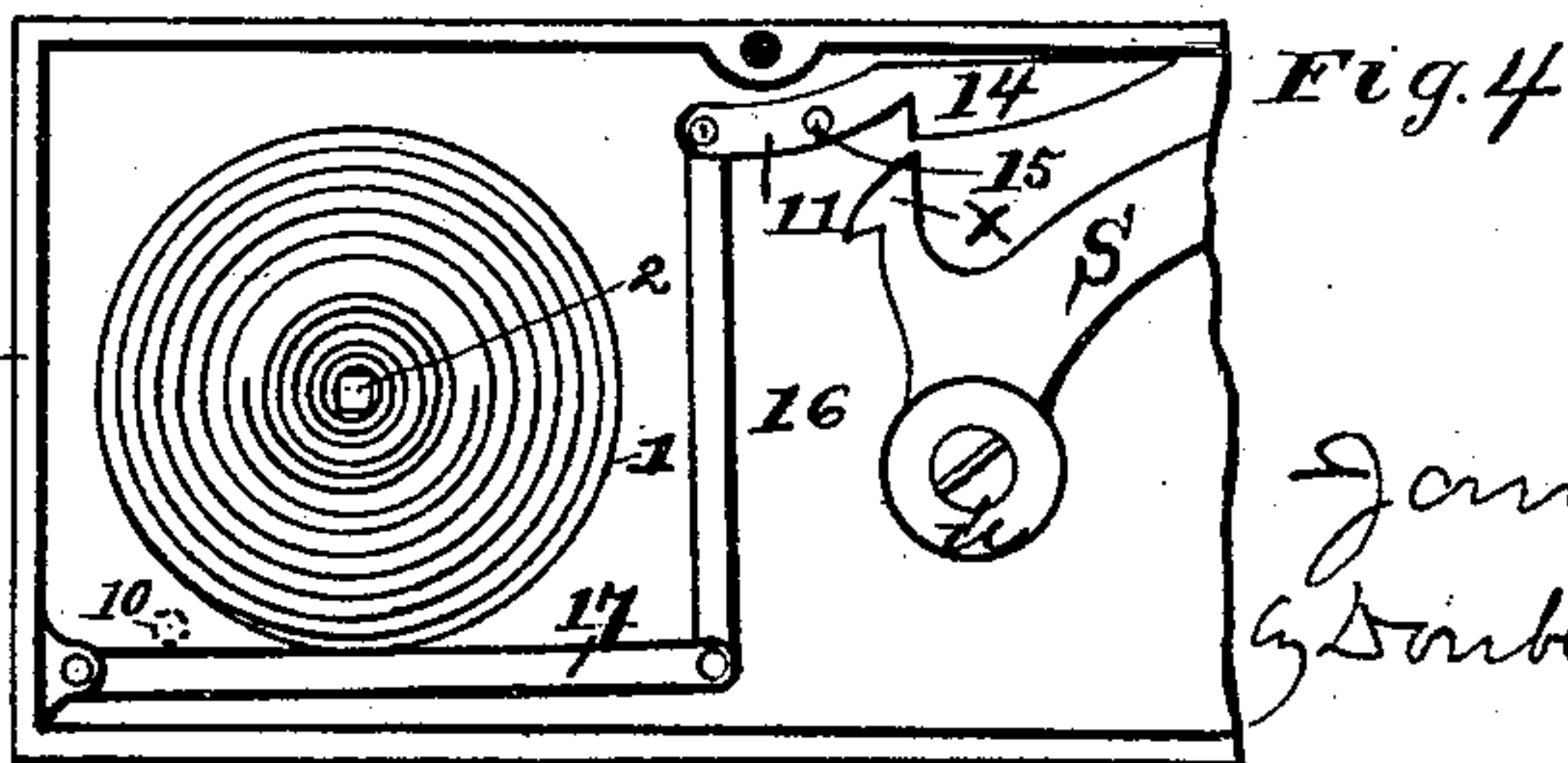
