(No Model.) 2 Sheets—Sheet 1.

# T. TAYLOR.

## AUTOMATIC BOLT WORK FOR SAFES.

No. 547,387. Patented Oct. 1, 1895.

Fig. 1.

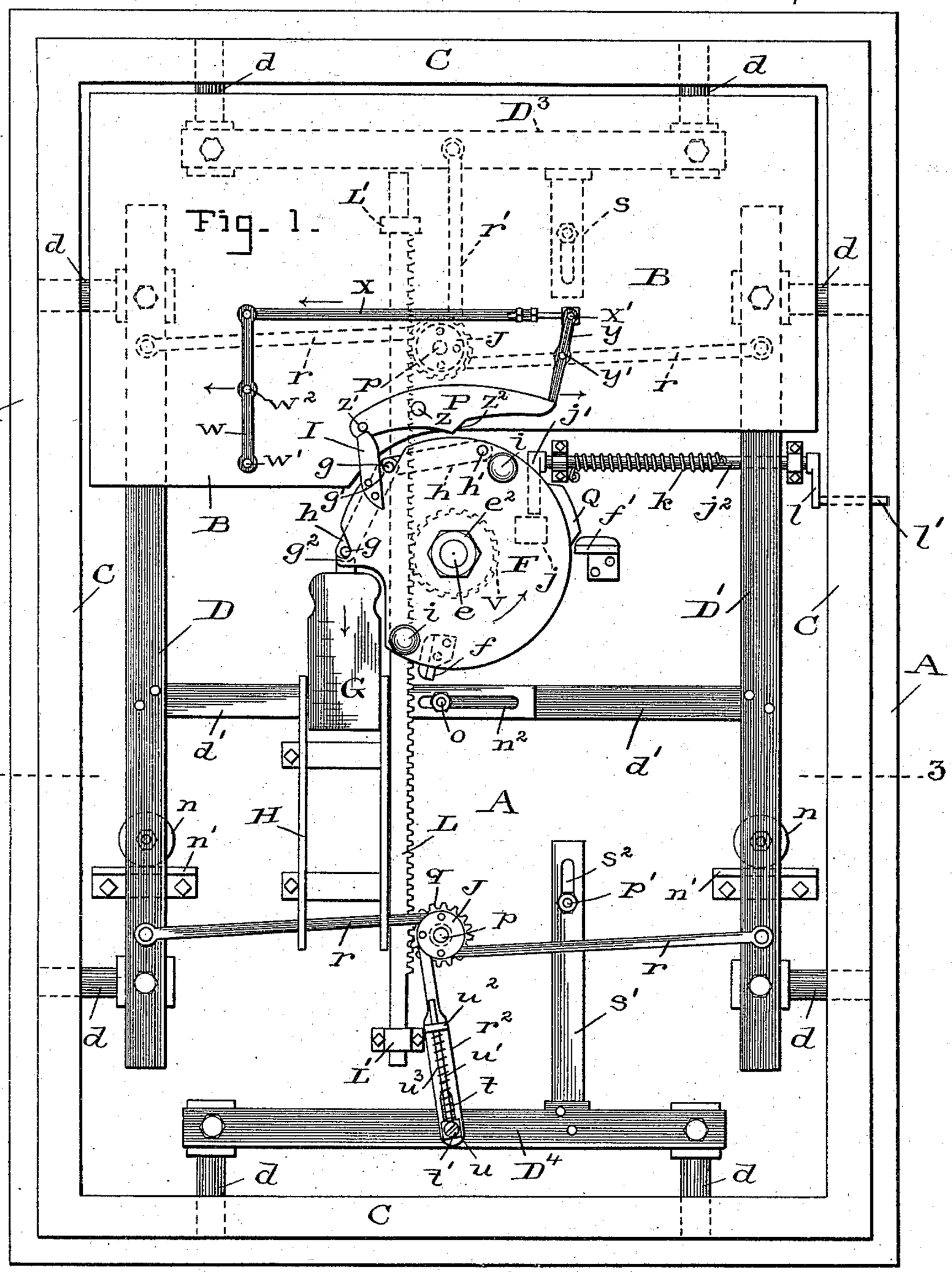
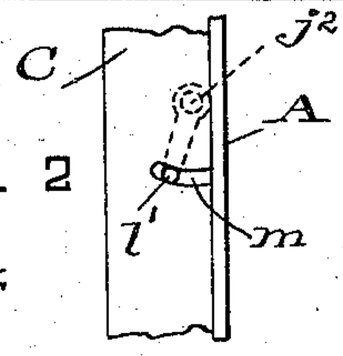



Fig. 2

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(No Model.) 2 Sheets—Sheet 2.

