

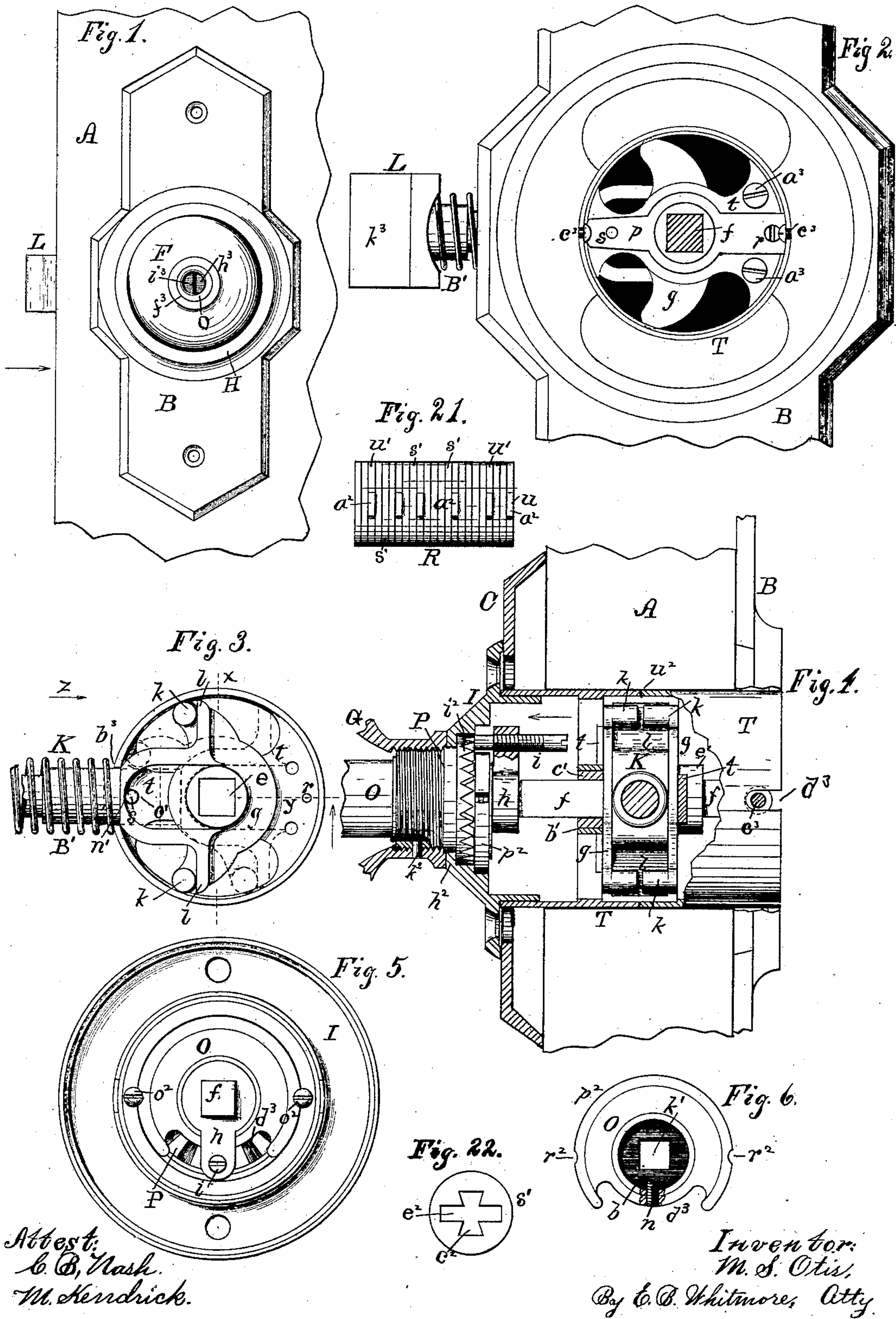
(Model.)

3 Sheets—Sheet 1.

M. S. OTIS.
LOCK.

No. 359,276.

Patented Mar. 15, 1887.



(Model.)

