

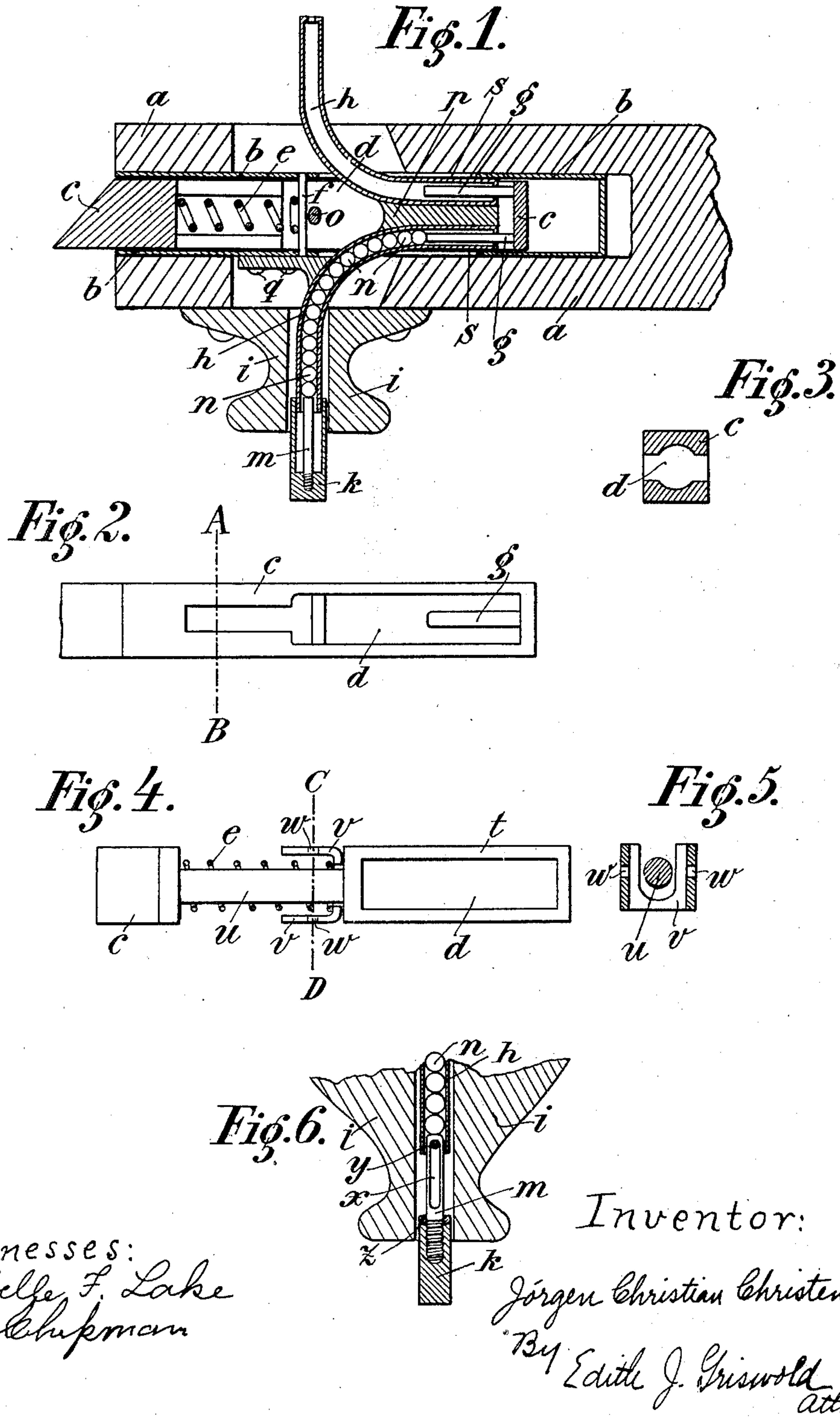
No. 719,087.

PATENTED JAN. 27, 1903.

J. C. CHRISTENSEN.
LOCK.

APPLICATION FILED SEPT. 30, 1902.

NO MODEL.



UNITED STATES PATENT OFFICE.

JØRGEN CHRISTIAN CHRISTENSEN, OF AALBORG, DENMARK.

LOCK.

SPECIFICATION forming part of Letters Patent No. 719,087, dated January 27, 1903.

Application filed September 30, 1902. Serial No. 125,354. (No model.)

To all whom it may concern:

Be it known that I, JØRGEN CHRISTIAN CHRISTENSEN, locksmith, of Aalborg, in the Kingdom of Denmark, have invented certain
5 new and useful Improvements in Locks, of which the following is a specification.

The present invention refers to improvements in locks of the kind that are opened by pushing a button on the door.

10 The invention consists therein that the movement from the button is transmitted to the bolt by means of a flexible but non-compressible organ inclosed within a tube—for instance, a row of balls, a screw-spring whose
15 windings are close to each other, or the like. By this arrangement the use of levers or oblique surfaces gliding upon one another is avoided and the construction of the lock is rendered more simple and efficient.

