapted for insertion. The walls or sides of the slot 21 are notched or fluted to correspond with flutings milled in the key's sides. The rear end of the barrel 20 has a member 22 which contacts the face 23 of the bolt 24 to withdraw the bolt upon rotation of the barrel. The levers or tumblers 25, 26, 27, 28, 29 and 30 are pivotally mounted upon post 31, and are of different widths so that their respective key operating faces 32, 33, 34, 35, 36 and 37 extend towards the barrel 20 and contact respectively the steps J, K, L, N, O and P of the regular key shown in Fig. 9. As the barrel 20 is rotated by the regular key, the key steps J, K, L, N, O and P contact and press against the

lever faces 32, 33, 34, 35, 36 and 37 respectively, and move the levers in a clockwise direction away from the barrel 20 until the gates or slots 38, 39, 40, 41, 42 and 43, in the levers 25, 26, 27, 28, 29 and 30, are aligned with the stump 44 of the bolt 24. At this point of operation the barrel 20 has rotated to a position where the member 22 engages the face 23 of the bolt 24, and as the rotation of the barrel continues the bolt 24 is completely withdrawn, the stump 44 passing within the gates 38, 39, 40, 41, 42 and 43 of the levers 25, 26, 27, 28, 29 and 30. The bottom end of the bolt 24 has an opening 45 which fits around the post 31 and serves to keep the retracted bolt aligned.

A stationary partition 46 is shown positioned between levels 27 and 28 and supported by posts 31 and 47 which extend through the openings 48 and 49 of the partition 46. This partition extends to the edge of the slot 21, as shown in Fig. 2, when the barrel is in its normal position. The end face 50 of the partition 46 is notched to correspond with the configuration of the slot 21, so as to facilitate placing the partition 46 with its face 50 as close as possible to the keyway, so that when a key is inserted in slot 21 its flutings on insertion, and its steps on rotation, must conform to the notches and immobility of the partition. This partition 46 is shown as positioned between levers 27 and 28, but it obviously can be positioned elsewhere in the lever line, thus assisting in key step combination controls.

The barrel 20 has a slot 51 to enable the barrel to avoid the partition when the barrel is being rotated by a key. The above description illustrates the normal operation of the lock under control of the regular key 95 shown in Fig. 9.

In accordance with a preferred form of this invention, as shown in Fig. 1, three supplementary levers 52, 53 and 54 are mounted upon stationary partition 46 and are pivotally sustained by pin 55 which is free to rotate within openings 57, 58, 59 in levers 52, 53, 54 and also within opening 56 in partition 46. Referring to Fig. 2 it will be noticed that the bolt 24 has an extra stump 60 which cooperates with the supplementary levers 53 and 54, and which extra stump enters the gates 61 and 62 in these levers when the bolt 24 is retracted and when the levers 53 and 54 are in their inoperative or bolt freeing position. This function of the stump 60 in relationship to the levers 53 and 54 can be readily understood by a study of Figs. 2, 4 and 5. It will be noticed from a study of lever 52 in Fig. 1 that this lever has no gate and that the lock stump 60 does not contact this lever, for in this arrangement of the invention stump 60 does not extend beyond lever 53. The function of lever 52 is to align the levers 53 and 54 into an operative or bolt obstructing position. Referring again to Fig. 1, lever 52 has a projecting flange 63 which fits with freedom of movement in opening 64 in partition 46 and in openings 65 and 66 in levers 53 and 54. As lever 52 is pivoted frontwards or backwards, flange 63 acts on levers 53 and 54 and will move them with the movement of lever 52.

Let it be supposed, for example, that it is desired to avail oneself of the invention, due to a suspicion that an unauthorized duplicate of the regular key 95 has fallen into unscrupulous hands. The present invention provides means whereby the regular key such as the key 95 of Fig. 9 will be unable to retract the bolt 24; and for this purpose a special key such as that of Fig. 6 is provided which is of such a configuration

as to produce this result, principally because step C on key 98 is higher than the step L of the regular key 95 of Fig. 9. When key 98 of Fig. 6 is inserted into key slot 21 and is turned, high step C on the key, as shown in Fig. 4, engages the face 34 of lever 27 and forces the lever back beyond its usual orbit of pivot so that the rear of lever 27 contacts the projection 67 on the face of lever 52 and pivots lever 52 in a clockwise direction away from lock barrel. Flange 63 on lever 52 acts on levers 53 and 54 and forces these levers into the position shown in Fig. 4. It will be noted that lever 54 is not visible in Fig. 2 or Fig. 4 being concealed by lever 53. Also gate 62 of lever 54 is not apparent in Fig. 5 being positioned to the rear of gate 61 in lever 53. It will be noted that gates 61, 62 on levers 53 and 54 are now out of alignment with extra stump 60 of bolt 24. When control key 98 of Fig. 6 is withdrawn, lever 27 being spring actuated restores to its normal position, but levers 53 and 54 remain in the position as shown in Fig. 4. The lock cannot now be opened by using the regular key 95 of Fig. 9 or any duplicate thereof, for the steps on the regular key cannot release the supplementary mechanism.

