No. 725,381. PATENTED APR. 14, 1903.

H. P. TOWNSEND.

LOCK.

APPLICATION FILED OCT. 11, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 2

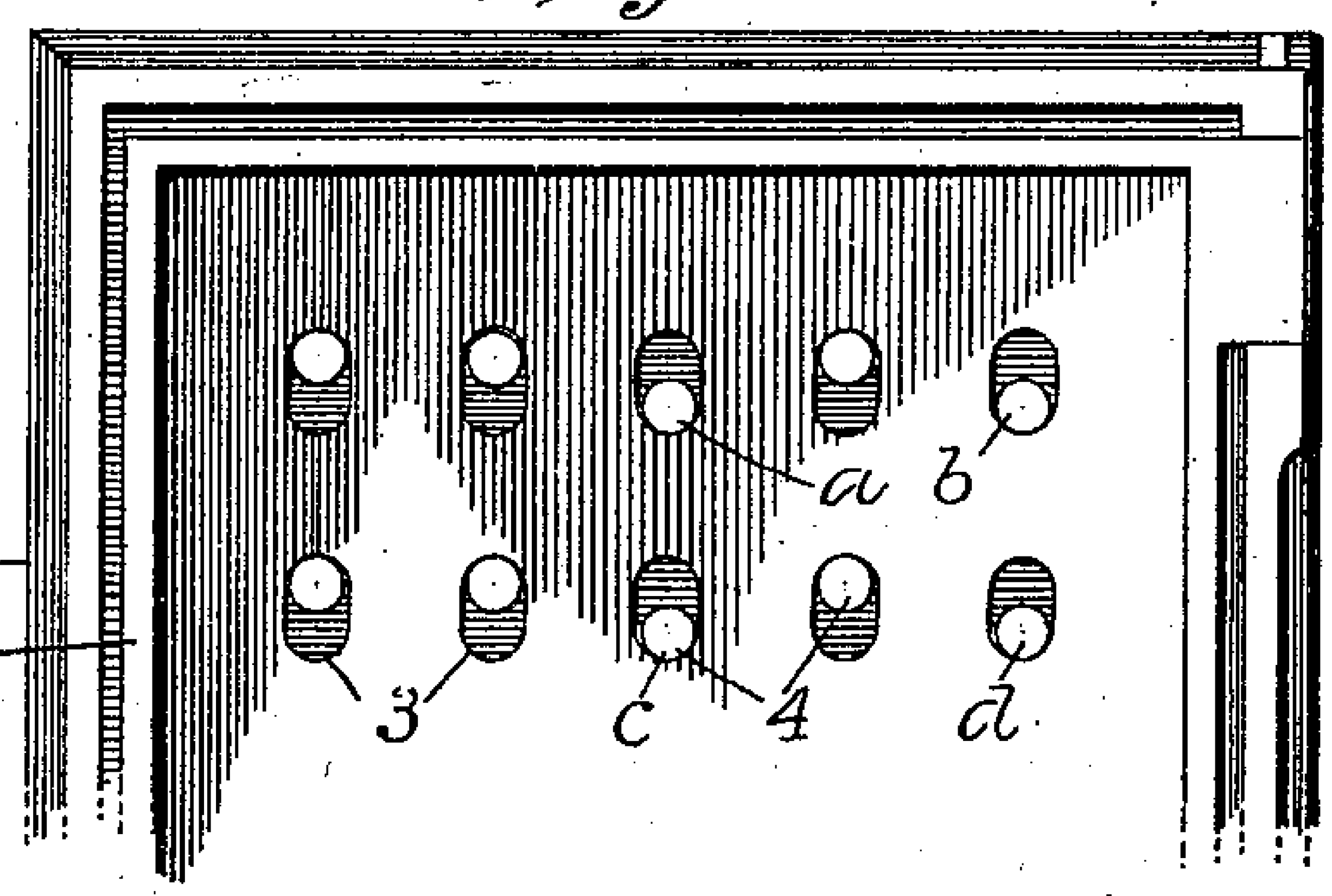


