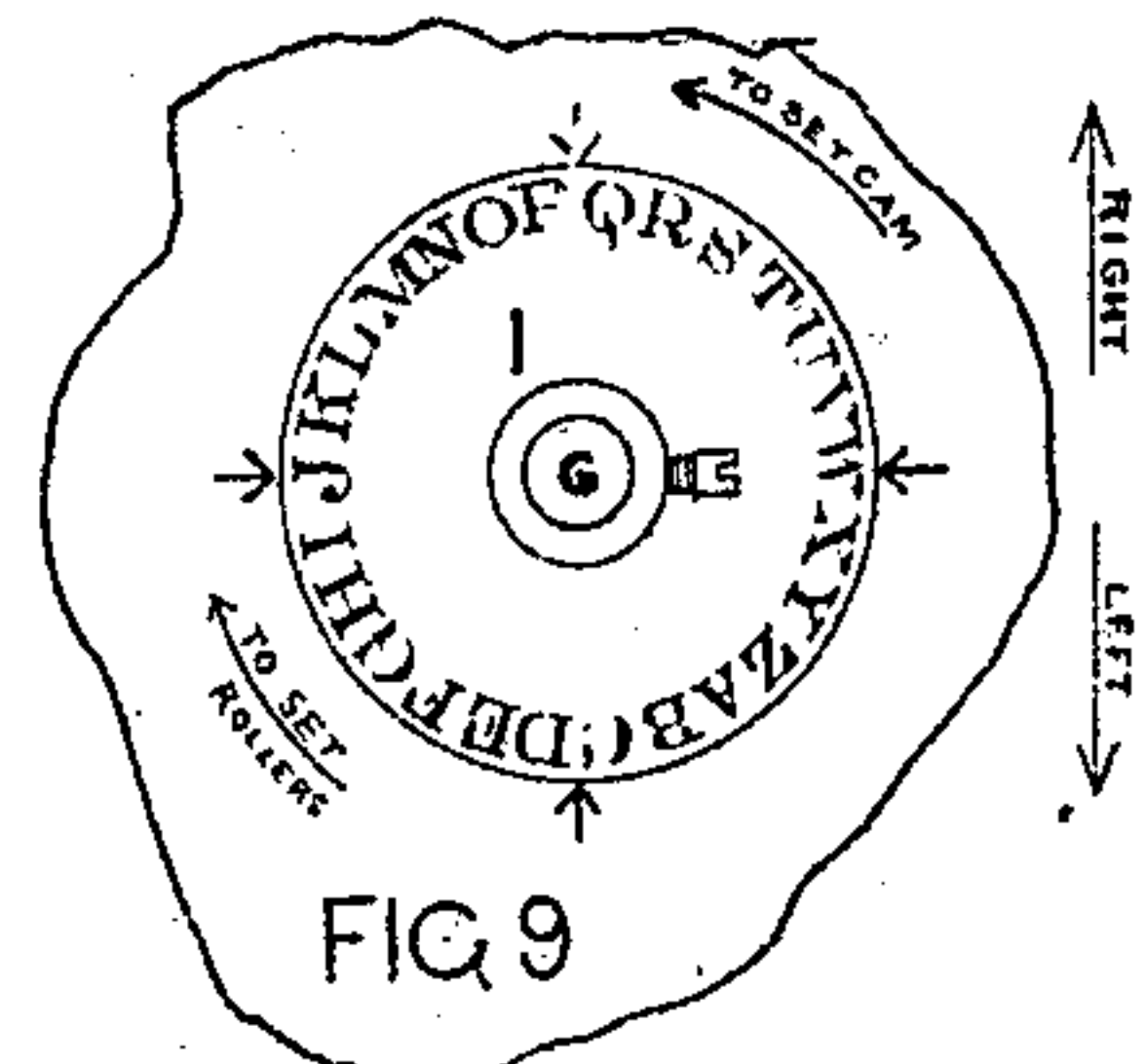
