

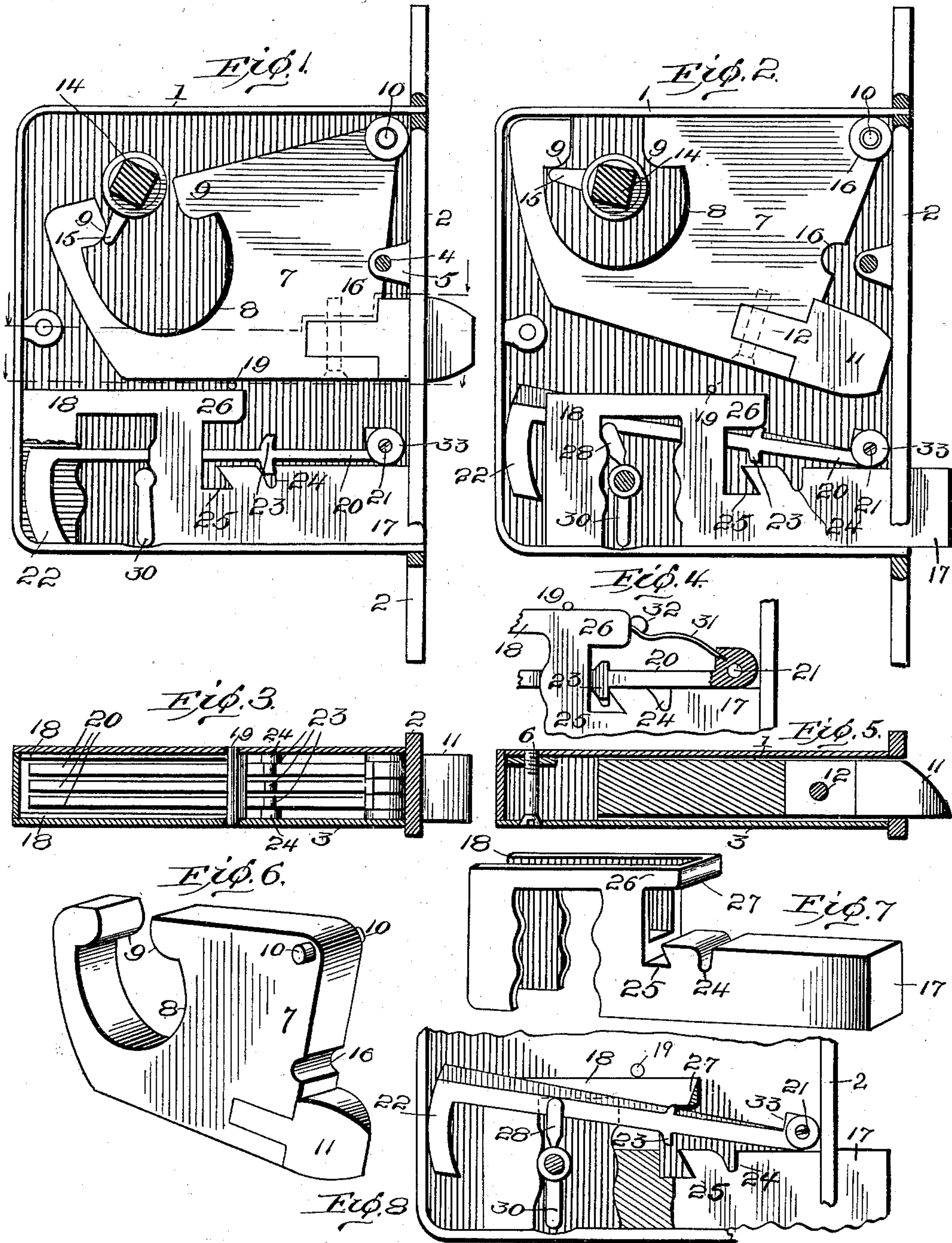
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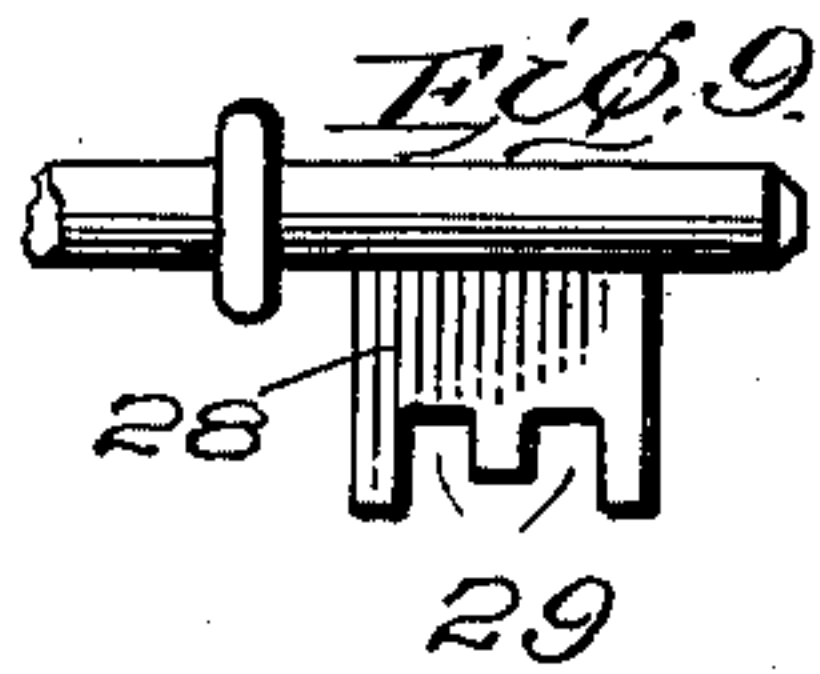
H. A. SCHROEDER.
COMBINED LOCK AND LATCH.

