

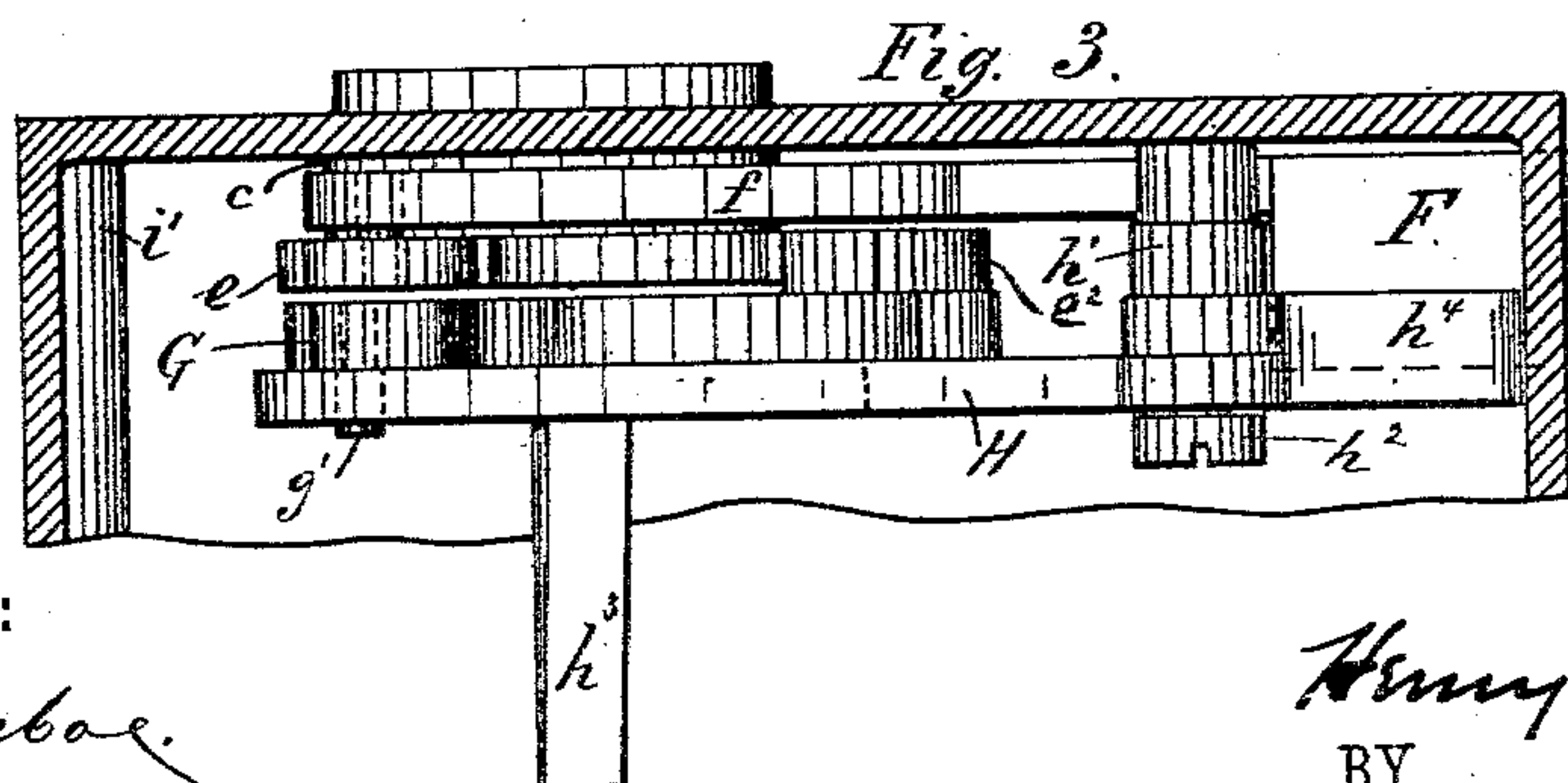