Fig. 1

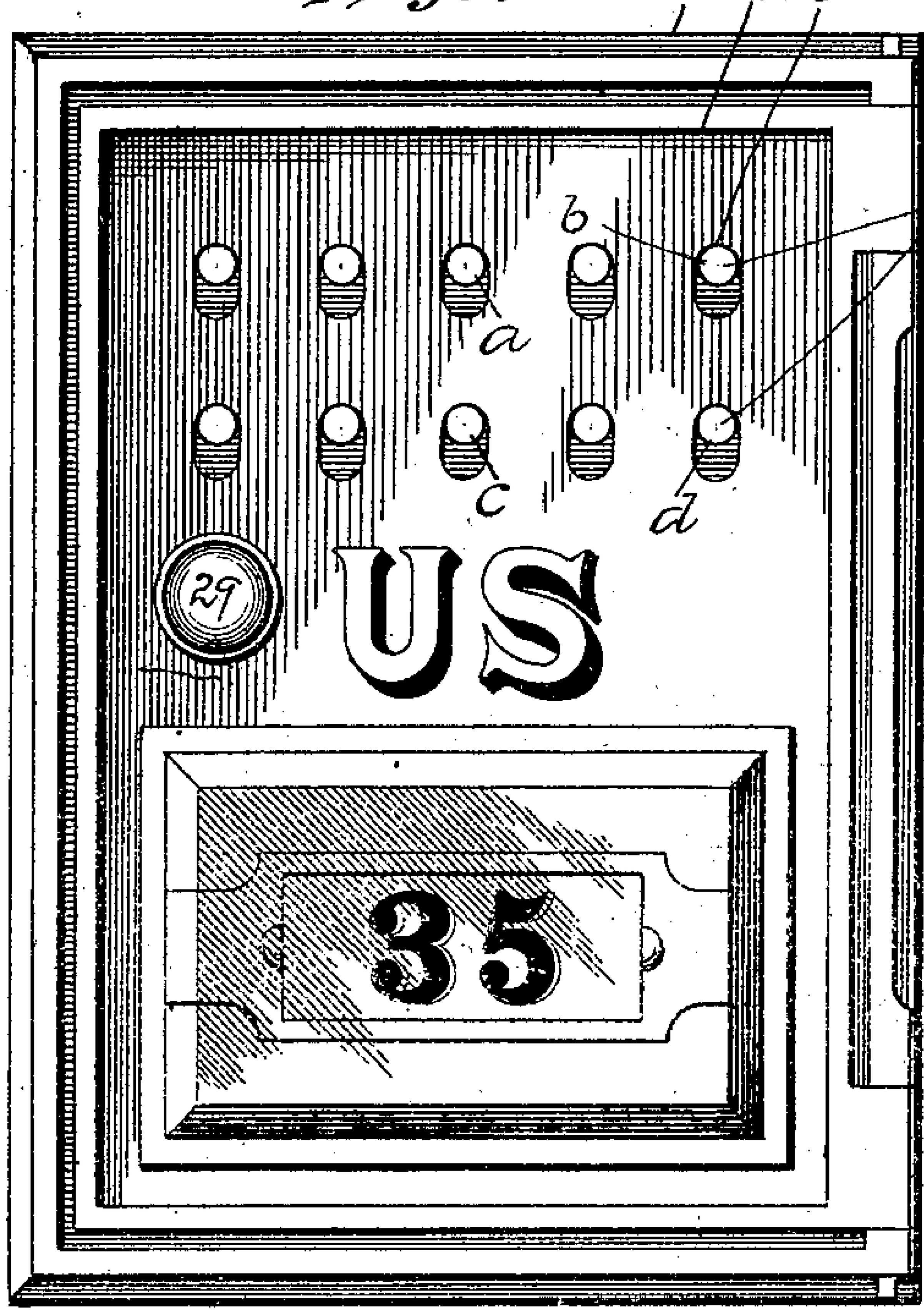
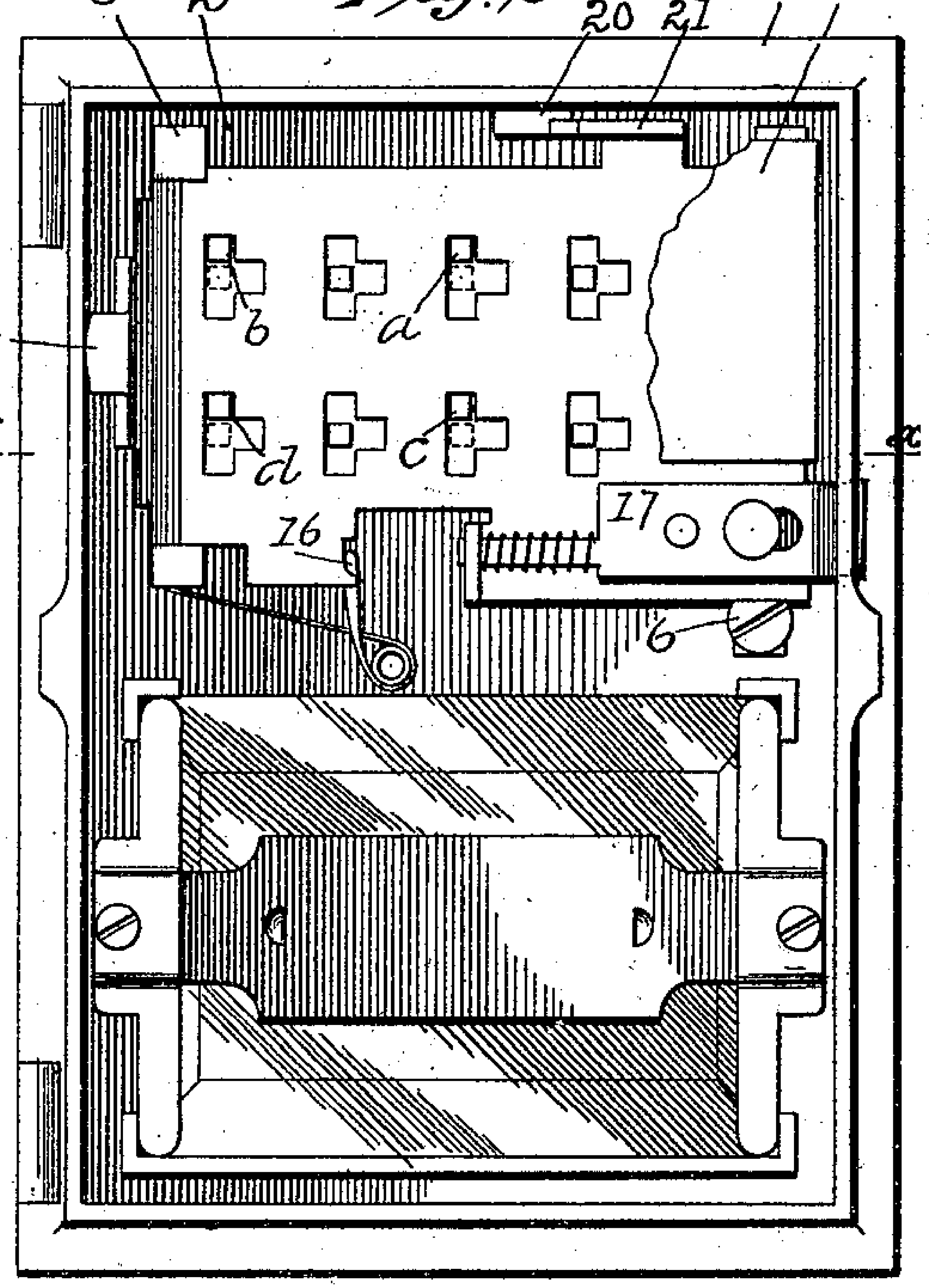


