

(No Model.)

3 Sheets—Sheet 1.

W. CORLISS.

SAFE LOCK.

No. 271,312.

Patented Jan. 30, 1883.

Fig:1.

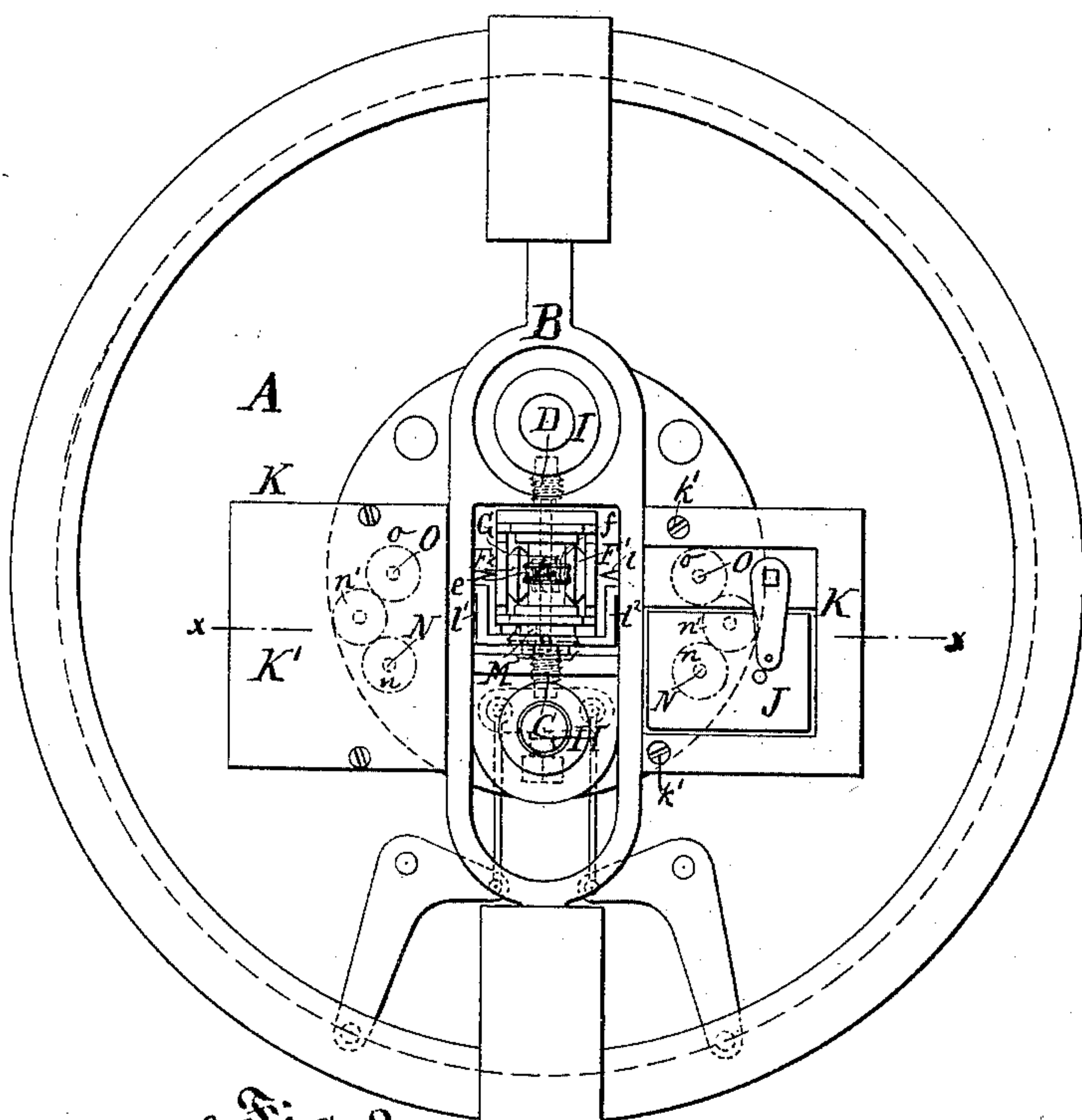
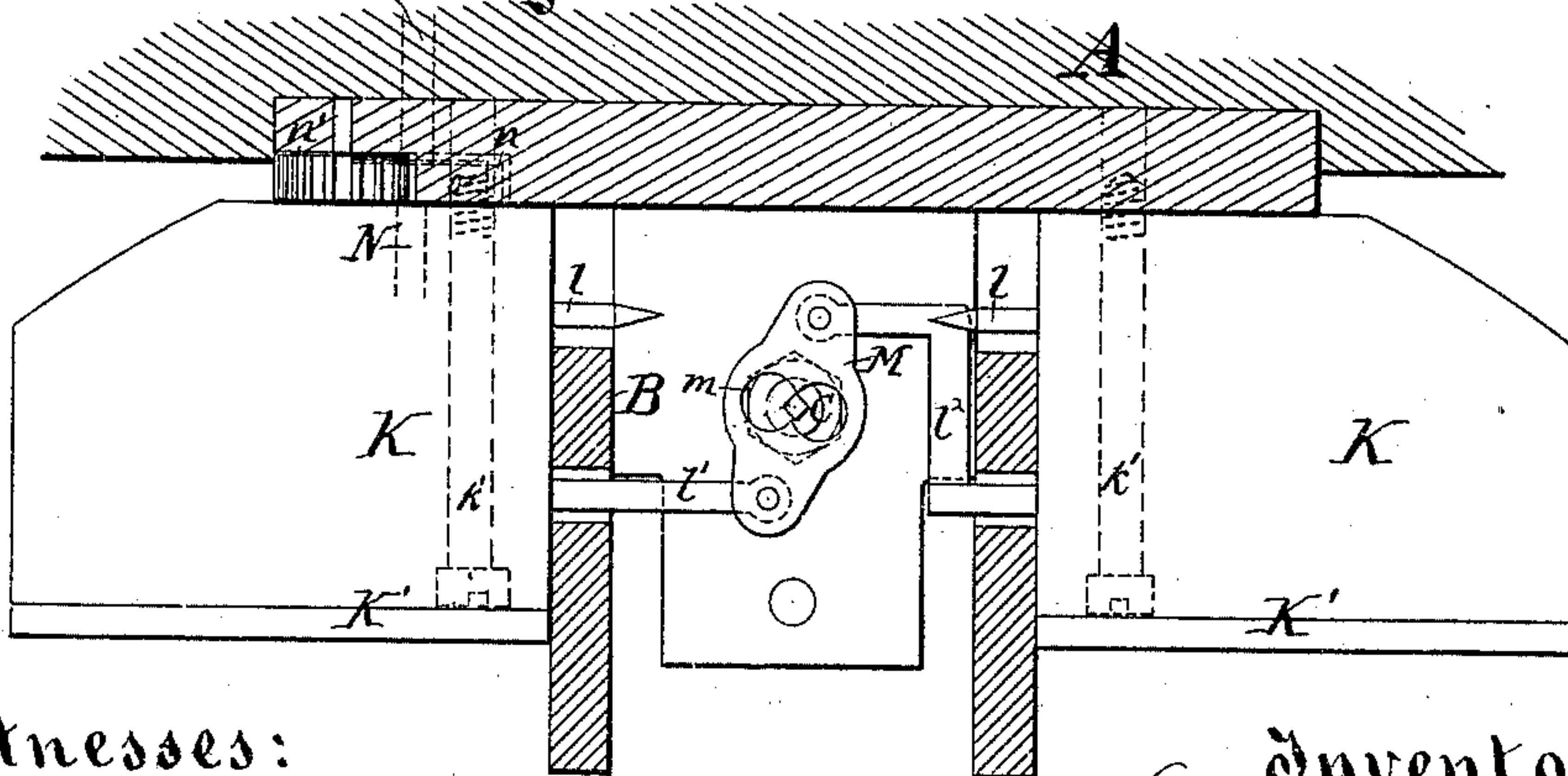


