No. 730.593. PATENTED JUNE 9, 1903.

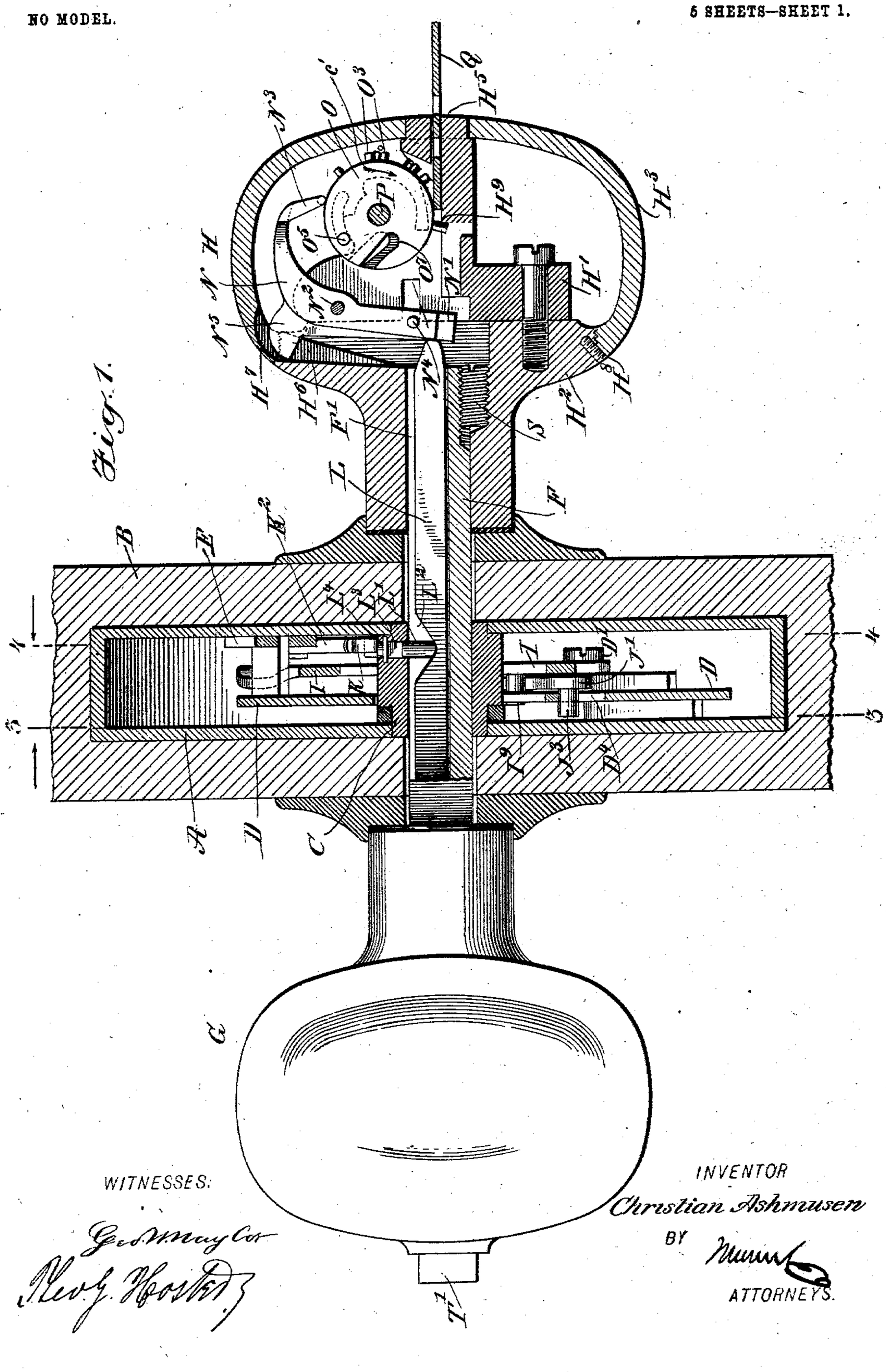
C. ASHMUSEN.

DOOR LOCK.

APPLICATION FILED DEC. 17, 1902.

NO MODEL. 5 SHEETS—SHEET 1.

Fig. 1.



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No. 730,593. PATENTED JUNE 9, 1903.

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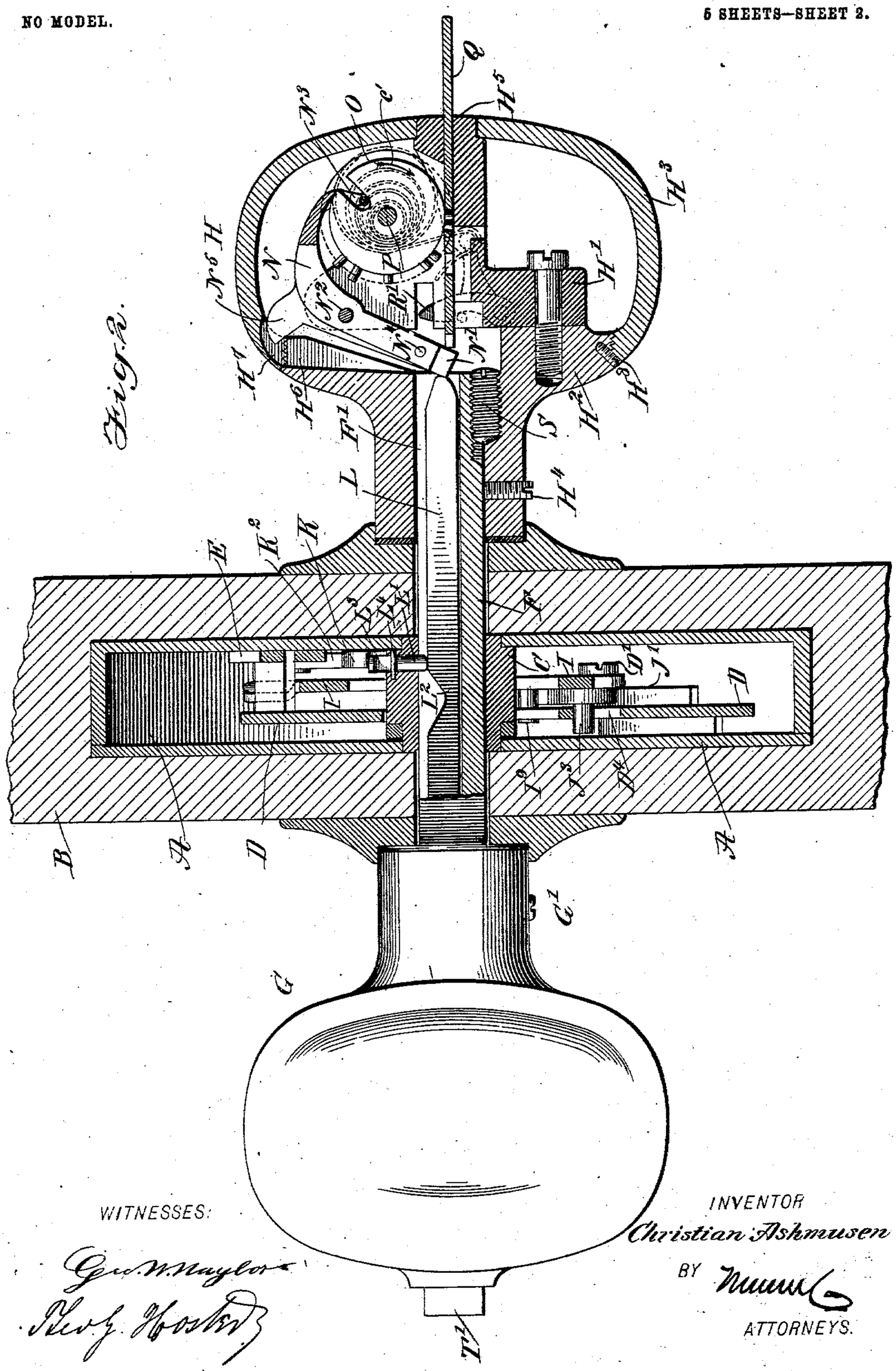
NO MODEL. 5 SHEETS—SHEET 2.

Fig. 2.