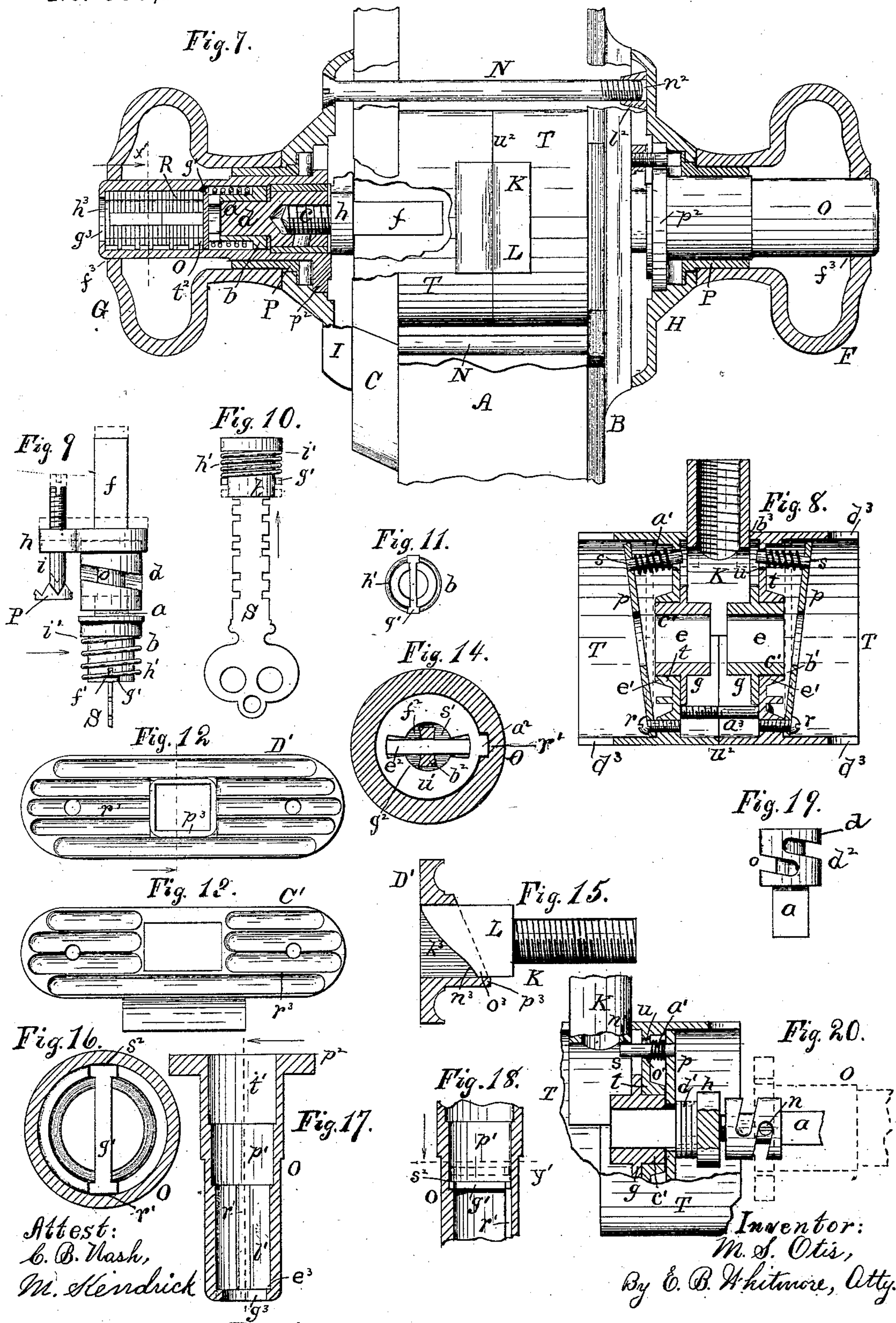
3 Sheets—Sheet 2.

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N. PETERS, Photo-Lithographer, Washington, D. C.

(Model.)

3 Sheets—Sheet 3.

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Fig. 21.

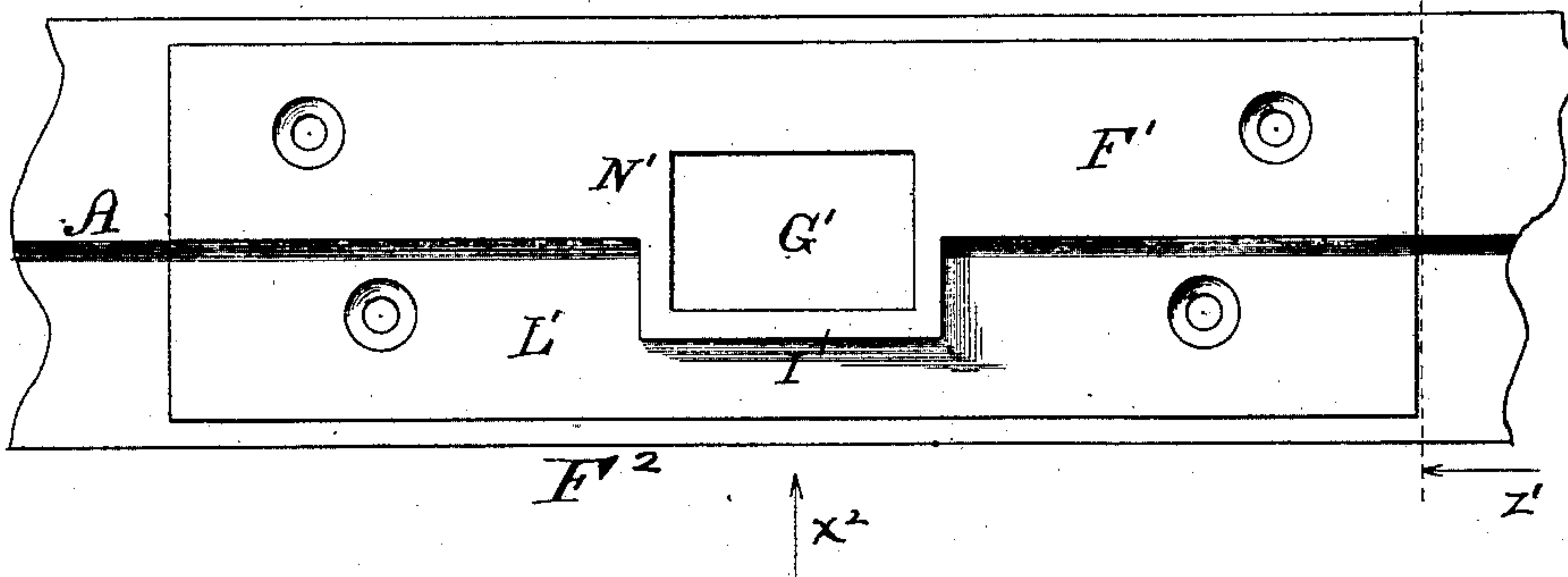


Fig. 22.