Fig:2.



Witnesses:
Charles R. Searle,
Thomas Davin

Inventor:
William Corliss
His attorney
Thomas D. Sinton

(No Model.)

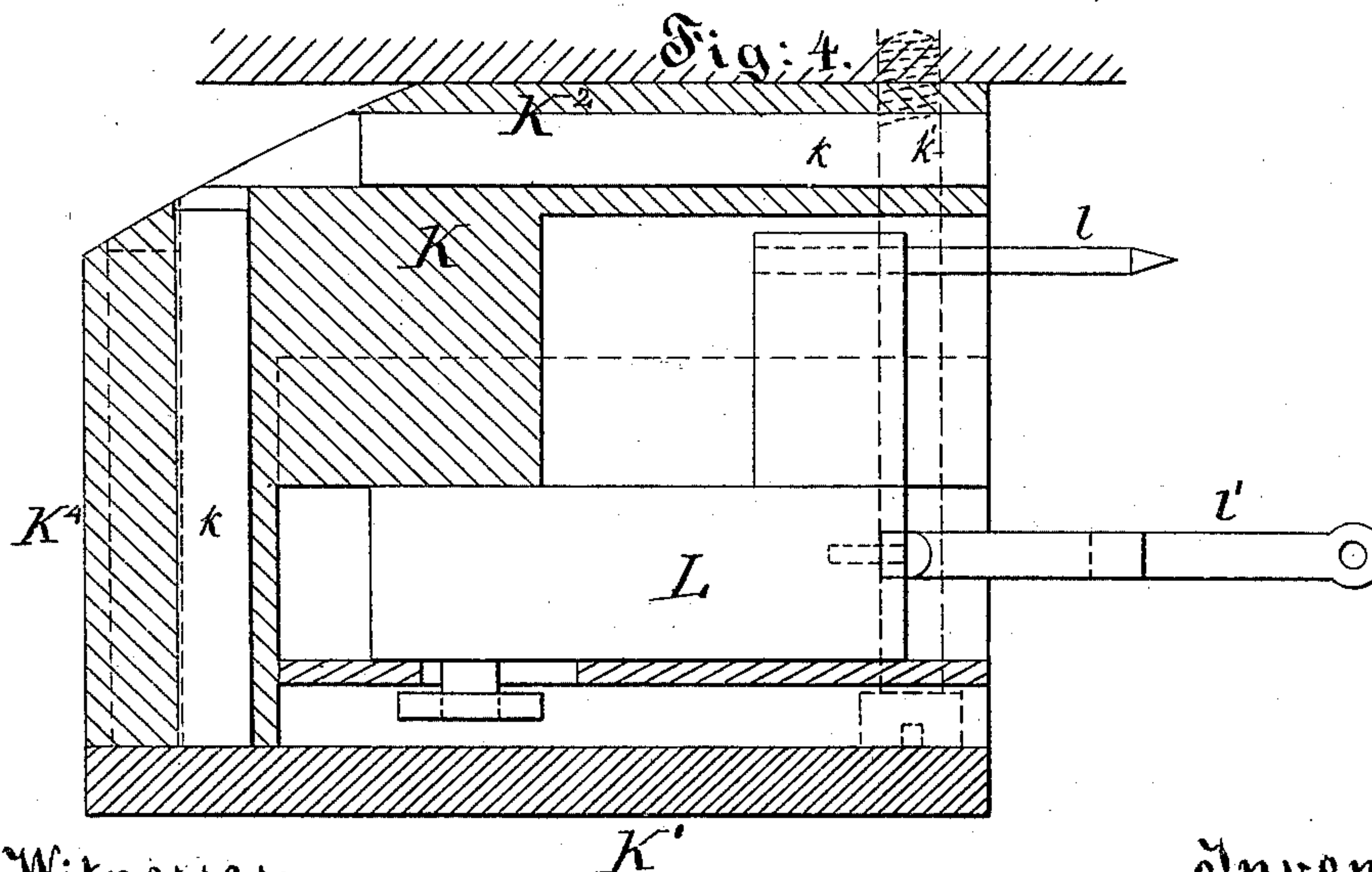
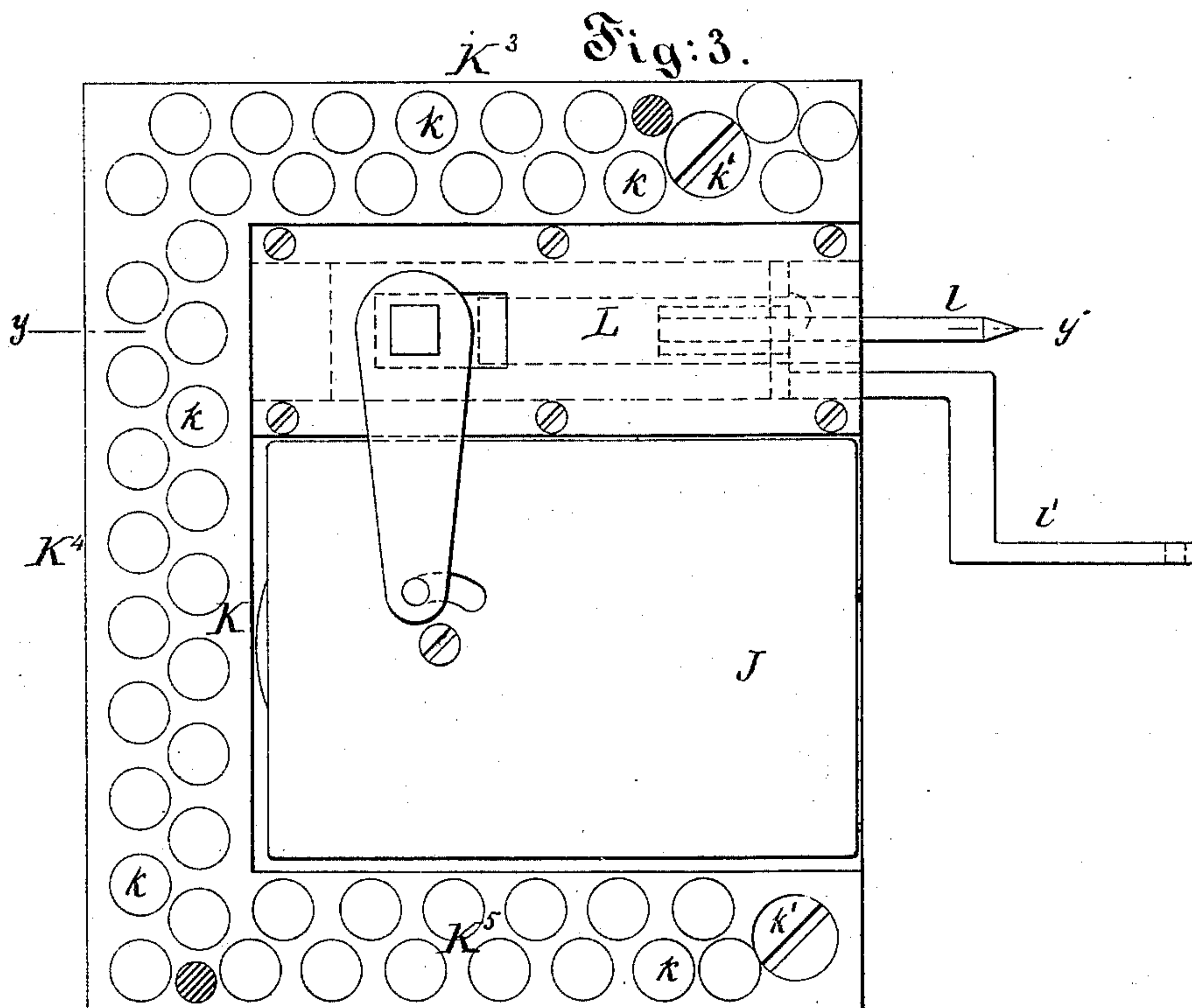
3 Sheets—Sheet 2.