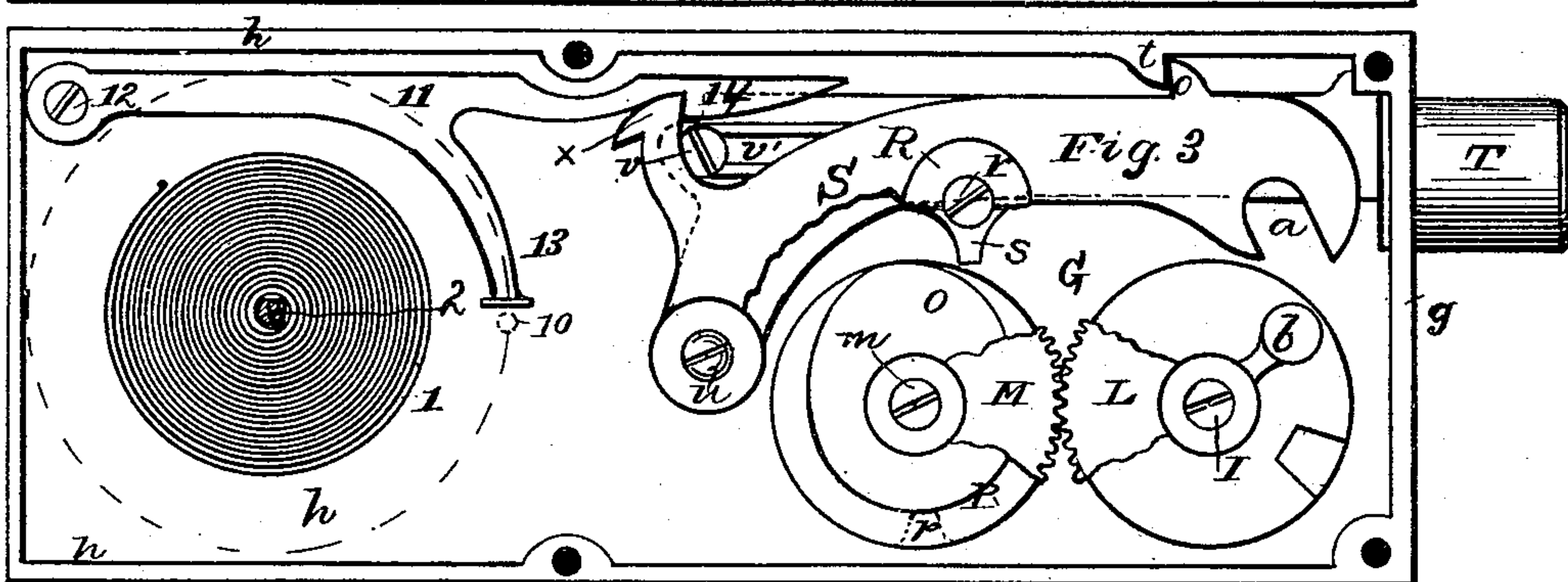
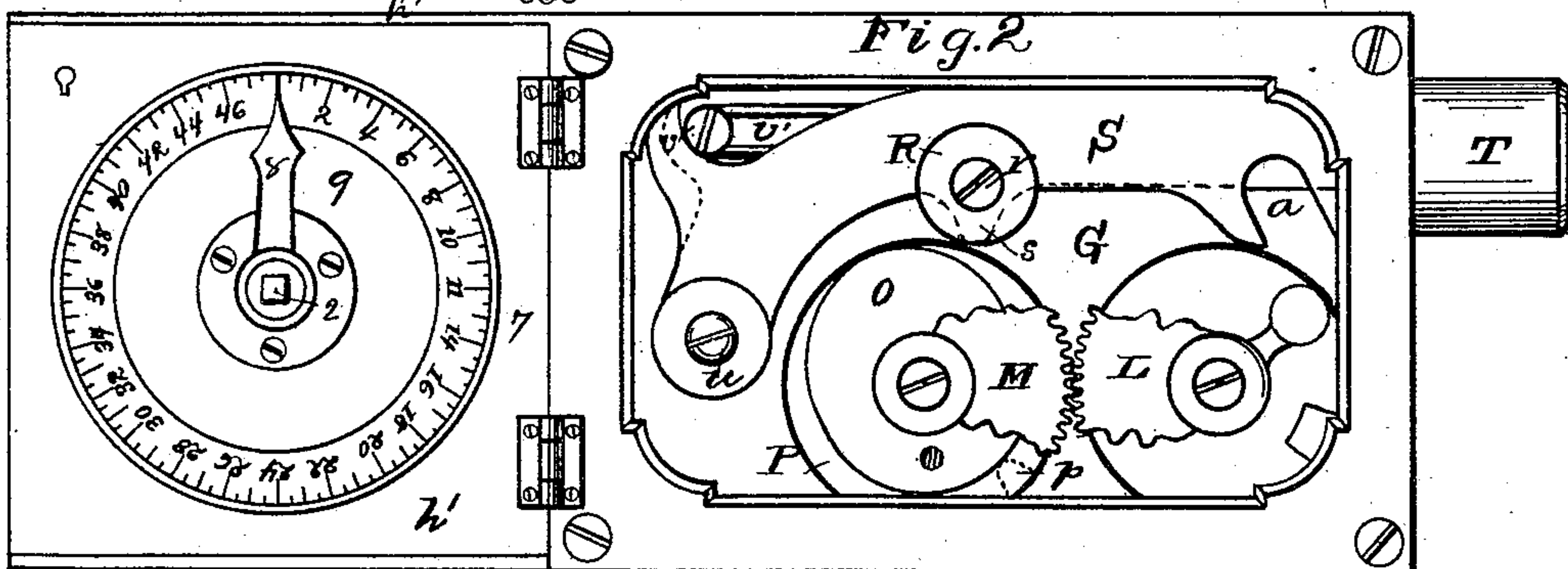
