

M. Adams.

Combination Lock.

N^o 96,376.

Patented Nov. 2, 1869.

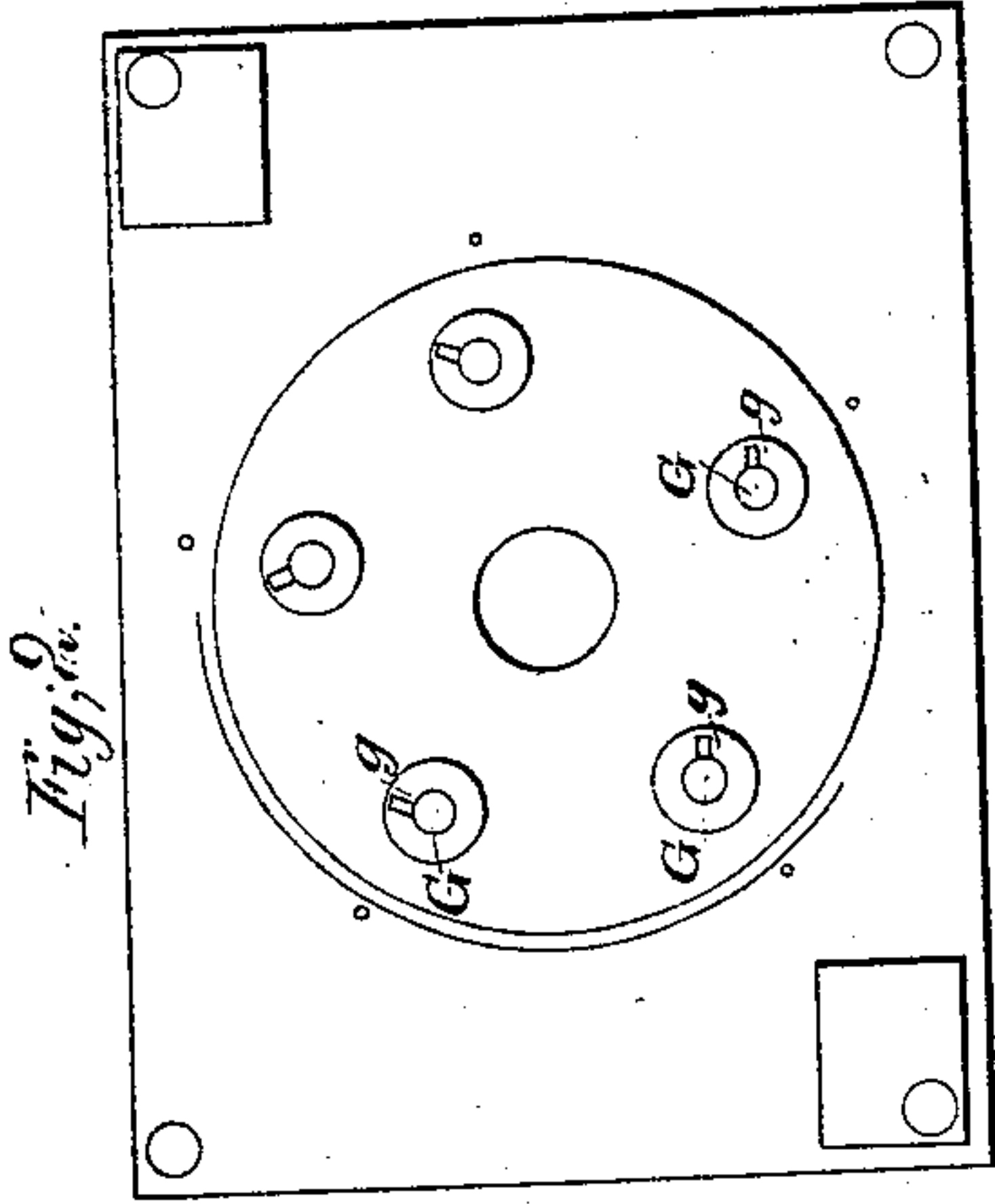


Fig. 9.