Fig. 3



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THE NORRIS PETERS CO. PHOTO-LITHO. WASHINGTON D. C.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4

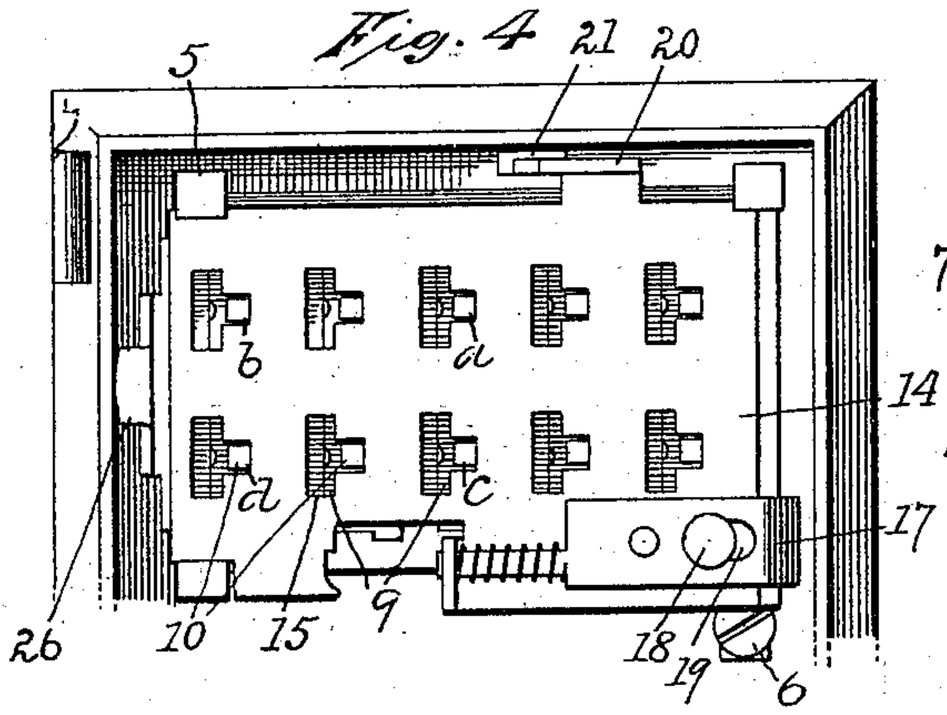


Fig. 5

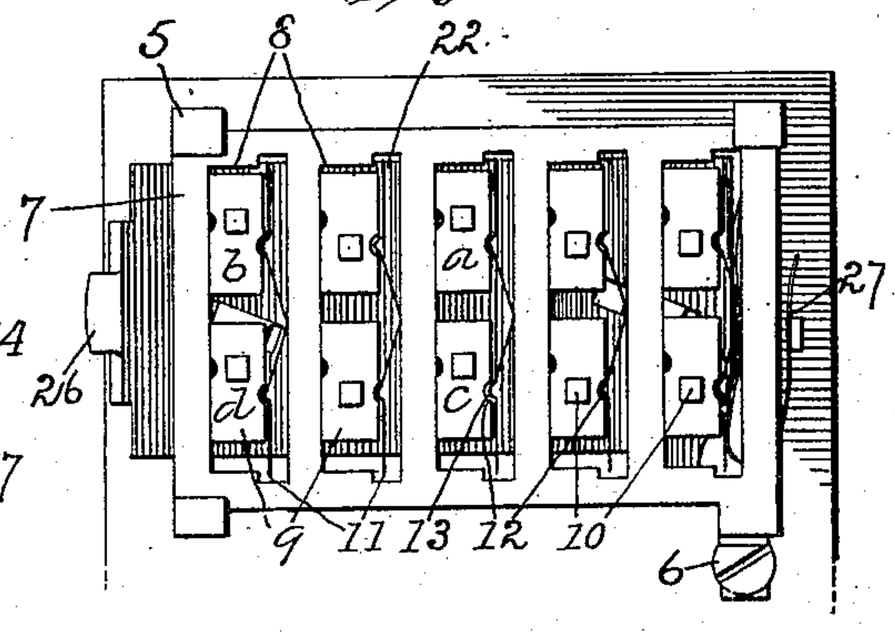


Fig. 6

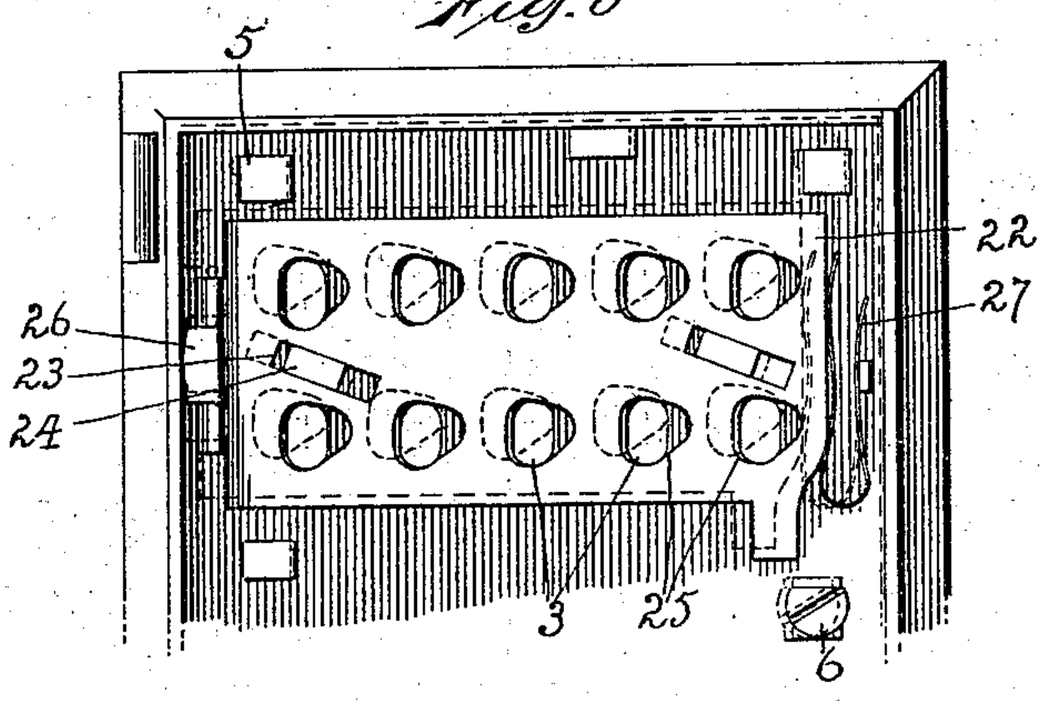


Fig. 7

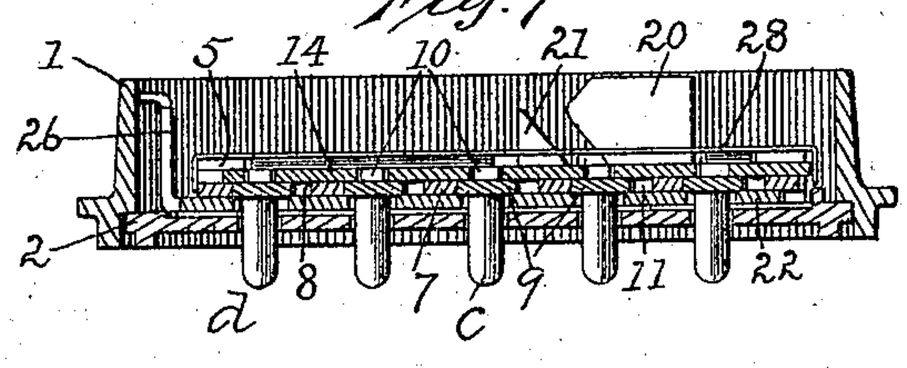
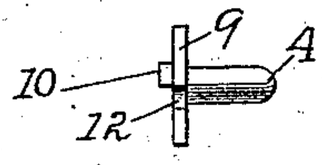


Fig. 9.

Fig. 8



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HARRY P. TOWNSEND, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO THE CORBIN CABINET LOCK COMPANY, OF NEW BRITAIN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

LOCK.

SPECIFICATION forming part of Letters Patent No. 725,381, dated April 14, 1903.

Application filed October 11, 1902. Serial No. 126,882. (No model.)

To all whom it may concern:

Be it known that I, HARRY P. TOWNSEND, a citizen of the United States, and a resident of New Britain, in the county of Hartford and State of Connecticut, have invented a new and useful Lock, of which the following is a specification.

My invention relates more especially to that class of locks in which a number of tumblers are brought into registering position by the hands of the operator to allow movement of the bolt, this class of locks being more commonly known as "combination-locks."

The objects of my invention are to produce a lock of this class which may be easily and quickly manipulated, one which is secure against discovery of its combination, one which may be operated without visual aid, and one whose tumblers are automatically returned to their locking positions after the bolt has been moved to release the door or lock by opening the receptacle. A form of device by means of which these objects may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a view in front elevation of the frame and of a door closing a receptacle and having my improved lock applied thereto, the door being closed and the operating-pins located in their normal position. Fig. 2 is a view of the upper portion of the door and frame, the door being closed and the operating-pins located in position to permit movement of the bolt to release the door. Fig. 3 is a rear view of the door and frame shown in Fig. 1 and with the parts in the same position. Fig. 4 is a rear view of the upper part of the frame