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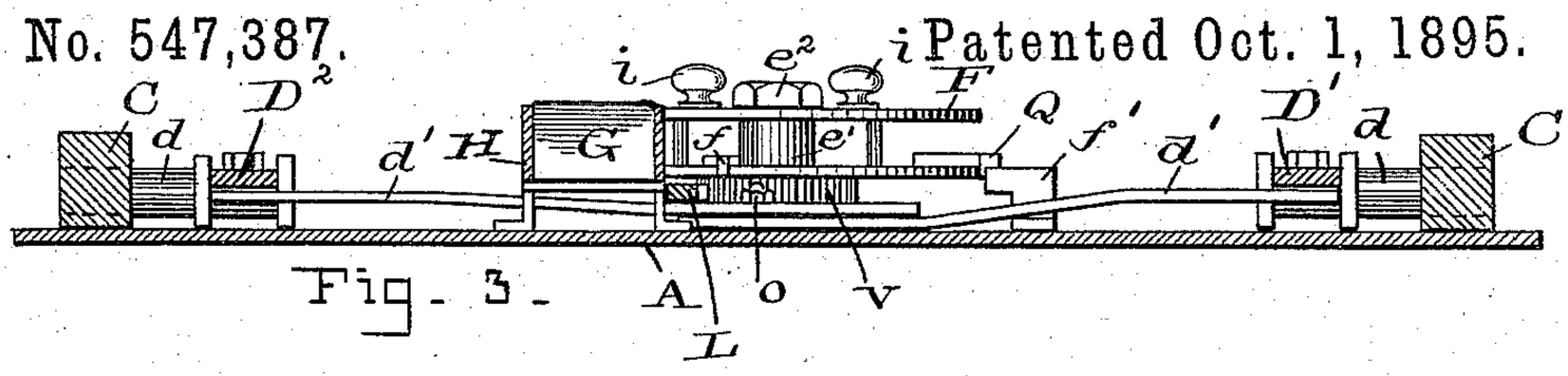


Fig. 3.

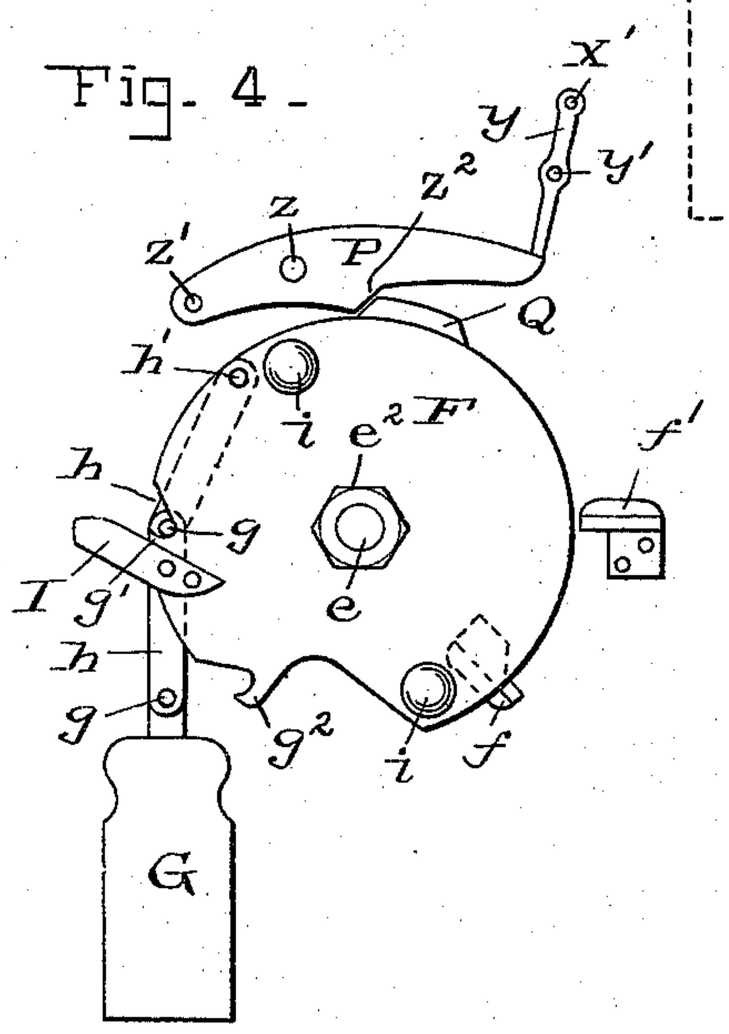


Fig. 4.