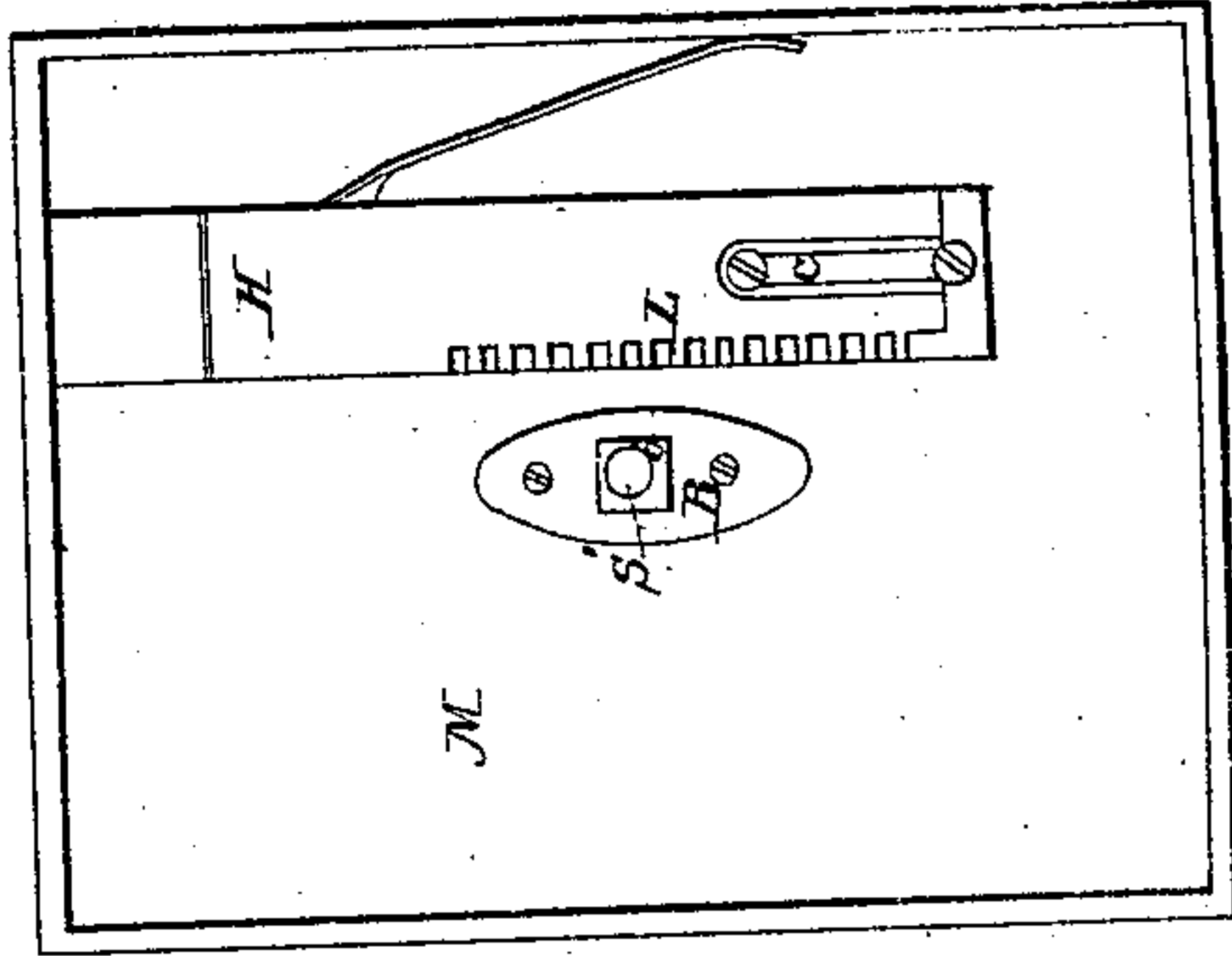


Fig. 4.

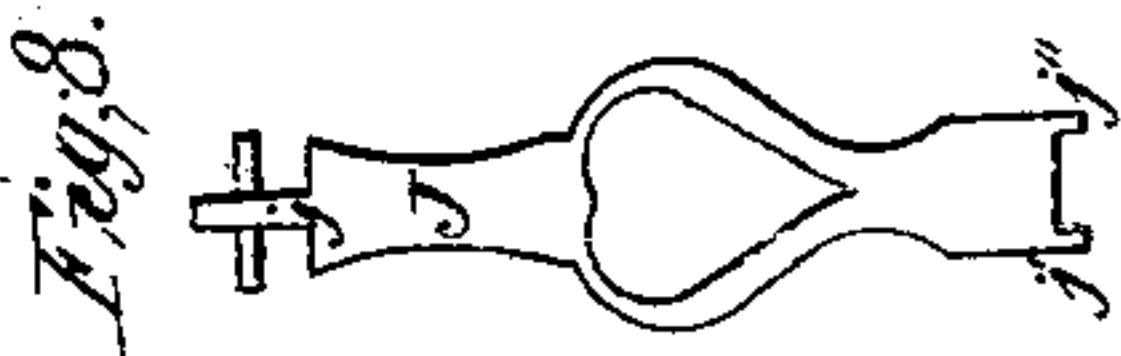


Fig. 8.