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SAFE LOCK.

No. 271,312.

Patented Jan. 30, 1883.



Witnesses:

Charles R. Searle
Thomas Davin

 K'

Inventor:

William Colles
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(No Model.)

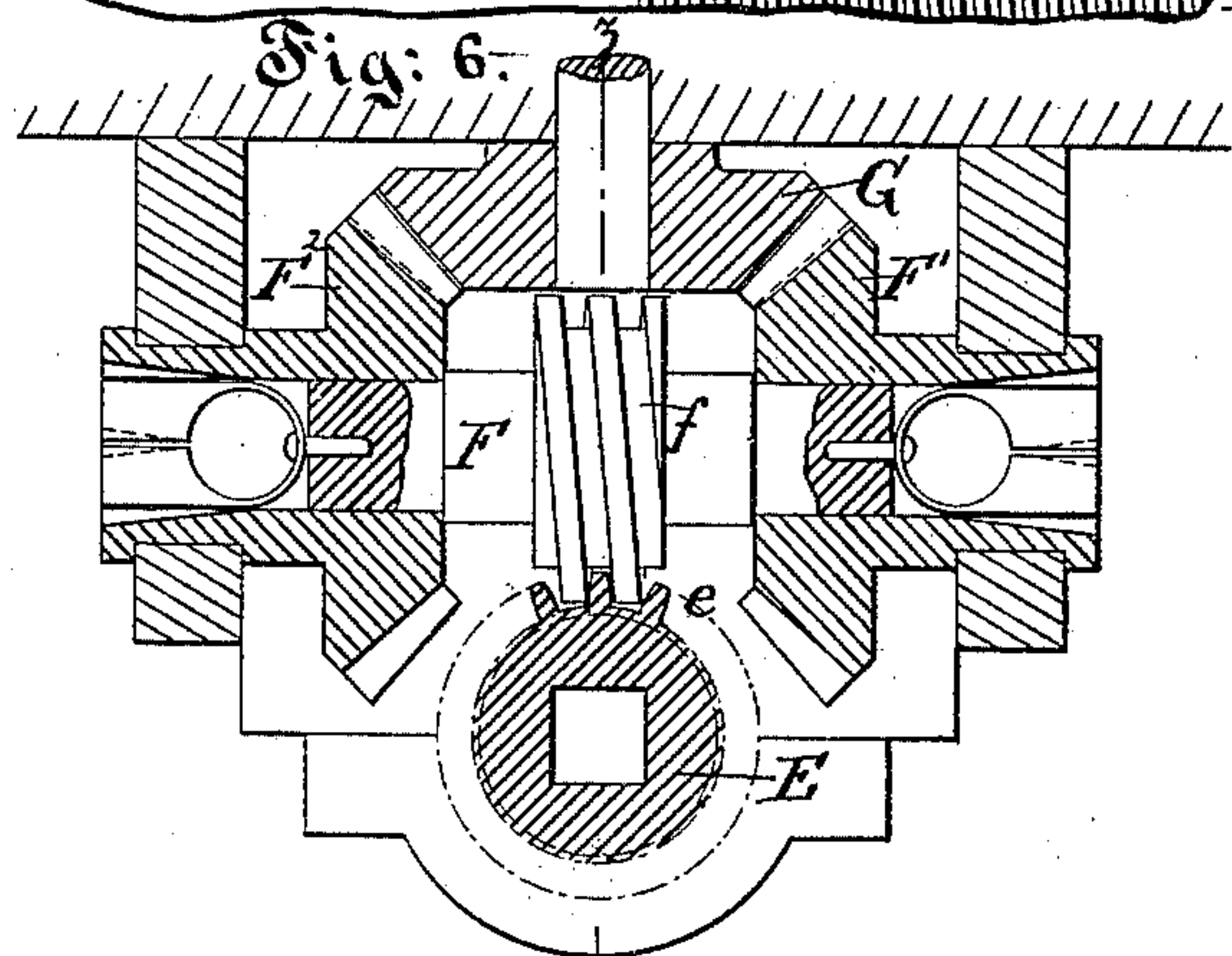
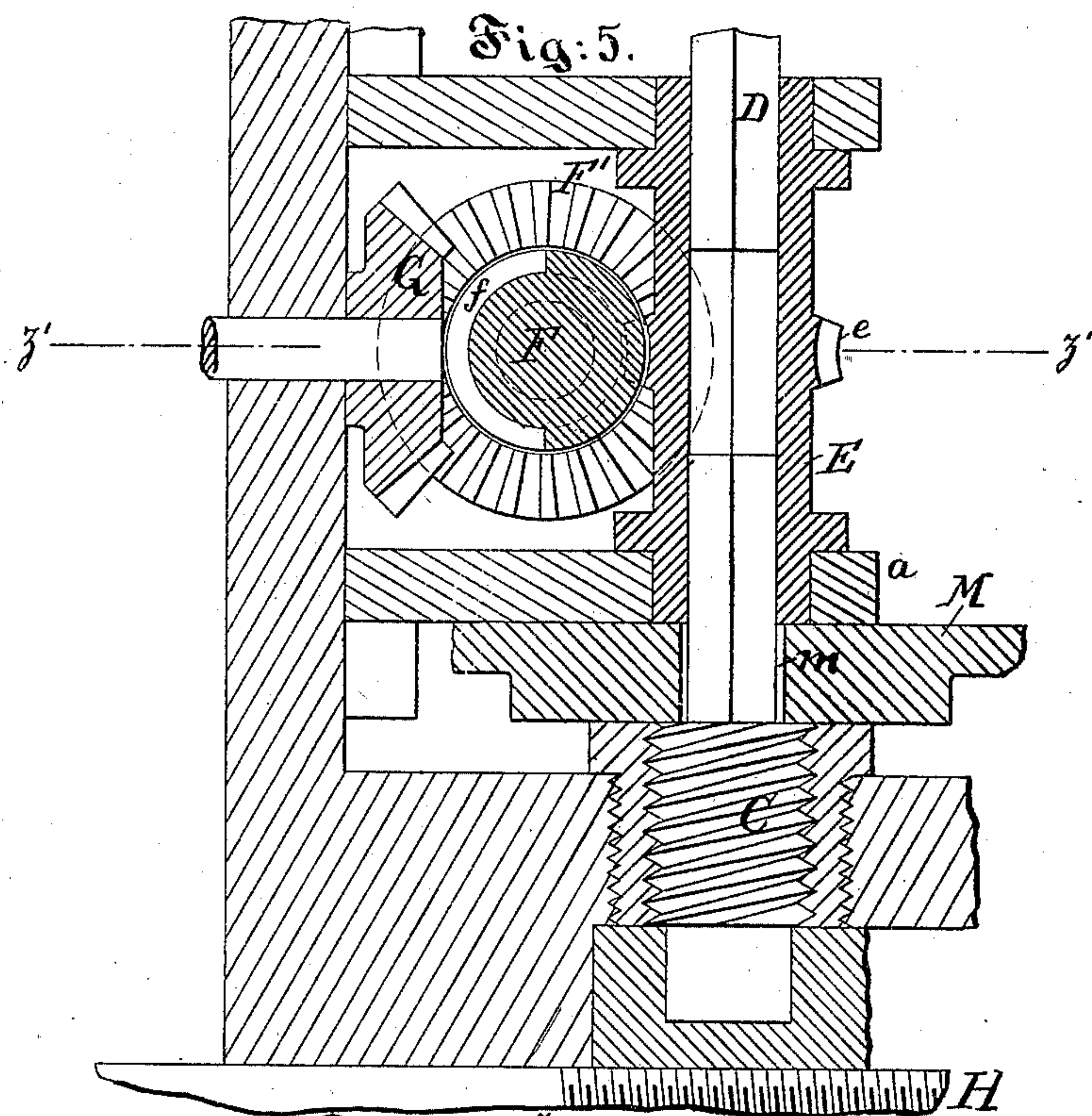
3 Sheets—Sheet 3.

W. CORLISS.

SAFE LOCK.

No. 271,312.

Patented Jan. 30, 1883.



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM CORLISS, OF PROVIDENCE, RHODE ISLAND.