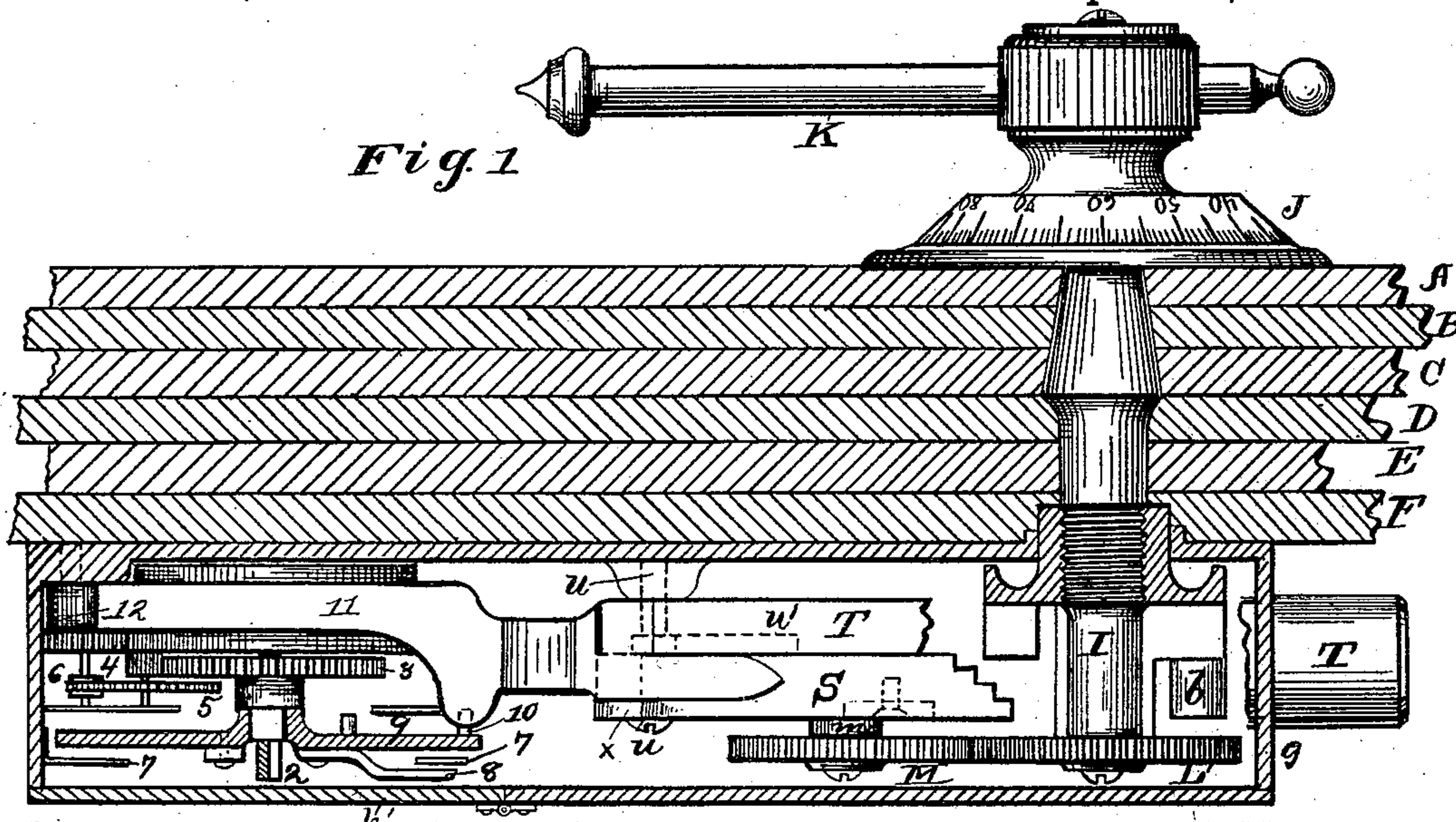