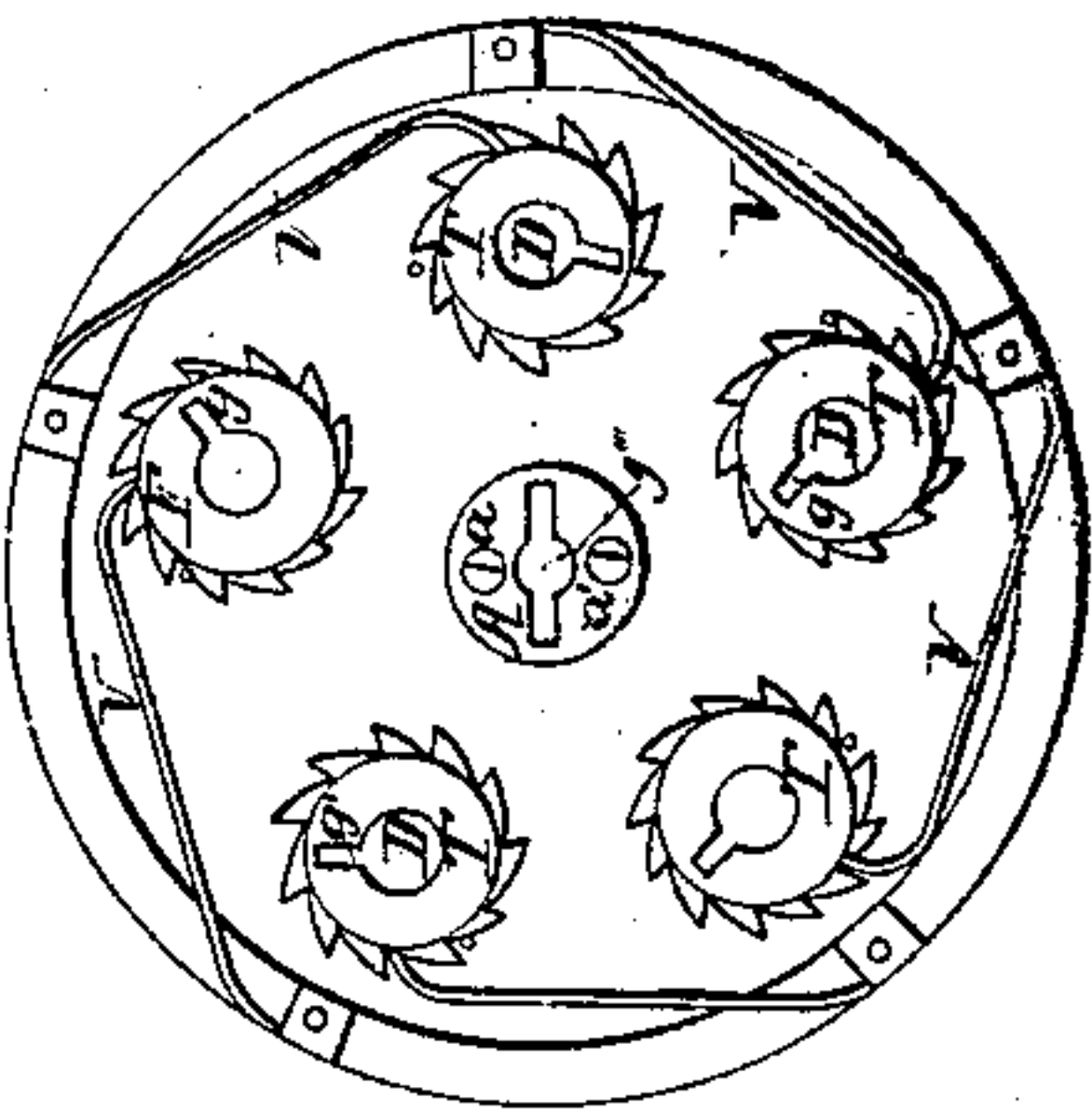


Fig. 3.