SAFE-LOCK.

SPECIFICATION forming part of Letters Patent No. 271,312, dated January 30, 1883.

Application filed June 30, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CORLISS, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Burglar-Proof Safes; and I do hereby declare that the following is a full and exact description thereof.

In a patent to me, dated July 25, 1882, No. 261,532, I have described a locking mechanism for safes, a principal feature of which is a certain arrangement of the lock proper with relation to the mechanism for throwing the bolt or bolts which secure the door, whereby the lock performs, conjointly with certain parts of the locking mechanism, an active function essential to the act of withdrawing the securing bolt or bolts. The result of this arrangement is that the lock proper is made a vital element of the door-opening mechanism.

In safes as ordinarily constructed the lock proper, when locked, performs merely a passive function in obstructing, by means of one of its members, the operation of the bolt-work. It follows therefrom that in such safes the door may be readily opened after simply removing the lock proper, while in a safe constructed according to my invention, as described in my above-mentioned application for patent, any derangement of the delicate parts of the lock, or any change of position of the entire lock by undue violence or otherwise, will render the opening of the safe a practical impossibility. According to the present invention I avail myself of these peculiar qualities of my locking mechanism to still further increase the safety against unauthorized persons obtaining access to the interior of the safe by inclosing the lock proper in an extra burglar-proof casing slightly fastened in the interior of the safe, so that even if a burglar should succeed in drilling or otherwise forming a sufficient hole through the door or walls of the safe he will encounter the resistance offered by said extra burglar-proof casing when he attempts to tamper with the lock, which, as above stated, he is obliged to do in order to be able to operate the door-securing bolt or bolts. Such extra burglar-proof casing may be made entirely of some very hard and practically undrillable material; but I prefer to make it of soft metal thickly studded with pieces of hardened steel. This construc-

tion, by presenting different degrees of hardness, precludes all possibility of penetrating this casing by means of drills. I believe that in this manner the lock will be protected sufficiently against the possibility of tampering with it, even for a length of time exceeding that which, under the most favorable circumstances, a burglar is supposed to have for effecting his purpose. I provide, however, means of safety additional to those indicated. The nature of the material of the extra burglar-proof casing is such that when an attempt is made to perforate it a very powerful pressure must be brought on the drill in attempting to make it efficient. I fasten this casing to the interior of the door, or of the walls of the safe, by comparatively slight fastenings, which will give way as soon as any excessive pressure is applied to the tool. The casing, with its inclosed lock, will consequently be forced off or displaced from its proper position, which will render the co-operation of the lock with the bolt-securing mechanism impossible, and thus leave the latter in its locked position without possibility of being opened.

One method in which experienced burglars attempt, under certain circumstances, to obtain access to the lock or locks of safes is to drill out or to draw the spindle or shaft by which the lock is worked from the outside. In order to defeat this method of attack, such spindles are now sometimes made in two or more sections placed out of line and connected by means of gearing. When such gearing is placed on the inside of the door either the difficulties encountered to obtain access to the lock after drilling or drawing the spindle would be small when the lock chances to be directly behind the hole thus formed; or when this is not the case such hole allows, at any rate, the introduction of powder or of any other suitable explosive, the powerful action of which, when exploded, never fails, in the case of ordinary "square," so-called, safes, to instantly lay open the entire contents. In some cases such offset-gearing is arranged within the body of the door, so as to have burglar-proof material on both the outer and inner side thereof, and to avoid the possibility of making a continuous opening clear through the body of the door or wall of the safe, even after the exterior spindle is

removed; but in that case the gearing has to be put in place while the door is being constructed, and in case of breakage or some derangement cannot be repaired without great difficulty. According to my invention I arrange the offset-gearing on the interior of the door and place behind it my detachable burglar-proof-lock casing, thus preventing any possibility of reaching the lock through the spindle-hole, even should the spindle be removed. The introduction of explosives is also retarded until this further obstruction is removed. At the same time I greatly increase the facilities for examining and repairing the parts when necessary.

I have somewhat modified the mode of operating the transverse shafts or bolts which secure the main operating-shafts described in my above-mentioned application, and also the means therein described for still keeping said transverse bolts in the locked position, even if the peculiar clutch mechanism should, by some extraordinary means, or by accident, be expanded without the co-operation of the lock.

The accompanying drawings represent what I consider the best means of carrying out the invention as applied to a safe of spherical or spheroidal form with a door opening inward, as set forth in the patent granted to me January 13, 1874, No. 146,382.

Figure 1 is an elevation of the interior of a circular-safe door provided with my improvements. Fig. 2 is a section on a larger scale on the line $x x$, Fig. 1, certain parts being shown in plan. Fig. 3 represents, on a still larger scale, the detachable and slightly-fastened burglar-proof-lock casing, with its contents. It is a rear elevation with the back plate removed. Fig. 4 is a horizontal section of the same on the line $y y$, Fig. 3. Fig. 5 is a vertical section of certain parts on the line $z z$, Fig. 6; and Fig. 6 is a horizontal section on the line $z' z'$, Fig. 5.