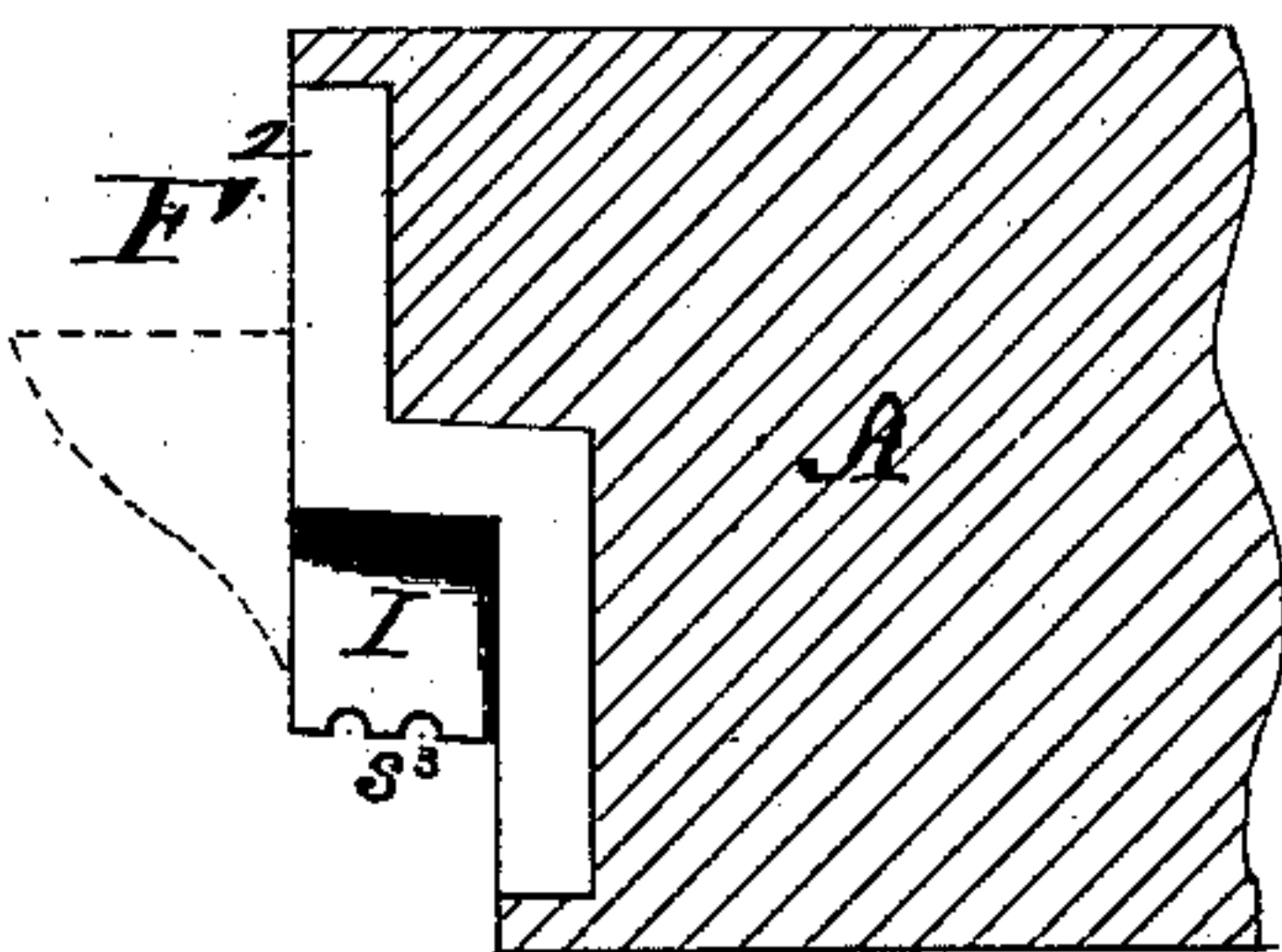
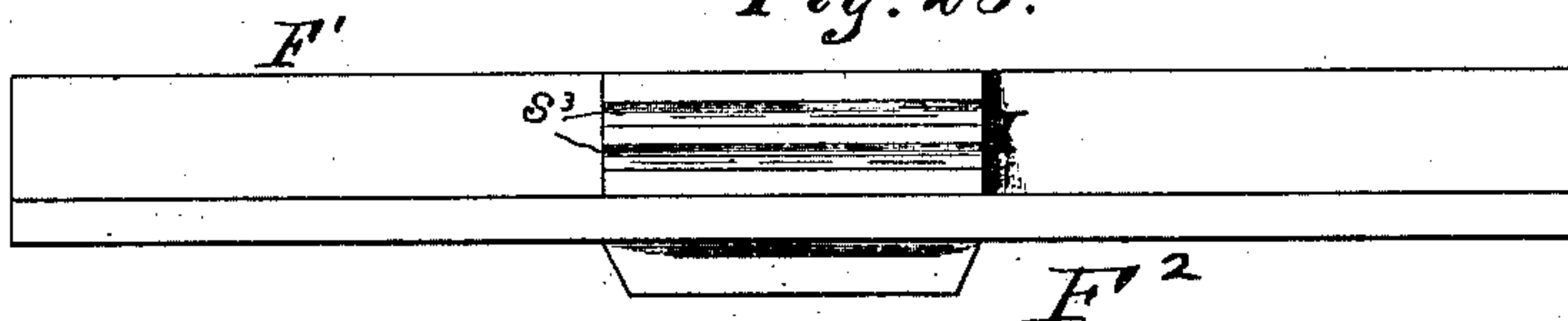


Fig. 23.



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UNITED STATES PATENT OFFICE.

