

C. H. SMITH.  
Latch.

No. 216,904.

Patented June 24, 1879.

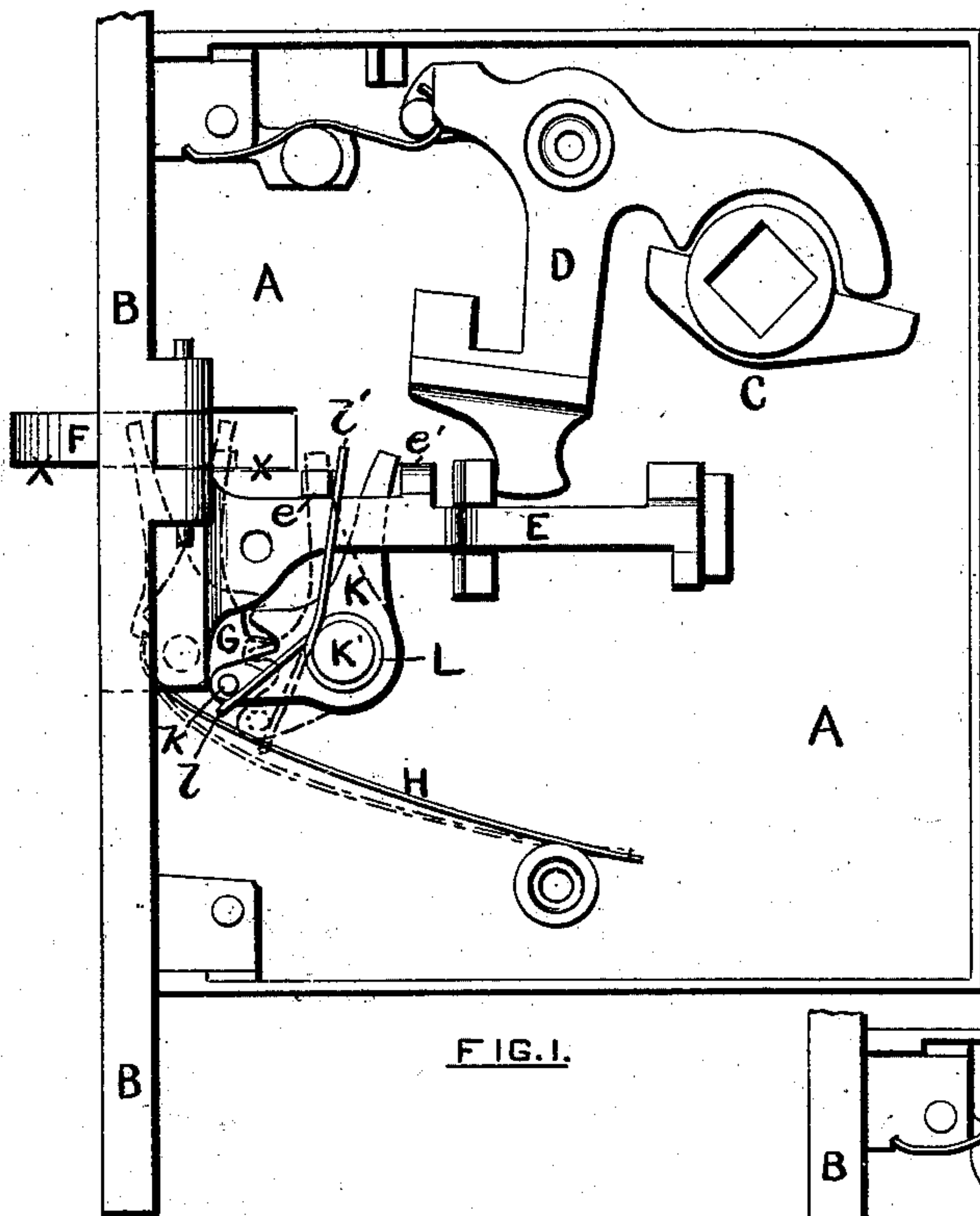


FIG. 1.

