Oct. 10, 1933. A. MAIN 1,929,985

UNIVERSAL LOCK MECHANISM

Filed July 1, 1931 2 Sheets-Sheet 1

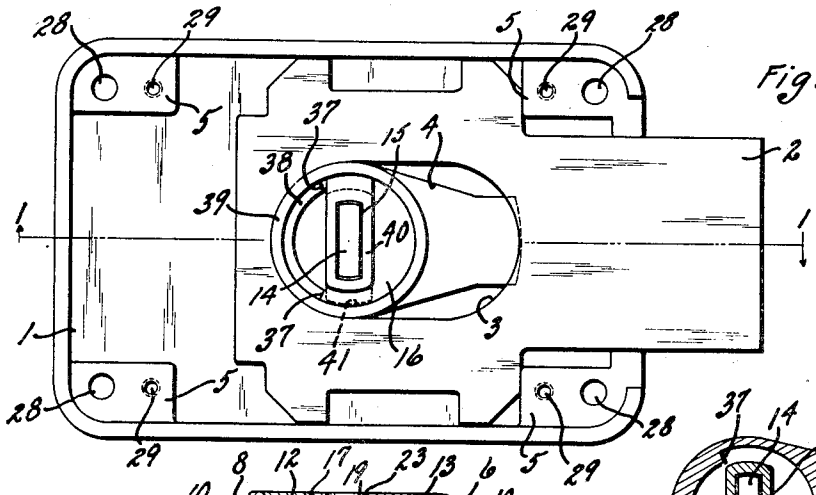


Fig. 2

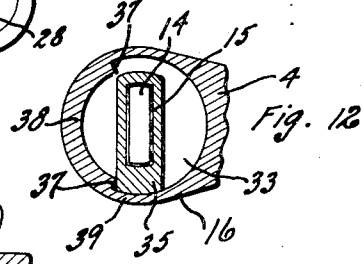


Fig. 12

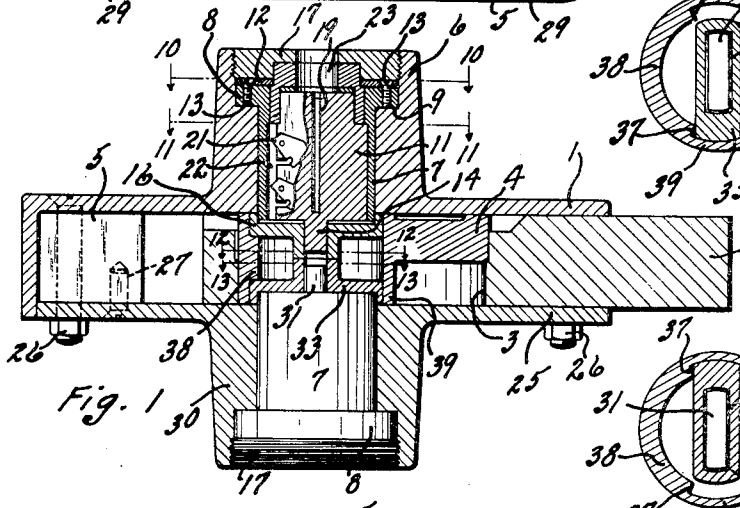


Fig. 1

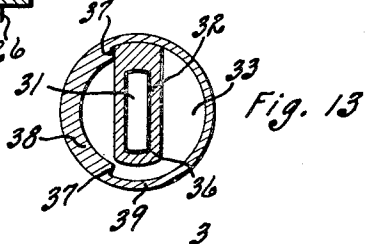