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NO MODEL. 5 SHEETS—SHEET 3.

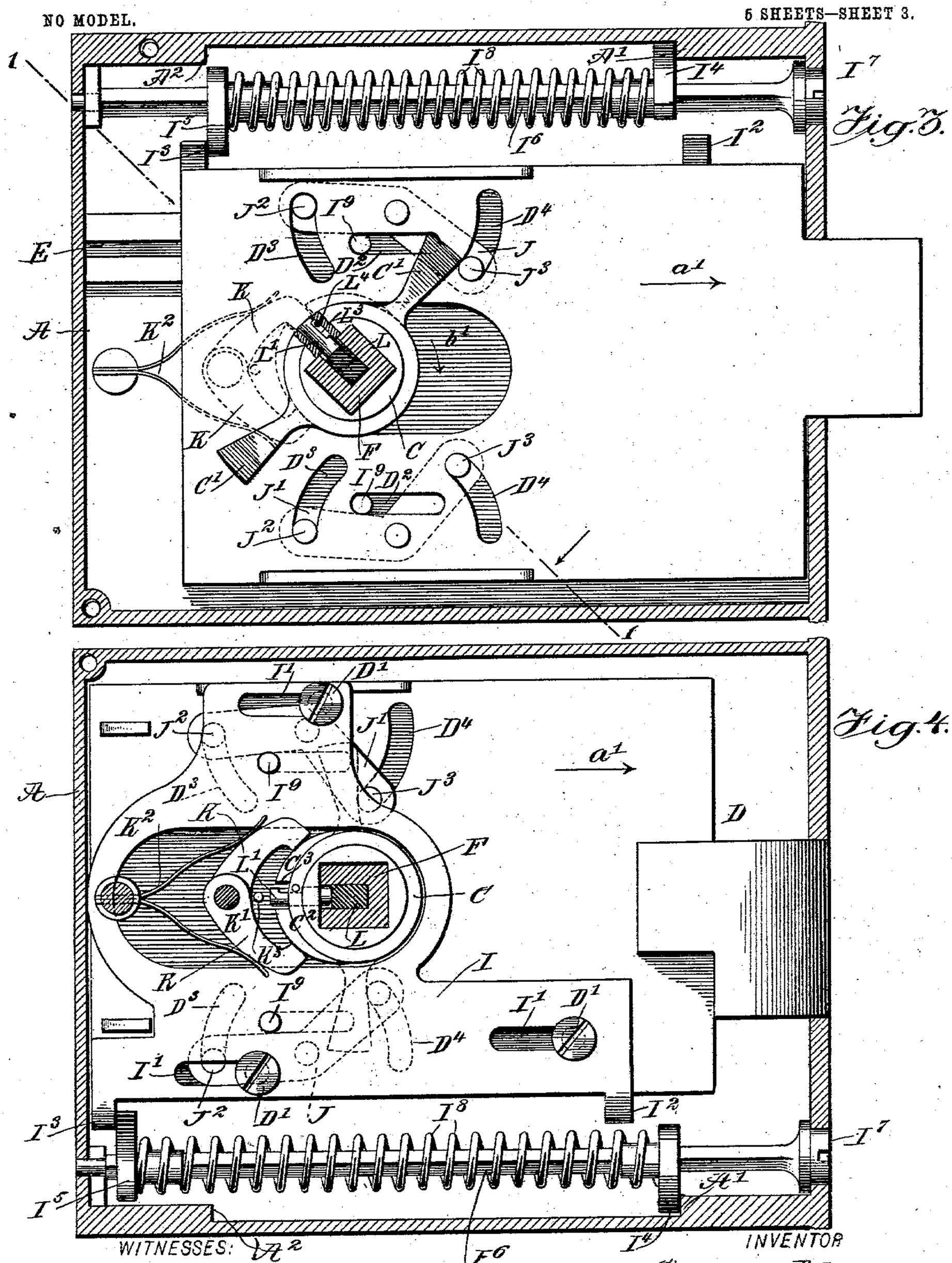

Fig. 3.

Fig. 4.

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NO MODEL. 5 SHEETS—SHEET 4.

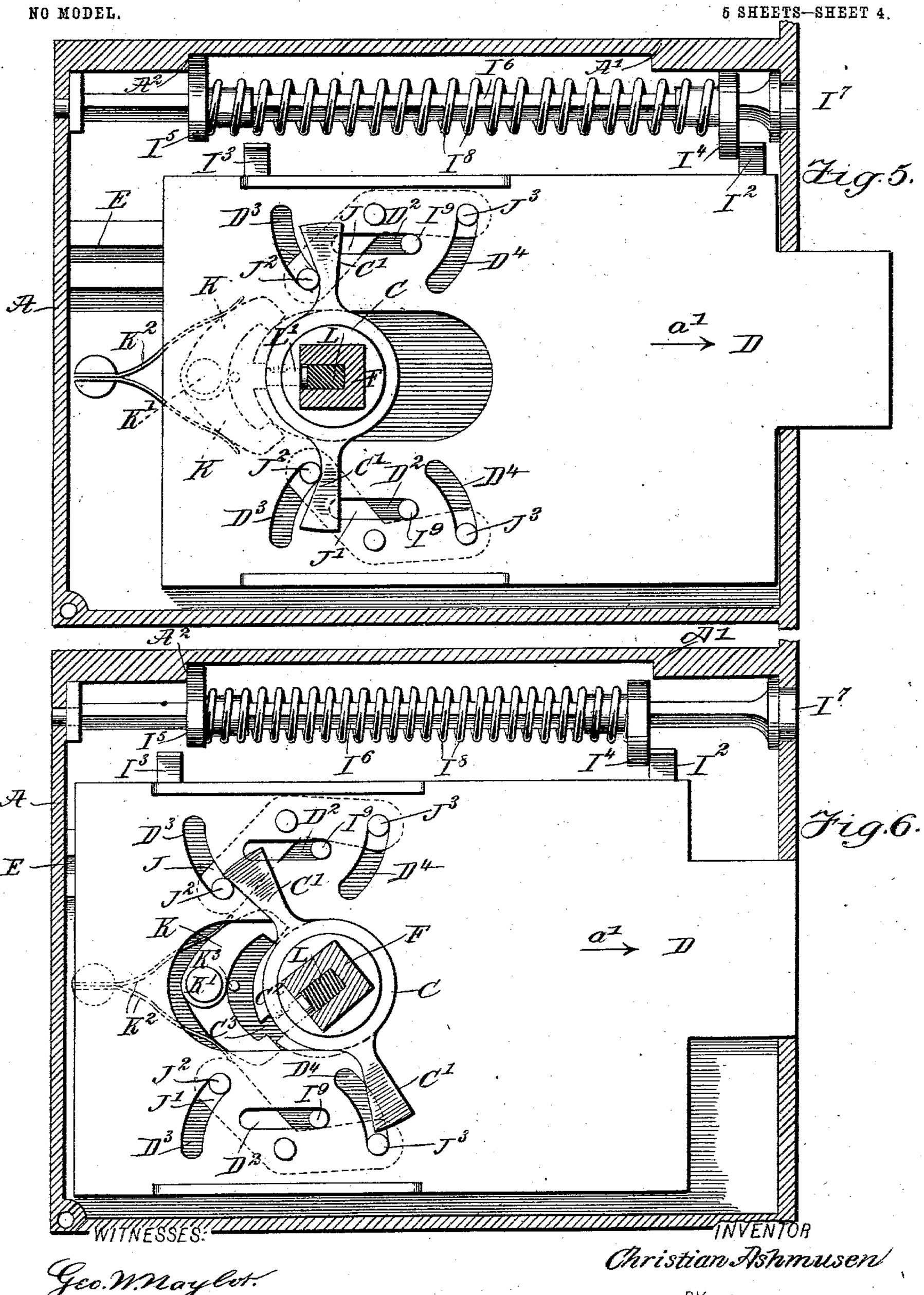

Fig. 5.

Fig. 6.

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NO MODEL. 5 SHEETS—SHEET 5.

Fig. 7.