MARVIN S. OTIS, OF ROCHESTER, NEW YORK.

LOCK.

SPECIFICATION forming part of Letters Patent No. 359,276, dated March 15, 1887.

Application filed August 22, 1885. Serial No. 175,094. (Model.)

To all whom it may concern:

Be it known that I, MARVIN S. OTIS, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Locks, which improvement is fully set forth in the following specification, and shown in the accompanying drawings.

The object of my invention is to produce an improved lock for doors and other uses operated by a flat key inserted in a key-hole at the center of either knob, either of which knobs of the lock may, by means of the key, be rendered inoperative; also, the bolt may be set by means of the key from either side of the door, so that it cannot be withdrawn from the socket of the casing, thus performing the functions of both a locking bolt and latch, the invention being fully set forth in the specification below, and more particularly pointed out in the claims.

Referring to the drawings, Figure 1, Sheet 1, is a view of the lock as it appears upon the door from without, showing the key-hole for a flat key at the center of the knob; Fig. 2, a view of parts of the lock from the same direction, drawn to a scale twice the size, the knob and circular plate attached thereto being omitted to uncover some of the interior parts of the lock; Fig. 3, a view from the same direction of one of the rocker-barrels with a portion of the bolt, a rocker, spiral spring, and other parts, the rocker and divided part of the bolt being shown in various positions at times assumed by them by full and dotted lines; Fig. 4, a view of the lock seen as indicated by arrow *z* in Fig. 3, parts of the rocker-barrels being broken away, and with the inner plate, a portion of the knob, and other parts centrally longitudinally sectioned as on the dotted line *x* in Fig. 3, drawn to show the rockers in their relation with the bolt, the rosette, and parts combined therewith, the bolt and some other parts being sectioned by other parallel planes; Fig. 5, a view of the inner surface of the cone-plate, viewed as indicated by arrow in Fig. 4, showing the end of the key-barrel, a portion of the rosette, and other parts; Fig. 6, a view at the end of the key-barrel, showing the key-piece in place therein, the bushing-ring, and the screw for the spiral block; Fig. 7, Sheet 2, an elevation of the lock,

viewed as indicated by arrow in Fig. 1, the knobs, one of the key-barrels, rosette, cone-plate, and other parts being centrally and longitudinally sectioned, drawn to show the relation of the parts within the key-barrel and the manner of holding the cone-plates to the opposite sides of the door, one of the rocker-barrels and other parts being broken away; Fig. 8, a central longitudinal section of the rocker-barrels, rockers, stops, bolt, &c., sectioned as on the dotted line *y* in Fig. 3, drawn to show the relation of the stops and pins to the bolt; Fig. 9, a view of the key-piece, spiral block, and spindle for the rocker, with other parts showing the same properly connected, with a portion of the key as about to enter the groove in the key-piece, the parts being shown in dotted position, as when thrown forward by turning the spiral block through one-half of a revolution to release the teeth of the rosette from the pawl; Fig. 10, a view of the key-piece with the key, the latter being shown as inserted in the groove of the key-piece, pressing the key-bar and spring back, the parts being seen as indicated by arrow in Fig. 9; Fig. 11, an end view of the key-piece, showing the key-bar in elevation and extending diametrically across the hollow key-piece, with its ends overhanging the same, the parts being seen as indicated by arrow in Fig. 10; Fig. 12, a view of the inner surface of the plate for the bolt; Fig. 13, a similar view of the socket-plate to receive the bolt; Fig. 14, a transverse section of the key-barrel, drawn to show the form of one of the tight wards and a parallel loose ward, with the dovetail binders for the latter, the key-barrel being sectioned, as on the dotted line *x'* in Fig. 7, and viewed as indicated by the arrow pointed thereon; Fig. 15, a transverse section of the plate for the bolt, taken as on the dotted line in Fig. 12, the bolt being shown as drawn back within the plate by the action of a rocker; Fig. 16, a transverse section of the key-barrel, showing the key-bar resting in slots formed at the inner surface of the barrel, the latter being sectioned as on the dotted line *y'* in Fig. 18, drawn to a scale twice the size of the latter figure; Fig. 17, a central longitudinal section of the key-barrel drawn to more fully show the interior of the same, more particularly the longitudinal groove

made to receive the projections of the tight wards placed in the barrel; Fig. 18, a view of a part of the barrel sectioned longitudinally, as upon the dotted line in Fig. 17, showing the key-bar resting therein; Fig. 19, a view of one of the spiral blocks, showing the spiral as extending once therearound; Fig. 20, a central longitudinal section of portions of the rocker-barrel, a cross-tie, rocker, stop, and portion of the bolt, parts being broken away and omitted, the figure being drawn to show the manner in which the stop is pushed in to hold the bolt in position; Fig. 21, Sheet 3, a front elevation of the plate for the bolt, secured to the edge of the door to hold and guide the outer free end of the bolt, and a portion of the door; Fig. 22, a view of the same taken as indicated by arrow z' in Fig. 21, the door being sectioned, as upon the dotted line in said latter figure; and Fig. 23, a view of the same taken at the edge of the plate, as indicated by arrow z'' in Fig. 1.

This lock does not, like most other locks, contain both a locking-bolt and a latching-bolt, but a single bolt only, which by the operation of the key is made to answer the purpose of both. The bolt-head is beveled to curved surfaces, so as to slide back and shoot into the socket-plate secured to the casing when the door is closed.