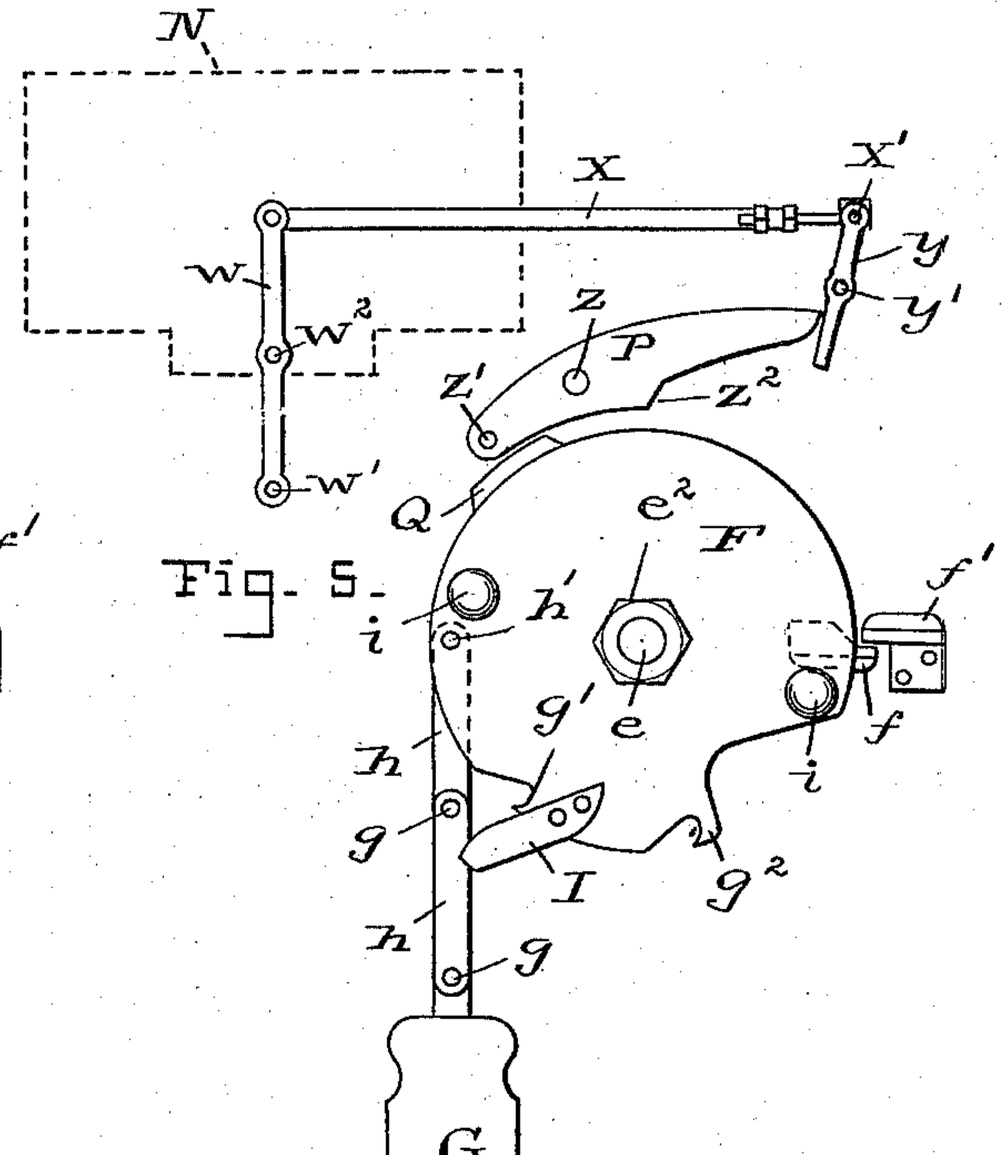


Fig. 5.

