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900,437.

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COMBINATION LATCH LOCK.
APPLICATION FILED JULY 3, 1906.

Patented Oct. 6, 1908.
2 SHEETS—SHEET 2.

Fig. 6.

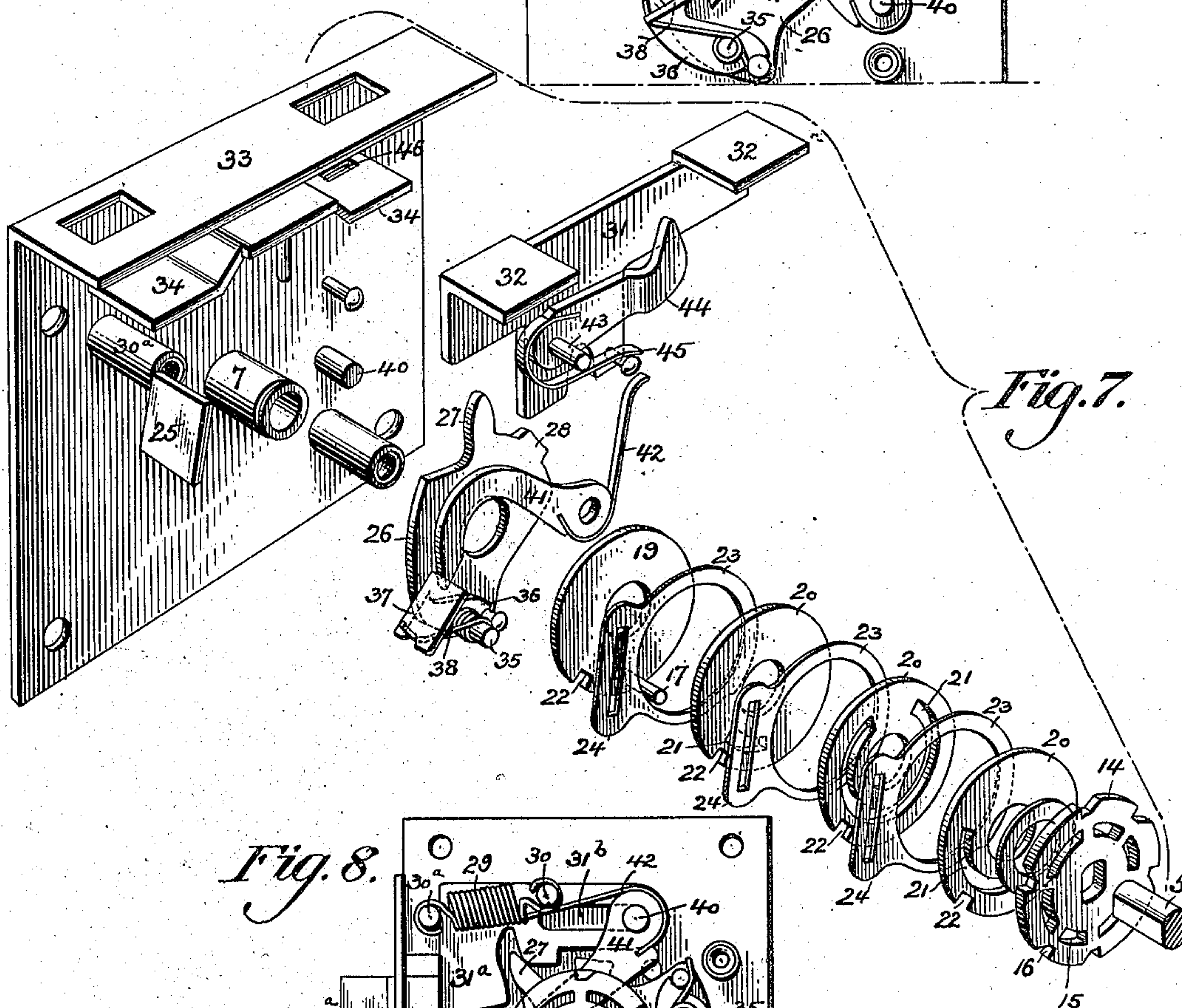
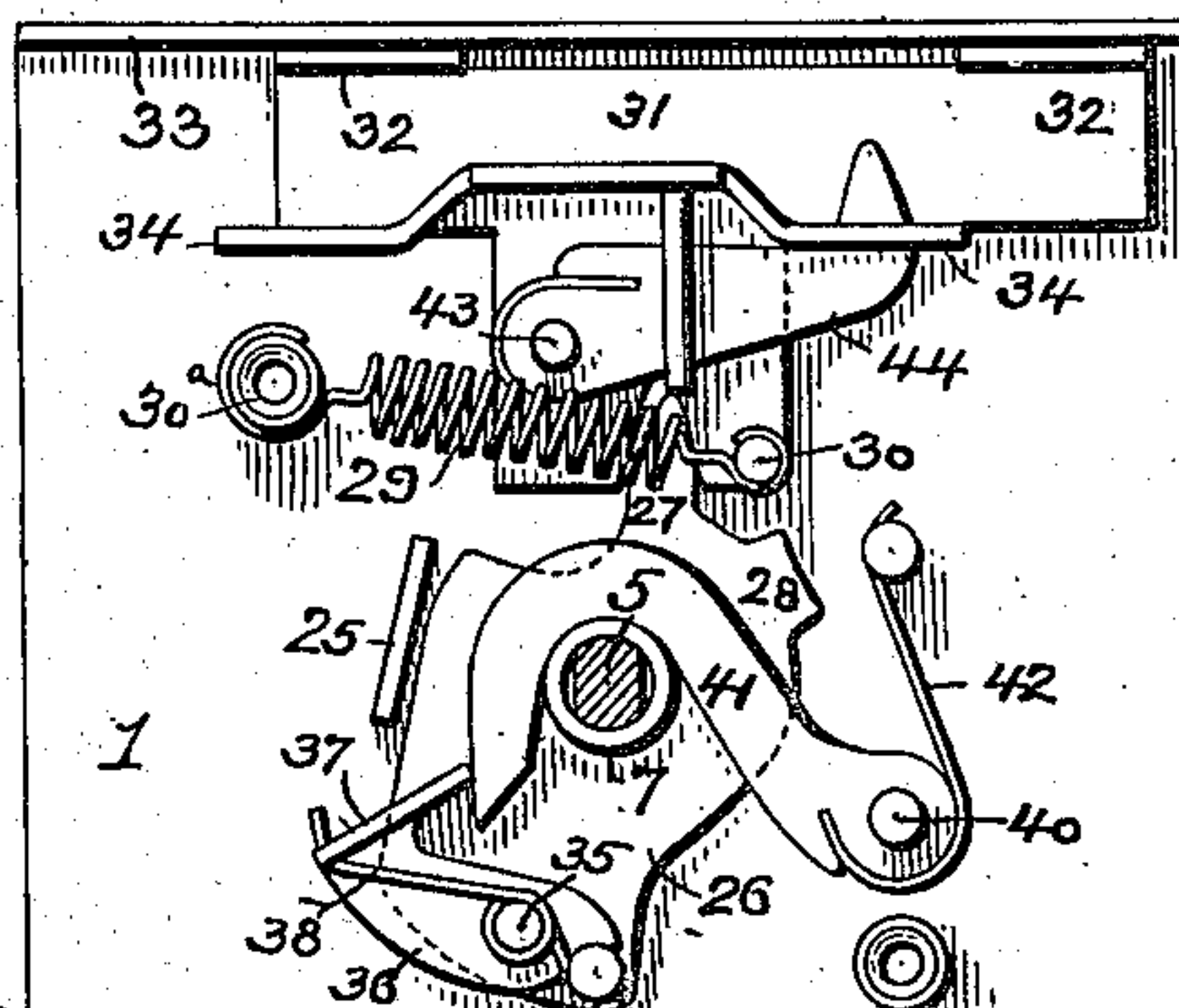
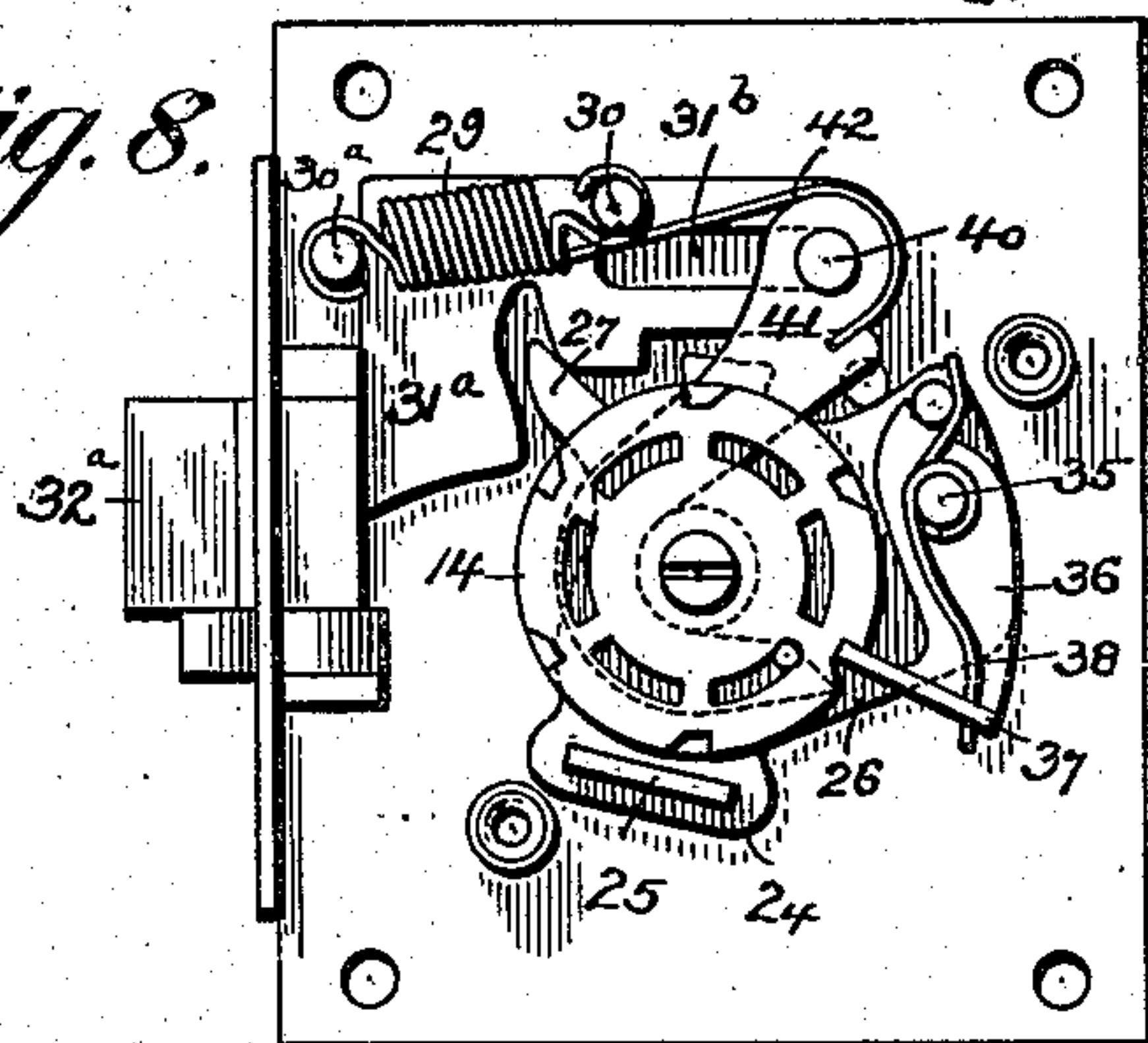


Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANK SOLEY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO MILLER LOCK COMPANY,
OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

COMBINATION LATCH-LOCK.

No. 900,437.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed July 3, 1906. Serial No. 324,614.

To all whom it may concern:

Be it known that I, FRANK SOLEY, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Combination Latch-Locks, of which the following is a specification.

My invention relates to that class of combination locks in which the retraction of the bolt is effected by the knob through the medium of the tumblers and bolt-operating mechanism, and the projection of the bolt is due to the action of a spring or springs, the objects of my invention being to provide for the automatic ejection of the dog from the notches of the tumblers and the dispersal of the latter when the bolt is projected by the action of the spring, and to provide, in a box or chest lock, for the automatic projection of the bolt, the ejection of the dog from the notches of the tumblers, and the dispersal of the latter when the lid is closed. These objects I attain in the manner herein-after set forth, reference being had to the accompanying drawings, in which

Figure 1 is a transverse section on the line *a-a*, Fig. 3, but on an enlarged scale, and showing the casing and barrel of the lock, the knob and other appurtenances; Fig. 2 is a section on the line *b-b*, Fig. 1, without the lock casing, and illustrating the parts in the positions assumed by them when the lock is locked; Fig. 3 is a similar view, but illustrating the parts in the positions assumed by them when the lock is unlocked; Fig. 4 is a section on the line *c-c*, Fig. 1; Fig. 5 is a section on the line *d-d*, Fig. 1; Fig. 6 is a section on the line *f-f*, Fig. 1; Fig. 7 is a perspective view showing various elements of the lock detached from each other in order to better illustrate their construction; and Fig. 8 is a view similar to Fig. 3, but illustrating the application of the invention to another form of lock. Figs. 2, 3, 6, 7 and 8 are on a smaller scale than Figs. 1, 4 and 5.