Fig. 13

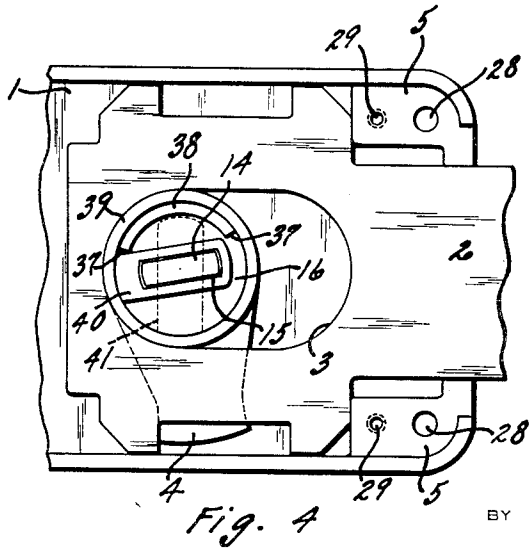


Fig. 4

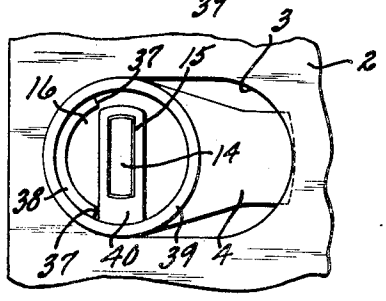


Fig. 3

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UNIVERSAL LOCK MECHANISM

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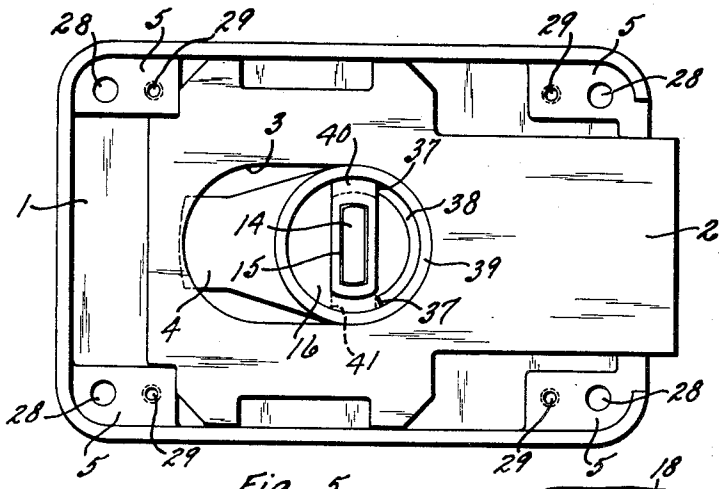