The operations of the key are, first, to detach either knob from the mechanism by which it operates the bolt, so that said knob shall turn upon its bearings without moving the bolt, thus virtually locking the door from either side; and, second, to lock or stop the bolt as it rests in the socket-plate of the door-casing, so that it cannot, except by violence, be withdrawn from the socket without using the key fitted to the lock. These locks are made to be operated with flat keys notched upon their sides to manipulate a system of tight and loose wards arranged in the key-barrel.

Referring to the parts, A is the door; B, the plate of the lock on the outside of the door; C, the plate on the inside of the door; F, the outer and G the inner knob; H, the outer circular conical plate or cone, and I the inner circular plate or cone between the respective knobs and the plates B and C.

K is the bolt of the lock, N the clamping-screws passing through the outer plates and the door to hold them together, and O the key-barrels inserted concentrically and longitudinally within the knobs.

P are notched circular pieces or rosettes, (shown more fully in Fig. 4,) which hold the respective knobs and the conical plates together.

b are cylindrical key-pieces (better shown in Figs. 9 and 10) inserted in the key-barrel.

d are cylindrical spiral blocks or holders for the spindles, also inserted in the key-barrels, having square shanks a , fitted to corresponding sockets in the key-pieces.

f are spindles, square in cross-section, formed with threaded shanks e , fitted to threaded

sockets in the holders d , the axes of the stem, holder, and key-piece of either key-barrel forming a straight line, which also corresponds to the axis of the key-barrel.

R is a system of wards, the latter being thin circular disks of metal perforated at their centers to receive the key, which latter is inserted in a key-hole at the smaller or outer end of the key-barrel held at the center of the knob.

g are rockers or cams, (better shown in Figs. 3 and 4,) which are formed with square openings e , in which to receive the spindles, which rockers face each other, having the inner divided end of the bolt K between them.

h are arms secured rigidly to the spindles, through the outer ends of which are passed pawls i , the wedge-shaped ends of which rest in notches of the rosette, (better shown in Fig. 9,) which locks the respective rosettes and spindles together, the pawl or pin and part of the rosettes shown in said figure being turned through a horizontal angle of ninety degrees, to better show the manner in which they fit together. The rockers are each formed with projections k , which bear upon the arms l of the bolt, (fully shown in Figs. 3 and 4,) from which, when the rockers are either one of them turned by its spindle, the bolt will be withdrawn from the socket of the door-casing to the position shown in Fig. 15.

n, Fig. 6, is a rigid pin passed transversely through the side of the key-barrel, made to project slightly within the space of the same and into the spiral groove o of the spiral block or holder d . By this means, when the spiral block is turned upon its axis within the barrel by the key, it, with the spindle and pawl i , will be urged forward, as indicated by dotted lines in Fig. 9, sufficiently to carry the pawl out of the notch of the rosette, so that the latter, with the knob attached, will turn independently of the spindle. The parts are so formed that turning the key S through one-half a revolution will raise the pawl away from the rosette sufficiently to release the latter, as above stated.

p are stops for the bolt K, secured to the tie-pieces t of the rocker-barrels T by screws r , near one side of said barrels, reaching diametrically across the interiors of the latter. These stops are turned inward at their free end at s , pointing substantially toward each other in position to pass through orifices u in said tie-pieces t . The bolt K, at the end within the barrels, is divided, and the points of the stops are held in position to pass in between the branches of the bolt, as shown in Figs. 3, 8, and 20, by means of which the bolt is prevented by positive means from being moved backward, so as to draw the head L of the same out of the socket of the casing. Spiral springs a' are coiled around the points s outside of the tie-pieces t , which serve to hold the stops away from the bolt, to permit the latter to be moved freely by the rockers, as above stated.

The tie-pieces are formed with longitudinal

openings b' , concentric with the rocker-barrels, and the rockers are respectively formed with hubs c' , fitted to enter the openings of the tie-pieces, which form bearings for the rockers to turn upon, the tie-pieces being formed with flanges or rings e' , surrounding the openings, to give greater breadth of bearing for the rockers.

The spindle f , connected with the outer knob of the door, is provided with a ring, d' , placed against the pawl-arm h thereof, as shown in Fig. 20, which ring, when the spindle is carried forward by the action of the spiral block d , as above stated, presses against the stop p and carries the point s of the stop p to a position in back of the bolt, as shown and above described. This ring I prefer to make up of thin sections, as shown, so that the distance to which the arm h and stop p are separated may be varied to suit circumstances. The holes u through the tie-pieces for the stop are made in such positions that when carried in back of the bolt the stop bears at one side, at o' , Fig. 3, against the tie-piece, and substantially touches at its opposite surface the bolt at n' , so that the latter is held by positive means from being moved back out of the socket of the door-casing.

From outside the door it is frequently desirable to disconnect the knob without locking or stopping the bolt as just described. To enable a person to do this the spiral piece d^2 , Fig. 19, similar to the block d , above mentioned, connected with the outer knob, has the spiral groove o extended completely around its outer surface, so that the spindle connected with it may have an endwise travel, due to a complete revolution of the spiral piece. The thickness of the ring d' is made so that it is brought to just touch the stop by a half-revolution of the key and spiral block, which motion carries the pawl away from the ratchet. Then another half-revolution of the key in the same direction carries the point of the stop back of the bolt, as set forth. The spiral block at the inside of the door has the spiral groove but half-way round, the ring upon the spindle at that side being always in contact with the stop, so that a half-revolution of the key serves to simultaneously release the knob and force the stop back of the bolt, as stated.