1 represents the face plate of the lock, to which is attached a casing 2, the latter being let into the body of the box or chest to which the lock is applied, and being provided with a cylindrical barrel 3 which projects through and beyond said body of the box or chest, and which may, if desired, be provided with a figured or numbered dial operating in conjunction with a rib or other pointer on the knob 4, whereby the adjustment of the latter

can be governed by the sense of sight. The lock can, however, also be operated by the sense of hearing or the sense of touch, the knob 4 being movable axially in the barrel 3, and the knob spindle 5 being also free to slide axially in a tubular hub 7 projecting inwardly from the face plate 1, as shown in Fig. 1.

Let into suitable recesses in the inner face of the knob 4 are a pair of balls 9, or in place of the same, fixed lugs or studs may be formed on or secured to the inner face of the knob. Formed in or rigidly secured to the interior of the barrel 3 is an annular plate 3^a, in which are formed a series of countersunk openings or depressions 10, corresponding in number with the figures or numbers of the dial when the latter is employed, whereby, when the knob 4 is moved inwardly, the balls 9 will engage these openings or depressions and the proper movements of the knob to effect the desired adjustment of the tumblers of the lock will be indicated both to the sense of hearing and to that of touch, as said balls 9, on the rotation of the knob enter the openings or depressions 10 in succession and produce a clicking sound, so that the lock can be operated in the dark as well as when a dial is visible to the operator. These features of the lock, however, constitute no part of my present invention, being shown, described and claimed in my prior application, No. 316,511, dated May 12, 1906.

A spring 6 interposed between the annular plate 3^a and a disk 14 on the knob spindle 5 tends to normally maintain the balls 9 in engagement with the countersunk depressions or openings 10, but slight longitudinal movement of the knob spindle 5, restricted by the head of a screw 13 at the inner end of said spindle, permits such outward movement of the knob as to effect withdrawal of the balls 9 from the openings 10, and the lock can then be operated by sight alone.

The disk 14 engages a reduced or flattened portion of the knob spindle 5, and it is therefore compelled to turn with the latter, and thus constitutes a driving disk for the tumblers.

The driving disk 14 has a series of slots 15 and a series of notches 16, one for each slot, and with any of the slots 15 may engage a pin 17 projecting from a supplementary driving disk 19, which is mounted so as to be

free to turn on the hub 7 of the face plate. Between the main and supplementary driving disks are interposed tumblers 20, each of which has a peripheral notch 22 and also a segmental slot or slots 21 for the reception of the driving pin 17, the length of each slot and the relation of a peripheral notch thereto determining the adjustment of the different tumblers necessary in order to bring their notches into line in opening the lock. The supplementary driving disk 19 also has a peripheral notch 22, and therefore acts as a tumbler in the same manner as the tumblers 20. These tumblers, like the disk 19, are free to turn on the hub 7, but are prevented, by washers 23, from imparting motion one to another except through the medium of the driving pin 17, the washers being interposed between the successive tumblers and between the first tumbler and the supplementary driving disk 19, and being prevented from rotating by reason of the engagement of slotted lugs 24 thereon with a lug 25 projecting inwardly from the face plate 1.

Between the supplementary driving disk 19 and the face plate of the lock is interposed a bolt thrower 26, which can turn on the hub 7 and is provided with projecting teeth 27 and 28 for engagement with the bolt plate 31, which has in the present instance two bolt lugs 32 and is guided between a flange 33 of the lock plate 1 and a slotted rib 34 projecting from the inner face of the same; the bolt plate being intended to be moved in one direction by the bolt thrower 26, and in the opposite direction by a spring 29 connected at one end to a stud 30 on the bolt plate 31, and at the other end to a post 30^a, secured to the face plate of the lock.

Pivoted to a pin 35 on the bolt thrower 26 is a lever 36 provided with a dog 37, said lever being acted upon by a spring 38 in such manner that the dog 37 has a normal tendency to move inwardly or toward the axis of the knob spindle.

On a pin 40 in the lock case swings a hooked arm 41 which partially embraces the hub 7, as shown in Fig. 6, and is normally maintained in contact with said hub by means of a spring 42.