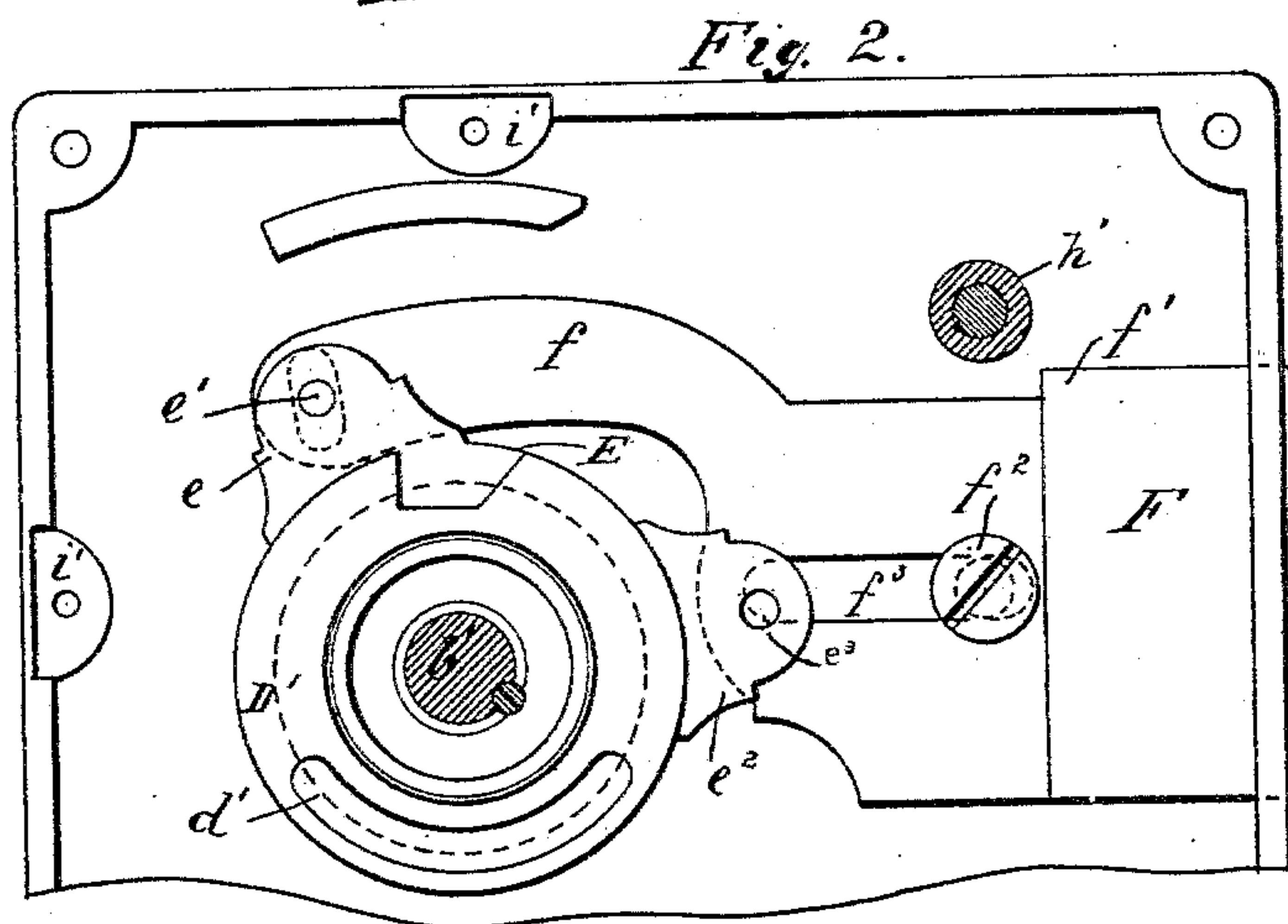