Similar letters of reference indicate like parts in all the figures.

A is the body of the door, supported on a bracket, B. The means for moving the door outward and inward and for expanding and contracting the circular bolt are the same as in my above-mentioned patent.

The transverse bolts C and D are screw-threaded, and provided each with a long square end, which is engaged within the corresponding square interior of the sleeve E, which is provided with a worm-wheel, e , in which engages the worm f of a short horizontal shaft, F, which is loosely supported in the hubs of two bevel-gear wheels, $F' F^2$, which latter may, one at a time, be engaged therewith by means of a clutch-piece similar to that described in my above-mentioned patent. When thus engaged the rotation of a small crank (not shown) on the outside of the door acts through a bevel-wheel, G, meshing into both wheels $F' F^2$, to move the bolts C and D into or out of the recesses provided therefor in the main operating-

shafts H I, or in their respective nuts, as will be easily understood, and by reason of the great purchase due to the worm-gear does this very strongly, while transmitting but a slight strain through G, and consequently slight fastenings for the lock and its inclosing-case are sufficient.

I prefer to employ two locks, J, each capable of working independently. Each lock is inclosed in a separate casing, K, one being mounted on each side of the bracket B. Both sides being exact counterparts of each other, a description of one will suffice. The casing K is a casting of soft brass. It is constructed with a front shield, K^2 , and side shields, $K^3 K^4 K^5$. Both the front shield, K^2 , and the sides $K^3 K^4 K^5$ are drilled with a great number of holes, into which cylinders k , of hardened steel, are tightly driven, as represented in Figs. 3 and 4. The back of the casing K, which can hardly be reached by any means, may simply be formed of a steel plate, K' , screwed on firmly. This casing is fastened to the door, or to an intermediate plate, as illustrated in the drawings, by means of comparatively-light screws k' , the latter being tapped only to a short distance into the door or intermediate plate, so that any excessive pressure exerted on the casing K with a view to penetrate it will be sufficient to strip the threads of such fastenings and displace the entire casing K, with its contents. The lock J, inclosed in this casing, operates a bolt, L, sliding in suitable guideways formed in the latter. A pointed pin, l , is carried on the bolt L, and extends exactly in line with the center of the shaft F, so long as the casing K is maintained in its normal position. By operating the bolt L from the outside through the mechanism of the lock J the pin l is thrust forward into the shaft F, and is thus caused to act on and engage the clutch mechanism. The latter, when so acted upon, connects the adjacent wheel F' or F^2 firmly to the shaft F, so that by turning the wheel G by means of a crank (not shown) on the outside of the door A the shaft F, and consequently the sleeve E, may be turned and the transverse bolts C and D withdrawn from their engagement with the nuts on the shafts H I, whereupon the main shafts H I may be operated to release the door and allow it to be opened. By reversing the order and the directions of these motions the safe will again be properly secured, as is easily understood.

It now remains to describe an additional safeguard.

The bolt L of each lock carries, besides the pin l , an arm, l' or l^2 , respectively, bent as shown in Figs. 1 and 2, reaching into the space behind the bracket B. The ends of these arms $l' l^2$ are connected to a piece, M, having a peculiarly-formed hole, m , through which extends the transverse bolt C. This hole has two large portions connected by a smaller. The small portion is sufficient for the small squared part of the bolt C; but only the large

parts of the hole will admit the larger portion of such bolt. As long as the bolt C is screwed down—that is, engaged with the main shaft H or its nut, and as long as both locks J are locked—that is, each with its bolt L in its backward or outward position—the piece M is held so that a solid part thereof is presented between the enlarged threaded part of the transverse bolt C and the part *a* of the fixed framework of the locking mechanism. These conditions prevent the opening of the safe, even if, by some accident or otherwise, the clutch mechanism in the shaft F should be expanded without throwing the bolt L forward. When, however, by the proper working of the lock, one or the other of the bolts L is thrown forward or inward, the arm *l'* or *l''* respectively will throw the piece M in such position that an enlarged part of the hole *m* is presented above the threaded part of the bolt C to permit the latter to be screwed upward to liberate the main shaft H, so that the latter can be operated. The enlarged parts of the hole *m* should be so proportioned as to fit quite closely to the threaded part of the bolt C, so as to allow the withdrawal of the latter only in one of two definite positions of the piece M. This position being determined by the forward motion of the bolt L, the displacement of the lock-casing K while the lock J is locked, and the consequent destruction of the connection between the bolt L and the piece M, will instantly destroy all control from the outside over the piece M, leaving the latter in such a position as to render the withdrawal of the bolt C impossible.