Fig. 5

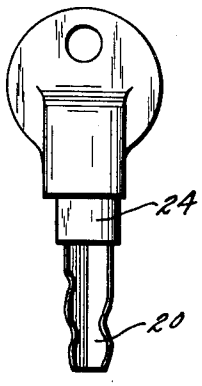


Fig. 7

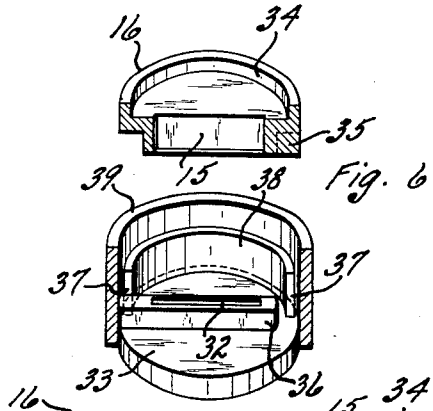


Fig. 6

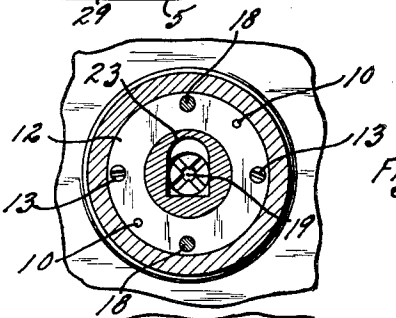


Fig. 10

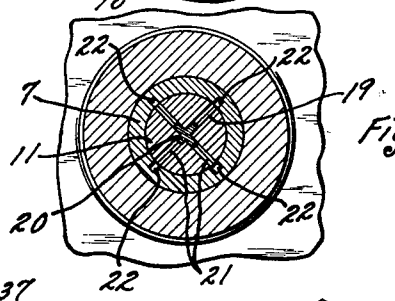


Fig. 11

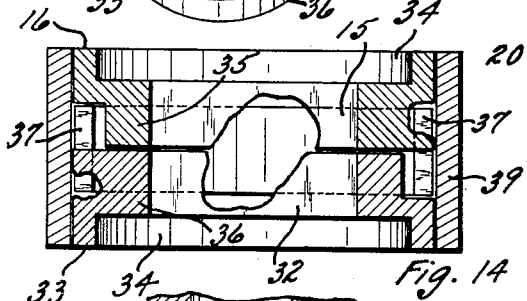


Fig. 14

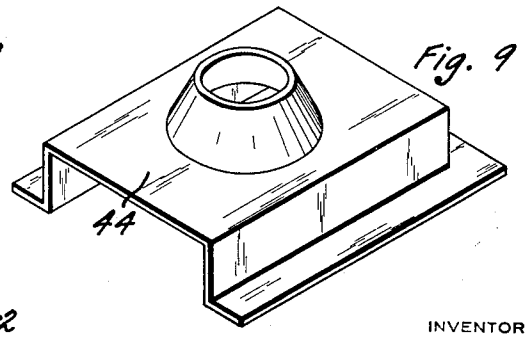


Fig. 9

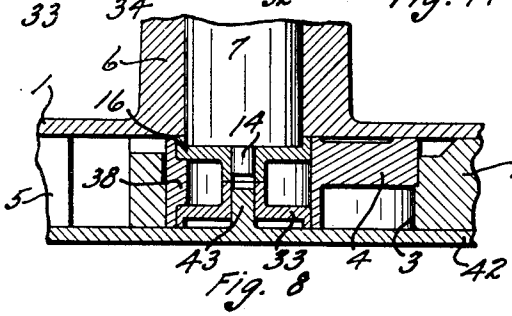


Fig. 8

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UNITED STATES PATENT OFFICE

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UNIVERSAL LOCK MECHANISM

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Application July 1, 1931. Serial No. 548,074

6 Claims. (Cl. 70—46)

My invention relates to a universal lock mechanism of the type particularly adapted to be used for confinement cells or corridor doors of a prison although it is not limited thereto. The term universal lock mechanism is to be hereinafter construed as meaning a lock mechanism so constructed that it may be universally used as a locking means for a communicating door necessitating a lock having key openings on both sides thereof, as a mortise lock with a key on either or any one side thereof, or as a cell or room lock where a key is used only on one side. The term universal lock is also to be construed to mean a lock mechanism so constructed and arranged that the lock may be applicable to any door regardless of the side on which the door is hinged and of the direction of swing of the door or, in the event of a slidably mounted door, of the direction of sliding movement of the door from closed to open position. That is, a lock constructed in accordance with my invention may be applied to doors irrespective of whether or not they are hinged on their right hand or left hand sides which necessarily results in the lock mechanism being on the side opposite the hinged mounting, and may be applied to sliding doors which slide either to the right or to the left from closed to open position which, as in the case of the hinged door, would necessitate the locks being applied to the side of the door adjacent the stop jamb to which the edge of the door is locked when the door is in closed position, and result in the lock bolt extending in opposite directions for right and left hand hinged doors respectively, or doors that move to the right or to the left from closed to open position. Lock mechanisms as previously constructed have necessitated a separate lock mechanism for each of the applications above enumerated.

Various objects and advantageous features of the invention are in part obvious and will appear more in detail hereinafter.