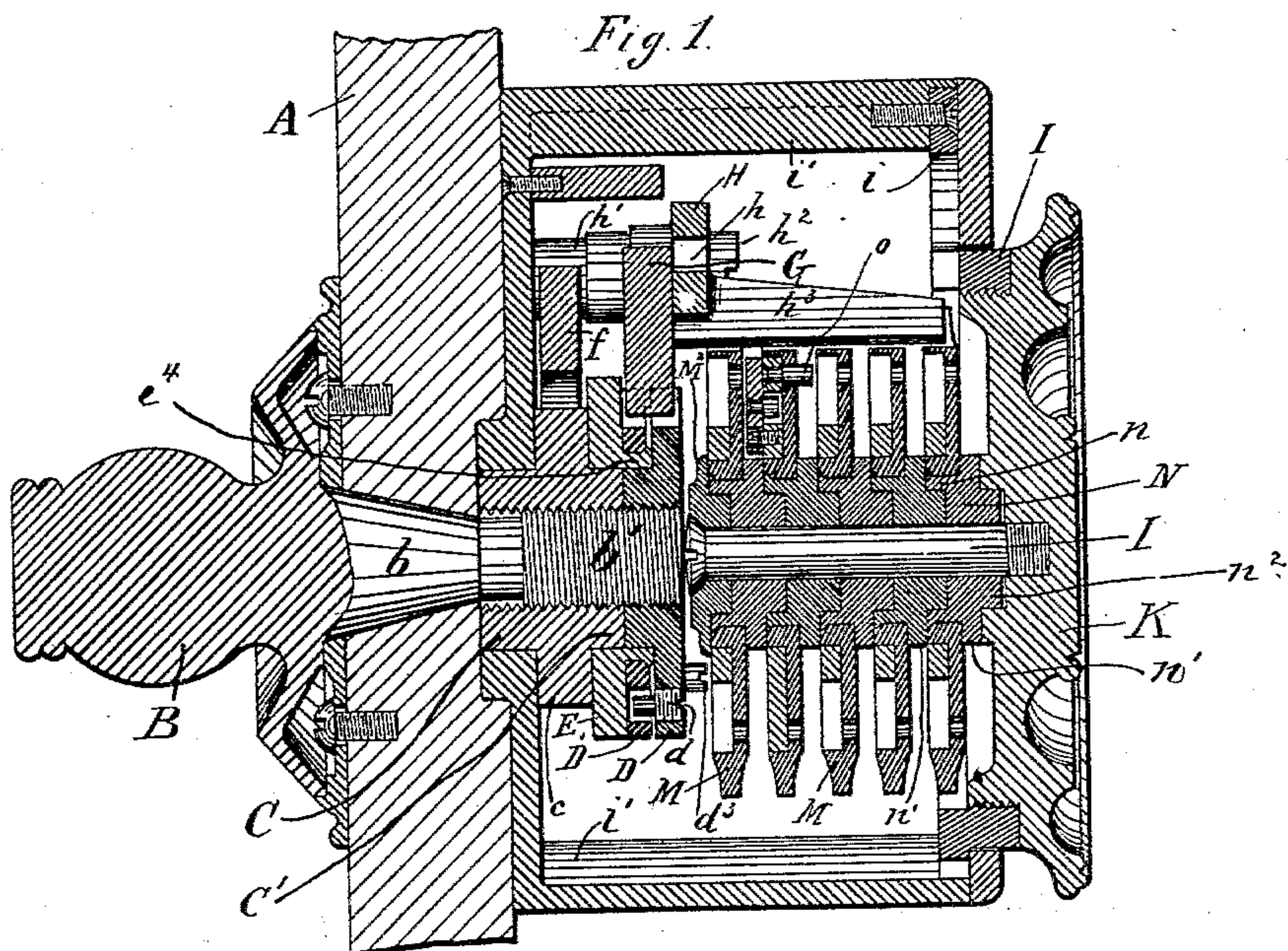
(No Model.)