(No Model.)

J. WHITE.
TIME LOCK.

No. 459,618.

Patented Sept. 15, 1891.



Witnesses:
J. B. Turner
J. L. Doubleday.

Inventor:
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UNITED STATES PATENT OFFICE.

JAMES WHITE, OF CLEVELAND, OHIO, ASSIGNOR TO THE NATIONAL SAFE AND LOCK COMPANY, OF SAME PLACE.

TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 459,618, dated September 15, 1891.

Application filed November 16, 1886. Serial No. 219,060. (No model.)

To all whom it may concern:

Be it known that I, JAMES WHITE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Time-Locks, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in safes, chests, vaults, &c., to which are applied locks and timing devices for securing them against attacks of burglars.

Heretofore a great objection incident to locking devices used for such purposes has been the fact that the mainspring of the timing mechanism is subject to breakage, and when such an accident occurs the movable parts of the lock and bolt work become permanently fastened, and access can be had to the interior only by the application of such force at the outside as will break and impair the structure.

Various devices have been used to overcome this objection; but those with which I am familiar have been more or less complicated, and while overcoming one difficulty have had their parts so constructed and arranged as to have others incident to them.

By means of the simple but durable construction and arrangements of parts herein shown and below described I have succeeded in obviating not only the chief objection, but also the others which have been developed by the devices heretofore used for overcoming it.

Figure 1 is a horizontal section of a portion of a safe-door, showing the parts of my improved time mechanism in connection with a combination-lock. Fig. 2 is an inside view in elevation, parts being broken away, of the timing and bolt mechanism. Fig. 3 is a view of parts of the same devices, the inner covering-plate being removed. Fig. 4 is a modification.

In the drawings I have shown parts of the walls and of a door of a burglar-proof safe or chest. These general parts of the safe may be made in any one of the many now well-known ways. As shown, the door is made up of several plates of steel and iron, as at A B C D E F, though the parts pertaining es-

entially to this invention can be readily applied also to doors otherwise made—as, for instance, those filled with fireproofing material.