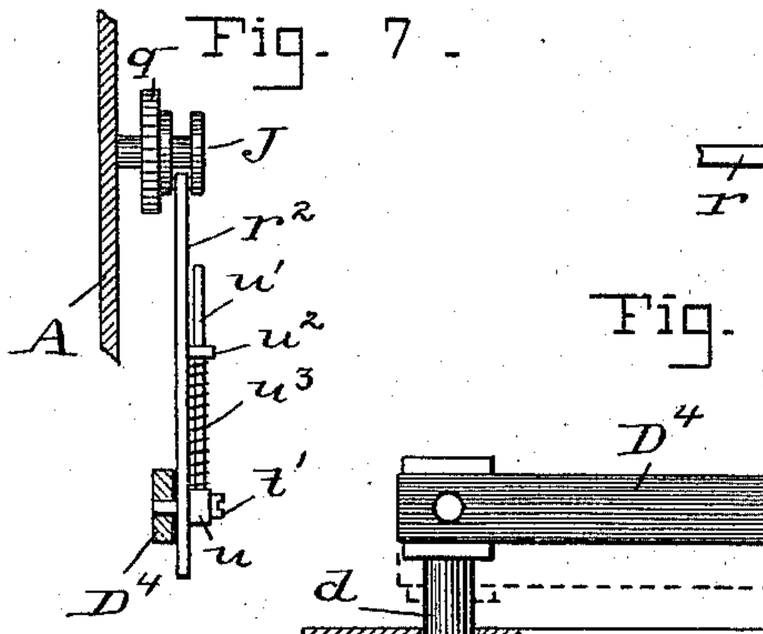


Fig. 7.




Fig. 6.

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# UNITED STATES PATENT OFFICE.

THOMAS TAYLOR, OF BALTIMORE, MARYLAND, ASSIGNOR TO CAROLINE A. MILLER, OF SAME PLACE.

## AUTOMATIC BOLT-WORK FOR SAFES.

SPECIFICATION forming part of Letters Patent No. 547,387, dated October 1, 1895.

Application filed June 8, 1895. Serial No. 552,073. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS TAYLOR, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Automatic Bolt-Work for Safe-Doors, of which the following is a specification.

This invention relates to improved automatic bolt-work for the doors of safes and vaults of that class involving mechanism which when the safe-door is closed will cause the bolts to be moved out to lock the door, and which by the operation of a time-lock will draw back the bolts.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is an inner side view of a door provided with my improved automatic bolt-work. Fig. 2 is an edge view of a portion of the door, and shows the slot through which the end of the crank-arm of the rock-shaft $j^2$ projects. Fig. 3 is a horizontal cross-section of the door on the line 3 3 of Fig. 1, and the parts shown are seen on looking upward. Fig. 4 is another view of the disk and related parts, which are also seen in Fig. 1, showing them in the position they take when the bolts are moved out. Fig. 5 is a view of the same parts seen in Fig. 4, but shows them in the position they take after drawing back the bolts. Fig. 6 is a view of the lower bolt-carrier bar and related parts. Fig. 7 is a vertical transverse view of the bar and parts shown in Fig. 6.

The letter A designates the outside plate of the door; B, the inside plate; C, the solid frame secured to the outside plate and provided with holes through which the bolts $d$ move out and in. The bolts at each vertical edge of the door, as well as those at the top and those at the bottom, are separately mounted—that is, the bolts at the right-hand edge are mounted on a bolt-carrier bar D′, those on the left-hand edge on a similar bar $D^2$, those at the top on a bar $D^3$, (seen in broken lines in Fig. 1,) and those at the bottom on a bar $D^4$. A stud $e$ is rigidly fixed to the outside plate A and projects inward, and a double disk F is mounted thereon, so as to turn back and forth. The two plates composing this double disk are separated by a ring $e'$, (see Fig. 3,) which takes around the stud $e$, and a nut $e^2$ on the end of the stud keeps the disk on. The innermost disk carries a prong $f$, which comes against a stop-block $f'$, fixed on the door-plate A, and prevents further rotation of the double disk. In the present instance this stop-block is shown located on the side diametrically opposite that where the weight is attached, but it is obvious it may be located on the same side. This disk makes a little more than a quarter turn backward and forward. The two plates of the disk have two hooks $g'$ $g^2$, and links $h$, jointed by pins $g$, form a chain which is attached by one end $h'$ in the space between the two plates. The ends of the pins $g$ project and take into the hooks on the disk-plates, as shown in Figs. 1 and 4. A weight G hangs pendent from the free end of the chain. This weight rises and lowers in a vertical guideway H, which is secured to the door-plate A. The outer disk has two knobs $i$, by grasping which the disk may be turned back to raise the weight and set the mechanism, or a crank may be used for this purpose. One of the disks carries a projecting arm I, which serves a purpose to be presently described.