and door, the latter being closed and the latch-carrier thrown back. Fig. 5 is a detail view showing the rear of the upper portion of the door, the parts being in the position assumed when the door is opened and the latch-carrier being removed. Fig. 6 is a rear view of the upper portion of the door and frame, the former being closed and the latch-carrier and tumbler-plate being removed. Fig. 7 is a detail view in cross-section through the door and frame and the lock mechanism on the dotted line $x\ x$ of Fig. 3. Fig. 8 is a detail side view of one of the tumblers. Fig. 9 is a detail end view of the latch.

While my improved lock is adapted to any device for closing the opening to a receptacle, it is especially applicable to the form of lock-box commonly employed in post-offices, and for this reason I have selected this form of receptacle in connection with which to illustrate the invention.

In the accompanying drawings the numeral 1 denotes the frame of the opening to the receptacle, and 2 the door closing said opening. The door is provided with openings or slots 3, which may be of any number desired and through which project operating-pins 4. The inner face or back of the door is provided with retaining-studs 5, one of which, 6, is in the form of a screw and is slabbed off on one side to permit the removal of certain parts held by the studs. These studs also provide slideways for portions of the mechanism. A tumbler holder or plate 7 is held by the studs 5, and this holder is provided with tumbler-recesses 8, in which the tumblers 9 are located. In the form of holder herein shown each recess is adapted to contain two tumblers; but these recesses may have any number of tumblers desired, as it is obvious that the improved lock is capable of the employment of any plural number of tumblers. Each tumbler preferably consists of a rectangular-shaped disk, from one face of which projects the operating-pin 4, and located on the other face of which is a locking-stud 10. Retaining-springs 11 are employed for the purpose of holding the tumblers in proper position. In the form shown each tumbler is provided with notches 12, located on opposite edges of the tumbler, and the springs 11 are each constructed to retain two tumblers. These springs are provided with humps 13, which normally rest in the notches 12.