In the drawings, which represent one suitable embodiment of the invention, Fig. 1 is a view taken on the line 1—1 of Fig. 2, partly in elevation and partly in section, showing a lock mechanism constructed in accordance with my invention, this lock mechanism being of the type having key openings on both sides thereof; Fig. 2 is a plan view showing the bolt and bolt actuating parts, with the bolt in full locked position; Fig. 3 is a fragmentary view showing a part of the bolt actuating mechanism in a position to move the bolt throwing arm preparatory to causing actuation of the bolt to retracted or full unlocked position; Fig. 4 is a fragmentary view showing the bolt throwing arm in a position to bring about actuating of the bolt to retracted or full unlocked position; Fig. 5 is a view similar to Fig. 2 showing the locking bolt in retracted or full unlocked position; Fig. 6 is a view showing the connectors for a double side lock mechanism in disassembled relation with the bolt throwing arm; Fig. 7 is a view showing the key employed for actuating the lock; Fig. 8 is a view partly in section and partly in elevation showing the lock mechanism shown in Fig. 1 where such lock mechanism is employed as one having a single key opening only; Fig. 9 is a perspective view of a cover plate adapted to be disposed over the entire lock mechanism to protect the same when the lock mechanism is applied to the outer face of a door; Fig. 10 is a sectional view taken on the line 10—10 of Fig. 1; Fig. 11 is a sectional view taken on the line 11—11 of Fig. 1; Fig. 12 is a sectional view taken on line 12—12 of Fig. 1 showing the position the top connector shown in Fig. 6 normally assumes relative to the bolt throwing arm when the bolt is in retracted or full unlocked position; Fig. 13 is a sectional view taken on line 13—13 of Fig. 1 showing the position the lowermost connector shown in Fig. 6 assumes relative to the bolt throwing arm when the bolt is in retracted or full open position; and Fig. 14 is a sectional view showing the connectors between the key operated mechanisms of the lock and the bolt throwing lever arm connector or roll back in assembled relation.

Referring to the drawings, I have shown, particularly in Figs. 1 to 6 inclusive, one embodiment of a universal lock mechanism comprising a casing 1 carrying the majority of the operating parts of the lock mechanism including a sliding locking bolt 2 having its locking portion guided in an opening in the wall of the casing and having an elongated guiding slot or opening 3 through which extend rotatable locking parts comprising a lever arm connector or roll back 4 and suitable operating connections between the lever arm connector or roll back and operating mechanism therefor. As is customary in this type of lock, the casing 1 is provided with stops 5 against which parts of the locking bolt 2 abut when in full locked or full unlocked position and the lever arm connector 4 is adapted to throw the locking bolt from full locked to full unlocked position or vice versa by a cam action by swing of the lever arm connector or roll back through 180°, 90° of this movement be-

ing lost motion and having no effect in changing the position of the locking bolt 2.

Referring to Fig. 1, I have shown a suitable key operated lock bolt operating and locking mechanism of the rotary plug and cylinder type as disclosed in my copending application, Serial No. 536,401, filed May 11, 1931, to which reference may be had for details of the lock bolt operating and locking mechanism not herein described. However, other types of lock bolt operating and locking mechanism are equally applicable. The casing 1 includes an annular boss 6 presenting a sleeve portion having a socket or recess in which a cylinder or barrel 7 is mounted, the cylinder or barrel having an annular flange 8 that rests on a shoulder 9 within the sleeve. Such cylinder or barrel fits loosely within the sleeve and the annular flange 8 is provided with openings adapted to fit over pins 10 extending outwardly from the shoulder whereby the cylinder or barrel is held against rotation but may be easily longitudinally inserted into or removed from the sleeve. A plug 11 fits loosely within the cylinder or barrel and is rotatable relative thereto, being held within the cylinder or barrel by means of an annular plate 12 held on the annular flange of the cylinder or barrel by means of screws 13. The plate 12 fits over the plug 11 and abuts against an annular shoulder thereon and the plug 11 is provided on its lowermost end with a non-circular driving projection 14 entering a corresponding socket 15 in a connector 16 adapted to make operative connection between the plug 11 and the roll back or lever arm connector 4 when the connector 16 is in certain of its positions.