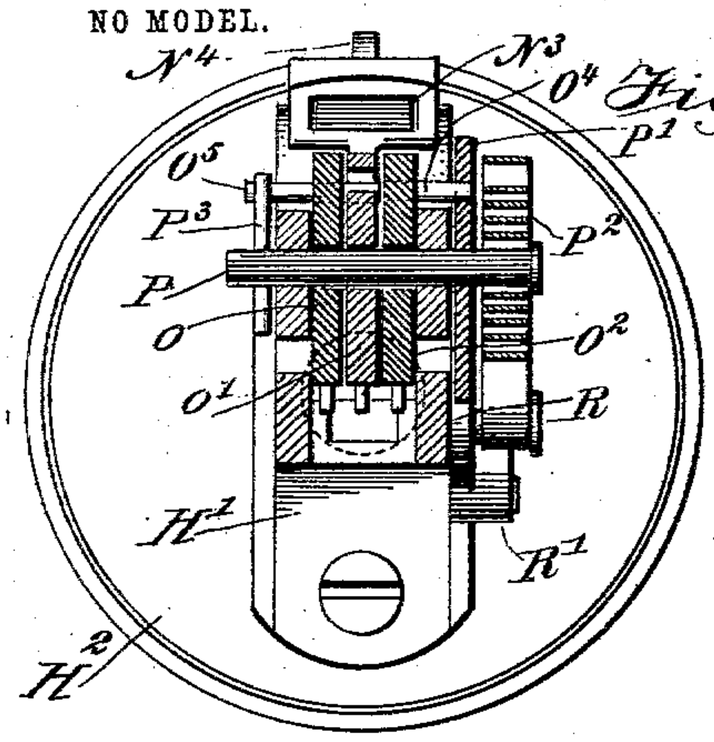


Fig. 8.

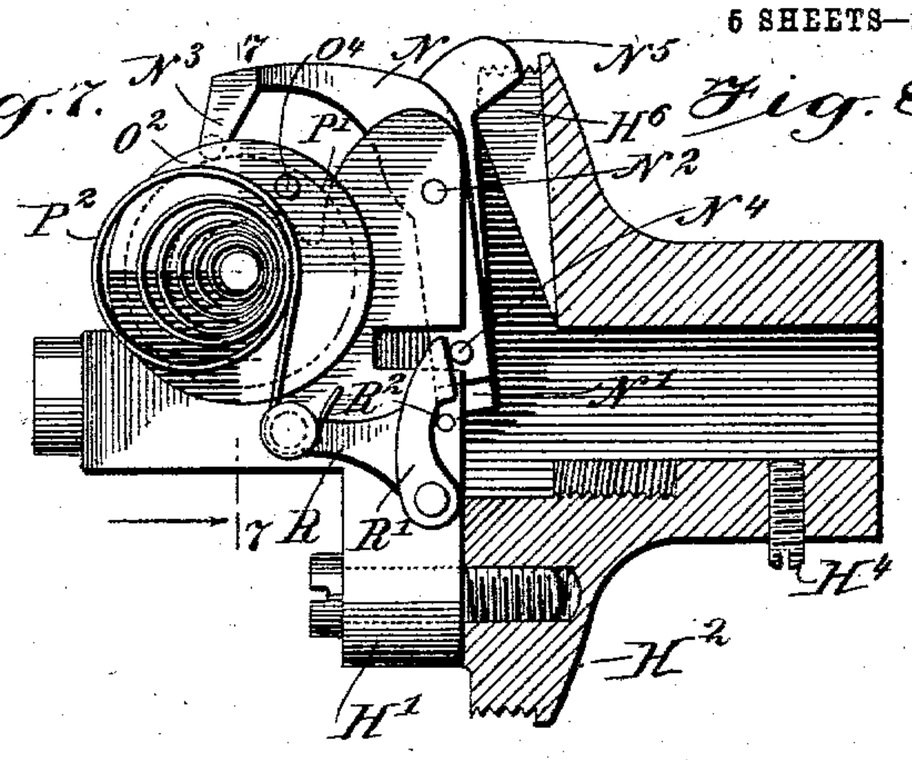


Fig. 9.

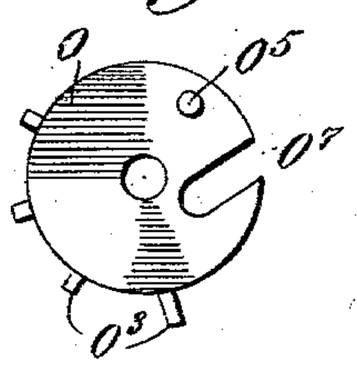


Fig. 10.

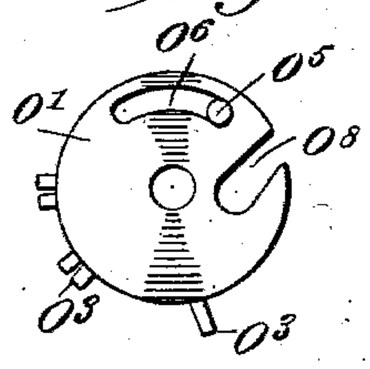


Fig. 11.

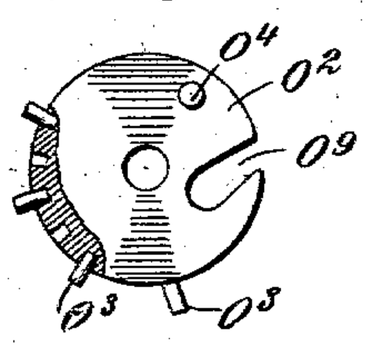


Fig. 12.

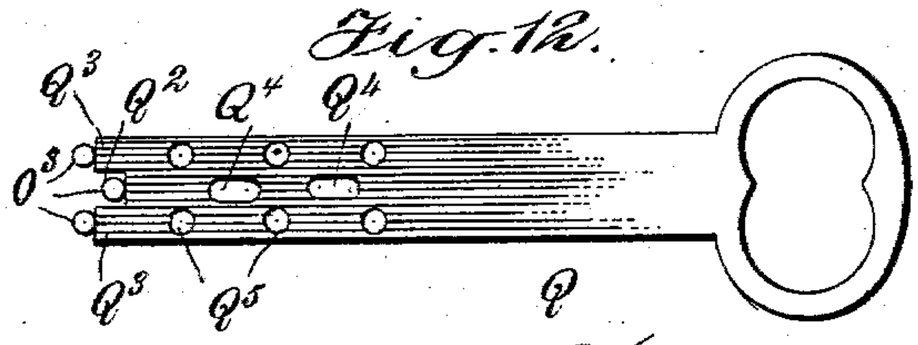


Fig. 13.

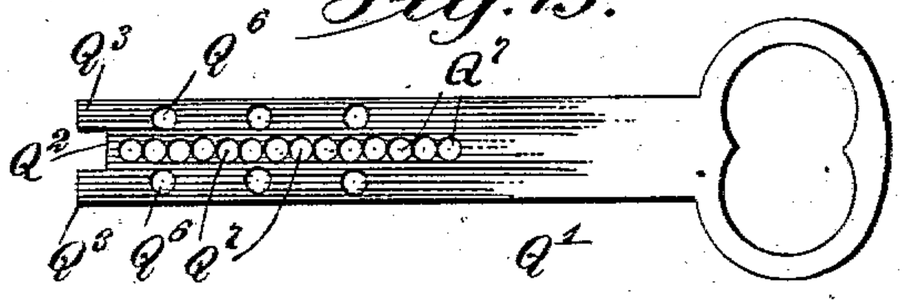


Fig. 12a.