2 Sheets—Sheet 1.

H. GROSS.
PERMUTATION LOCK.

No. 318,982.

Patented June 2, 1885.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

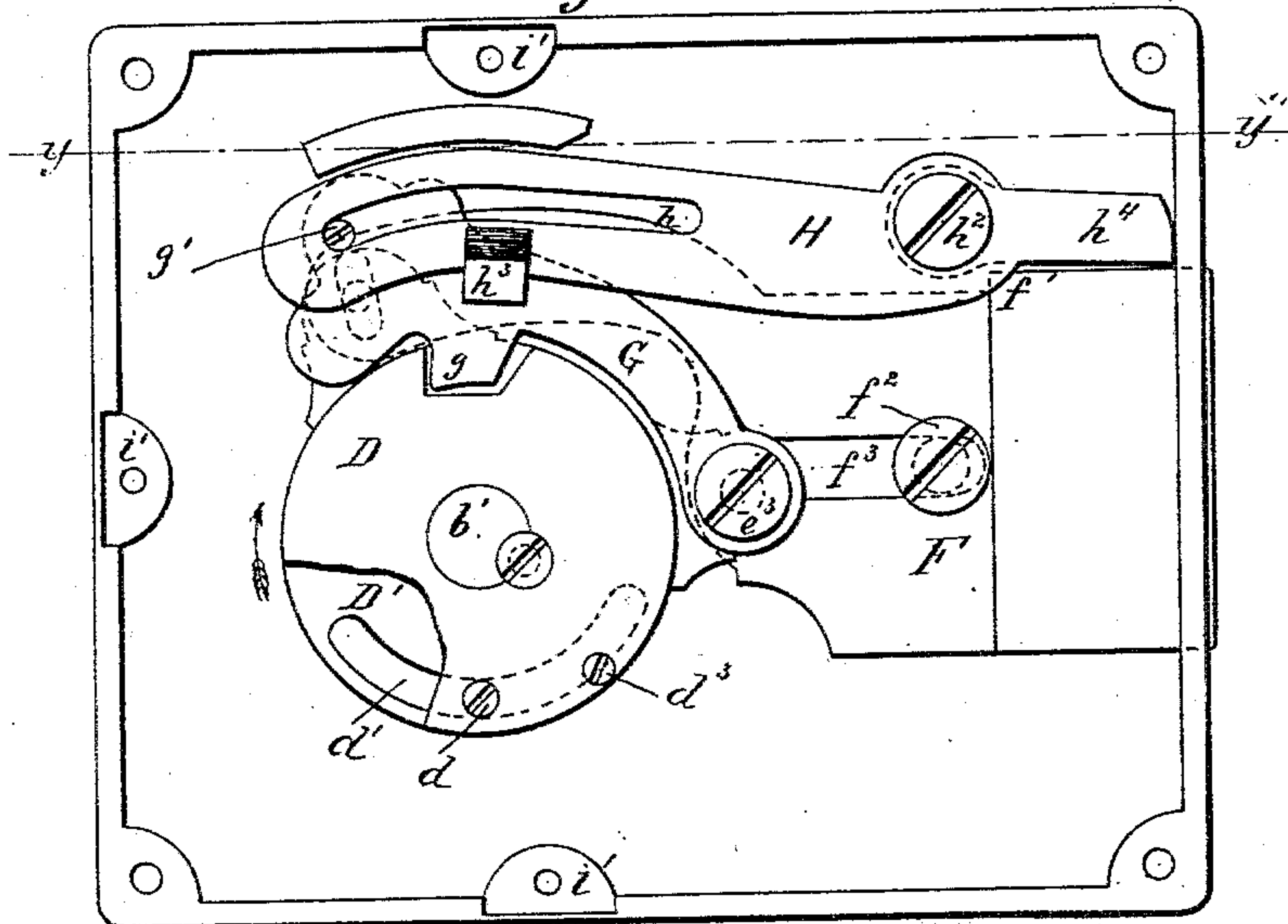


Fig. 5.