Suitable means are provided for confining the cylinder and plug within the sleeve. As shown, the cylinder and plug are confined in the sleeve by a washer 17 threaded into the outer end of the sleeve and doweled into the cylinder or barrel by means of pins 18 that extend through openings in the washer 17 and into corresponding openings in the cylinder or barrel. After the parts have been properly assembled, the outermost ends of the pins 18 may be ground off flush with the outer face of the washer which effectively prevents removal of the washer and other parts of the lock bolt operating and locking mechanism except by an authorized person with proper equipment.

Plug 11 is provided with a cruciform keyway or slot 19 for a key 20 having ward portions of like cross section which actuate tumbler levers 21 that cooperate with longitudinal grooves 22 in the cylinder or barrel 7 and normally prevent rotation of the plug relative to the cylinder or barrel. At its top, the plug 11 is provided with a non-circular socket or recess 23 to receive a like-shaped portion 24 of the key 20 when the latter is fully inserted in the keyway of the plug 11. This construction permits the operating power of the key to be taken from the portion 24 thereof instead of from the wards, which protects the wards against injury. Likewise, such construction prevents the key from being inserted into the lock in any but one position.

In one embodiment of my invention, the casing 1 is closed by a plate 25 secured thereto by means of bolts 26 or screws 27 that enter openings 28 or 29 respectively in the casing 1 and this plate includes, like the casing 1, an annular boss 30 forming a sleeve portion for the reception of a lock bolt operating and locking mechanism similar to the one which was just previously described and in co-axial alignment therewith, the plug of this lock bolt operating and locking mechanism having a non-circular projection 31 adapted to enter a slot 32 in a connector 33 for making an operative connection between the lock operating and locking mechanism within the annular boss 30 and the roll back or lever arm connector 4.

As shown in Figs. 1, 6 and 14, each of the connectors 16 and 33 embody annular sleeve-like cutout portions 34 for the reception of the ends of the cylinders or barrels of the key actuated lock bolt operating and locking mechanisms disposed within the sleeves 6 and 30 respectively. Also, on their opposite sides, the connectors are provided with off-center projections 35 and 36 respectively, each projection having one end thereof adapted to abut against the ends 37 of a semi-circular member 38 on the inner wall of the sleeve portion 39 of the lever arm connectors or roll back 4 with their opposite ends adapted to travel within the inner circumference of the member 38. Referring to Fig. 14, it will be seen that the connectors 16 and 33 fit within the sleeve portion 39 of the roll back or lever arm connector 4 when in assembled relation and, in accordance with my invention, the connectors are so disposed that the long ends of the off-center projections 35 and 36 abut against opposite ends 37 of the member 38. Thus, with the connectors 16 and 33 locked against movement by the projections 14 and 31 of the lock bolt operating and locking mechanism when no key is disposed therein prevents movement of the roll back or lever arm connector 4 in either direction to hold the locking bolt 2 in whatever position it is in at the time the keys are withdrawn from the lock bolt operating and locking mechanism.

In the operation of this universal locking mechanism embodying the key actuated lock bolt operating and locking mechanism and key openings in co-axial alignment on opposite sides of the lock mechanism, assuming that there is no key in either lock bolt operating or locking mechanism whereby the locking bolt is held against movement in either direction by the long ends of the off-center projections 35 and 36 on the connectors 16 and 33 abutting against opposite ends 37 of the member 38, a key is inserted in one of the key openings which moves the locking dogs 21 out of the grooves 22 and permits the plug 11 to be rotated by turning the key. Turning of the key will, through the projection 14 on the plug 11, one of the connectors 16 or 33, the connection between one of the connectors and the roll back or lever arm connector through the off-center projections 35 or 36 and the member 38, move the roll back or lever arm connector 4 to actuate the lock bolt toward either full locked or full unlocked position.