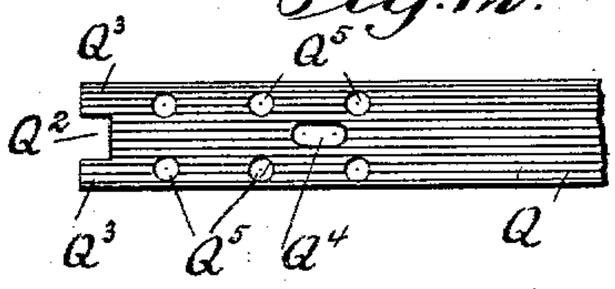
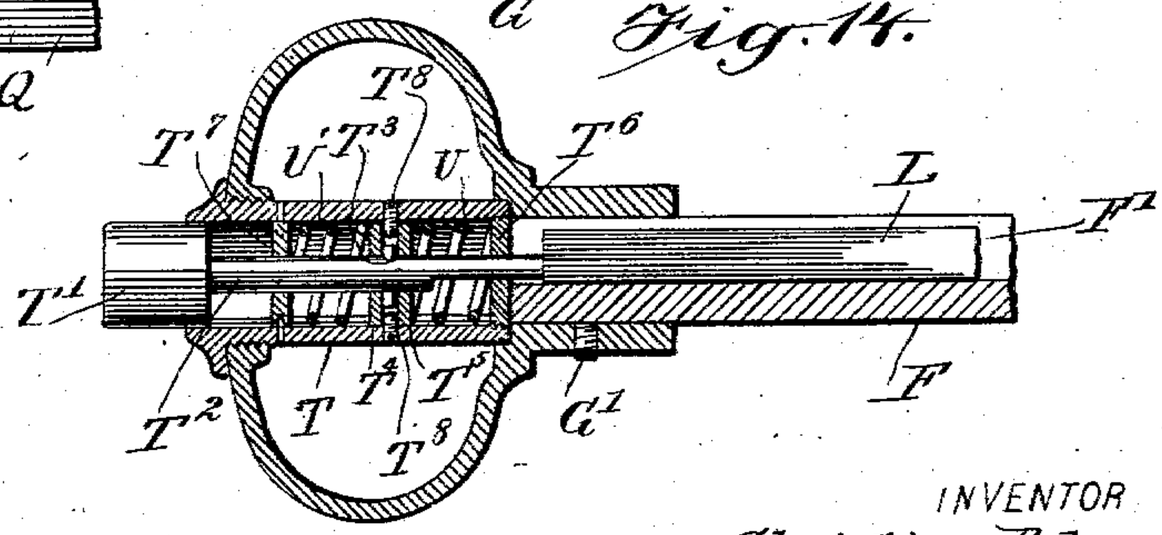


Fig. 14.



WITNESSES:

Geo. W. Naylor.

Rud. J. Hoosten

INVENTOR

Christian Ashmusen

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ATTORNEYS.

No. 730,593. Patented June 9, 1903.

UNITED STATES PATENT OFFICE.

CHRISTIAN ASHMUSEN, OF KINGS PARK, NEW YORK.

DOOR-LOCK.

SPECIFICATION forming part of Letters Patent No. 730,593, dated June 9, 1903.

Application filed December 17, 1902. Serial No. 135,472. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN ASHMUSEN, a citizen of the United States, and a resident of Kings Park, in the county of Suffolk and State of New York, have invented a new and Improved Door-Lock, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved door-lock which can be readily changed from a spring-lock to a dead-lock, and vice versa, is not liable to be opened or tampered with by unauthorized persons or unscrewed to give access to the mechanism, and arranged with the lock mechanism contained in the door-knob and adapted to be unlocked either from the outside by a key inserted in the outer door-knob or from the inside by a push-button on the inner door-knob.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a transverse section of the improvement on the line 1 1 of Fig. 3, showing the parts in a locked position. Fig. 2 is a similar view of the same, showing the parts in an unlocked position. Fig. 3 is a longitudinal sectional elevation of the same on the line 3 3 of Fig. 1, showing the lock as a key-controlled dead-lock, the main bolt being in an extended locking position. Fig. 4 is a similar view of the same on the line 4 4 of Fig. 1, showing the main bolt in a withdrawn position. Fig. 5 is a like view of the improvement, showing the parts adjusted to form a spring-lock, the main bolt being in an outermost locking position. Fig. 6 is a similar view of the same, showing the main bolt in an unlocked position on turning either the inner or outer knob. Fig. 7 is a longitudinal sectional elevation of the combined lock mechanism in the outer door-knob, the section being on the line 7 7 of Fig. 8, part of the knob-shell being removed. Fig. 8 is a side elevation of the same, part of the knob-shell being shown in section. Figs. 9, 10, and 11 are face views of the roller-tumblers. Figs. 12 and 12^a are face views of regular keys. Fig. 13 is a similar view of a master-key, and Fig. 14 is a transverse section of the inner door-knob and its mechanism for unlocking the door-knob from the inside of the door.

The casing A of the door-lock is secured in the usual manner to the door B, and in the front and rear plates of the casing is mounted to turn a cam-hub C, carrying a cam C′, extending in opposite directions and adapted to manipulate the main bolt D, mounted to slide in suitable guideways E, arranged on the casing, the said main bolt being adapted to engage the usual keeper (not shown) in the door-casing. The square bore of the cam-hub C is engaged by the correspondingly-shaped spindle F, carrying an inner door-knob G and an outer door-knob H.

On one side of the main bolt D, within the casing A, is mounted a sliding plate I, having elongated slots I′, engaged by bolts D′ on the bolt D to limit the forward and backward movement of the sliding plate I on the bolt and to carry the bolt along, as hereinafter more fully described. On the upper edge of the sliding plate I are formed spaced lugs I^2 and I^3, adapted to be engaged by cams I^4 and I^5, respectively, of which the cam I^4 stands in an opposite direction to the cam I^5, and the said cams are secured on a shaft I^6, mounted to turn in suitable bearings in the front and rear ends of the casing A. The cams I^4 and I^5 are mounted to slide lengthwise on the shaft I^6, but are held against turning thereon by moving on a polygonal portion thereof, as plainly indicated in the drawings.

The forward end of the shaft I^6 is provided with a slotted head I^7, reaching to the outer face of the front end of the casing, to permit the application of a screw-driver or other tool on the said head I^7 to turn the shaft I^6 for setting the door-lock either as a dead-lock, as shown in Figs. 3 and 4, or as a spring-lock, as shown in Figs. 5 and 6. In the former case the cam I^4 is in an inactive position—that is, out of alinement with its lug I^2—while the cam I^5 is in an active position in engagement with its lug I^3. When the door-lock is set for a spring-lock, then the cam I^5 is in inactive position out of engagement with the lug I^3, while the cam I^4 is then in active position in engagement with its lug I^2. A spring I^8 is

coiled on the shaft I^6 and presses against the cams I^4 and I^5 to hold the same against shoulders A′ and A^2, formed on the inside of the door-casing, as plainly indicated in the drawings—that is, the cam I^4 engages the shoulder A′ when in an inactive position, but is out of engagement with the said shoulder when in an active position. The cam I^5 abuts against the shoulder A^2 when in an inactive position, (see Figs. 5 and 6,) but is out of engagement with the shoulder when in an active position, as shown in Figs. 3 and 4.

Now when the lock is in a dead-lock position, as shown in Figs. 3 and 4, the spring I^8 holds the cam I^5 with considerable force against the lug I^3 to move the sliding plate I into a rearward position on the bolt D, and consequently tends to move the bolt rearwardly into a withdrawn or unlocked position, as shown in Fig. 4.

When the lock is changed to a spring-lock, on giving the shaft I^6 a half-turn then the spring I^8 presses the cam I^4 against the lug I^2 to move the sliding plate I into a forward position on the bolt D and holds the latter in a shot-out or locked position, as plainly indicated in Fig. 5.

To set the lock from a dead-lock (shown in Figs. 3 and 4) to a spring-lock, (shown in Figs. 5 and 6,) the bolt D must be held projected while the shaft I^6 is turned, and to set it from a spring-lock to a dead-lock the bolt D must be held withdrawn while the shaft I^6 is turned.

The sliding motion of the sliding plate I is limited by pins I^9, secured on the sliding plate and projecting into elongated slots D^2, formed in the main bolt D, so that the sliding plate carries the bolt D along whenever the pins I^9 reach the ends of the slots D^2, and the sliding plate is moved still farther in the same direction either by the action of the spring I^8 or by operating the knob G or H, as hereinafter more fully described.

On the inner face of the main bolt D and at opposite sides of the spindle F are fulcrumed bell-crank levers J and J′, provided on the free ends of their arms with pins J^2 and J^3, projecting into segmental slots D^3 and D^4, formed on the bolt D. The pins J^2 and J^3 of the bell-crank levers J and J′ project slightly beyond the face of the bolt D for engagement by the cam C′ of the cam-hub C to move the sliding plate and with it the bolt D for manipulating the lock, as hereinafter more fully described.