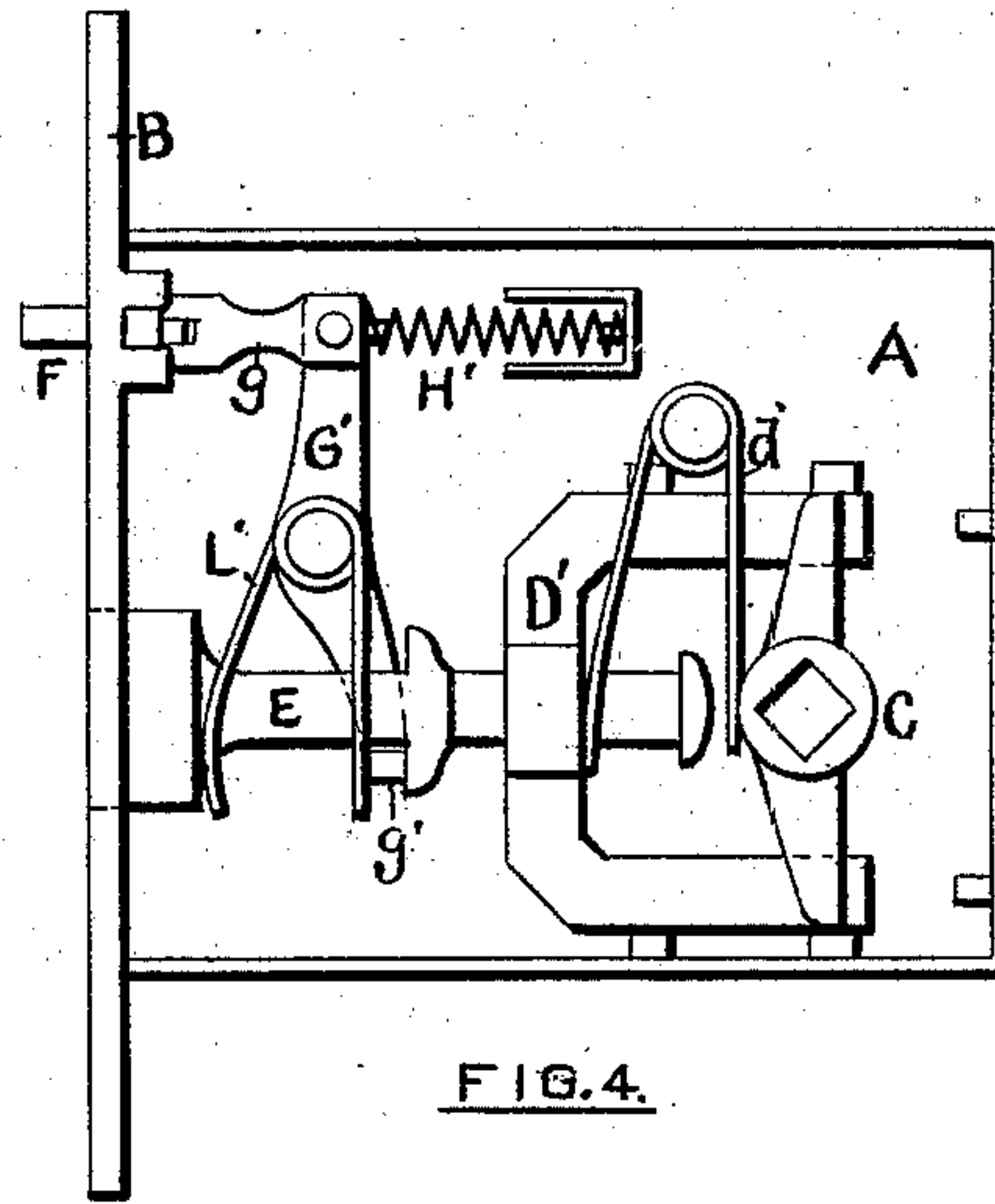


FIG. 4.