The tumblers employed in this lock are of two classes, which I term "live" and "dead" tumblers—that is, the live-tumblers are those which must be moved into such position that the latch plate or bolt may be thrown back, and the dead-tumblers are those which require no movement to enable this operation to be done. The notches in each of the tumblers are so located that the humps in the springs will lie in notches, whether the tumbler be a live or a dead tumbler, and this con-

struction renders the "feeling out" of the combination a difficult matter, as the springs offer an equal resistance to the moving of all the tumblers, so that the force required to move each tumbler is practically the same. By reversing any tumbler it may be created live or dead, depending upon its condition before being reversed.

A latch or bolt plate 14 overlies the tumbler-holder 7 and has a free sliding movement underneath the heads of the studs 5 6. This latch-plate is provided with T-shaped openings 15, into which the locking-studs 10 from the tumblers project. The studs on the live-tumblers have a movement in the crosswise part of the T-shaped slot and are brought into a position opposite that part of the slot corresponding to the stem of the T. When all the locking-studs have been brought into this position, the bolt is thrown backward by the action of the spring 16. It will be noted that a like movement of the dead-tumblers will place the locking-studs in such position that the bolt cannot be moved, so that only the live-tumblers must be moved in order to enable the latch-plate to move to throw the bolt or latch.

A latch or bolt 17 is mounted on the latch-plate and is adapted to enter an opening or recess in the frame to hold the door in its locked or closed position. A latch-stud 18 projects through a slot 19 in the latch, allowing the lock an independent movement of the latch-bolt. It will be noted that the latch or bolt is moved from engagement with its socket in the frame only by the movement of the latch-plate and that neither the plate nor the latch can be moved from outside of the opening—that is, there are no means on the outside by which an extra pressure may be brought to bear on the tumblers through the latch-carrier to enable any one to determine which one of the tumblers will be required to be moved in order to allow movement of the latch-plate. The latch-plate is also provided with a cam projection 20, arranged to engage a cam-lug 21 on the door-frame. As the door is opened this cam projection 20, striking the lug 21, throws the plate in such position that the live-tumblers may be again returned to their normal location assumed when the parts of the structure are in their locking position.

A tumbler-returning plate 22 underlies the tumbler holder or plate 7 and has a free sliding movement. This tumbler-returning plate is provided with guide-slots 23, receiving guide-studs 24 from the back face of the door. These studs and slots are so arranged that as the plate is moved longitudinally it will also have a lateral movement imparted to it, the two movements constituting a diagonal movement of the plate. This tumbler-returning plate is also provided with triangular-shaped holes 25, through which the operating-pins 4 extend. The tumbler-returning plate has on its back edge a plate extension 26, which is adapted to strike the edge of the door-frame and as the door is closed throw the plate toward the opposite edge of the door against the force of the returning plate-spring 27. This holds the plate away from the tumblers when the door is closed and allows each of the tumblers a free movement except for the pressure of the tumbler-retaining springs.

While I have shown the spring 27 as a means of forcing the tumbler-returning plate 22 into position to return the tumblers to place, it is obvious that means other than a spring may be employed and yet come within the scope of the invention, and I do not desire nor intend to limit myself to this form. It is also obvious that different parts of the structure may be variously changed and modified without departing from the invention, and such changes or modifications are contemplated by me.

A cover-plate 28 is employed for covering the parts of the lock.

It will be noted that the latch-head is composed of a piece of metal cast or struck up to form the slanting front edge of the latch and the side walls being formed without seam or joint and the back being left open.

The operation of the device is as follows: The door being closed and the parts in normal position, as shown in Figs. 1 and 3, the tumblers *a*, *b*, *c*, and *d* are arranged as the live-tumblers and must be operated to allow the door to be unlocked. These letters are applied to the pins and studs as well as to the tumblers for the sake of clearness. The operating-pins having been pushed down, as shown in Fig. 2, the locking-studs are brought into the position shown in dotted outline in Fig. 3. As soon as the last stud has been brought into this position the latch-plate 14 is thrown back under the force of the spring 16, and the door is thrown partly open by the force exerted by the spring 27 through the tumbler-retaining plate 22 and its extension 26. As the door is now pulled open, as by means of the knob 29, the cam projection 20 striking the lug 21 on the door-frame throws the latch-plate 14 forward into the position shown in Fig. 3. This opening movement of the door has released the projection 26 from contact with the door-frame, and the tumbler-returning plate is free to act under the influence of the spring 27, except that for the fact that the lower edges of the triangular holes 25 have been forced against the operating-pins 4, which in turn are held by the locking-studs 10, located in that part of the T-shaped openings corresponding to the stem of the T in the latch-plate. As above stated, this latch-plate being thrown backward the spring 27 is free to act, and the tumbler-returning plate 22 is thrown back, the lower edges of the triangular-shaped slots coming against the pins on the live-tumblers and returning the tumblers to their normal position. As the door is closed the tumbler-returning plate by contact of the plate extension 26

with the frame of the door is returned to its normal position and out of contact with the operating-pins.