When it is desired to free the supplementary mechanism the control key 98 of Fig. 6 is again inserted into slot 21, but is not inserted the full depth of the keyway, but only so far as to place step F on the key in alignment with partition 46. Referring again to Fig. 1 high steps G and H of the key will then act upon levers 28 and 29 and force them backwards in a clockwise direction beyond their usual orbit of pivot so that the rear of the levers contact the projections 68 and 69 of levers 54 and 53 and pivot these levers forward in a counterclockwise direction into their normal position as shown in Fig. 5, whereby their gates 61 and 62 are restored into alignment with the extra stump 60 of the bolt 24. Levers 28 and 29 restore by actuation of their springs their normal positions. Lever 52 is restored to normal by levers 53 and 54 acting on flange bar 63. The control key 98 of Fig. 6 may then be removed from the lock after which the lock can be opened by the regular key 95 of Fig. 9 in a normal manner. It will also be noted that the keys 98, 97, 96 of Figs. 6, 7 or 8 cannot open the lock at any time for these keys are cut to control features of the supplementary mechanism only.

While it is preferred to operate the lock by means of the two keys 98 and 95 shown in Fig. 6 and Fig. 9, a three-key combination is also shown. Figs. 7 and 8 show two keys 97 and 96 for controlling the supplemental feature, key 97 of Fig. 7 being so cut that it acts upon lever 27, which lever actuates supplementary lever 52 by means of the high step Q on said key. Key 97 controls the bolt obstructing feature of the supplementary mechanism. Key 96 of Fig. 8 is used to release the supplementary mechanism and place the supplementary levers in a bolt-freeing position by means of the high steps R and S on said key, acting upon levers 28 and 29, and upon supplementary levers 53 and 54 in a manner explained before.

The above description covers the lock's operation when the supplementary feature is optional and when the lock can be used as a normal lock with key 95 of Fig. 9, until such time as the use of the supplementary feature is desirable. Fig. 10 shows a modification of the invention wherein the supplementary mechanism is always in use, and accordingly two keys are always needed to

5

operate the lock. In this embodiment of the invention the control key 98 of Fig. 6 throws all three supplementary levers into an inoperative or bolt-freeing position at the same time. Referring to Fig. 10 the embodiment shown is superimposed on a lock such as displayed in Fig. 1. Levers 86, 87 and 88 of Fig. 10 correspond respectively to levers 27, 28 and 29 of Fig. 1. Partition 92 of Fig. 10 is the same as partition 46 of Fig. 1 except that an additional hole 91 is drilled to accommodate the pivot of latch 83. Supplementary levers 80, 81 and 82 of Fig. 10 correspond in their general function to levers 52, 53 and 54 of Fig. 1, but are of a different shape, and perform in a different manner as will now be explained. When the embodiment as shown in Fig. 10 is used, the extra stump 60 of the bolt 24, as shown in Fig. 2, is lengthened and extends to lever 80, and is designed for cooperation with the half-gate 84 in lever 80. Levers 81 and 82 are spring actuated with their springs motivated by the projecting flange bar 85 of lever 80. When lever 80 is pivoted in a clockwise direction away from the lock barrel, its flange bar 85 moves forward towards the lock barrel and thus spring pressure is removed from levers 81 and 82. It may be noted that in the first-mentioned preferred embodiment of the invention the operative or bolt-obstructing movement of the supplementary levers was in a clockwise direction away from lock barrel, while in the present embodiment of Fig. 10, their operative or bolt-obstructing movement is in a counterclockwise direction towards the lock barrel. When it is desired to open the lock, a control key similar to 98 of Fig. 6 but with high steps cut at C, E and F is inserted in the key slot and turned. Steps C, E and F act upon levers 86, 87 and 88 as explained before. Lever 86 pivots lever 80 in a clockwise direction away from lock barrel, and lever 80 is then engaged by latch 83 which is secured to partition 92 by pivot pin 93. Lever 80 is held by the latch 83, and its flange bar 85 moving towards lock barrel removes tension from the springs of levers 81 and 82. High steps E and F on control key act on levers 87 and 88 which pivot levers 81 and 82 in a clockwise or backward direction away from lock barrel, and into their inoperative or bolt-freeing position, in which their gates are in alignment with extra stump 60 on the lock bolt 24. Control key 98 is now removed from the lock, levers 86, 87 and 88 being spring actuated restore to their normal positions, and when the regular key 95 of Fig. 9 is inserted, the bolt can be retracted in the usual manner. As the bolt is retracted its extra stump 60 enters the gates 89 and 90 in the levers 81 and 82, and it also enters the half-gate 84 in the lever 80 forcing lever 80 and latch 83 apart, and moving lever 80 into its operative or bolt obstructing position. Flange bar 85 on lever 80 moves backwards replacing tension on springs of levers 81 and 82, but these levers cannot move into an operative bolt-obstructing position, but remain positioned inoperatively or bolt-freeing as shown in Fig. 5, for extra stump 60 rests in their gates 89 and 90 and prohibits their movement. When bolt 24 moves upward again into its operative locked position, stump 60 is removed from gates 89 and 90 and levers 81 and 82 automatically reset themselves into their operative bolt-obstructing position.