The door is provided with a combination-lock mechanism adapted to be set and to be operated from the outside, the one shown having an arbor I, a dial J, and handle at K. The parts forming the combination-lock are generally indicated by G, and these may be of any suitable character; though I prefer to have them constructed and arranged as shown, these being of the general type illustrated in my earlier patent, No. 287,787, of October 30, 1883. At the inner end of the arbor I there is a spur-wheel L, which meshes with a spur-wheel M, mounted on a stud-screw *m*, carrying also the tumblers P and the cam-tumbler O. The arbor I also carries a sleeve or collar provided with a pin *b*, which at proper times is engaged by the drag-bar, to be described. The drag-bar is, as a whole, represented by S, and a lock-bolt, as shown at T. There may be one such bolt, or several may be joined by suitable devices and adapted to be operated simultaneously. The drag-bar S and the bolt T are connected by the pivot at *u*, about which the drag-bar S can vibrate. The latter has a fence at *s* adapted to enter the recess *p* in the tumblers P. The drag-bar S also has a roller R which is vertically above the cam-tumbler O, it having a screw-bearing at *r*. At the end of drag-bar S there is a recess or notch *a*, into which pin *b* can fit, and when therein there is such connection between the arbor and the drag-bar S that they can be caused (the other parts being properly situated) to slide the bolt T. The latter at its inner end is supported and guided by means of a screw *v*, fitted in a slot *v'* in the bolt, and the latter has also a bearing near its outer end in the end of the casing *g*, which surrounds and more or less incloses the bolt mechanism. The drag-bar S has also a lug *o* at its upper edge, for a purpose to be described. At or near its inner end it is formed with an upwardly-extending arm X, with which the latch engages. The said time-lock devices consist, essentially, of a mainspring, clock-work, a locking-latch, means carried by the clock-work for moving said latch, and a dial and hand for setting the clock-work.

In the construction shown the mainspring is represented by 1. It is mounted on the arbor 2, and with it is combined a suitable timing mechanism having wheels 3, 4, 5, and 6, together with an escapement and whatever other details are necessary and which will be readily understood. There is a dial 7 concentric with the arbor 2, and the latter is provided with a hand 8. The timing mechanism can be constructed to allow it to run for twelve, twenty-four, or forty-eight hours, or any other desired time. The hand 8 revolves with a disk 9, which upon its inner face carries a pin 10, so situated as to engage at the proper time with the latch. This latch is generally represented at 11, it having a main shank or arm pivoted at 12. From it there projects an arm 13, it lying in the path of the aforesaid pin 10, carried by the timer. The latch 11 is also provided at its outer end with a shoulder or with a lug, as at 14, whereby it is adapted to engage with and in the above-described arm X of the drag-bar S. When the latch 11 is in engagement with the said arm X, it will be seen that it is impossible for the drag-bar S to drop, even when the tumblers are gated, and that therefore the arbor I cannot be brought into engagement with the drag-bar S and bolt T, even if the parts of the combination at M, N, O, and P are properly manipulated; but it will be also seen that if the clock-work or timer is set in motion it will sooner or later bring the pin 10 into such position as to engage with arm 13, whereupon the latch 11 will be lifted so as to release the arm X. After this occurs the combination-lock mechanism is free to be so operated as to lower the drag-bar S into engagement with the arbor through pin b, whereupon the bolt-work can be operated from the outside.

By referring to Figs. 1 and 3, it will be seen that the latch is so situated as to lie in planes transverse to the axis of the spring and between its edges—that is to say, it lies in those planes wherein the parts of the spring move as they expand away from the axis. Hence, if the spring should be allowed to expand sufficiently, it will ultimately come in contact with this latch 11 and cause it to move and release it from the arm X of the drag-bar. The spring does thus expand the instant that it is broken. Therefore, if at any time while the clock-work is in operation it should break and thus stop the timer before pin 10 lifts latch 11, the spring itself will, by its outward expansion after the breakage, effect this release, leaving the bolt-work free to be manipulated from the outside of the safe-door.

I do not wish to be limited to the exact construction and arrangement of parts shown for attaining this end, the essential feature of this part of the invention consisting in such construction and arrangement of parts that the expansion of the spring after breakage is utilized to release the timer from the lock. Intermediate levers or bars or wheels can be

interposed between the latch 11 and the spring and can be so arranged as to take the motion of expansion from the spring and transmit it to said latch to effect its release. I prefer the construction and relative arrangement of parts shown, as it is simple, instantaneous, and perfectly reliable.