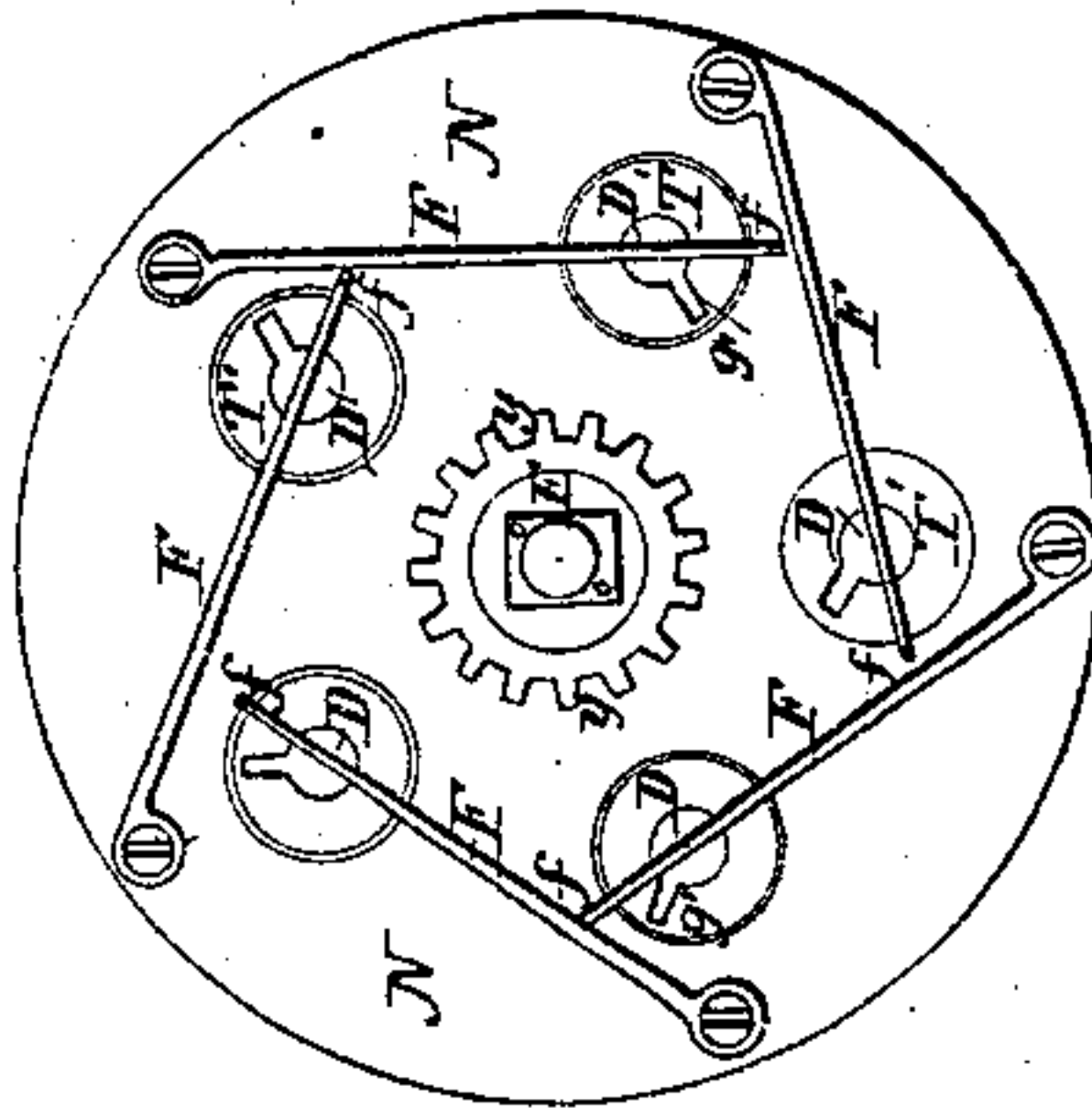


Fig. 6.