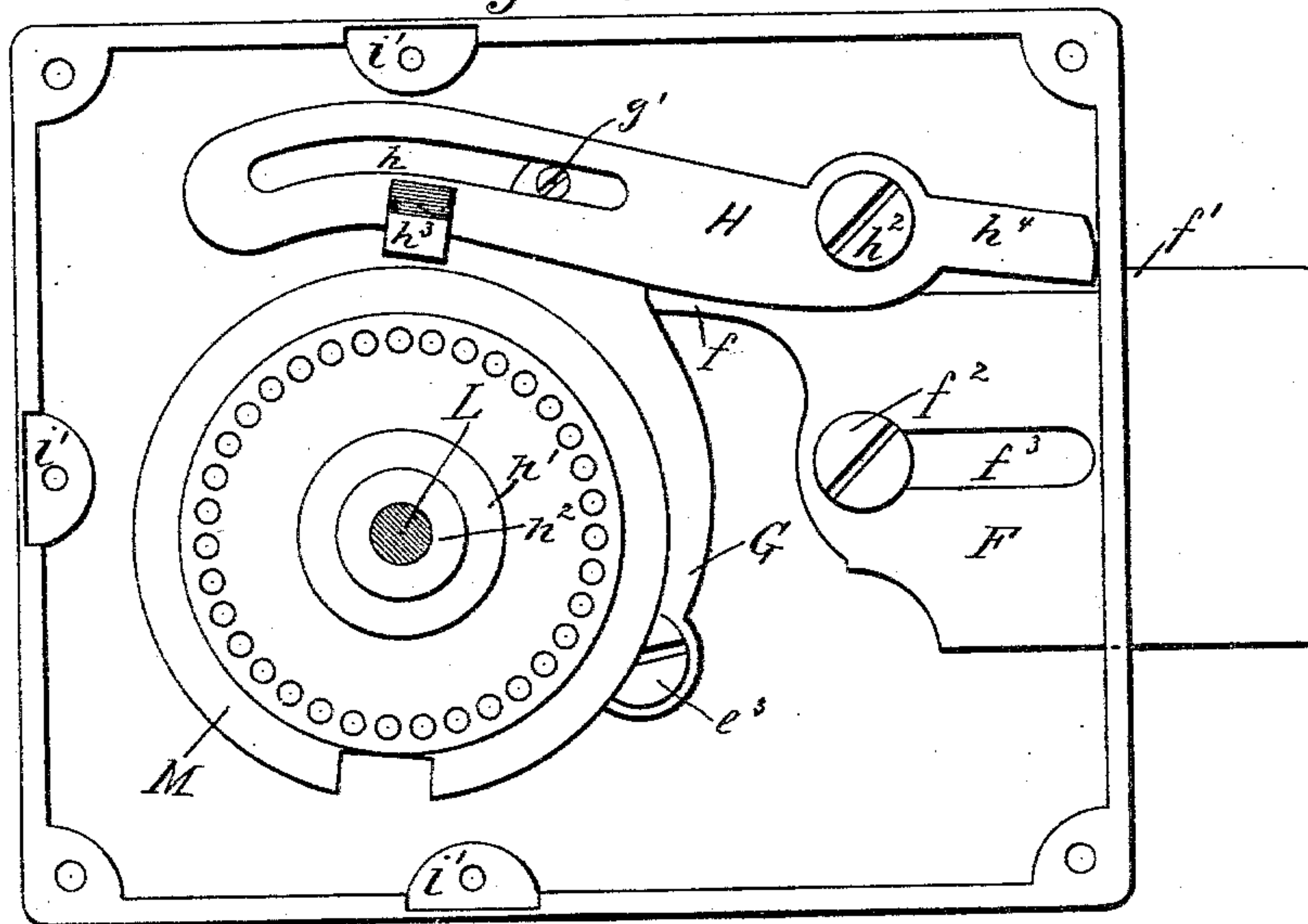