Assuming that the key 20 is inserted in the key actuated lock bolt operating and locking mechanism controlling the movement of the connector shown in full lines in Figs. 2, 3, 4 and 5 and indicated by the numeral 40, turning of the key to produce clockwise movement of the off-center projection will cause the connector and the off-center projection 40 thereon to move 180° clockwise with lost motion until it contacts with the opposite end 37 of the member 38. Movement of the connector and off-center projection 40 in a contra-clockwise direction is prevented by the abutment of the off-center projection shown by dotted lines and indicated by the numeral 41 abutting against the one end 37 of the member

38 which is held immovable by the key actuated lock operating and locking mechanism adapted to operate or prevent operation of that connector. After contact between the longitudinal end of the projection 40 with the same end 37 of the member 38 as is contacted with by the projection 41, continued clockwise movement of the projection 40, the projections being such as to pass one above the other, will result in movement of the roll back or lever arm connector 4 likewise in a clockwise direction through 180° to move the locking bolt 2 to retracted or full unlocked position with the ends 37 of the member 38 abutting against opposite sides of the projections 40 and 41 from that shown in Fig. 2 as is indicated in Fig. 5. Then, movement of the key in a contra-clockwise direction, further movement of the key in a clockwise direction being prevented by abutment of one of the ends 37 of the member 38 with the off-center projection 41 as shown in Fig. 5, will result in a reversal of movement of parts as just described to assume the position shown in Fig. 2 and during which movement the roll back or lever arm connector 4 is moved contra-clockwise through the same arc of 180° to move the locking bolt 2 to projected or full locked position as shown in Fig. 2. Should the key be inserted into the key actuated lock operating and locking mechanism opposite the one just described in co-axial alignment therewith, the same operation as hereinbefore described will take place with the exception that the key is first moved contra-clockwise to actuate the roll back or lever arm connector 4 contra-clockwise through an arc of 180° to move the lock bolt 2 to retracted or full unlocked position and may then be moved clockwise through the same arc of 180° to move the locking bolt 2 to projected or full locked position by clockwise movement of the key with the off-center projection 40 being held stationary by the key actuated lock operating and locking mechanism adapted to operate or prevent operation of that connector. Thus, it will be seen that I have provided a universal locking mechanism with lock actuating parts and key openings on opposite sides thereof and in co-axial alignment whereby one lock actuating mechanism has no effect on the actuation of the other to operate the locking bolt and wherein either lock actuating mechanism may be used if desired. This lock just described is particularly applicable to use as a lock mechanism for a corridor door or as a mortise lock wherein key openings are desired on both sides of the lock.

Referring to Fig. 8 of the drawings, I have provided a means whereby this lock mechanism just described may be adapted for use as a confinement cell lock or in other places where key openings are desired only on one side of the lock and this has been accomplished by providing a plate 42 adapted to interfit with the casing 1 and be held thereon by means of the bolts 26 or screws 27. This plate embodies a centrally located projection 43 that forms an integral part of the plate 42 and is adapted to enter the corresponding socket in the connector 33 in place of the projection 31. With this plate in use, one of the lock operating mechanisms including the connector 33 will be rendered entirely useless and only the lock operating parts on the opposite sides of the lock will be effective.

Suitable means are also provided for protecting the lock mechanism should the lock mechanism be attached to the outer wall of a door. This takes the form of a plate 44 as shown in Fig. 9 adapted to fit over the lock mechanism casing and be attached to the face of the door by any suitable means, for instance, by means of rivets or by welding. Thus, the use of a cheaper material, for instance, cast metal, may be used in the construction of the lock mechanism casing with the cover only made up of a malleable material which will resist normal attempts to cause fracture thereof.

With the above construction, I have provided a lock mechanism that is universal in its application in that it is so constructed that it may be applied to sliding or swinging doors at either edge thereof and irrespective of whether or not a key opening is desired on both sides of the door. That is, the lock may be applied with a key opening on one side thereof only or both sides thereof as desired and the lock mechanism may be turned, rotated, or applied in any desired manner. Further, the lock mechanism is so constructed that, when used as a lock having key openings on both sides thereof, the lock bolt may be actuated to projected or full locked position or retracted or full unlocked position from one side of the door and may then be actuated to either of its two positions from the opposite side of the door. That is, the lock operating mechanisms on one side of the door do not at any time affect operation of the locking bolt from the opposing side of the door and by the lock actuating mechanism on that side.