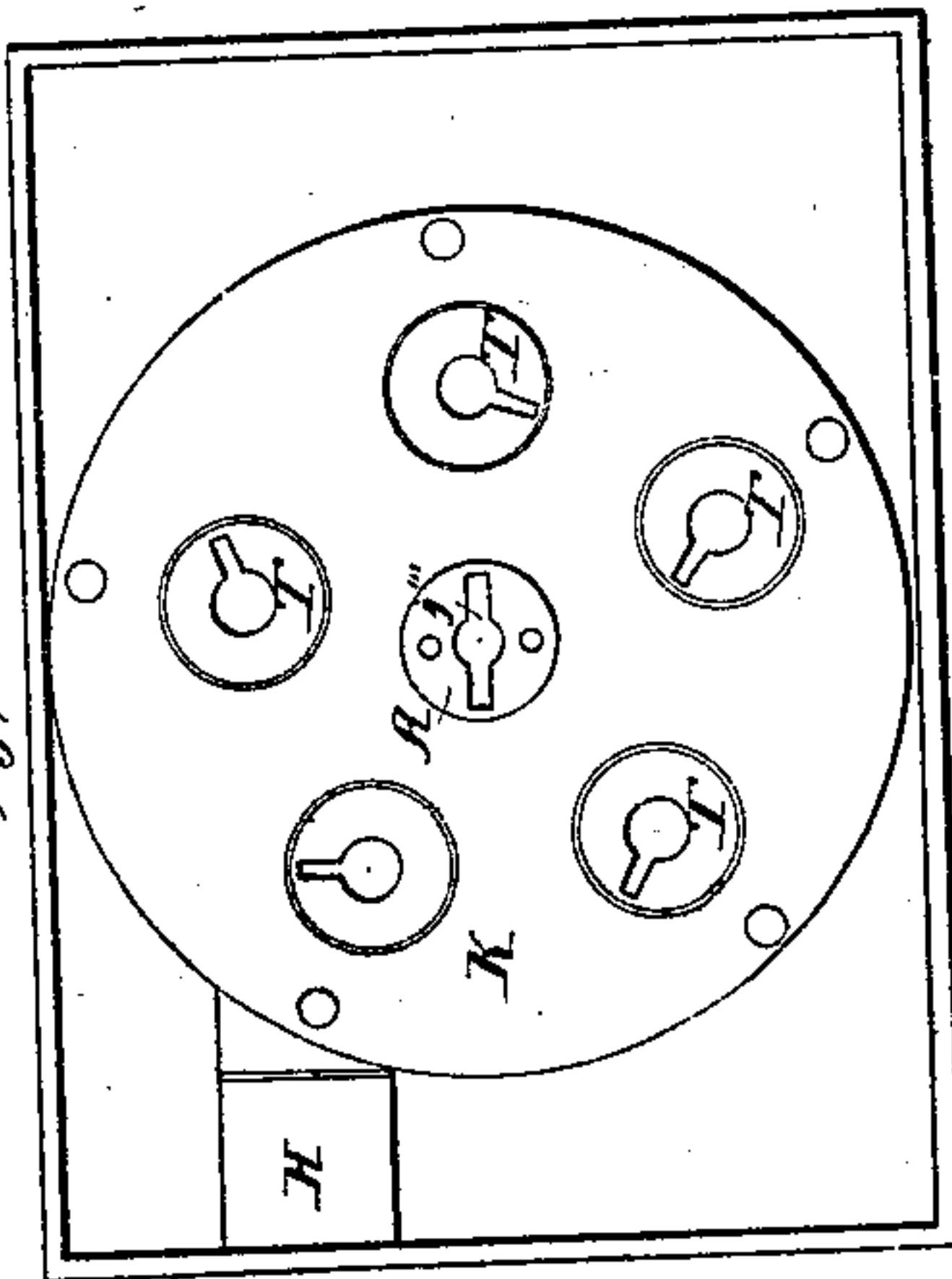


Fig. 5.

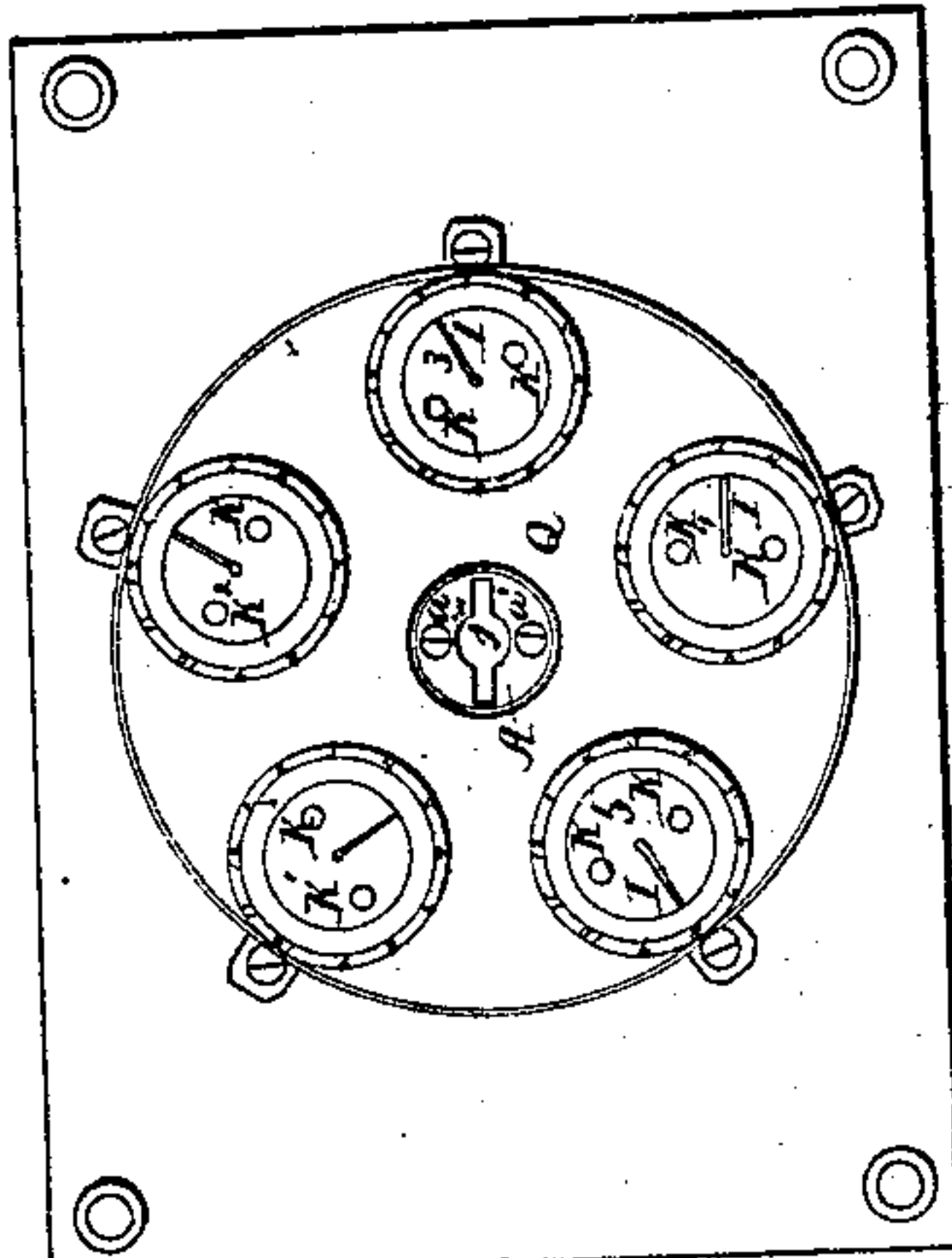


Fig. 1.