(Application filed Sept. 28, 1900.)

(No Model.)



Witnesses:
J. M. Fowler Jr.
J. B. Caldwell



Inventor
Henry A. Schroeder.
By R. S. Caldwell,
Att'y.

UNITED STATES PATENT OFFICE.

HENRY A. SCHROEDER, OF BALTIMORE, MARYLAND.

COMBINED LOCK AND LATCH.

SPECIFICATION forming part of Letters Patent No. 712,604, dated November 4, 1902.

Application filed September 28, 1900. Serial No. 31,446. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. SCHROEDER, a citizen of the United States, residing at Baltimore, State of Maryland, have invented certain new and useful Improvements in a Combined Lock and Latch; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in combined locks and latches, and has for its object to produce a device of this nature which shall be simple in its construction, cheap to manufacture, and efficient and durable in use.

With these objects in view my invention comprises a gravity-latch retracted by the turning of an ordinary knob in either direction, whereby a single dog engages one of two shoulders to lift the weighted body.

My invention further comprises in combination with the above, a lock consisting of a sliding bolt carrying therewith a ward-frame and adapted to be restricted in its movement by a number of pivoted gravity-tumblers which are capable of engaging the bolt from either above or below.

With the above and other objects in view my invention further consists in the novel details of construction and combination of parts, to be clearly described in the following specification and fully set forth in the claims.

Referring to the accompanying drawings, forming part of this application, in which like characters of reference indicate same parts throughout the several views, Figure 1 is a side elevation of my invention with the casing-plate removed, showing the latch in its normal position and the bolt in its retracted position. Fig. 2 is a similar view showing the latch in its elevated position and the bolt in the act of being retracted. Fig. 3 is a section through the casing on the lower sectional line of Fig. 1. Fig. 4 is a detail view of a modified form of tumbler in which the gravitating tendency is augmented by spring-pressure. Fig. 5 is a sectional view through the casing on the upper sectional lines of Fig. 1. Fig. 6 is a perspective view of the gravity-latch. Fig. 7 is a perspective view of the bolt. Fig. 8 is a detail view of

the lock portion, partly in section, showing the tumblers in proper position to permit the bolt being retracted by clearing the top and bottom catches of the tumblers; and Fig. 9 is a side elevation of a key-ward suitable for operating the lock here shown.

In the drawings, 1 represents the lock-casing, of usual shape, provided with the ordinary face-plate 2 and cover 3, the three being held together by a screw 4, passing through the cover, then through a lug 5 on the rear of the face-plate and threaded to the back of the casing, and also by a screw 6, connecting the casing and cover at their rear ends.

A weight 7, having a U-shaped opening 8 in its upper edge, forming oppositely-disposed rounded shoulders 9 with a passage-way therebetween, is pivoted to the casing at its upper front corner on trunnions 10 and has fitting in a slot at its lower front corner a reversible beveled nose 11, secured by a screw 12 and adapted to project through an opening in the face-plate. A sleeve 13, mounted on end bosses to be free to turn in the casing, is fitted on an ordinary squared knob-shank 14 and is provided with a single projecting dog 15, which when turned in either direction engages one of the rounded shoulders 9 and lifts same, thereby withdrawing the nose 11, which, however, will be again projected when the knob is released by the gravitating of the weight 7. The downward movement of this weight 7 is limited by its engagement with lug 5 on the face-plate, and it is provided with a notch or seat 16 on its front edge to receive said lug. The top and bottom faces of the nose 11 are curved, so as to move freely through the opening in the face-plate without binding, whether it be used for right or left hand latch, and the beveled surface causes the latch to automatically retract in the usual manner on closing the door, the opening 8 of the weight being given sufficient depth to permit of this movement in all positions of the dog 15.