Now when the lock is in a dead-lock position and it is desired to move the bolt D outward in the direction of the arrow *a′* then the operator on turning either knob G or H in the direction of the arrow *b′* causes the upper cam C′ to act on the pin J^3 of the bell-crank lever J, and when the knob is turned in the opposite direction then the lower cam C′ acts on the pin J^3 of the lower bell-crank lever J′ to move the bolt D in the direction mentioned. Thus on turning either knob in either direction the bolt D is shot out into a locking position. When the lock is in a spring-lock position, as shown in Figs. 5 and 6, then the position of the bell-crank levers J and J′ is reversed—that is, the pins J^2 thereof are now in an active position relative to the cam C′—so that on turning either knob in either direction the bolt D is moved in the inverse direction of the arrow *a′* into a withdrawn or unlocking position, and as soon as the pressure on a knob is released the spring I^8 forces the parts back to a normal locking position, as shown in Fig. 5.

It is understood that when the shaft I^6 is given a half-turn for changing the lock from a dead-lock to a spring-lock, and vice versa, then the pressure exerted by the spring I^8 on the sliding plate I causes the latter to slide lengthwise on the bolt D, and in doing so the pins I^9 act on the arms of the bell-crank levers J to swing the same into the position shown in Figs. 3 and 4 or into that shown in Figs. 5 and 6.

In order to hold the main bolt D in a shot-out or locking position against the tension of the spring I^8, as shown in Fig. 3, the following device is provided: On the hub C is formed a cam C^2, formed with a notch C^3, and on the peripheral face of the said cam C^2 ride the free ends of pawls K, fulcrumed on a pin K′, attached to the casing A, and the said pawls are held in contact with the cam C^2 by springs K^2, and the swinging motion of the pawls toward each other is limited by a stop-pin K^3, attached to the casing A. Now when the several parts are in the position shown in Fig. 3 then the free end of one of the pawls engages the notch C^3 to hold the hub C against turning, it being understood that if the hub had been turned in the inverse direction of the arrow *b′* then the other pawl K would have engaged the notch C^3 to hold the hub C against turning. It is evident that when a pawl K engages the notch C^3 the hub is held against turning—that is, the cams C′ are held in position either against the pin J^3 of the bell-crank lever J or against the pin J^3 of the other bell-crank lever J′ to prevent return movement of the bolt D—as long as the pawl K is in engagement with the notch C^3.

In order to move the pawl engaged with the notch C^3 out of engagement therewith, a pin L′ is provided, mounted to slide radially in the hub C to project into the notch C^3, and the inner end of the said pin L′ engages the inner edge of a bar L, mounted to slide longitudinally in the recess F′ of the spindle F. The edge of the bar L engaged by the pin L′ is formed with a V-shaped recess L^2 for the inner end of the pin L′ to drop in (see Fig. 1) on shifting the bar L lengthwise in the spindle F and for moving the pin L′ outward to project into the notch C^3 when the bar L is moved into the position shown in Fig. 2.

The sliding motion of the pin L′ is limited by a stop-pin L^4, secured to the casing A and

extending into a recess L^3, formed in one side of the pin, as plainly indicated in Figs. 1, 2, and 3.

Now when the bar L is in the position shown in Fig. 1 then the pin L′ is in an innermost position—that is, with its outer end out of the notch C^3 to allow the free end of either pawl K to drop into the said notch on turning the spindle F and with it the hub C. When the bar L is shifted to the position shown in Fig. 2, then the pin L′ is moved into an outermost position—that is, extends into the notch C^3 to prevent the free ends of the pawls K from dropping into the notch on turning the spindle F and with it the hub C. Now this bar L is controlled at its outer end from a key-lock mechanism arranged within the hollow outer knob H, and the inner end of the said bar L is adapted to be engaged by a push-button mechanism arranged in the inner knob G.

The key-lock mechanism in the hollow outer knob H is arranged as follows: The forward end of the bar L is in contact with the lower end N′ of a lever N, fulcrumed at N^2 on a bracket H′, secured to the face of an outer knob-section H^2, on which screws a knob-section H^3, as plainly indicated in Figs. 1 and 2, the said inner knob-section H^2 being fastened by a set-screw H^4 to the spindle F. The forward end of the lever N is in the form of a depending loop N^3, normally in engagement with the peripheral surfaces of roller-tumblers O, O′, and O^2, mounted to rotate loosely on a spring-actuated shaft P, journaled in suitable bearings arranged on the bracket H′. The roller-tumblers O, O′, and O^2 are provided on their peripheral faces with radially-disposed tumbler-pins O^3, adapted to be engaged by a key Q or a master-key Q′ to allow of turning the roller-tumblers, as hereinafter more fully described. The roller-tumbler O^2 is provided on its outer face with a pin O^4, (see Figs. 7, 8, and 11,) engaging a disk P′, secured on a shaft P, on which is fastened the inner end of a helical spring P^2, secured on its outer end on a lug R, projecting from an arm R′, pivoted to the bracket H′ and adapted to be engaged by a pin N^4, arranged on the lower end N′ of the lever N. Normally the arm R′ abuts against a stop-pin R^2, secured on the bracket H′, as indicated in Fig. 8. On the roller-tumbler O is secured a pin O^5, projecting from both faces of the tumbler, to engage with its outer end a pin P^3 on the shaft P and on the inner end an elongated slot O^6, formed in the roller-tumbler O′. (See Figs. 7 and 10.) The roller-tumblers O, O′, and O^2 are formed with notches O^7, O^8, and O^9, adapted to be engaged by the loop N^3 of the lever N at the time the notches are in register with each other, and the roller-tumblers O, O′, and O^2 are moved into the position shown in Fig. 2 by the insertion of the key Q or Q′ through a keyhole H^5, formed in the forward end of the bracket H′, the keyhole portion of the bracket fitting the opening in the middle of the outer knob-section H^3, as indicated in the drawings. It is understood that the tumbler-pins O^3 are so arranged in the roller-tumblers O, O′, and O^2 that when the proper key Q or Q′ is inserted in the keyhole H^5 and pushed rearward then the key turns the roller-tumblers to finally bring their notches O^7, O^8, and O^9 in register with each other and in register with the loop N^3, so that the latter can swing down into the said notches on the inner end of the key, engaging the end N′ and imparting a swinging motion to the lever N. Now when this takes place the end N′ pushes the bar L inwardly to the position shown in Fig. 2, so that the pin L′ rides up the forward wall of the notch L^2 to pass into the notch C^3, to disengage the corresponding pawl K from the said notch, to unlock the hub C from the position shown in Fig. 3, and thereby allow the spring I^8 to move the bolt D inwardly into the unlocking position shown in Fig. 4. Now when the roller-tumblers O, O′, and O^2 are rotated by the action of the key Q, as described, then the pins O^4 and O^5, acting on the disk P′ and the pin P^3, respectively, rotate the shaft P, so as to wind up the spring P^2, and as soon as the operator releases the pressure on the key then the spring rotates the shaft P in the opposite direction, and by the disk P′ and pin P^3 engaging the pins O^4 and O^5 the roller-tumblers are returned to their former position, and the lever N is caused to swing to its previous position by the action of the spring device in the inner knob G acting on the bar L. Thus the several parts are returned to their normal position (shown in Fig. 1) as soon as the pressure on the inserted key Q is released.

It is understood that the key Q or Q′ is formed with openings and shoulders, as indicated in the drawings, to act as a rack on the pins O^3 to rotate the roller-tumblers, as previously explained, and when the pressure on the key is released the roller-tumblers move the key outward by the action of the previously-wound-up spring P^2, so that the key is automatically returned to an outermost position.

As shown in Fig. 12 and Fig. 12^a, the key Q is formed at its forward end with a notch Q^2 for engagement with the pin O^3 of the middle roller-tumbler O′, the notch forming shoulders Q^3 for engagement with the first pins O^3 of the roller-tumblers O and O^2. In alinement with the notch Q^2 are spaced elongated slots or openings Q^4 for engagement with the following pins O^3 of the roller-tumbler O′, and apertures Q^5 are arranged in alinement with the shoulders Q^3 for engagement with the pins O^3 of the roller-tumblers O and O^2.