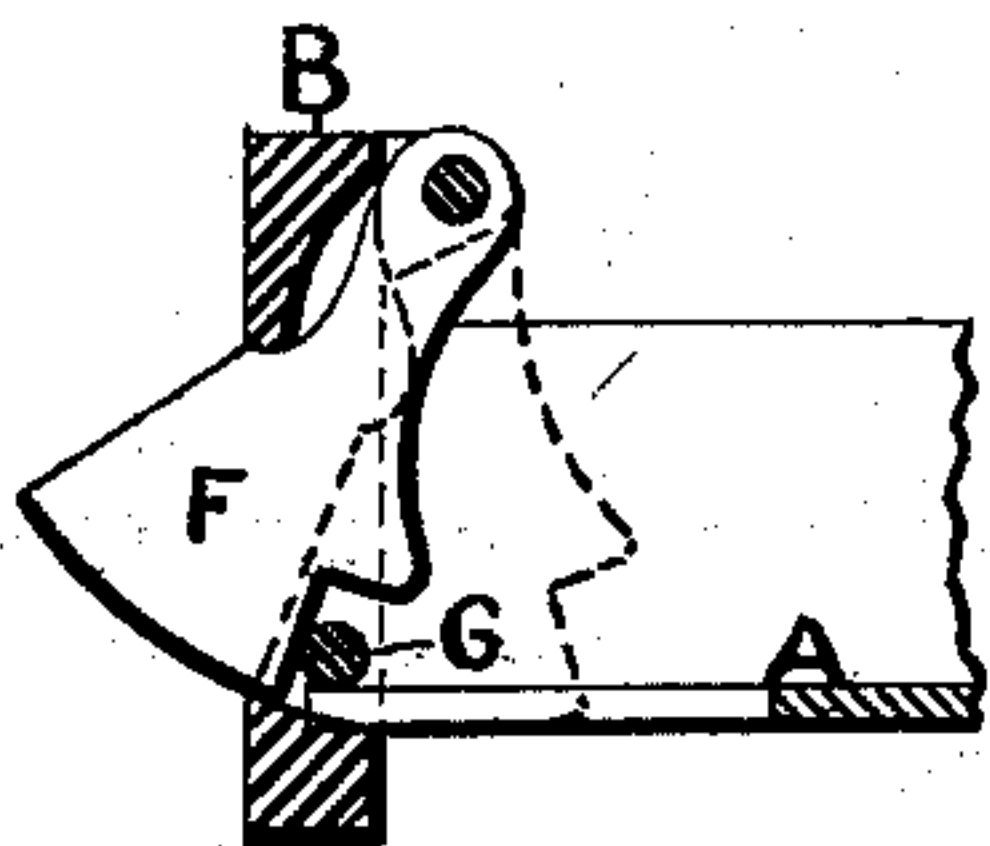


FIG. 3.