In the lock portion a solid bolt 17, with an integral ward-frame 18, is slidably seated on the bottom edge of the casing and is confined within its limits by a guide-pin 19. A series of tumblers 20 are pivoted to a pin or screw 21 in the front of the casing and extend through the ward-frame, with curved enlarged rear ends 22 forming weights to give the tum-

blers a downward tendency. Oppositely-disposed lugs 23 are formed on the top and bottom of the tumblers 20, the lower of which are adapted when the bolt is entirely withdrawn to drop within a transverse groove 24 across the top of the bolt 17 and when in its full-shot position to fall within the transverse groove 25, also extending across the top of the bolt and located at the junction of the ward-frame with the bolt. The ward-frame comprises two arch-shaped plates formed integral with the bolt and in the same planes as the side faces of the bolt and having forwardly-projecting shoulders 26, bridged across by a bar 27, adapted to engage the upper lugs 23 when the tumblers are raised higher than is necessary for the lower lugs 23 to just clear the groove 25. The lugs 23 are made of different lengths on the several tumblers; but the distance from the top of the upper lug to the bottom of the lower lug of each tumbler is just slightly smaller than the width of the throatway between the lower edge of bar 27 and the upper edge of groove 25, through which they have to pass on shooting the bolt. Thus it will be seen that in order to throw the bolt it is necessary to first elevate the tumblers, each to its particular degree, and this is accomplished by a key of the form shown in Fig. 9, where the key-ward 28 is provided with two depressions 29 for lifting the outside tumblers to a certain degree when turned in the keyhole 30 and an intermediate bit for raising the middle tumbler to a greater degree, and two end bits for engaging the ward-frame and throwing the bolt as soon as the tumblers have assumed their proper position. The rear bottom edge of the bar 27, the top edge of the groove 25, and the forward edges of the lugs 23 are made inclined or knife-edged for the purpose of making the engagement between these parts more secure when it is attempted to retract the bolt by a false key; but the front bottom edge of bar 27, the top edge of slot 24, and rearward edges of lugs 23 are rounded off to enable the bolt to be more easily and quickly shot. In some instances I prefer to give the tumblers a downward pressure greater than that due to their weighted ends alone, and for this purpose I set small leaf-springs 31 into apertures provided therefor in the enlarged pivot ends of the tumblers and engage the free ends of these springs after compression with a stationary pin 32, which extends across the casing and serves the further function of limiting the forward movement of the bolt by engagement with the shoulders 26.

The space on the pin 21 between the tumblers and casing is taken up at either end by loose circular washers 33, which further serve as roller-bearings for the front end of the bolt, and thus make the action easier and prevent the possibility of the bolt binding with the face-plate.

It will be observed that throughout the construction of the combined lock and latch it

has been my aim to arrange the parts so that the knob-spindle, keyhole, latch-nose, and bolt end will assume the same positions relative to the general structure as the corresponding parts of the style of lock and latch now in common use, so that my improved device may be readily substituted for these when already fitted without making any alterations in the door. It is with this object in view that the opening 8 is located at the rear upper part of the weight 7 instead of elsewhere.

The pivoting of the tumblers at their forward ends instead of at their rear ends has the decided advantage, in that the arc described by the swing of the lugs 23, to which said lugs are most naturally made to conform, is in such a position as to make the false retraction of the bolt most difficult by the claw action of the lugs 23, whereas such effect would be lost with the tumblers pivoted at their rear ends, when the resistance to the bolt would be in the nature of a cam engagement, which could be overcome by pressure.

By locating the lugs 23 between the pivot of the tumblers and the surface to be engaged by the key the differences in the several lugs 23 are magnified at the place where they are engaged by the key, so that the features of the key-ward will be more prominent and the lock less liable to false operation.

The two side plates of the ward-frame form a double bearing-surface for the key, so that the bolt will be equally operated upon on both sides and prevent binding, which would be liable to occur with the pressure on one side of the bolt only.