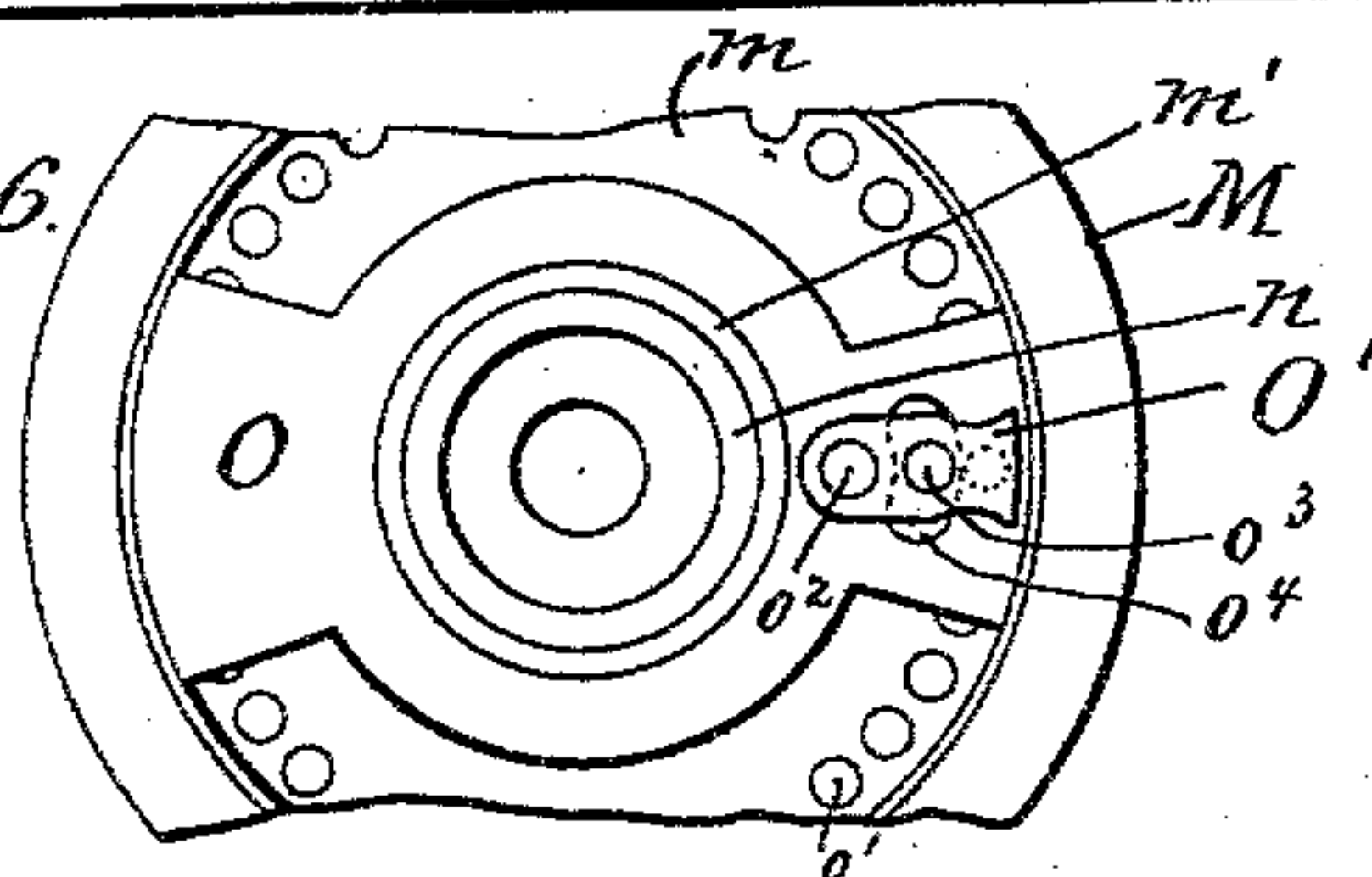