A pin 43 on the bolt plate 31 serves as a pivot for a trigger 44, whose free end, when the lock is open, is caused, by the action of a spring 45, to project through a slot 46 in the guide rib 34, as shown in Figs. 3 and 6, the end of the trigger thus retaining the bolt plate 31 in the unlocked position against the action of the spring 29. When, however, the lid of the box or chest is closed, one of the hasps strikes the projecting end of the trigger 44, and depresses the latter to such an extent that it is disengaged from the outer wall of the slot 46 of the guide rib 34 and fails to longer retain the bolt plate in the open position, the spring 29 then moving the

bolt plate from the position shown in Fig. 3 to that shown in Fig. 2, thereby effecting the ejection of the dog from the notches of the tumblers and the dispersal of the latter as hereinafter set forth.

When the lock is locked and the bolt plate 31 projected the parts occupy the relation shown in Fig. 2, the inner end of the dog 37 resting upon the peripheries of the tumblers and driving disks, but when by proper manipulation of the knob 4 the notches 22 of the tumblers and a notch 16 of the driving disk have been brought into line with each other and with the inner end of the dog 37, the latter will, by the action of a spring 38, be caused to enter said notches, and further movement of the driving disk will therefore be imparted to the dog and thence to the bolt thrower 26 which carries the same, and consequently to the bolt plate 31 so as to retract the bolt lugs 32, as shown in Fig. 3.

When the dog 37 enters the notches of the driving disk and tumblers, it is brought in front of the inner end of the arm 41, as shown in Fig. 8, and as the dog is moved forwardly it carries said arm 41 with it, the arm swinging on its pin 40 until, because of the different arcs of travel of the arm and dog, they clear each other, whereupon the arm is immediately restored to its normal position by the action of the spring 42, as shown in Fig. 3, thus bringing under the dog 37 the outer face of the arm 41 which is inclined in respect to the arc of travel of the inner end of said dog 37 when the latter is in engagement with the notches of the driving disk and tumblers, as shown in Fig. 3. When, therefore, the bolt plate 31 is moved to the locking position by the spring 29 on the release of the trigger 44, and corresponding movement is imparted to the bolt thrower, the inner end of the dog 37, will ride on the inclined face of the arm 41 and will be forced by the latter out of the notches of the driving disk and tumblers, and the latter will, by their momentum, be dispersed or disarranged to such an extent as to carry their notches out of line with one another, and thus compel a readjustment of the tumblers through the medium of the knob before the lock can be again opened.

In Fig. 8 I have illustrated the application of my invention to an ordinary form of latch lock having a beveled bolt 32^a, the lock plate 31^a having a slot 31^b whereby it is guided on the pin 40 upon which the arm 41 is mounted, the action of the lock in other respects being the same as that of the lock which I have described at length in the preceding portion of this specification.

I claim:—

1. In a spring lock, the combination of a bolt, notched tumblers, a dog engaging the same and remaining in engagement therewith when the bolt is retracted, and auto-

matic means independent of the tumblers and acting directly upon the dog to effect ejection of the same and permit dispersal of the tumblers by rotation of the same when the bolt is projected.

2. In a spring lock, the combination of a bolt, notched tumblers, a dog engaging the same and remaining in engagement therewith when the bolt is retracted, a bolt thrower carrying said dog, and means independent of the tumblers and acting directly upon the dog to effect automatic ejection of the same and permit dispersal of the tumblers by rotation of the same when the bolt is projected.

3. In a spring lock, the combination of a bolt, notched tumblers, a dog for engaging the same, and a dog-engaging device which is moved out of the way by the dog in the opening movement of the lock and engages and ejects said dog when the bolt is projected.

4. In a spring lock, the combination of a bolt, notched tumblers, a dog for engaging

the same, and a pivoted and spring-actuated dog-ejector which is moved out of the way by the dog in opening the lock, and acts upon said dog to eject the same from the notches of the tumblers when the bolt is projected.

5. In a spring lock the combination of notched tumblers, a dog for engaging the same, and a dog-engaging device having a free end normally projecting into the path of the dog but swinging in a plane eccentric to said path, whereby it is automatically freed from engagement with the dog as the latter moves forward, said free end of the ejector having a cam formation which acts upon the dog to eject the same from the notches of the tumblers as it moves backward.

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

FRANK SOLEY.

Witnesses:

WM. E. DUDLEY,
JOHN ASHBRIDGE.