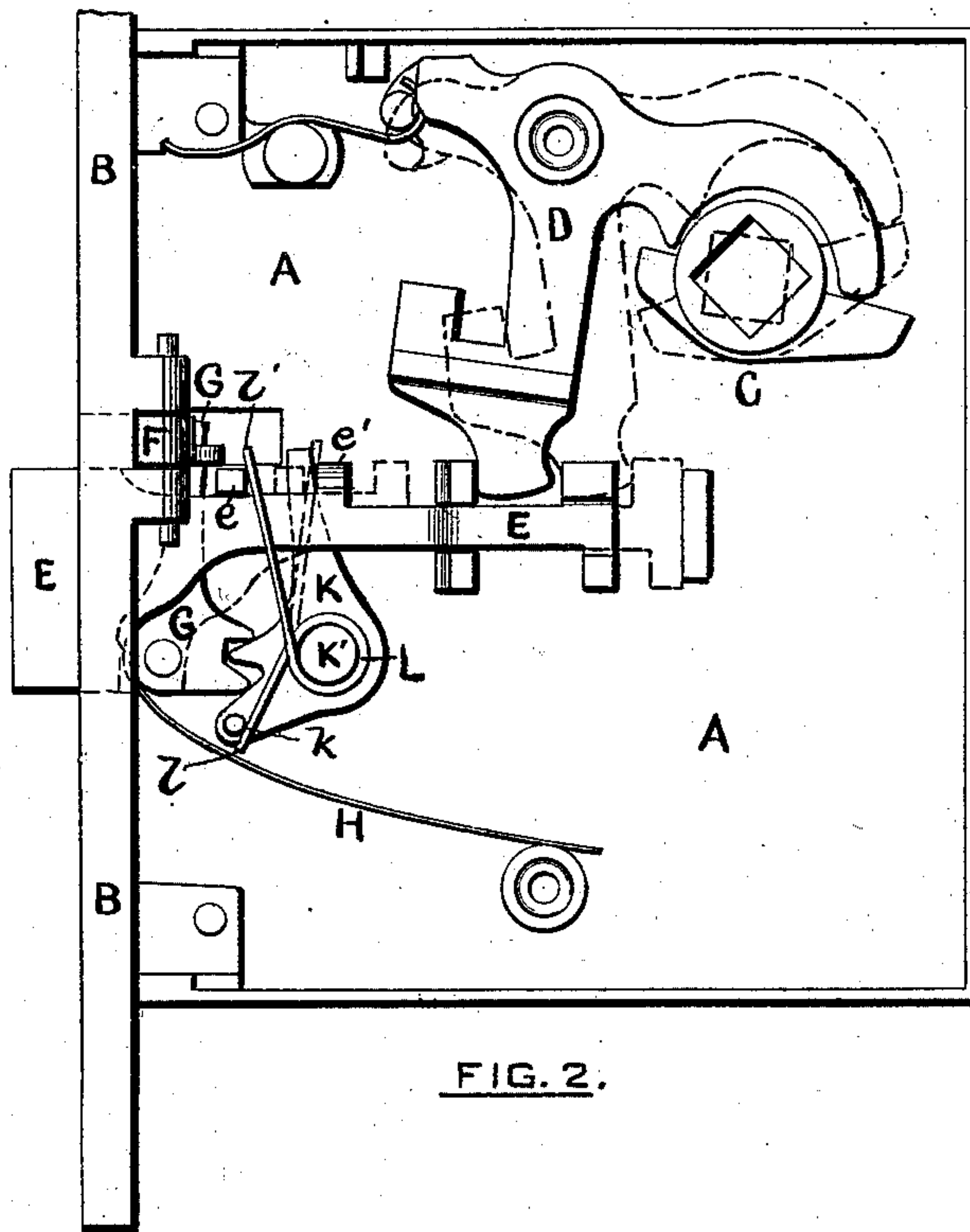


FIG. 2.

WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN LATCHES.

Specification forming part of Letters Patent No. **216,904**, dated June 24, 1879; application filed April 28, 1879.

*To all whom it may concern:*

Be it known that I, CHARLES H. SMITH, of the city and county of New Haven and State of Connecticut, have invented a certain new and useful Improvement in Door-Latches; and I do hereby declare that the following specification, taken in connection with the accompanying drawings, forming a part of the same, is a full, clear, and exact description thereof.

The improved latch hereinafter described belongs to that class in which, upon the complete closing of the door, the latch-bolt previously held back within the case is permitted to be projected into the mortise in the door-jamb for the purpose of securely holding the door.

In my invention a square instead of a bevel-faced latch-bolt is employed, and which is at all times housed within the latch-case unless a cam-faced lever, which projects beyond the plane of the face-plate, and which is combined with the latch-bolt, as hereinafter explained, is pressed inward, in which case, if the door be open, the bolt will be moved outward as the lever is moved inward; but if the door be closing and the face of the latch be abutting against any part of the door-jamb or usual striker-plate, the latch will be held within the case until the door is fully closed, notwithstanding that the operative cam-faced lever is moving inward. The movement of the said lever, however, inward winds up a spring, which reacts when the bolt is in line with the mortise in the jamb, and projects the bolt forward to hold the door fast.