What I claim is:

1. Locking mechanism of the character described, comprising a hollow casing, a reciprocating bolt therein having a through opening, and lock actuating mechanism for said bolt extending through the bolt opening, comprising a roll back effective upon the bolt and including a sleeve portion provided with shoulders spaced approximately 180° apart, two independent actuators rotatable within said sleeve with each actuator having an operating projection adapted by rotation of the actuator to engage either of said shoulders for actuation of said roll back, and a key controlled operating member for each of said actuators.

2. Locking mechanism of the character described, comprising a hollow casing, a reciprocating bolt therein having a through opening, and lock actuating mechanism for said bolt extending through the bolt opening, comprising a roll back effective upon the bolt and including a sleeve portion provided with shoulders spaced approximately 180° apart, two independent actuators rotatable within said sleeve with each actuator having an operating projection adapted by rotation of the actuator to engage either of said shoulders for actuation of said roll back, and a key controlled operating member for each of said actuators, each operating member being adapted to maintain its actuator stationary when the other of said operating members is operated.

3. Locking mechanism of the character described, comprising a hollow casing, a reciprocating bolt therein having a through opening, and a lock actuating mechanism for said bolt extending through such bolt opening, comprising a roll back effective upon the bolt and including a sleeve portion provided with shoulders spaced approximately 180° apart, two independent actuators rotatable within said sleeve with each actuator having an operating projection adapted by rotation of the actuator to engage either of said shoulders, and a key operated member for each of said actuators, said actuators having their pro-

jections normally disposed oppositely with the bolt in full projected or full retracted position, whereby to prevent movement of said bolt except through said key operated members.

4. Locking mechanism of the character described, comprising a hollow casing, a reciprocating bolt therein having a through opening, and a lock actuating mechanism for said bolt extending through such bolt opening, comprising a roll back movable through 360° and effective upon the bolt and including a sleeve portion provided with shoulders spaced approximately 180° apart, two independent actuators rotatable within said sleeve with each actuator having an operating projection adapted by rotation of the actuator to engage either of said shoulders, and a key operated member for each of said actuators, said actuators having their projections normally disposed oppositely with the bolt in full projected or full retracted position, whereby to prevent movement of said bolt except through said key operated members, each actuator being movable through 360° to move the bolt to full projected or full retracted position, 180° of such movement being lost motion.

5. Locking mechanism of the character described, comprising a hollow casing, a reciprocating bolt therein having a through opening, and a lock actuating mechanism for said bolt extending through such bolt opening, comprising a roll back effective upon the bolt and including a sleeve portion provided with shoulders spaced approximately 180° apart, two independent actuators rotatable within said sleeve with each actuator having an operating projection adapted by rotation of the actuator to engage either of said shoulders, and a key operated member for each of said actuators, said actuators being in superposed relation and with the operating projections normally disposed oppositely to abut the opposite shoulders on said sleeve portion with the bolt in full projected or full retracted position, whereby to prevent movement of said bolt except by operation of said key operated members.

6. Locking mechanism of the character described, comprising a hollow casing, a reciprocating bolt therein having a through opening, and a lock actuating mechanism for said bolt extending through such bolt opening, comprising a roll back movable through 360° and effective upon the bolt and including a sleeve portion provided with shoulders spaced approximately 180° apart, two independent actuators rotatable within said sleeve with each actuator having an operating projection adapted by rotation of the actuator to engage either of said shoulders, and a key operated member for each of said actuators, said actuators being in superposed relation and with the operating projections normally disposed oppositely to abut the opposite shoulders on said sleeve portion with the bolt in full projected or full retracted position, whereby to prevent movement of said bolt except by operation of said key operated members, each actuator being movable through 360° to move the bolt to full projected or full retracted position, 180° of such movement being lost motion.

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