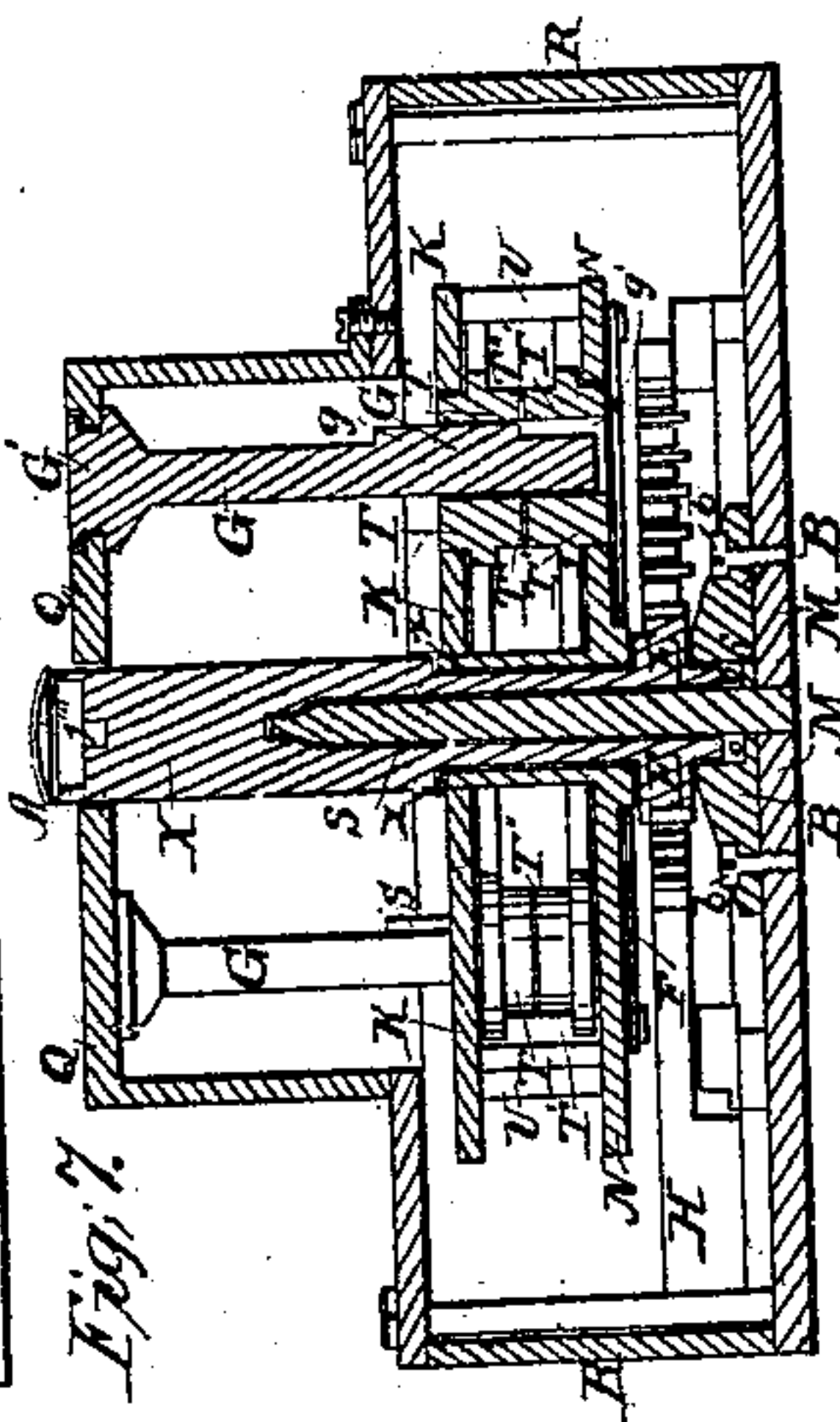


Fig. 2.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN COMBINATION-LOCKS.

Specification forming part of Letters Patent No. 96,376, dated November 2, 1869.

To all whom it may concern:

Be it known that I, MOSES ADAMS, of Chilmark, in the county of Dukes and State of Massachusetts, have invented a new and useful Improvement in Combination-Locks; and I do declare that the following is a full and exact description of the construction and operation of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification, in which—

Figure 1 is a view of the face-plate of the lock, showing the heads of the tongue-bolts and indicators, with the combination figures and indices marked thereon. Fig. 2 is a view of the under surface of the face-plate. Fig. 3 is a top view of the upper set of ratchet-wheels with their spring catches or pawls attached. Fig. 4 is a view of the upper surface of the bottom plate, with the mortise-block and lock-bolt attached. Fig. 5 is a view of the lock with the face-plate off. Fig. 6 is a bottom view of the movable body or mechanism of the lock, showing also the lower set of ratchet-wheels and the spring catches or detents by which they are kept in place. Fig. 7 is a vertical sectional view of the lock, showing the inside mechanism in position to perform the function of locking. Fig. 8 is a view of the key by which the lock is locked or unlocked.