The construction shown in the drawings exhibits several advantages. In the first place, the cam-faced lever projecting beyond the face-plate presents a slight frictional resistance to the door in closing. Again, inasmuch as this lever operates to cause the bolt to be projected forward instead of operating to force a latch inward, as in the case of ordinary lever-latches, a square-headed latch-bolt can be employed, which has the advantage of great strength; but especially is this arrangement important, for the reason that when the bolt is shot forward after the door is closed it is impossible to insert a knife-blade between the striker-

plate and the edge of the door and push back the bolt, whereas in all lever-latches operating to push the latch inward a bevel-faced latch-bolt is required, and when the door is closed the cam-lever flies outward into the mortise in the jamb, and upon the insertion of a knife-blade it is easy to press upon the lever and move the bolt backward.

In my improved latch the cam-lever is held inward by contact with the striker at all times when the door is closed, and pressure against it has no tendency to move the latch-bolt backward.

Referring to the drawings, Figure 1 represents a view of the latch with the bolt in its rearward position, the cap-plate being removed. Fig. 2 shows the same with the bolt projected. Fig. 3 represents a section of the face-plate on line *x x*, showing the projecting operating-lever hinged thereto, and Fig. 4 represents a modification of certain parts of the latch.

As shown in each of the figures, A represents the case of the latch; B, the face-plate of the same; C, the hub, and D the lever worked by the knob-spindle to withdraw the square-faced bolt E when the door is closed. Hinged to the face-plate B is a vibrating cam-faced lever, F, which has a salient face projecting beyond the face-plate for the purpose of impinging against the striker-plate when the door is closing. Engaging the rear face of this lever, as shown in Figs. 1, 2, and 3, is the long arm of a bell-crank lever, G, pivoted to the case, and provided with a flat spring, H, which keeps the levers G and F in contact. The short arm of this lever G is furnished with one or more teeth, which mesh with the teeth of another bell-crank lever, K, also pivoted to the case A. Upon the pivot K' of the lever K is arranged a coil-spring, L, the short arm, *l*, of which engages a pin, *k*, on the short arm of the lever K, the long arm, *l'*, of said spring engaging a lug, *e*, on the latch-bolt. The long arm of the lever K engages a lug, *e'*, on the bolt E, and by the force of the springs H and L tends to keep the said bolt in its rearward position.

As shown in Fig. 1, when the bolt E is housed in the latch, which is always the case when the door is open, the lever D is not in



contact with it, and can in no way exert an operating force upon it. Under these conditions, if the cam-faced vibrating lever F should be worked, the spring L would act only as a lever, and move the bolt E outward and inward simultaneously with but in a direction opposite to that of the movement of the vibrating lever F, the spring H returning the parts to their respective positions shown in said figure. When the door closes, however, the spring L takes on its proper function, and no longer acts as a lever, but as a spring, as will now appear.

During the movement of the door to a closed position the projecting vibrating lever F comes in contact with the striker-plate, and is turned backward upon its pivot. This movement operates the levers G and K, and tends to advance the bolt by the lever action of L. The outward movement of the bolt, however, is prevented until the mortise in the striker-plate is in line with the head of the bolt, which does not occur until the door is fully closed and the lever F moved to its farthest rearward position. The bolt, therefore, being thus prevented from advancing by the striker-plate during the backward movement of the lever F, the long arm of L remains in position, while its short arm, *l*, moves with the lever K, as shown by broken lines at Fig. 1. This winds up and increases the force of the spring L, so that when the mortise and bolt-head become aligned it discharges its spring function, and projects the bolt into the mortise by a movement of its arm *l'*, the parts assuming the position shown by full lines at Fig. 2.