For forming different combinations in the key-lock the pins O^3 in the roller-tumblers O, O′, and O^2 may be inserted in different apertures to change the combination of the lock, it being understood that the slots Q^4 and apertures Q^5 for the key Q are similarly changed, according to the position of the pins.

In the master-key Q′ the apertures Q^6 correspond to the apertures Q^5 in the regular key; but the middle row of apertures Q^7 has the apertures arranged one alongside the other to fit all combinations of pins O^3. The middle roller-tumbler O′ allows of opening a series of locks with the same master-key—that is, locks in which the pins O^3 of the middle roller-tumbler are changed—while the pins O^3 of the outside roller-tumblers are all alike.

It is expressly understood that I do not limit myself to the number of roller-tumblers employed, as the same may be varied—that is, increased or decreased in number—and the keys Q Q′ changed correspondingly.

The first pins O^3 in the roller-tumblers O, O′, and O^2 are somewhat longer than the following ones, so that the said first pins abut against a shoulder H^9, formed on the bracket H′, to limit the return movement of the said roller-tumblers when the key Q or Q′ is withdrawn. (See Fig. 1.)

On the lever N is formed a lug N^5, adapted to swing into registering notches H^6 and H^7, formed on the inside and at the screw-joint of the sections H^2 and H^3 of the outer door-knob H, to prevent the section H^3 from being unscrewed from the section H^2 unless a swinging motion is first given to the lever N on the outward movement of the bar L, so that the lug N^5 moves out of engagement with the notches H^6 and H^7, and thereby permits unscrewing of the section H^3 from the section H^2. A screw H^8 is screwed into the screw-joint of the sections H^2 and H^3 from the outside (see Figs. 1 and 2) to normally lock the sections H^2 and H^3 together; but in case the screw H^8 is unscrewed and removed the section H^3 cannot be unscrewed from the section H^2 by an unauthorized person, as the lug N^5, engaging both notches H^6 and H^7, prevents such unscrewing movement.

The spindle F is lengthwise adjustable in the knob-section H^2 by means of a screw S, engaging screw-threads formed half-way in the spindle F and half-way in the knob-section H^2, the threads in the spindle being somewhat longer than the screw, so that on turning the latter in the threads of the section H^2 the spindle is moved lengthwise in the knob-section, either inward or outward, according to the direction in which the screw S is turned. It is understood that access is had to the screw S only when the section H^3 is removed from the section H^2.

By the arrangement described the knobs G and H and the spindle can be readily adjusted to properly fit the thickness of the door B on which the door-knob is applied.

The inner knob G is secured by a screw G′ to the spindle F, and in this door-knob is arranged a fixed transverse tube or barrel T, in which is fitted a push-button T′, having the inner end of its shank T^2 adapted to engage the inner end of the bar L (see Fig. 14) to allow of moving the bar L outward on pressing the push-button T′ inward in its bearing in the tube T. The shank T^2 is provided with a pin T^3, engaging on opposite disks T^4 and T^5, held loosely on the shank T^2 within the tube T, as plainly shown in Fig. 14. Against the disks T^4 and T^5 press coil-springs U and U′, contained in the tube T, and the inner end of the spring U abuts against the inner end T^6 of the tube T, while the outer end of the spring U′ presses against a stop T^7, secured in the tube, near the outer end thereof. Stop-screws T^8 screw in the tube T to limit the inward movement of the disk T^5 and the outward movement of the disk T^4, it being understood that the stop-screws T^8 are normally located directly opposite the pin T^3, as indicated in Fig. 14.

Now when the push-button T′ is pressed inward by the operator then the spring U is compressed, so that on the release of the push-button the latter is returned to its normal position by the action of the said spring U. When the bar L is moved inwardly on the swinging of the lever N, actuated by the key Q, as previously explained, then the bar L pushes the shank T^2 and its push-button T′ outward in the tube T against the tension of the spring U′, so that when the lever N is released on the outward movement of its key Q then the push-button is returned to its normal position, and with it the bar L and lever N, owing to the action of the spring U′.

The operation is as follows: When the door-lock is set to form a dead-lock, as shown in Figs. 1, 2, 3, and 4, and the bolt D is shot out on turning either knob G or H and locked in place by one of the pawls K, engaging the notch C^3 in the cam C^2 of the hub C, then the door is locked and the knobs G and H cannot be turned to unlock the door. To now unlock the door from the outside, it is necessary to push the key Q into the keyhole H^5 for the key to rotate the roller-tumblers in the direction of the arrow *c′*, so that the notches O^7, O^8, and O^9 of the said roller-tumblers finally register with the loop N^3 of the lever N at the time the inner end of the key Q moves into engagement with the end N′ of the said lever to impart a swinging motion to the lever to bring the loop into engagement with the said registering notches O^7, O^8, and O^9, as shown in Fig. 2. The swinging motion given to the lever N by the key Q causes an inward sliding of the bar L to move the pin L′ outwardly in the hub C to push the pawl K out of engagement with the notch C^2. As soon as this takes place the compressed spring I^8, acting on the lug I^3, causes an automatic inward sliding of the bolt D to unlock the door, the several parts then standing in the position shown in Figs. 2 and 4.

From the foregoing it will be seen that the simple operation of forcing the key inward causes unlocking of the door without requiring the operator to turn the knob, and hence the door can be readily unlocked and opened by the operator using but one hand.

When the operator releases the key from

inward pressure, then the spring-actuated roller-tumblers O, O′, and O² in returning to their previous position slide the key Q outward, and at the same time the lever N returns to its former position, owing to the action of the previously-compressed spring U′, forcing the push-button T′, the bar L, and lever N to their former positions. The return movement of the bar L, however, does not affect the pin L′, except that the notch L² is again brought into register with the inner end of the pin L′, so that on the closing of the door and turning of either knob G or H the bolt D is shot out into locking position and held against return movement by one of the pawls K again engaging the notch C³ and pressing the pin L′ inward.

By having the lever N arranged as described it is evident that the lock cannot be picked by the insertion of a wire or the like in the keyhole H⁵, as the wire after passing the pins O³ cannot impart a swinging motion to the lever N, owing to the loop N³ being out of register with the notches O⁷, O⁸, and O⁹, and as the end N′ of the lever stands in front of the operating-bar L the latter cannot be reached and actuated by the inserted wire. The lever N thus forms a baffle for the operating-bar L. It will also be seen that the use of a wrong key cannot upset the combination to which the roller-tumblers are set, as the key cannot be pushed farther in than the tumblers.

When the several parts are in the locked position (shown in Figs. 1 and 3) and it is desired to unlock the door from the inside, then it is only necessary for the operator to press the push-button T′ to cause the bar L to move outwardly, and thereby push the pin L′ outwardly to disengage the pawl K from the notch C³ to allow the spring to automatically withdraw the bolt from the keeper. Now when the push-button T′ is pressed inward the spring U is compressed, so that when the operator releases the push-button the latter is immediately returned to its normal outward position. The bar L on its outward movement, as above described, acts on the lever N to impart a swinging motion thereto, so that the pin N⁴ imparts a swinging motion to the arm R′, (see Fig. 8,) whereby the spring P² is compressed without, however, disturbing the position of the shaft P and the roller-tumblers O, O′, and O². Now when the operator releases the push-button and the latter returns to its normal position, as above referred to, then the bar L is also returned to its normal position by the action of the spring P², imparting a return swinging motion to the arm R′, which latter now returns the lever N to its normal position, and the lever N returns the bar L, so that the latter's notch L² again stands in register with the pin L′.

From the foregoing it will be seen that on releasing the key Q or the push-button T′ the bar L is returned automatically to its normal position, (shown in Fig. 1,) so that a subsequent turning of either knob causes an outward movement of the bolt and automatic locking against return movement to hold the door in a locked position.

It is understood that a knob H, with the key-lock therein, can be used on the inner end of the spindle F instead of the push-button knob G, shown and described; but for ordinary use the knobs G and H, as shown and described, are preferred.