I claim—

1. In combination with a door or like part, a lock mounted thereon and including a bolt, tumblers arranged with their planes parallel with the face of the door and operatively connected with said bolt and movable in a plane parallel with the face of the lock, and finger-operated means secured to said tumblers.

2. In combination with a door or like part, a lock mounted thereon and including a bolt, tumblers operatively connected with the bolt and arranged with their planes parallel with the face of the door and including a lug projecting from the back to permit movement of the bolt, said tumblers being movable in a plane parallel with the face of the lock, and pins projecting from the front face of the tumblers.

3. In combination with a door or like part, a lock mounted thereon and including a bolt, tumblers operatively connected with the bolt and consisting of thin disks arranged with their planes parallel with the face of the door and including a lug projecting from the back to permit movement of the bolt, said tumblers being movable in a plane parallel with the face of the lock, and pins secured to and projecting from the front face of the tumblers through slots in the door.

4. In combination with a door or like part, a lock mounted thereon and including a bolt, tumblers operatively connected with said bolt and arranged with their planes parallel with the face of the door, pins projecting from one face of the tumbler through slots to the face of the door, and lugs projecting from the opposite face of the tumbler to permit movement of the bolt, in one position of the tumbler but inactive to permit such movement in a reversed position of the tumbler.

5. In combination with a door or like part, a lock mounted thereon and including a bolt-plate having T-shaped recesses, a bolt mounted on the bolt-plate, means for moving the bolt-plate, tumblers operatively connected with said bolt and arranged with their planes parallel with the face of the door and having a lug projecting from one face to permit movement of the bolt in one position of the tumbler, but inactive to permit such movement in a reverse position of the tumbler, and pins projecting from the opposite face of the tumblers.

6. In combination with a door or like part, a lock mounted thereon and including a bolt-plate having recesses, a bolt mounted on the bolt-plate, means for moving the bolt-plate, tumblers arranged with their planes parallel with the face of the door and having lugs on one face arranged at one side of the longitudinal center, and pins projecting from the opposite face of each tumbler.

7. In combination with a door or like part, a lock mounted thereon and including a bolt-plate having two sets of recesses, each recess of one set being located transversely of and intersecting a recess of the opposite set, tumblers arranged with their planes parallel with the face of the door and having lugs on one face located at one side of the longitudinal center, and a pin projecting from the central portion of the opposite face of each of said tumblers through the front of the door.

8. In combination with a door or like part, a lock mounted thereon and including a bolt-plate having T-shaped recesses, a bolt mounted on the bolt-plate, means for moving the bolt-plate, tumblers arranged with their planes parallel with the face of the door and having lugs engaging the recesses in the bolt-plate, a tumbler-plate for containing the tumblers, and a returning-plate to return the tumblers to their normal position.

9. In combination with a door or like part, a lock mounted thereon and including a bolt-plate, a bolt mounted on the plate, means for moving the plate, a tumbler-plate underlying the bolt-plate, tumblers arranged with their planes parallel with the face of the door and located in the tumbler-plate and having lugs adapted to engage the bolt-plate, and operating-pins projecting from the tumblers through the front face of the door.

10. In combination with a door or like part, a lock mounted thereon and including a bolt-plate, a bolt mounted on the plate, means dependent upon the movement of the door for moving the plate, sliding reversible tumblers to permit movement of the plate, and operating-pins secured to the tumblers and projecting through the front face of the door.

11. In combination with a door or like part, a lock mounted thereon and including a bolt-plate, a bolt mounted on the plate, means dependent upon the movement of the door for moving the plate, a tumbler-plate underlying the bolt-plate, sliding reversible tumblers in the tumbler-plate including lugs on one face to permit movement of the bolt-plate, and operating-pins secured to the opposite face and projecting through the front face of the door.

12. In combination with a door or like part, a lock mounted thereon and including a bolt-plate, a bolt mounted on the plate, a tumbler-plate underlying the bolt-plate, tumblers mounted in the tumbler-plate and having lugs to permit movement of the bolt-plate and operating-pins projecting through a returning-plate to the front of the door, and the returning-plate having openings for the reception of the operating-pins.