Fig. 6.



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HENRY GROSS, OF CHICAGO, ILLINOIS.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 318,982, dated June 2, 1885.

Application filed April 4, 1884. (No model.)

To all whom it may concern:

Be it known that I, HENRY GROSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Permutation-Locks, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

In the construction of permutation-locks it is at present customary to provide the inner end of the dial-knob spindle or operating-arbor with a notched drive-wheel that will serve to withdraw the locking-bolt when the notches of the several tumblers and of the drive-wheel have been brought coincident, so as to permit the angle-bar to drop therein. A difficulty met with in a lock so constructed is that the angle-bar, when the notch of the drive-wheel is immediately below it, rests upon the tumblers, and by careful manipulation the experienced safe-opener can ascertain just when the notches of each tumbler are brought beneath the angle-bar, and in this way can obtain access to the safe without a knowledge of the combination.

One of the objects of my present invention is to provide an improved construction of double-notched drive-wheel that shall serve to retain the angle-bar above and off the tumblers until they have had their notches brought into alignment with each other and with the notches of the drive-wheel.

A further object of my invention is to provide improved means for operating the locking-bolt from the drive-wheel, and to furnish means whereby this bolt shall be securely guarded against withdrawal until the notches of the tumblers and of the drive-wheels have been brought into proper position.

My invention has also for its object to sustain the tumblers in such manner that they can be more easily moved, and that any one or more of these tumblers can be withdrawn or others added when it is desired to diminish or increase the complexity of the combination.

These several objects of invention I have accomplished by the mechanism hereinafter described, illustrated in the accompanying draw-

ings, and particularly defined in the claims at the end of this specification.

In the accompanying drawings, Figure 1 is a view in vertical transverse section of a permutation-lock embodying my improvements. Fig. 2 is a view in rear elevation showing the bolt, the bolt-yoke, and one portion of the double drive-wheel. Fig. 3 is a view in longitudinal section on line *y y* of Fig. 4, showing in plan the subjacent parts. Fig. 4 is a view in rear elevation of my improved permutation-lock, the back plate and tumblers being removed. Fig. 5 is a view in rear elevation showing one of the tumblers in position, (its journal-pin being illustrated in section,) and showing the manner in which the bolt is dogged when thrown forward. Fig. 6 is a detail plan view of one of the tumblers.

A designates the door of a safe or vault, to the face of which is attached in suitable manner the dial-knob B, the inwardly-tapering arbor *b*, of which passes through the door and has formed thereon the threaded spindle *b'*, having fixed thereto the interiorly-threaded hub C, and outer section D, of the double drive-wheel. The reduced front portion of this hub is suitably journaled, as shown, in the front plate of the lock-casing, against which bears the shoulder *c* of the hub, and upon the reduced rear portion, C', of the hub is journaled the drive-yoke E, having the ear *e*, that connects by the pin *e'* with the slotted end of the shank *f* of the bolt F, and having the ear *e''*, that is connected by the screw *e'''* with the latch-bar G. The drive-yoke E is provided with the reduced portion or flange-ring *e''''*, upon which is held, in a manner free to revolve, the inner drive-wheel section, D', that receives its movement from the outer section, D, by means of the pin *d*, that enters the curved slot *d'* of the section D'. The sections of the double drive-wheel are each provided with a notch, into which, when brought coincident, may drop the catch lug or shoulder *g* of the latch-bar G. From the upper portion of this latch-bar projects the pin *g'*, that enters the long curved slot *h*, formed in the dogging-lever H, and serves to lift this lever when the catch-lug *g* is thrown from the notches of the drive-wheel. The dogging-lever H is provided upon its inner face with the journal-

hub h' , through which passes the pivot-bolt h^2 , and from its outer face projects the angle-bar or dog h^3 , adapted to enter the notches of the tumblers when brought coincident beneath this bar. The short end h^4 of the lever H is adapted to bear against the shoulder f' of the bolt F when the bolt is thrown forward and the lever is in the elevated position shown in Fig. 5. A guide screw or pin, f^2 , passing through the slot f^3 of the bolt, serves to sustain the same as it is moved back and forth.

From the construction of parts as thus far defined it will be seen that if by turning the dial-knob the notches of the driving-wheel sections be brought in line and the catch-lug g drops therein, then a movement of the drive-wheel in the direction of the arrow, Fig. 4, will cause the latch-bar G to partially rotate the drive-yoke E, which in turn will thrust forward the bolt F, connected thereto by the shank f . A further movement of the drive-wheel in the same direction will cause the catch-lug g to ride from out the notches of the drive-wheel, thereby lifting the latch-bar G and the lever H until the short end h^4 of this lever is in position behind the shoulder f' of the bolt F, to securely guard this bolt against backward movement.