It is to be understood that the above description is by way of example, that various modifications may be made within the scope of the invention as defined in the following claims.

6

What is claimed is:

1. A lock operable by sequential manipulation of a number of different keys comprising a casing, a barrel having a slot therein for the reception of the keys, a bolt movable relative to said casing and actuatable by said barrel, a plurality of levers movable relative to said casing, arranged to detain and release said bolt in accordance with their positions, a partition among said levers stationary relative to said casing, a supplementary lever pivotally mounted on said partition and positioned to detain and release said bolt in accordance with the position of said supplementary lever, one of said plurality of levers having a portion positioned to engage and cause pivotal movement of said supplementary lever to its bolt-releasing position, said one lever being actuatable by one of the keys to actuate said supplementary lever, and all of said plurality of levers being actuatable by a second one of said keys to position them in their bolt-releasing positions.

2. A lock actuatable by sequential manipulation by a number of different keys comprising a casing, a barrel rotatable in said casing and having a keyway therein for the reception of the keys, a bolt movable relative to said casing actuatable by said barrel, a plurality of main levers movable relative to said casing arranged to detain and release said bolt in accordance with their positions, a partition among said levers stationary relative to said casing, a plurality of supplementary levers pivotally mounted on said partition arranged to obstruct and free the movement of said bolt in accordance with their positions, certain of said main levers corresponding to individual supplementary levers having portions arranged to engage and cause pivotal movement of said supplementary levers to their bolt-freeing positions, said certain corresponding main levers being actuatable by a first key to actuate said supplementary levers to their bolt-freeing positions and all of said main levers being actuatable by a second key to position them in their bolt-releasing positions.

3. A lock actuatable by sequential manipulation of a number of different keys, comprising a casing, a barrel rotatable in said casing, said barrel having a keyway therein, a bolt movable relative to said casing actuated by said barrel, a plurality of stumps on said bolt, a plurality of main levers movable relative to said casing arranged to engage and release one of said stumps in accordance with their position, a partition stationary relative to said casing positioned among said main levers, a plurality of supplementary levers pivotally sustained by said stationary partition arranged to engage and release another of said plurality of stumps on said bolt, certain of said main levers being arranged to engage and cause pivotal movement of said supplementary levers to their stump-releasing positions, said certain main levers being actuatable by a first key to cause pivotal movement of said supplementary levers to their stump-releasing positions, and all of said main levers being actuatable to their stump-releasing positions by a second key.

4. A lock comprising a casing, a barrel rotatable in said casing, said barrel having a keyway therein, a bolt movable relative to said casing actuated by said barrel, a plurality of key-operable levers movable relative to said casing arranged to restrict and free the movement of said bolt in accordance with their positions, a first supplementary lever movable relative to said casing arranged to restrict and free the movement of

7

said bolt in accordance with the position thereof, a second supplementary lever movable relative to said casing arranged to engage and move said first supplementary lever to its bolt-restricting position, one of said key-operable levers being 5 actuable by a first key to actuate said second supplementary lever and thereby move said first supplementary lever to its bolt-restricting position, a second one of said key-operable levers being arranged to engage and move said first supplementary lever to its bolt-freeing position, said 10 second key-operable lever being actuable by a second key to move said first supplementary lever to its bolt-freeing position, and all of said key-operable levers being actuable to their bolt-releasing positions by a third key. 15

5. A lock comprising a casing, a barrel rotatable in said casing, said barrel having a keyway therein, a bolt movable relative to said casing actuated by said barrel, a plurality of key-operable levers movable relative to said casing arranged to restrict and free the movement of said bolt in accordance with their position, a partition among said levers stationary relative to said casing, supplementary levers pivotally mounted on said stationary partition all but one being arranged to restrict and free the movement of said bolt in accordance with their positions, said one of said supplementary levers having a portion which engages the other supplementary levers, 30 one of said key-operable levers being arranged to

8

engage and move said one supplementary lever to position the remaining supplementary levers in their bolt-restricting positions, said one key-operable lever being actuable by a first key to actuate said one supplementary lever and thereby position the remaining supplementary levers in their bolt-restricting positions, others of said key-operable levers being arranged to engage and move said remaining supplementary levers to their bolt-freeing positions, said other key-operable levers being actuable by a second key to actuate said remaining supplementary levers to their bolt-freeing positions, and all of said key-operable levers being actuable by a third key to position them in their bolt-releasing positions. 15

OSCAR A. SHANN.

REFERENCES CITED

20 The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
799,338	Horne	Sept. 12, 1905
1,166,381	Marvel	Dec. 28, 1915
1,268,900	Watson	June 11, 1913
1,543,447	Marvel	June 23, 1925
1,549,581	Lewis	Aug. 11, 1925
1,793,254	Shann	Feb. 17, 1931
1,957,586	Gutman	May 8, 1934