The same letters indicate identical parts in the different figures.

To enable others skilled in the art to make and use my invention, I proceed to describe its construction and operation.

Q is the face-plate, upon which are placed the indicators, numbered 1, 2, 3, 4, and 5, with their combination figures, numbered from 1 to 12, on each indicator, and corresponding with the number of teeth or ratchet-holes in both sets of ratchet-wheels, hereinafter described. The heads of the tongue-bolts G G, hereinafter described, are confined and revolve in the face-plate Q. On the head of each tongue-bolt is an index, I, which, in preparing the lock for locking, may be made to point to any one of the combination-figures of the indicator surrounding the tongue-bolt on which the index is placed, according to the pleasure of the operator. M is the bottom plate, upon which the mortise-block B is firmly fastened

by screws or rivets *b b*. The face-plate Q, the bottom plate M, and the side-plates R R constitute the shell of the lock, in which the operating mechanism is contained. K is the upper and N is the lower plate, both circular in form, which, with their supports U U, constitute the movable frame in which the operating mechanism of the lock is confined. T is the upper set and T' the lower set of ratchet-wheels, arranged with their faces meeting at T'', as seen in Fig. 7, and having for their axes the tongue-bolts G G. The tongue-bolts G G have flanges *g*, which play into the slots *g'* in the ratchet-wheels T T'. G' is the head of one of the tongue-bolts, showing the manner in which it is confined in the face-plate Q. D D are holes in the ratchet-wheels T T' for the reception of the tongue-bolts G G. V V are spring catches or detents, which play into the teeth of the upper set of ratchet-wheels T. F F are spring-detents, fastened at one end by screws to the under side of plate N, and crossing the center of the lower set of ratchet-wheels T' and the tongue-bolts G G, the ends of which detents are turned up at a right angle with the body of the detent, or may be provided with a projecting point near their respective ends, each of which points pass through a hole in plate N, and enter holes or slots in the wheels T', as seen at *ffff* in Fig. 6. In that figure the holes *ffff* are substitutes for ratchet-teeth. S is a spindle, fixed firmly in bottom plate M and mortise-block B, and projecting from the center of mortise O'. S', in Fig. 4, is the hole in which the spindle S is inserted. X is the key-bolt, which is supported by and turns upon the spindle S. The key-bolt terminates in a square tenon, O O, which is so fitted as to easily enter and recede from the mortise O'. E is a cog-wheel, firmly attached to the key-bolt X, the cogs Y of which play into the ratchet L in the lock-bolt H. The spindle S and the key-bolt X pass through a square hole, *x x*, forming the inside connection between the plates K and N, the key-bolt X being so formed as, with the upper surface of the cog-wheel E, to constitute a recess into which the plates K and N enter, as seen in Fig. 7. By this device the entire operating mechanism of the lock may be raised or depressed, as may be required in adjusting the

lock for use. A is the cap of the key-bolt X, fastened thereto by the screws $a a'$, and containing a slot, j''' , for the reception of the upper end j of the key J. $j' j''$ are points or projections on the lower end of key J, which fit into the holes $k k'$ in the heads of the tongue-bolts G G, by which the latter are turned. The tongue-bolts G G have a rotary motion only. The key-bolt X has both a rotary and perpendicular motion, and may, with the frame containing the operating mechanism of the lock, be raised when it is required to adapt the lock for use, or depressed after the lock shall have been so adapted. By the operating or moving mechanism I mean the key-bolt X and the two sets of ratchet-wheels T T' and their detents, embraced in the frame-work of the lock, and composed of the plates K and N and their connecting-supports U U.

Any number of tongue-bolts, with their corresponding indicators, sets of combination-figures, and sets of ratchet-wheels, from two to six, or even more, may be employed. In the drawings annexed, five sets of these devices only are employed.

Having described the construction of my improved lock, I now proceed to set forth its mode of operation. The lock, as represented in Fig. 7, is in such a condition of adjustment as will permit the lock-bolt H to be turned out or in, as may be required.

In order to put the lock in position to be locked, or adjust its mechanism for that purpose, I proceed in this way: I insert the end j of the key J in the slot j''' . I then turn the key one-quarter of a circle around, and with the end of the key lift up the key-bolt X until the tenon O O is relieved from the mortise O'. I then turn the key-bolt sufficiently to enable the corners of the tenon O O, which is square, to rest upon the sides of the mortise O'. By this means the key-bolt, bearing with it the whole moving mechanism of the lock, is kept in a position of rest while the lock is being adjusted for use. By thus elevating the key-bolt and moving mechanism the tongue-bolts G G, which are stationary so far as perpendicular motion is concerned, are made to pass through both sets of ratchet-wheels T T', and their ends coming in contact with the detents F F push them out of the slots $f f f f$, thus relieving the lower set of ratchet-wheels T'. In this situation both sets of ratchet-wheels T and T' revolve with ease upon the tongue-bolts as their axes, and are now in condition for adjustment with the combination-figures on the respective indicators.