I can employ any kind of locks, as the locks J. I will describe them as “combination-locks.” In each the lock-operating spindle N protrudes but to a small extent through the wall of the casing K, and carries on its overhanging end a gear-wheel, *n*, which meshes into an intermediate wheel, *n'*. The latter meshes in turn into a wheel, *o*, on the shaft O, which extends through the entire thickness of the door, and is on the exterior connected in any ordinary or suitable manner to the knob of a combination-dial.

The invention may, as above stated, be applied to all kinds and forms of safes, and I do not confine myself to the spherical form referred to.

Modifications may be made in the details without departing from the principle of the invention. Certain parts may be used without others; but I prefer the whole combined and arranged substantially as described.

When only one lock is to be employed one of the gear-wheels *F'* or *F''* will be omitted; or the shaft F may be omitted altogether and the pin *l* arranged as described in my patent above referred to. In this case the shape of the hole *m* in the piece M will be reduced to a simple round hole, and said piece will be permanently pivoted on one side to a part of the fixed framing, the other side being con-

nected to an arm projecting from a single bolt L.

The casing or casings K may be made entirely of hardened steel; or any other construction to render them burglar-proof may be adopted. The lock J may be surrounded on all sides by this burglar-proof casing; but I do not esteem that precaution generally necessary. It is sufficient to protect it on those sides on which an attack will be possible. Both locks may be inclosed in one single burglar-proof casing. The intermediate offset-wheel, *n'*, may be omitted; or more than one of such intermediate wheels may be used, care being taken to always arrange the lock-spindle that passes through the door so that it comes opposite the burglar-proof surface of the casing K.

When a lock is used which, as herein set forth, must actively co-operate with the door-securing mechanism in order to open the safe, some advantages of my invention may even be realized, without the use of the extra drill-proof casing K, by simply fastening the ordinary lock-case, J, by means of fastenings that will give way as soon as an extraordinary strain is exerted upon the same; but in such case these fastenings should be much slighter than in the case of a drill-proof casing, so as to give way with absolute certainty, even under the comparatively light pressure that is exerted on the drill in penetrating ordinary materials, as brass, &c.; but the use of the drill-proof casing K is preferable, as allowing the structure to be made more solid, and also an account of its considerable weight, which, when the fastenings are once loosened, positively insures such a displacement that the proper co-operation of the parts to open the door is rendered absolutely impossible.

Instead of brass, other soft metal may be used for the casing K. The improvements may be applied to safes of rectangular form.

The steel cylinders *k* may be threaded and screwed into the soft metal; but I believe it sufficient to make them fit closely and drive or force them into place.

I claim as my invention—

1. In a safe for valuables, the combination, with a lock, of a casing made separate from the safe and attached on the interior thereof, having a front shield, *K²*, and also side shields, *K³* *K⁴* *K⁵*, the latter extended inward, so as to protect the edges of the lock, all of approximately drill-proof construction and arranged in the interior thereof, substantially as herein specified.

2. In a safe for valuables, the combination of a suitable door, means, substantially as specified, for engaging the same with the safe-body, and a lock arranged to actively co-operate with said engaging means, and fastened to the interior of the safe by slight fastenings, substantially as and for the purposes herein specified.

3. In a safe for valuables, the combination of a suitable door, means, substantially as

specified, for engaging the same with the safe-body, a lock arranged to actively co-operate with said engaging means, and a practically drill-proof casing containing said lock, held
5 by slight fastenings, substantially as and for the purposes herein specified.

4. In a safe for valuables, the spindle O, passing clear through the door proper, combined with offset-gearing on the interior of the
10 door, operating the lock-spindle N, and with a drill-proof casing or body, K, containing the lock, mounted detachably on the interior of the door, opposite the spindle O, and arranged to serve as further drill-proof obstruction when
15 a hole is formed clear through the door by the removal of the spindle O, substantially as herein specified.

5. The shaft F and worm *f*, sleeve E, and worm-gear *e*, in combination with one or more
20 wheels, F' F², adapted to receive a slow strong motion from a quick slight motion received through the wheel G from the exterior of the safe, and with means *l*, operated in connection with one or more locks, for controlling the

transmission of such force to one or more 25 transverse bolts, as C D, operated thereby, all arranged and adapted to control suitable mechanism for securing the safe-door, substantially as herein specified.

6. In a safe for valuables, the combination, 30 with two locks and the bolt C, of the vibrating piece M, having the peculiarly-shaped aperture *m*, connected to the two locks, as shown, so that the operation of either will present a large portion of the hole in such a position 35 as to allow the unlocking, while without the operation of either the contracted portion of the hole is presented and the securing means cannot be removed, substantially as set forth.

In testimony whereof I have hereunto set my 40 hand, at Providence, Rhode Island, this 24th day of June, 1882, in the presence of two subscribing witnesses.

WILLIAM CORLISS.

Witnesses:

A. H. GENTNER,
SAML. T. DOUGLAS.