The key-piece b is formed, as shown in Figs. 9, 10, and 11, with a groove, f' , formed diametrically across one end thereof, in which to receive the end of the key when the latter is inserted in the lock to operate the same. A small bar or piece, g' , in the form of the letter I, is inserted in the groove, and a spiral spring, h' , is placed upon the key-piece, between the shoulder i' thereof and the projecting ends of the bar g' , the tendency of which spring being to force the bar in a direction away from the shoulder. When the key is inserted in the key-piece to turn the latter, it presses the bar g' back within the groove f' , compressing the spring, as shown in Fig. 10. The key-piece b is hollow, the bore being made square in

cross-section at the end opposite that entered by the key, as shown at k' in Fig. 6, in which to receive the squared shank a of the spiral block d , (or d^2), on account of which, when the end of the key is inserted in the slot of the key-piece, the latter, with the spiral-block, may be turned thereby.

As shown in Figs. 7 and 17, the bore of the key-barrel O is formed of three chambers of different diameters, the smallest one, l' , being filled with the cylinder or body R of assembled wards, the middle part, p' , occupied by the key-piece b , and the spiral block d resting in the largest part, t' , thereof. Some of the wards composing the body R are "tight," and do not turn with the key, while the others, or the "loose" wards, turn with the key inside of the barrel. These wards are made from sheets of metal of uniform thickness, the peripheries of the loose wards s' , Fig. 22, being unbroken circles, while the tight wards u' , Fig. 14, which are similar circular plates, have slight peripheral projections a^2 . These wards are put together in the form of a cylindrical body, R , Fig. 21, in which the tight wards are separated by one or more loose wards. The diameters of these wards are uniform and correspond to the internal diameter of the chamber l' of the key-barrel, in which said body of wards is placed.

The wards are held together by dovetail ties b^2 , passing through cavities c^2 , formed in the loose wards, there being left between the ties a straight narrow slit, e^2 , to receive the key. The tight wards are formed each with a central circular opening, f^2 , of sufficient diameter to allow the ties b^2 to turn within them as said ties and loose wards are carried around with the key. A longitudinal groove, r' , is formed in the chamber l' , in which to receive the projecting parts a^2 of the tight wards, as shown in Fig. 14, which projecting parts, resting in the groove, prevent the tight wards from turning in the barrel with the key. The tight and loose wards are alternated, or arranged in any order desired, and the key correspondingly notched, as shown in Fig. 10, the notches permitting the key to turn within the fixed wards, the inner edges, g^2 , of the latter passing within said notches as the key is turned. The portions of the key between the notches carry the loose wards around with it. The ties b^2 for the loose wards extend from end to end of the body of wards, tying all the wards together, so that the loose ones turn together, while the tight ones remain stationary in the barrel from the projections a^2 catching in the slot r' . As above stated, the turning of the key one-half way round in either knob carries the pawl i out of the notch of the rosette, so as to release the knob and render it inoperative. This operation at the inside of the door at the same time stops or locks the bolt, while at the outside of the door it only releases the knob, requiring another half-turn of the key in the same direction to lock the bolt.

The bolt is thrown outward, or in a direction

away from the rocker-barrels, by means of a spiral spring, B', wound round the same and pressing at its ends, respectively, against said barrels and the under surface of the head of the bolt.

The rosette P, as shown in Fig. 4, is threaded within the neck of the knob, and when passed through the cone and put to place in the knob secures the cone and knob together by means of the flange or projection h^2 of the cone-plate being held between the notched head i^2 of the rosette and the end of the knob. The cone is not held rigidly, but so that the knob and rosette may turn freely thereon, as with a journal-bearing. The rosette and knob are held rigidly together by means of a transverse pin, k^2 , passing through both.

The cones I and H are held rigidly to the respective plates C and B, bearing against the door, by means of the tie-bolts N, passing through the orifices in the cone I and plates C and B, said tie-bolts being fully shown in Fig. 7. These tie-bolts are put through from the inside of the door and enter internally-threaded knobs or projections l^2 , projecting inward from the inner face of the cone H at the outside of the door. The holes h^2 , that receive the threaded ends of the tie-bolts, are not bored through the cone, so that the tie-bolts are not visible from without. On this account, and on account of the manner of fastening the knob and cone together, no part of the lock can be removed from the outside of the door, except by violence, the pin k^2 being nicely fitted to the knob and rosette and covered from view by nickelplating or otherwise.

The key-barrel on either side of the door is held rigidly to the cone by screws o^2 , Fig. 5, which are threaded partly in the substance of the cone and partly in the periphery of the flange p^2 of the key-barrel in the notches r^2 , Fig. 6. The key-barrels, cones, and rocker-barrels are rigid with the respective plates secured to the door, and do not turn or move with the other parts of the lock. The rockers, spindles, and rosettes turn with the respective knobs, unless the rosettes and pawls are separated, as above described, in which case the knobs and their respective rosettes turn together upon their respective bearings with the cone, without moving any other parts of the lock. The loose wards, the key-piece, and the spiral block at either side of the door are all turned together by the key in the key-barrel. When the spindle is turned by the knob by means of the rosette and pawl, it turns upon its threaded bearing in the socket of the spiral block.