Upon the rear of the lock-casing is held the ring I, having flanges i , that rest upon and are screwed to the ribs i' , and around this ring fits the back plate of the casing. The interior of the ring I is screw-threaded, and receives the threaded portion of the cap K, carrying the journal-pin L, that sustains the tumblers M of the lock. Each of these tumblers is held in a manner free to revolve upon the flanged portion n of a distinct individual hub or journal-sleeve, N, that is suitably perforated to receive the journal-pin L, and is provided with a washer-flange, n' , adapted to properly separate the tumblers, and with a reduced portion, n^2 , adapted to fit within the flanged portion n of the adjoining tumbler. The tumblers M have each the cut-away space m and flange m' , around which fits the usual segmental plate O, carrying the pin o , adapted to pass through the pin-holes o' and a sufficient distance beyond to catch the striking-arm O' , pivotally held on the plate O of the adjacent tumbler by the pin o^2 . A pin, o^3 , carried by the striking-arm and projecting into the slot o^4 of the plate O, allows this arm to swing a short distance, so that the tumblers may be operated in either direction to bring their notches into alignment. A washer, M^2 , having a reduced portion to fit within the flange of the inner tumbler, serves to retain the tumblers securely upon the journal-pin L. The angle-bar h^3 projects over all the tumblers, and a catch-pin, d^3 , extends from the face of the drive-wheel to engage the striking arm of the inner tumbler. By thus providing the tumblers with individual hubs or sleeves an easier movement of the tumblers is secured, and any one or more of them can be removed, if it be desired to decrease the complexity of the com-

bination. When tumblers are thus removed, it is only necessary to use a shorter journal-pin or to supply their place upon the pin shown with suitable washers.

It will be noticed that when the lock-bolt is thrown forward the angle-bar will be held above and off the tumblers until their notches have been brought into proper alignment with each other and with the notches of the double drive-wheel; hence no indication can be had from the angle-bar as to the position of the tumbler-notches beneath the same.

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

1. In a permutation-lock, the combination, with the operating-arbor, of a divided drive-wheel carried by said arbor and formed of two connected sections, each provided with a notch to receive a latch-bar when the notches of the drive-wheel sections are brought coincident, substantially as described.

2. In a permutation-lock, the combination, with the operating-arbor, of a double drive-wheel formed of two sections, one of which is fixed on the operating-arbor and the other of which is provided with a slot to receive a pin projecting from the adjoining section, substantially as described.

3. In a permutation-lock, the combination, with the operating-arbor, of a drive-wheel and a hub fixed upon said arbor, a drive-yoke encircling the arbor, and a latch-bar and a locking-bolt connected to said drive-yoke, substantially as described.

4. In a permutation-lock, the combination, with the operating-arbor and a hub and drive-wheel thereon, of the drive-yoke encircling the arbor, the locking-bolt and latch-bar attached to said yoke, and the dogging-lever connected with the latch-bar, substantially as described.

5. In a permutation-lock, the combination, with the locking-bolt having a shoulder thereon, of a dogging-lever having an end for engaging said shoulder, a latch-bar connected to said dogging-lever and to the locking-bolt, and a drive-wheel and arbor for operating said latch-bar, substantially as described.

6. In a permutation-lock, the combination of an operating-arbor, a drive-wheel, a drive-yoke, a latch-bar and locking-bolt connected with said drive-yoke, a dogging-lever having an angle-bar, and a series of tumblers, substantially as described.

7. In a permutation-lock, the combination, with the main casing having a detachable back plate or cap carrying a journal screw-pin distinct from the main arbor, which terminates at the tumblers, of a series of tumblers having individual hubs or sleeves mounted on said journal-pin, substantially as described.

8. In a permutation-lock, the combination, with the series of tumblers and a journal-pin therefor, of a series of individual hubs or sleeves having reduced and cut-away portions,

the reduced portion of one hub being of a size to fit within the cut-away portion of the adjoining hub, substantially as described.

5 9. In a permutation-lock, the combination, with a series of tumblers and their journal-pin, of a series of individual hubs or sleeves for the tumblers, said hubs or sleeves having reduced or cut-away portions adapted to

fit together, as set forth, and having the flanges to hold the tumblers apart, substantially as described. 10

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Witnesses:

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