From the foregoing it will be seen that a combined lock and latch made in accordance with this description and employing my preferred form of tumbler is entirely devoid of springs for any purpose, is most simple in its construction, and very cheap to manufacture, while at the same time most difficult to pick, for the reason that the engagement between the tumblers and bolt is separated from the keyhole by the solid bolt, so as to render them practically inaccessible, and, further, because the difference between the tumblers is located in this protected place instead of in the vicinity of the keyhole, as in locks of ordinary construction.

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

1. In a device of the character described, a casing, a weight pivoted therein and provided with an opening in its upper part, a pair of shoulders on the weight with a passage-way therebetween leading to the opening, a knob-shank adapted to enter the opening from the passage-way as the weight is elevated, a dog carried by the knob-shank to engage either of the shoulders and lift the weight when the knob-shank is turned, said opening being substantially of a U shape to avoid striking the weight against the dog when said weight is raised by means other than the knob-shank,

and a nose carried by the weight and projecting through the casing.

2. In a device of the character described, a casing, a face-plate, a lug on the face-plate, a cover for the casing, a bolt passing through the lug and connecting the cover with the casing, a weight pivoted in the casing provided with an opening in its upper part, a pair of shoulders on the weight with a passage-way therebetween leading to the opening, a knob-shank adapted to enter the opening from the passage-way as the weight is elevated, a dog carried by the knob-shank to engage either of the shoulders and lift the weight when the knob-shank is turned, said opening being sufficiently large to prevent striking the weight against the dog when said weight is raised by means other than the knob-shank, said knob-shank and dog being free to retreat from the opening by way of the passage-way to avoid receiving the blow of the weight on its downward movement and permitting said blow to be received by the lug on the face-plate, and a nose carried by the weight and projecting through the casing.

3. In a device of the character described, a casing, a bolt sliding therein, an arched ward-frame carried by the bolt, a series of tumblers pivoted to the casing at their forward ends and extending through the ward-frame, downwardly-projecting lugs on the tumblers for engaging in either of two transverse grooves in the bolt, a transverse bar carried by the bolt above the tumblers, and upwardly-projecting lugs on the tumblers for engaging said bar, substantially as described.

4. In a device of the character described, a casing, a bolt slidable therein, an arched ward-frame carried by the bolt and comprising side plates and an overhanging transverse bar, said bolt having a groove forming a throatway with said overhanging bar, and a series of tumblers pivoted in the casing at their forward ends, oppositely-disposed lugs thereon of such length as to just pass through the throatway and means for giving the tumblers a tendency to move in the same direction, substantially as described.

5. In a device of the character described, a casing, a slidable bolt within and resting on the lower edge of the casing, an arched ward-frame carried by the bolt and comprising side plates and an overhanging transverse bar, said bolt having a transverse groove forming a throatway between its upper edge and the lower edge of the bar, a series of tumblers pivoted at their forward ends to the casing and extending through the throatway

and having weighted rear ends, and oppositely-disposed lugs on the tumblers of different lengths the combined length of the lugs on each tumbler being such that they are just enabled to pass through the throatway, substantially as described.

6. In a device of the character described, a casing, a slidable bolt therein resting on the lower edge of said casing, an arched ward-frame carried by the bolt and comprising side plates and a transverse overhanging knife-edged bar, said bolt having a pair of transverse grooves, one of which is provided with a knife-edge forming a throatway with the knife-edge of the bar, a series of tumblers pivoted at their forward ends to the casing and extending through the throatway and having weighted rearward ends, and oppositely-disposed knife-edged lugs on the tumblers of different lengths, the combined lengths of the lugs on each tumbler being such that they are just enabled to pass through the throatway, substantially as described.

7. In a device of the character described, a casing, a bolt slidable therein, an arched ward-frame carried by the bolt and comprising side plates and a transverse overhanging bar, said bolt having a groove forming a throatway with said overhanging bar, and a series of tumblers pivoted in the casing at their forward ends, oppositely-disposed lugs thereon of such length as to just pass through the throatway, a pin in the casing for limiting the outward movement of the bolt, and a spring on each tumbler engaging said pin, substantially as described.

8. In a device of the character described, a tumbler pivoted at one end and adapted to be engaged by a key-ward near the other end, oppositely-disposed lugs on the tumbler between the pivot and the engaging surface, and a bolt having means to be engaged by the lugs of the tumbler substantially as described.

9. In a device of the character described, a tumbler pivoted at one end and adapted to be engaged by a key-ward near the other end, a weight on said other end, oppositely-disposed lugs on the tumbler between the pivot and the engaging surface, and a bolt having means to be engaged by the lugs of the tumbler, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY A. SCHROEDER.

Witnesses:

ALBERT T. LEMKUHL,
STERLING E. SMITH.