Besides the groove r' within each of the key barrels there is another short groove, s^2 , of the same cross-section, diametrically opposite, made to receive one of the overhanging ends of the bar g' , as shown in Figs. 16 and 18. The inner ward, t^2 , Fig. 7, of the series rests squarely against the small end of the key-piece, (shown in Fig. 11,) pressing the bar g' slightly back within the slit f' , its relative position

being indicated in dotted lines in Fig. 10. The projections a^2 of the tight wards are formed opposite the ends of the respective openings or slits f^2 of said wards, which causes the slits of all those wards to point toward the groove r' of the key-barrel, on account of which, when the key is inserted into the lock its inner end will always register with and squarely meet the bar g' , and not cross it at any time. When the key is pressed against the bar, the latter is pushed out of the grooves r' and s^2 of the key-barrel into the chamber p' thereof, which allows the key-piece to turn in the barrel. When the key is withdrawn, which cannot be done until turned so that the slits of the loose wards register with the slits of the tight wards, the bar g' follows it, from the action of the spring h' , until said bar meets the inner ward, t^2 , its ends then being in the grooves of the key-barrel, as stated. The ends of the bar g' resting in the grooves of the barrel prevents the key-piece from turning at any time out of place, by the jarring of the door or otherwise, it being essential that the bar shall at all times register with the slits of the wards and turn with the key. Should the key-piece turn in the barrel from any cause, so the bar g' would stand across the end of the key when presented, the latter would be prevented from entering the slit of the key-piece to turn the latter to release the knob or set or stop the bolt, as stated. The tie pieces t of the rocker-barrels cross the interior of the latter diametrically, the planes of which tie-pieces being at right-angles with the common axis of the barrels.

The stops p are each expanded at the middle and pierced by holes sufficiently large to admit the spindles without touching them.

The lock, as shown, is double, all parts, aside from the bolt, being in duplicate, excepting the outside plates, the spiral blocks, and tie-bolts. The two similar and equal rocker-barrels are squarely abutted at their ends at the line w^2 , Figs. 3 and 7, which forms the dividing-line between the two locks. A semi-circular opening, b^3 , Figs. 3 and 8, is formed in each of the opposing edges of the rocker-barrels to accommodate the bolt K. The rocker-barrels are held together by longitudinal screws a^3 , Figs. 2 and 8, piercing the tie-pieces t .

The plates C and B, resting against the surfaces of the door, are secured to the respective rocker-barrels by means of short screws c^3 , Figs. 2 and 4, passed through longitudinal slots d^3 , Fig. 8, which slots admit of the adjustment of said plates to doors of different thicknesses, and the ring d' , Fig. 20, is regulated as to thickness by removing or adding sections as the door to be fitted is thicker or thinner.

The flange p^2 of the key-barrel is cut away at d^3 , as shown in Figs. 5 and 6, to expose the teeth of the rosette, within which opening the pawl i works. The circular movement of the pawl is not great, it being limited by the arms l of the bolt coming in contact with the pro-

jections k of the rockers in one direction and the inner surface of the rocker-barrels in the other direction.

The knobs are each formed with a circular longitudinal opening, f^3 , at their centers, in which the smaller ends of the respective key-barrels are fitted, which key-barrels form bearings upon which, with the flanges h^2 of the cones, the knobs turn. The ends of the key-barrels I prefer to have slightly project from the knobs, as shown, which projecting ends are longitudinally pierced by concentric circular orifices g^3 . The diameter of the orifice is less than the diameter of the chambers l' of the barrels, on account of which a ledge or shoulder, e^3 , is formed within the barrel. A plain circular plate, h^3 , Figs. 1 and 7, formed with a simple rectangular slit, i^3 , in which to receive the key, is first placed within the key-barrel to rest upon the ledge e^3 therein, the cylinder of wards R being next inserted, as above stated. This plate h^3 is the key-hole plate or escutcheon of the lock, the slit i^3 constituting the key-hole.

In the lock as shown the spindles f are independent of each other, being separated at the middle of the lock, with the ends opposite each other, and the axes of the spindles in the same straight line.

The beveled surface k^3 of the latch or head L of the bolt is not a plain surface, as generally made, but formed of two reverse curves, as shown in Fig. 15. This form of bolt-head causes it to slide back more readily when encountering the socket-plate C' in the act of closing the door. The contact of the bolt-head with the socket-plate occurs at the point n^3 , where the bevel or slant of the bolt-head is of a shape to more easily overcome the inertia of the bolt, after which the latter, from the form of the curve, is moved more rapidly back into the lock. Where the beveled surfaces of the bolt-heads of door-locks are made uniform, no advantage is given the bolts at the point of starting or at the point at which their inertia mainly is necessarily overcome.

The plate D' , Figs. 12 and 15, in which the beveled head of the bolt rests, is formed with an extended plate, p^3 , reaching inward toward the lock, which forms a guide for the bolt-head to move back upon when withdrawn within the door. This plate extends sufficiently far back to prevent the corner o^3 of the bolt from at any time passing off thereof and catching against the edge of the same. The inner surface of the plate D' —that is, the surface in contact with the door—and the like surface of the socket-plate C' , Fig. 13, are longitudinally furrowed, as shown, so that sharp edges r^3 are presented to the wood, and, slightly sinking into the latter, cause the plates to be more firmly held thereto. The ends of these plates are made circular, so as to be more conveniently fitted to the door and casing than if made square across, the depressions in the wood to receive them being formed at the ends by boring with an ordinary carpenter's bit and cutting out

the timber between them to form the parallel part of the depression. The rocker-barrels, also being cylindrical, may be let into the door in a circular opening formed with a bit of the right diameter, and the bolt may also be inserted in a circular cavity formed in the edge of the door by an ordinary bit. On account of the parts being thus formed, the lock may be quickly and conveniently fitted to the door, the cavities in which to receive the parts being nearly all formed with bits of proper diameter.

The plate F^2 (shown on Sheet 3) is designed to be put upon a door rabbeted at its edge—as, for instance, a door of a pair of double doors opening and closing at the middle. This rabbeted plate has its longitudinal depressed and raised parts L' and F' about equal in width, the opening G' for the head of the bolt cutting across the line providing said parts, as shown. To form the opening G' , a rectangular shell or wall, I' , is built out upon the depressed part L' of the plate even with the surface of the elevated part N' thereof. The exterior surface of the wall I' is formed with longitudinal grooves s^3 , for the purpose of preventing a person from using a lever or other instrument to force back the bolt, the end of the instrument catching in the grooves s^3 .