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

Figure 1 shows a horizontal section through a lock of the said kind. Fig. 2 is the bolt seen in side elevation. Fig. 3 is a section on the
25 line A B of Fig. 2. Fig. 4 is another constructional form of the bolt. Fig. 5 is a section on the line C D of Fig. 4, and Fig. 6 is a detail.

30 *a* is the door, in which the lock is fixed, *b* the lock-case, and *c* the bolt. The bolt is provided with a long slot *d*, in whose front end is located a spring *e*, which with its one end bears against the bolt and with its other end against a pin *f* or the like in the lock-case *b*.
35 The spring *e* tends to push forward the bolt *c*. Two pins *g*, whose axis are parallel with the moving direction of the bolt, are fixed at the rearmost end of the slot *d*.

40 Two tubes *h*, attached to the lock-case, are carried into the slot *d*. These tubes are bent after a circular arch, the two ends of the same tube being at right angles with each other and made rectilinear through a distance corresponding to the length of the pins *g* or to the
45 distance which the bolt *c* moves through. The tubes *h* are mounted in such a manner that the pins *g* during the movement of the bolt can glide inside the inner ends of the tubes *h*. The outer ends of the tubes, which are at
50 right angles with the door-planes, project into knobs *i*, mounted upon the door. In each of these knobs is arranged a hollow button *k*,

gripping over the end of the tube *h* and being supplied with a pin *m*, projecting into the end of the tube.

The tubes *h* are filled with balls *n*, whose diameter almost corresponds to the inside diameter of the tubes. The balls *n* fill that part of the tubes *h* which is lying between the ends of the pins *g* and *m* when one of these is
60 pushed into the tube and the other simultaneously withdrawn from same.

By pressing on the button *k* when the lock is in the position shown in Fig. 1 the pressure will be transmitted, through the pin *m*, to the
65 row of balls *n*, and as the balls cannot move sidewise the pressure and the movement will be further transmitted to the pin *g*, which is pushed back, carrying along the bolt *c*, whereby the lock is opened. At the same time the
70 spring *e* is compressed in such a manner that when the pressure upon the button *k* ceases the bolt will again slide forward and the pin *g* will, through the row of balls *n*, push back the button *k* until it assumes the original position. A pin *o* limits the forward movement
75 of the bolt. At their extremities the tubes are of a smaller diameter than the balls, (see the uppermost end of the upper tube *h*, Fig. 1,) so that the balls cannot drop out even if
80 the pins be completely removed. The button *k* is in a suitable manner connected with the tube *h* or with the knob *i*.

As shown in Fig. 1, the tubes *h* can be mutually connected by means of a block *p*,
85 to which they are both soldered, so that the two tubes form one single body, fastened to the lock-case *b* by means of a bracket and screws *q*. The tubes *h* protrude through openings *s* in the lock-case.

Another constructional form for the bolt *c* is shown in Figs. 4 and 5. The slot *d* is here arranged in a special frame *t*, connected with the other part of the bolt by means of a rod
90 *u*. The pin *f* (shown in Fig. 1) is replaced by a U-shaped plate *v*, fastened to the lock-case by means of screws passed through holes *w*. The spring *e* is inserted between the head of the bolt and the plate *v*.

In Fig. 6 is shown another constructional
100 form for the manner in which the pin *m* is arranged in the tube *h*. The pin *m* is provided with a slit *x*, into which a pin *y* in the tube *h* is projecting. The pin *m* is screwed

into the button *k* and held in position by means of a counter-nut *z*.

As already stated, a tightly-wound spiral spring inclosed in tubes may be used instead of a row of balls and against whose ends the pins *g* and *m* act in the same manner as in the construction described above. The use of a row of balls is, however, to be preferred instead of a spring, the friction being thereby greatly diminished.

Having now particularly described and ascertained the nature of this said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In locks provided with a bolt adapted to be pushed back by pressure at right angles to the door-frame, the combination of the bolt, a button on the door upon which button pressure is effected, and a bent tube between the bolt and the button, with a flexible but non-compressible organ inclosed in said tube.

2. In locks provided with a bolt adapted to be pushed back by pressure at right angles to the door-plane, the combination of the bolt, a button on the door upon which button pressure is effected, and a bent tube between the bolt and the button, with a row of balls inclosed in said tube.

3. A lock-case, a bolt movable therein and

provided with a slot and pin, in combination with a bent tube attached to the lock-case, one end of said tube passed into the slot in said bolt and over the pin in said bolt, the outer end of said tube adapted to terminate in the knob of a door, a press-button provided with a pin movable inside the outer end of said tube, and a row of balls filling the tube between the pin in said bolt and the pin in said press-button, whereby when one of said pins is pushed into said tube the other is simultaneously pushed out by said balls.

4. A lock-case, a bolt movable therein and provided with two pins, in combination with two bent tubes attached to the lock-case and connected together to form a single body, the inner ends of said tubes being passed over said pins in said bolt, press-buttons provided with pins movable inside the outer ends of said tubes, and balls in said tubes between the pins in their ends.

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

JØRGEN CHRISTIAN CHRISTENSEN.

Witnesses:

ERNEST BOUTARD,
EMIL MOURITZEN.