In locking the safe the timer is wound up until the hand 8 comes to the predetermined hour indicated on the dial 7, this action moving pin 10 away from arm 13, so that latch 11 is free to drop and either engage with arm X or be ready to engage therewith as soon as drag-bar S is lifted. The door is then closed, the arbor turned, and the bolt T thrust out into its seat. The arbor is then revolved until pin b is out of engagement with the drag-bar S, this turning of the arbor revolving the wheels L and M and cam O, which effects the lifting of the drag-bar S and swinging the arm X into engagement with latch 11. After this the bolt-work cannot be operated until the spring 1 either mediately through the timing devices or immediately lifts the latch 11. Thus it will be seen that the single latch performs the three functions of holding the drag-bar out of the path of the pin b, carried by the arbor I, of holding the stop o in engagement with the stop on the casing at t, and the fence above the notches of the tumblers, even when the latter are gated, these three functions being performed by the combination of the latch with the drag-bar, because of the drag-bar being provided directly with the fence and the stop o, which I regard as being an improvement upon prior locks, because of its simplicity in construction and operation. It will be noticed that the pins b engaging with the front and rear walls of the notch a in the drag-bar moves the bolt both out and in.

In several respects there can be modification of a number of the parts without departing from the invention. The bolt T can be engaged more directly with the latch 11 or other stop mechanism interposed between the timer and the bolt. A sliding lever or bar can be used in place of bar 11, instead of the latch 11, if preferred.

In order to prevent the bolt from being thrown in by jars or by turning the safe over, I combine with the bolt mechanism stops. These are shown at t. Preferably the stop t is formed on the drag-bar S, and t is on the stationary casing. The timing mechanism is inclosed in a casing h, which may be an extension of the casing g around the bolts. It can be provided with a door h' to permit access to the timer.

One modification is shown in Fig. 4, in which the latch 11 is pivoted midway between its ends at 15, and is connected by a link 16 with a secondary lever 17, lying in the plane of the mainspring 1 of the timer, so that it will be actuated by said mainspring in case of breakage, as will be readily understood without further explanation; but under either con-

struction it will be seen that the latch engages with the drag-bar the moment that the bolt is shot, and the cam O lifts the drag-bar out of the path of the pin b and holds the drag-bar in that suspended position continuously until the latch is released by the time movement without any change of position on the part of either the latch or the drag-bar from the time the bolt is shot until the latch is released by the time-lock. Hence when I use the words "continuously engaging" in connection with the latch I refer to this last-mentioned peculiarity of operation which distinguishes my lock from prior ones.

What I claim is—

1. The combination, with the bolt and the arbor, of the drag-bar pivoted to the bolt, the latch which engages with the drag-bar, and the time-lock having its spring arranged to actuate the latch whenever the spring breaks, substantially as set forth.

2. The combination, with the bolt and the arbor, of the drag-bar pivoted to the bolt, the tumblers revolving about a pivot other than the arbor and driven from the arbor, and the cam which lifts the drag-bar, substantially as set forth.

3. The combination of the bolt provided at its rear end with a downward-extending arm, the drag-bar pivoted at its rear end to the downward-extending arm guides at the front and rear end of the bolt to direct its movement when sliding, and the latch which engages with the upward-extending arm of the drag-bar to hold the drag-bar out of the path of the pin of the arbor, substantially as set forth.

4. The combination of the arbor carrying the pin, the tumblers revolving about a pivot other than the arbor and driven from the arbor, the bolt provided at its inner end with a pivot, the drag-bar mounted on the pivot of the bolt and provided with the upward-extending arm, and the latch pivoted at its inner end and engaging with the upward-projecting arm of the drag-bar and provided with the arm 13, adapted to engage with the time-lock, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES WHITE.

Witnesses:

F. N. CARTER,
J. B. FAY.