To prepare the lock for action, I proceed in this manner: I adjust the indices to the combination-figures according to my pleasure. For example, I turn tongue-bolt No. 1 until the index upon it points exactly to combination-figure 5. This carries with it the set of ratchet-wheels attached to, and revolving on, that bolt, and so as to all the bolts and ratchet-wheels. I then turn tongue-bolt No. 2 until its index points to combination-figure 1. I

turn No. 3 until its index points to combination-figure 2. I turn No. 4 until its index points to combination-figure 4. I turn No. 5 until its index points to combination-figure 8. The lock is now adjusted for the operation of locking. I now make a note of all the combination-figures which I have locked upon, or to which I have made the indices point. I now turn out the lock-bolt H, and then depress the key-bolt X with the moving mechanism attached until the tenon O O passes into the mortise O', and in this position, the tenon and mortise being square, the key-bolt cannot turn either way. The ends of the tongue-bolts G G now cease to depress the spring-detents F, each of which passes into its corresponding hole or slot f in the lower set of ratchet-wheels, thus holding them firmly in place. In this condition of the lock the flanges g of the tongue-bolts are removed from the slots g' of the under set of ratchet-wheels T'. In this situation the tongue-bolts may be revolved with the upper set of ratchet-wheels T without in the least affecting the lower set. I then turn all the tongue-bolts with their respective indices from the combination-figures locked upon to some other combination-figure on each indicator, according to my pleasure. For example, I turn bolt No. 1 until the index points to combination-figure 12, No. 2 until the index points to figure 5, No. 3 until the index points to figure 9, No. 4 until the index points to figure 8, No. 5 until the index points to figure 6; or I may turn all the bolts until the indices, respectively, point to figure 12, or any other figure in the series. In these positions of the tongue-bolts and upper set of ratchet-wheels it will be seen that the flanges g are all removed from the slots g' in the lower set of ratchet-wheels. In this situation it is impossible to lift the moving mechanism of the lock. It remains with the tenon O O of the key-bolt X firmly fixed in the mortise O', and consequently the lock-bolt H cannot be turned either way. The lock is now fast and immovable.

In order to relieve the lock-bolt H and unlock the lock, I proceed in this manner: I first look at my memorandum, and then turn all the indices around to the combination-figures to which they pointed when I commenced the operation of locking. For example, I turn tongue-bolt No. 1 until the index points to combination-figure 5, No. 2 until the index points to figure 1, No. 3 until the index points to figure 2, No. 4 until the index points to figure 3, No. 5 until the index points to figure 8. This brings the two sets of ratchet-wheels T and T' into the same relation with each other as they occupied when they were adjusted for locking. The slots g' of the two sets of wheels are now in exact relation with each other, and ready to receive the flanges g of the tongue-bolts G G. I then insert the end j of the key J into the slot j''' , and raise the key-bolt X with the working mechanism until the tenon O O is relieved from the mortise O', turning it a little, so that the corners of the tenon will rest on

the sides of the mortise, as in the process of locking. This operation has forced the tongue-bolts and their flanges *g* into the corresponding holes and slots *g'* in the lower set of ratchet-wheels, the ends of the bolts bearing upon the spring-detents *F*, and forcing them out of the slots or holes *ffff* in which they rest, thus relieving the lower set of ratchet-wheels, and enabling them to revolve with the upper set upon their common axes, the tongue-bolts. The lock-bolt *H* may now be turned back into the lock by means of the key-bolt *X* and the cog-wheel *E*. The lock is now ready to be adjusted for another operation.

As before remarked, my lock may be constructed with two or more tongue-bolts and their corresponding sets of ratchet-wheels. I think, however, that six bolts and sets of wheels will be sufficient for all practical purposes. With that number the chances of discovering the combination-figures on which the lock is locked would not be one in a million.

Having above described the construction and operation of my improved combination-lock, what I claim, and desire to secure by Letters Patent, is—

1. The employment of the tongue-bolts *G G*, in combination with the sets of ratchet-wheels *T* and *T'*, constructed and operating substantially as above set forth.

2. The movable frame composed of the plates *K* and *N* and their supports *U U*, in combination with the key-bolt *X*, constructed as and for the purpose above set forth.

3. The key-bolt *X*, in combination with the cog-wheel *E*, the mortise-block *B*, the spindle *S*, the tongue-bolts *G G*, the sets of ratchet-wheels *T* and *T'*, and the lock-bolt *H*, constructed and operating substantially as above set forth.

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Witnesses:

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