When the door-lock is set as a spring-lock, as shown in Figs. 5 and 6, then the bolt D is normally held in a locking position, as shown in Fig. 5, by the action of the spring I⁸, as previously explained. Now on turning either knob G or H in either direction the bolt is moved inward by the action of either of the cams C′ on the corresponding pins J² of the bell-crank lever J or J′; but as soon as the pressure on the knob G or H is released the bolt D is again shot out by the action of the spring I⁸. On turning either knob in either direction the hub C is turned sufficiently for the cam C′ to move the bolt D into a withdrawn position; but the hub is not turned far enough for either pawl K to engage the notch C³, (see Fig. 6,) so that the hub C is not locked against return movement, as is the case when the door-lock is set in a dead-lock position, as above explained in reference to Fig. 3.

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

1. A lock having a main bolt, a sliding plate thereon, and a spring device to force the bolt either inward or outward, according to the position in which the spring device is set, as set forth.

2. A lock having a main bolt, and a spring device for the same, adapted to be set to press the bolt in either direction, as set forth.

3. A lock having a casing, a main bolt slidable in the casing, and a spring device in the casing, adapted to be set from the face of the casing to press the bolt in either direction, as set forth.

4. A lock having a main bolt, a plate held to slide lengthwise on the said bolt and having spaced lugs, and a spring device arranged for engaging either of the lugs, to shift the sliding plate on the bolt and to move the latter in either direction, as set forth.

5. A lock having a main bolt, a plate held to slide lengthwise on the said bolt and having spaced lugs, and a spring device arranged for engaging either of the lugs, to shift the sliding plate on the bolt and to move the latter in either direction, the said spring device comprising a shaft, cams turning with and mounted to slide lengthwise on the shaft, the cams standing in opposite directions on the shaft and arranged to abut against the said lugs, and a spring for pressing the cams in opposite directions, as set forth.

6. A lock having a main bolt, a plate held to slide lengthwise on the said bolt and hav-

ing spaced lugs, and a spring device arranged for engaging either of the lugs, to shift the sliding plate on the bolt and to move the latter in either direction, the said spring device comprising a shaft, cams turning with and mounted to slide lengthwise on the shaft, the cams standing in opposite direction on the shaft and arranged to abut against the said lugs, and a spring for pressing the cams in opposite directions, against fixed shoulders in the lock-casing, as set forth.

7. A lock having a main bolt, a plate held to slide lengthwise on the said bolt and having spaced lugs, and a spring device arranged for engaging either of the lugs, to shift the sliding plate on the bolt and to move the latter in either direction, the said spring device comprising a shaft, cams turning with and mounted to slide lengthwise on the shaft, the cams standing in opposite directions on the shaft and arranged to abut against the said lugs, and a spring for pressing the cams in opposite directions, against fixed shoulders in the lock casing, the said shaft having a head in the face of the casing, to allow turning the shaft from the outside of the casing, as set forth.

8. A lock having a casing, a bolt slidable therein, a sliding plate having a limited sliding movement on the bolt and in the direction of the movement of the bolt, spaced lugs on the said sliding plate, a shaft mounted to turn in the casing and having a head extending to the face of the casing, to allow turning the shaft from the outside of the casing, cams held to slide on and to turn with the said shaft and standing in opposite directions on the shaft, the cams being adapted to engage the said lugs, shoulders on the casing, and a spring coiled on the shaft, between the cams, and pressing the latter in opposite directions, as set forth.

9. A lock having a spindle, a cam on the spindle, for operating the spring-pressed main bolt, and an automatic locking device for the cam to lock the latter against return movement when the bolt is shot out, as set forth.

10. A lock having a spindle, a cam on the spindle, for operating the spring-pressed main bolt, and a locking device for the cam, to lock the latter against return movement when the bolt is shot out, the locking device consisting of a spring-pressed pawl, for automatically engaging a notch on the cam-hub when said hub is turned, as set forth.

11. A lock having a spindle, a cam on the spindle, for operating the spring-pressed main bolt, a locking device for the cam to lock the latter against return movement when the bolt is shot out, and an unlocking device, for disengaging the locking device from the cam, to allow the bolt to return automatically, as set forth.

12. A lock having a spindle, a cam on the spindle, for operating the spring-pressed main bolt, a locking device for the cam to lock the latter against return movement when the bolt is shot out, a bar slidable in the spindle, and a pin in the cam-hub, adapted to be actuated by the bar, to disengage the locking device from the cam, as set forth.

13. A lock having a spindle, a cam on the spindle, for operating the spring-pressed main bolt, a locking device for the cam, to lock the latter against return movement when the bolt is shot out, an unlocking device, for disengaging the locking device from the cam, to allow the bolt to return automatically, and a key-lock in a spindle-knob, for controlling the said unlocking device, as set forth.

14. A lock having a spindle, a cam on the spindle, for operating the spring-pressed main bolt, a locking device for the cam, to lock the latter against return movement when the bolt is shot out, an unlocking device, for disengaging the locking device from the cam, to allow the bolt to return automatically, and a push-button in a spindle-knob, for controlling the said unlocking device, as set forth.

15. A lock having a spindle, a cam on the spindle, for operating the spring-pressed main bolt, a locking device for the cam, to lock the latter against return movement when the bolt is shot out, a bar slidable in the spindle, a pin in the cam-hub, adapted to be actuated by the bar, to disengage the locking device from the cam, and a key-lock in a spindle-knob, for controlling the said bar, as set forth.

16. A lock having a spindle, a cam on the spindle, for operating the spring-pressed main bolt, a locking device for the cam, to lock the latter against return movement when the bolt is shot out, a bar slidable in the spindle, a pin in the cam-hub, adapted to be actuated by the bar, to disengage the locking device from the cam, and a push-button in a spindle-knob, for controlling the said bar, as set forth.

17. A lock having a spindle, a cam on the spindle, for operating the spring-pressed main bolt, a locking device for the cam, to lock the latter against return movement when the bolt is shot out, a bar slidable in the spindle, a pin in the cam-hub, adapted to be actuated by the bar, to disengage the locking device from the cam, a key-lock in a spindle-knob, for controlling the said bar, and a spring device in the other spindle-knob, for returning the bar, as set forth.

18. A lock having a spindle, a cam on the spindle, for operating the spring-pressed main bolt, a locking device for the cam, to lock the latter against return movement when the bolt is shot out, a bar slidable in the spindle, a pin in the cam-hub, adapted to be actuated by the bar, to disengage the locking device from the cam, a push-button in a spindle-knob, for controlling the said bar, and a spring device in the other spindle-knob, for returning the bar, as set forth.

19. A lock having a main bolt, a spring device for pressing the bolt in an inward direction, a spindle, a cam on the spindle, for mov-

ing the main bolt outwardly, a locking device for engagement with the cam, to lock the latter and the main bolt against return movement, an unlocking or releasing device for the said locking device, and a key-lock in the knob of the spindle, for actuating the said unlocking device, the key-lock having roller-tumblers and a baffle-lever in the rear of the roller-tumblers, for the key to first turn the roller-tumblers, to reach and actuate the baffle-lever, as set forth.

20. A lock having a main bolt, a spring device for pressing the bolt in an inward direction, a spindle, a cam on the spindle, for moving the main bolt outwardly, a locking device for engagement with the cam, to lock the latter and the main bolt against return movement, an unlocking or releasing device for the said locking device, a key-lock in the knob of the spindle, for actuating the said unlocking device, the key-lock having roller-tumblers and a baffle-lever in the rear of the roller-tumblers, for the key to first turn the roller-tumblers, to reach and actuate the baffle-lever, and a spring device for the roller-tumblers and the baffle-lever, as set forth.

21. A lock having a spring-actuated main bolt, a locking device for the same, an unlocking device for the locking device, and a key-lock in the spindle-knob, comprising spring-pressed roller-tumblers, adapted to be turned by pushing a key into the knob, and a baffle-lever in the rear of the roller-tumblers, for actuating the said unlocking device, the baffle-lever being actuated by the key subsequently to turning the roller-tumblers, as set forth.

22. A lock having a key-lock in the hollow knob of the spindle, for releasing the main bolt, the key-lock being provided with roller-tumblers having pins on their periphery, for engagement by the key, to turn the roller-tumblers on pushing the key in the direction of its length, and a baffle-lever pivoted in the knob, in the rear of the roller-tumblers and in the path of the key, to be actuated by the latter, the baffle-lever having a loop reaching to the peripheral faces of the roller-tumblers and adapted to pass into registering notches in the roller-tumblers, as set forth.