13. In combination with a door or like part, a lock mounted thereon and including a bolt-plate, a bolt mounted on the plate, a tumbler-plate underlying the bolt-plate, tumblers mounted in the tumbler-plate and having lugs to permit movement of the bolt-plate and operating-pins projecting to the front of the door, a cam projection extending from the bolt-plate and a returning-cam for operating the bolt-plate.

14. In combination with a door or like part, a lock mounted thereon and including a bolt-plate, a bolt mounted on the plate, a tumbler-plate underlying the bolt-plate, tumblers mounted in the tumbler-plate and having lugs engaging T-shaped recesses in the bolt-plate and operating-pins projecting to the front of the door, a returning-plate having openings for the reception of the operating-pins and underlying the tumbler-plate, a cam projection extending from the bolt-plate, and a returning-cam for operating the bolt-plate.

15. In combination with a door or like part, a lock mounted on the door and including a bolt, tumblers operatively connected with the bolt, finger-operated means projecting from the tumblers to the front face of the door, and means for returning the tumblers to normal position through the swinging movement of the door.

16. In combination with a door or like part, a lock mounted on the door and including a bolt, tumblers operatively connected with the bolt, a tumbler-returning plate, finger-operated means projecting from the tumblers through said returning-plate, and means for moving said plate in the swinging movement of the door.

17. In combination with a door or like part, a lock mounted on the door and including a bolt, tumblers operatively connected with the bolt, finger-operated means projecting from the tumblers to the front face of the door, a returning-plate for returning the tumblers, a spring for moving the plate in one direction, and means for moving the plate in the opposite direction by the swinging movement of the door.

18. In combination with a door or like part, a lock mounted on the door and including a bolt, tumblers operatively connected with the bolt, finger-operated means projecting from the tumblers to the front face of the door, a tumbler-returning plate normally disengaged from the tumblers, and means for operating the plate in the operation of the mechanism to lock or unlock the door.

19. In combination with a door or like part, a lock mounted on the door and including a bolt, tumblers operatively connected with the bolt, finger-operated means projecting from the tumblers to the front face of the door, and means for returning the tumblers to normal position actuated by the manipulation of the tumblers.

20. In combination with a door or like part, a lock mounted on the door and including a bolt, tumblers operatively connected with the bolt, finger-operated means projecting from the tumblers to the front face of the door, a tumbler-returning plate connected with the tumblers, a spring for moving the plate in one direction, and means caused by the movement of the tumblers for positively moving the plate in the opposite direction.

21. In combination with a door or like part, a lock mounted on the door and including a bolt, tumblers operatively connected with the bolt, finger-operated means projecting from the tumblers to the front face of the door, a tumbler-returning plate connected with the tumblers, and a lug on the plate adapted to engage a fixed stop in the swinging movement of the door.

22. In combination with a door or like part, a lock mounted on the door and including a bolt-plate, a bolt mounted on the plate, means for exerting force on the plate to move the bolt from engagement with its socket in the closed position of the door, tumblers operatively connected with the bolt, and finger-operated means projecting from the tumblers to the front face of the door.

23. In combination with a door or like part, a lock mounted on the door and including a bolt-plate, a bolt mounted on the plate, means for exerting force on the plate to disengage the bolt from its socket in the closed position of the door, means for positively moving the bolt-plate in the opposite direction, tumblers operatively connected with the bolt, and finger-operated means projecting from the tumblers to the front face of the door.

24. In combination with a door or like part, a lock mounted on the door and including a bolt-plate, a bolt mounted on the plate, means normally exerting force on the plate to move the bolt backward, and means dependent on the movement of the door for forcing the plate forward and locking it in this position.

25. In combination with a door or like part, a lock mounted on the door and including a bolt, tumblers operatively connected with the bolt, means for operating the tumblers, and a returning-plate operatively connected with the tumblers and spring-actuated in one direction and having an extension to engage the door-frame and actuate it in the opposite direction.

26. In combination with a door or like part, a lock mounted on the door and including a bolt-plate, a bolt mounted on the plate, means normally exerting force on the plate to disengage the bolt from its socket, a cam projection located on the plate, a cam-lug to engage said projection in the opening movement of the door, tumblers operatively connected with the bolt-plate, finger-operated means projecting through the returning-plate to the front of the door, the tumbler-returning plate having an opening for the finger-operated means, means for forcing the returning-plate in one direction to return the tumblers to normal position, and an extension from said returning-plate arranged to engage the frame of the door and force the plate in the opposite direction.

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