The forward movement of the bolt brings its tail into contact with the lever D, in which position the bolt is retained by the spring L, ready to be withdrawn by the lever D when operated by the knob-spindle for the purpose of opening the door. When this lever is moved and the bolt retracted the spring L would resume its lever function were it not that the vibrating lever F is prevented from advancing, because of its contact with the striker-plate. The levers G and K, therefore, remain stationary, and only the long arm, *l'*, of the spring L is moved by the bolt. This increases the force of the spring by winding it up, as shown by broken lines in Fig. 2, so that when the bolt has been retreated into its case, and the lever F is allowed to advance by the opening of the door, the lever will be projected into its original position beyond the latch-face by the joint action of the springs L and H.

Although, as hereinbefore described, a bell-crank lever, D, is used to retract the bolt for the purpose of opening the door, and levers G K are employed to increase the tension of the spring L, yet a common yoke may be substituted for the lever D, and a single lever for the levers G K. Such a modification is shown at Fig. 4, where D' represents the yoke in engagement with its hub and overlying the tail of the bolt, a spring, *d*, operating to keep the

parts in the position shown. The projecting vibrating lever F is engaged by an arm, *g*, which is pivoted to a lever, G', and controlled by the spring H'. The lever G' is pivoted to the latch-case, and its end *g'* is in contact with the bolt. The spring L' is placed upon the pivot of the lever G', and its ends respectively engage the end *g'* of the lever G' and the head of the bolt E. Under this arrangement the spring L' performs the same functions as the spring L, the lever G' the same as the levers G and K, the spring H' the same as the spring H, and the yoke D' the same as the lever D. The movements of the bolt E and vibrating lever F, therefore, are the same as before specified.

From the foregoing description it will be seen that when the door is open the latch-bolt will be housed in its case so long as the lever F projects to its full extent beyond the face-plate B; that should the lever F be moved when the door is in this position, the bolt will be operated simultaneously with but opposite in direction to the lever by the lever function of the spring L or L', and that when the lever F ceases to be manipulated the spring H or H' will house the bolt and project the lever into the proper position for the closing of the door. It will also be seen that when the door is closing or opening the movements of the lever F and bolt E are not simultaneous, but that the complete movement of one is followed by the complete movement of the other, the spring L or L' performing its true spring function to advance the bolt or project the lever F, as the case may be.

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

1. The combination of a vibrating lever pivoted to the latch-case and projecting beyond the face-plate, a sliding bolt held back by spring-pressure within the latch-case, and intermediate operative mechanism, substantially as described, whereby the bolt will, by lever-connections, be moved outward as the vibrating pivoted lever is moved inward unless the bolt is forcibly held back, but if so held the movement inward of the said lever will wind up a spring in readiness to project the bolt so soon as the obstacle is removed, as set forth.

2. The combination of a vibrating cam-lever pivoted to the latch-case and projecting beyond the face-plate, a lever or a connected train of levers within the latch-case and operated by the cam-lever, a sliding bolt held back within the latch-case, and a spring which is wound up by the movement of the cam-lever inward, substantially as and for the purpose specified.

3. The combination of a sliding latch-bolt, a lever or a connected train of levers operating under spring-pressure to slide the bolt into and retain it within the latch-case, and a flexible spring-lever, L, arranged to throw the



bolt forward when the bolt is relieved of the pressure which tends to hold it back, substantially as described.

4. The combination, as substantially before set forth, of the sliding bolt, the hub and its arms worked by the knob-spindle, suitable mechanism connecting the bolt with the hub, mechanism, substantially as described, for retracting the bolt independently of the knob-spindle and its connections when the vibrating cam-lever is not pressed inward, and mechanism, substantially as described, for projecting the bolt when the door is fully closed.

5. The combination of the sliding latch-bolt, the spring-lever for projecting the bolt mounted loosely upon the fulcrum of a vibrating lever within the latch-case, and the operative cam-lever and its connections for working the vibrating lever, substantially as described.

CHARLES H. SMITH.

Witnesses:

THEO. E. SMITH,  
H. E. RUSSELL, Jr.