23. A lock having a movable member forming a part of a releasing device for the main bolt, and a key-lock in the spindle-knob, for actuating the releasing device, the key-lock comprising spring-pressed roller-tumblers, adapted to be turned by pushing the key transversely in the spindle-knob, and a baffle-lever for actuating the movable member of the releasing device, said baffle-lever being arranged in the knob in the rear of the roller-tumblers and in front of the movable member of the releasing device, as set forth.

24. A lock having a spindle containing a slidable bar forming part of the releasing device of the main bolt, a hollow knob on the spindle, having a keyhole, roller-tumblers journaled in the knob, having peripheral pins adapted to be engaged by the key, on pushing the latter in the keyhole, and a baffle-lever fulcrumed in the knob, in the rear of the roller-tumblers and in contact with the said bar, the baffle-lever being adapted to be actuated by the key on the latter's inward movement, as set forth.

25. A lock having a spindle containing a slidable bar forming part of the releasing device of the main bolt, a hollow knob on the spindle, having a keyhole, roller-tumblers journaled in the knob, having peripheral pins adapted to be engaged by the key, on pushing the latter in the keyhole, a baffle-lever fulcrumed in the knob, in the rear of the roller-tumblers and in contact with the said bar, the baffle-lever being adapted to be actuated by the key on the latter's inward movement, a spring device for the said roller-tumblers, and an arm pivoted in the knob and connected with the spring device and engaging the said baffle-lever, as set forth.

26. A lock having a spindle-knob and a key-lock contained in the spindle-knob and actuated by a key pushed transversely into a keyhole in the knob, the key-lock having a plurality of roller-tumblers provided with peripheral pins projecting into the path of the key, for the latter to turn the rollers, to allow further inward movement of the key, and a baffle-lever fulcrumed in the knob in the rear of the roller-tumblers, to be actuated by the inner end of the key subsequently to turning the roller-tumblers, the said baffle-lever having a loop extending into the peripheral face of the roller-tumblers, to engage registering notches in the roller-tumblers on the key imparting a swinging motion to the baffle-lever, as set forth.

27. A lock having a spindle-knob and a key-lock contained in the spindle-knob and actuated by a key pushed transversely into a keyhole in the knob, the key-lock having a plurality of roller-tumblers provided with peripheral pins projecting into the path of the key, for the latter to turn the rollers, to allow further inward movement of the key, a baffle-lever fulcrumed in the knob in the rear of the roller-tumblers, to be actuated by the inner end of the key subsequently to turning the roller-tumblers, the said baffle-lever having a loop extending into the peripheral face of the roller-tumblers, to engage registering notches in the roller-tumblers on the key imparting a swinging motion to the baffle-lever, a spring device for the roller-tumblers, and a shoulder in the knob, for the first pins of the roller-tumblers to abut against, as set forth.

28. A key-lock in a hollow spindle-knob, having roller-tumblers provided with peripheral pins, a shaft on which the tumblers are mounted to rotate loosely, a spring controlling the said shaft, and a connection between the shaft and the roller-tumblers, as set forth.

29. A key-lock in a hollow spindle-knob, having roller-tumblers provided with periph-

eral pins, a shaft on which the tumblers are mounted to rotate loosely, a spring controlling the said shaft, and a connection between the shaft and the roller-tumblers, the connection comprising a disk, secured on the shaft and having a fixed pin engaging one tumbler, and a pin on the shaft engaging a pin on the other tumbler, as set forth.

30. A key-lock in a hollow spindle-knob, having roller-tumblers provided with peripheral pins, a shaft on which the tumblers are mounted to rotate loosely, a spring controlling the said shaft, and a connection between the shaft and the roller-tumblers, the connection comprising a disk, secured on the shaft and having a fixed pin engaging one tumbler, and a pin on the shaft engaging a pin on another tumbler, the last-named pin projecting into a slot in a third tumbler, as set forth.

31. A lock having a push-button device in one of the spindle-knobs, and a releasing device for the main bolt, controlled by the said push-button device, the latter comprising a push-button having a shank, and springs pressing the shank, one of the springs being compressed on the inward movement of the push-button and the other on the outward movement of the said button, as set forth.

32. A lock having a main bolt, a plate slidable thereon, a spring device for pressing the plate in either direction, bell-crank levers fulcrumed on the said main bolt and adapted to be actuated by the slidable plate, and a spindle-cam for engaging pins on the said bell-crank levers, as set forth.

33. A lock having a main bolt, a plate slidable thereon and having a pin engaging a slot in the bolt, a spring device for pressing the plate in either direction, a spindle-cam having arms, and levers fulcrumed on the main bolt on opposite sides of the spindle-cam, the levers having pins adapted to be engaged by the said cam, as set forth.

34. A lock having a main bolt, a plate slidable thereon and having a pin engaging a slot in the bolt, a spring device for pressing the plate in either direction, a spindle-cam having arms, and bell-crank levers fulcrumed on the main bolt on opposite sides of the spindle-cam, the bell-crank levers having pins adapted to be engaged by the said cam, and the said bell-crank levers being actuated by the pin on the said plate, to change the position of the bell-crank levers, as set forth.

35. A lock provided with a hollow spindle-knob for containing a key-lock, the knob being made in sections screwed together, and a locking device inside of the knob, to normally lock the sections against unscrewing, the said locking device being controlled from a mechanism in the other spindle-knob, as set forth.

36. A lock provided with a hollow spindle-knob for containing a key-lock, the knob being made in sections screwed together, and a locking device inside of the knob, to normally lock the sections against unscrewing, the said locking device being controlled from a mechanism in the other spindle-knob, and the locking device being provided with a lever fulcrumed in the knob and having a lug engaging registering recesses in the knob-sections at the screw-joint, as set forth.

37. A lock provided with a hollow spindle-knob for containing a key-lock, the knob being made in sections screwed together, and a locking device inside of the knob, to normally lock the sections against unscrewing, the said locking device being controlled from a mechanism in the other spindle-knob, and the locking device being provided with a lever fulcrumed in the knob and having a lug engaging registering recesses in the knob-sections at the screw-joint, and a spring for pressing the said lever, as set forth.

38. A lock having a main bolt, and provided with a hollow spindle-knob made in sections detachably secured together, and a key-operated lock in the knob for releasing the main bolt, one member of the said lock serving to hold the knob-sections locked together, as set forth.

39. A lock provided with a hollow spindle-knob made in sections screwed together and having registering recesses, and a key-lock in the knob for releasing the main bolt, a member of the lock being adapted to engage the recesses of the knob-sections to lock the said sections together, as set forth.

40. A lock provided with a hollow spindle-knob made in sections screwed together and having registering recesses, and a key-lock in the knob for releasing the main bolt, said lock comprising tumblers having pins for engagement by the key and provided with notches, and a pivoted lever, said lever being provided with a projection for engaging the notches of the knob-sections, as set forth.

41. A lock provided with a hollow spindle-knob made in sections screwed together and having registering recesses, a key-lock in the knob, for releasing the main bolt, a member of the lock engaging the said recesses to lock the knob-sections together, and means in the other knob for disengaging the said member of the lock from the knob-sections, as set forth.

42. A key-lock in a hollow spindle-knob, comprising roller-tumblers having pins on their peripheries for engagement by a key, and provided with notches, a spring-actuated shaft upon which the tumblers are loosely mounted, a connection between one of the tumblers and said spring-shaft, a pivoted lever adapted to engage the notches of the tumblers, and a connection between the said lever and the spring of the said shaft, as set forth.

43. A key-lock in a hollow spindle-knob, comprising tumblers having pins on their peripheries for engagement by a key, and provided with notches, a shaft upon which the tumblers are loosely mounted, a disk secured

to the shaft and with which one of the tumblers is connected, a pivoted arm, a spring having one end connected with the arm and the other with the shaft, and a pivoted lever for engaging the notches of the tumblers, said lever being provided with a pin engaging said arm, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHRISTIAN ASHMUSEN.

Witnesses:

THEO. G. HOSTER,

EVERARD BOLTON MARSHALL.