The pawl i is fitted to the arm or holder h with a screw-thread, so as to be adjustable in a direction toward or from the rosette.

What I claim as my invention is—

1. In a door-lock, a cylindrical rocker barrel or case, T , formed with a cross tie or web, t , extending inward from the inner surface thereof in a plane at right angles with the axis of the case, substantially as described.

2. In a door-lock, a cylindrical rocker barrel or case, T , having a cross tie or web, t , extending inward from the inner surface thereof in a plane at right angles with the axis of the case, said cross-tie being formed with a longitudinal opening, b' , and a rocker, g , formed with a hub, c' , fitted to the opening b' and having a bearing therein, substantially as described.

3. The combination, in a door-lock, of the bolt K , formed with arms l , rocker-barrel T , formed with a perforated cross-tie, t , and a rocker, g , having arms k , adapted to act upon the arms of the bolt, said rocker having its bearing in the cross tie, substantially as described.

4. The combination, in door-locks, with the similar rocker-barrels T , abutted at their ends and held together by screws a^3 , said rocker-barrels being formed with tie-pieces t , of rockers g , having bearings within the respective tie-pieces, and bolt K , held between the rockers, substantially as described.

5. In combination with the knob G of a door-lock, a rosette, P , held within the knob, and a cone-plate, I , having a flange or projecting part, h^2 , held between said rosette and knob, substantially as shown and described.

6. In combination with the knob G of a

door-lock, a rosette, P, secured to said knob, a cone-plate, I, held between the rosette and knob, and a key-barrel, O, resting concentrically within said knob and cone-plate, secured rigidly to the latter, substantially as shown and described.

7. The combination, in door-locks, of the knob G, with notched rosette P, secured thereto, the key-barrel O, key-piece *b*, spirally-grooved block or socket *d*, spindle *f*, and arm *h*, secured thereto, provided with a pawl for the rosette, substantially as set forth.

8. The combination, in door-locks, of the knob G, with rosette P, secured thereto, the key-barrel O, key-piece *b*, spirally-grooved block or socket *d*, spindle *f*, rocker *g*, and tie-piece *t*, substantially as set forth.

9. In combination with the knob and rosette P of a door-lock, the key-barrel O, key-piece *b*, spirally-grooved block *d*, spindle *f*, and pawl for the rosette, with rigid pin *n*, adapted to engage the spiral groove of the block, substantially as shown and described.

10. The combination, in door-locks, of the key-barrel O, slotted key-piece *b*, key-bar *g'*, and spring *h'*, substantially as shown.

11. A key-barrel, O, of a door-lock, formed with a key-hole, *g*³, at one end thereof and an internal slot, *r'*, in combination with a series of wards resting within the key-barrel formed with projections *a*² to enter said slot *r'*, substantially as shown.

12. In combination with the slotted key-barrel of a door-lock, a cylindrical body, R, fitted therein, composed of a series of circular plates, *s'*, and circular plates *u'*, formed with peripheral projections *a*² to enter the slot of the key-barrel, said plates being held together by longitudinal ties *b*², substantially as shown and described.

13. In a lock, a series of slotted circular plates, *s'*, having notches *c*², formed at the sides of the slots, and longitudinal tie-bars *b*², inserted in the notches, in combination with a series of circular plates, *u'*, formed with concentric openings of a size to allow the said ties to pass through, substantially as described and shown.

14. A hollow key-barrel, O, of a door-lock, having its bore formed in chambers of different

diameters, and formed with a concentric longitudinal key-hole at one end thereof, substantially as shown.

15. In combination with the key-barrel O and rosette P, the spirally-grooved block *d*, and spindle *f*, with arm *h* secured thereto, and provided with an adjustable pawl, *i*, for the rosette, substantially as set forth.

16. The combination, in a door-lock, of a rocker-barrel, T, formed with a tie-piece, *t*, a divided bolt, K, stops *p* for the bolt, and spindle *f*, with ring or part *d'* to bear against the stop, substantially as and for the purpose set forth.

17. The key-barrel of a door-lock, having its bore formed in chambers of different diameters and provided with a notched flange, *p*², at one end thereof and a central longitudinal opening, *g*³, for the key at the opposite end, said opening *g*³ being of less diameter than the bore of the barrel, substantially as shown.

18. The bolt K of a door-lock, formed with a head or latch, L, having a curved inclined face, *k*³, substantially as shown.

19. The plate D' and opposing socket-plate C' for the bolt of a door-lock, formed with ridges *r*³ upon their inner surfaces, substantially as and for the purpose specified.

20. A plate, F', for a door-lock, having a longitudinal portion, L', thereof depressed below the remaining portion, N', with the opening G' formed to cross the line dividing the said two portions of the plate, substantially as shown and described.

21. In combination with the rosette P of a door-lock, the spindle *f*, arm *h*, and adjustable pawl *i* for the rosette, substantially as shown.

22. A plate, F', for a door-lock, having a longitudinal portion, L', thereof depressed below the remaining portion, N', with the opening G' for the bolt-head made to cross the line dividing the said two portions L' and N' of the plate, with notches or grooves *s*³ formed in the outer face of the wall of the opening, substantially as and for the purpose specified.

M. S. OTIS.

Witnesses:

E. B. WHITMORE,
M. KENDRICK.