The rear disk-plate has a lug, (shown by the square broken outline $j$,) and a pawl $j'$ on the end of a rock-shaft $j^2$ engages said lug $j$ and thereby holds the disk F and connected parts from action. A torsion-spring $k$ on the rock-shaft tends to keep the pawl $j'$ engaged with said lug. The other end of the rock-shaft $j^2$ has a crank-arm, the right-angled part $l$ of which projects down on the inner side of the solid frame C, and the parallel part $l'$ of which projects through a slot $m$ in said frame. (See Fig. 2.) When the door is closed, this part $l'$ of the crank-arm will strike against the jamb and thereby the rock-shaft $j^2$ will tilt and the pawl $j'$ will be released from the lug $j$, and then the weight G and other parts of the bolt-throwing mechanism will automatically move the bolts out to the locking position.

Each of the side bolt-carrier bars D′ and $D^2$ are provided with a roller $n$, which rests and travels on a bracket $n'$, suitably fixed to the door-plate A. These rollers sustain the weight of the bars and of the bolts $d$ and prevent friction when the bolts move in or out.

A horizontal bar or arm $d'$ is rigidly secured to each of the side bolt-carrier bars D′ and D². These two horizontal bars $d'$ have their ends overlapping each other, and each end has a slot $n^2$. A stud $o$, fixed to the door-plate A, projects through these slots and said stud serves to guide the two arms $d'$ as they move at the time the bolts $d$ are moving.

Two crank-disks J are each pivoted on a stud $p$, secured to the door-plate, and each disk carries a pinion $q$. One of these disks is located near the lower part of the door and the other near the upper part. A rod $r$ connects each side bolt-carrier bar D′ D² with the lower crank-disk J, and similar rods at the top crank-disk also connect with said side bars. A vertical rack-bar L moves up and down in guides L′ and passes back of the disk F. This rack-bar meshes with both of the crank-disks J and turns them so that when the latter are turned one way the preliminary down-traverse of the rack-bar will move out the side bolts $d$, and then when the further down traverse takes place said crank-disks are further turned to retract said side bolts. The top crank-disk J also has a rod $r'$, (seen in broken lines,) which connects it with the top bolt-carrier bar D³, and said bar has a rigid guide-plate $s$. (Shown in broken lines.) The bottom bolt-carrier bar D⁴ has a guide-plate $s'$ with a slot $s^2$, through which a stud $p'$ projects. This bottom bar D⁴ and its bolts $d$ are connected with the lower crank-disk J in a different manner from either of the other bolt-carrier bars, as follows: A rod $r^2$ has one end connected with the crank-disk J, and the other end has a longitudinal slot $t$, and a screw $t'$, fixed on the bar D⁴, passes through said slot. By this construction when the disk J turns one way the rod $r^2$ will lift the lower bar D⁴ and retract its bolts, but when said disk turns the other way the slot $t$ in the rod $r^2$ will allow said rod to push downward freely without pressing down the lower bar D⁴, and thus the lower bar and its bolts are free to move down simply by their own gravity. The advantage of this special connection between the lower bar D⁴ and the crank-disk J is that in case any obstruction should accidentally get into the lower bolt-holes of the door-jamb, and thereby hinder the lower bolts $d$ from moving down into said holes, such hinderance would not prevent the other bolts at the sides and top from properly moving out. The said screw $t'$ holds a head $u$, from which a rod $u'$ projects upward and passes loosely through a guide $u^2$ fast on the rod $r^2$. A spiral spring $u^3$ is around the rod, and is compressed between the head $u$ and guide $u^2$. This spiral spring assists the down movement of the lower bar D⁴ in case its gravity is insufficient.

The rear plate of the double disk F has a pinion $v$, which meshes with the rack-bar L, and consequently when the disk F is turned in one direction by the action of the weight G, the rack-bar L moves downward and the bolts are all thrown or moved out. When the disk is turned by an operator in the opposite direction, the rack-bar L is lifted and all the bolts are first moved out and then at once retracted, leaving the mechanism set for re-locking.

All parts of the mechanism have now been described except that which connects between the time-lock N and the disk F. The time-lock to be employed in this class of devices is well known. A lever $w$ is pivoted at its lower end $w'$ to the inner plate B, and its upper end is jointed to a rod $x$, which is also jointed at $x'$ to a trip-lever $y$, which latter is centrally pivoted at $y'$ on the inside plate. The center $w^2$ of the lever $w$ connects with the trigger or bolt of a time-lock. A set-lever P has a pivot $z$ intermediate of its ends, which secures it to the inside plate B. One end of this set-lever engages the free end of the trip-lever $y$, as in Fig. 1, when the mechanism is set, and also, as in Fig. 4, when the bolts are moved out. The opposite end of the set-lever P has a pin $z'$, which projects toward the front, and the lower edge has an angle-point $z^2$. The arm I on the disk comes up under the said pin $z'$ on the set-lever, as seen in Fig. 1, when the weight is entirely up and the mechanism is set. This arm I insures that the other end of the set-lever P shall be tilted so as to engage with the trip-lever $y$. The disk F has a curved lug Q, with beveled ends. At the time the bolts are moved out the disk takes the position seen in Fig. 4, with this lug Q in contact with the angle-point $z^2$ on the set-lever P, and said angle-point stops the further rotation of the disk, thus keeping the bolts in the locked position. The bolts will remain in this locked position until the arrival of the hour at which the time-lock acts. When that moment arrives, the time-lock trigger or bolt will draw the lever $w$, the effect of which will be to tilt the trip-lever $y$, and its free end, which engages the set-lever P, as in Figs. 1 and 4, will thereupon be disengaged, as seen in Fig. 5, and the weight G will then turn the disk F, as in Fig. 5, and retract the bolts and allow the door to be opened.

It is obvious that variations and modifications may be made in the construction without departing from the invention.

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

1. In an automatic bolt-throwing mechanism, the combination of the four sets of bolts, namely, those at the two vertical edges of the door, the top of the door and bottom of the door, each set being mounted on a separate and independently-movable carrier-bar, D′, D², D³, D⁴; two crank disks; three rods connecting from each disk to the said carrier bars; a horizontal arm, $d'$, rigidly secured to each of said two vertical side carrier bars and the ends of said two arms overlapping each other but unconnected; a guide for said two arms;

a disk, F, turning on a stud; a weight suspended from the disk; and connections between the said disk and the two crank-disks.

2. In an automatic bolt-throwing mechanism, the combination of the four sets of bolts, namely, those at the two vertical edges of the door, the top of the door and bottom of the door, each set being mounted on a separate and independently-movable carrier-bar, D′, $D^2$, $D^3$, $D^4$; a disk, F, turning on a stud and provided with a lug; a rock-shaft carrying at one end a crank arm to strike against the jamb of the door and at the other end carrying a pawl, $j'$, to engage with the said lug on the disk; a chain to wind on said disk; a weight suspended by the chain; and mechanism connecting the disk and said four separately movable carrier bars.

3. In an automatic bolt-throwing mechanism, the combination of the four sets of bolts, namely, those at the two vertical edges of the door, the top of the door and bottom of the door, each set being mounted on a separate and independently-movable carrier bar, D′, $D^2$, $D^3$, $D^4$; crank disks connected by means of rods with said separately-movable carrier bars and each crank disk carrying a pinion; a disk, F, turning on a stud and provided with a pinion, and also a chain; a movable rack bar connecting the said crank disks and chain disk; and a weight attached to the chain.

4. In an automatic bolt throwing mechanism, the combination of the four sets of bolts, namely, those at the two vertical edges of the door, the top of the door and bottom of the door, each set being mounted on a separate and independently-movable carrier bar, D′, $D^2$, $D^3$, $D^4$; crank disks connected positively by means of rods with the two side carrier bars, D′, $D^2$, and the top carrier bar, $D^3$, so as to impart both outward and retracting movement to the bolts attached to said bars; and a connection between one of said crank disks and the bottom carrier bar, $D^4$, which will merely lift said bar to retract its bolts but will not press said bar down leaving it free to move down or not move down, when all the other bolts are thrown out.

5. In an automatic bolt-throwing mechanism, the combination of a disk, F, turning on a stud and having a lug, Q, and also an arm, I; a weight suspended from the said disk; a set lever, P, mounted above the disk and having at its lower edge an angle-point which contacts with the said lug on the disk when the latter turns to move the bolts out, and also provided at one end with a pin, $z'$, with which the said arm on the disk engages when the weight is entirely up; a trip-lever which engages one end of said set-lever when the mechanism is set; a time lock; and connections between said trip lever and the bolt of the time lock.

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

THOMAS TAYLOR.

Witnesses:

CHARLES B. MANN, Jr.,

C. CALVERT HINES.