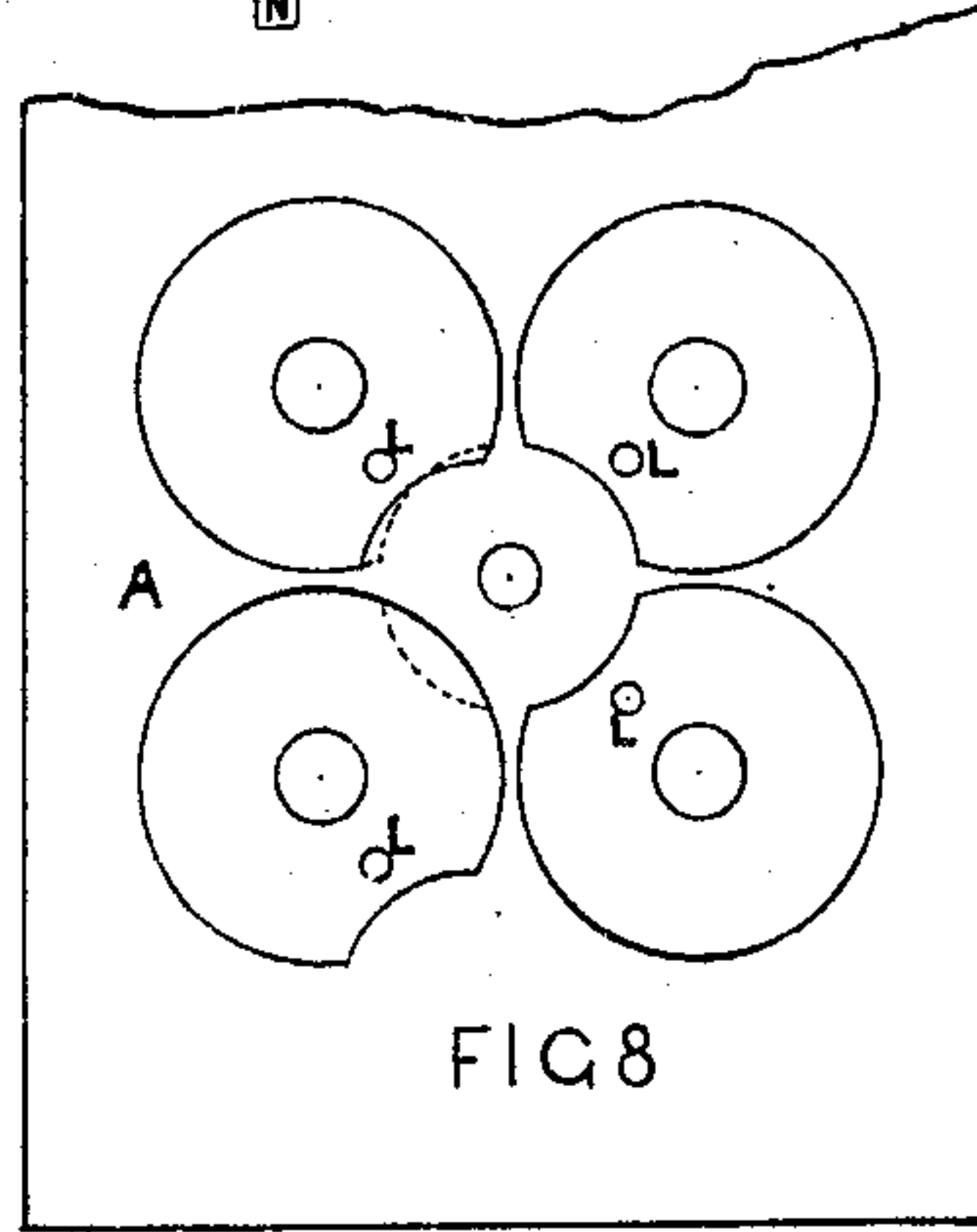
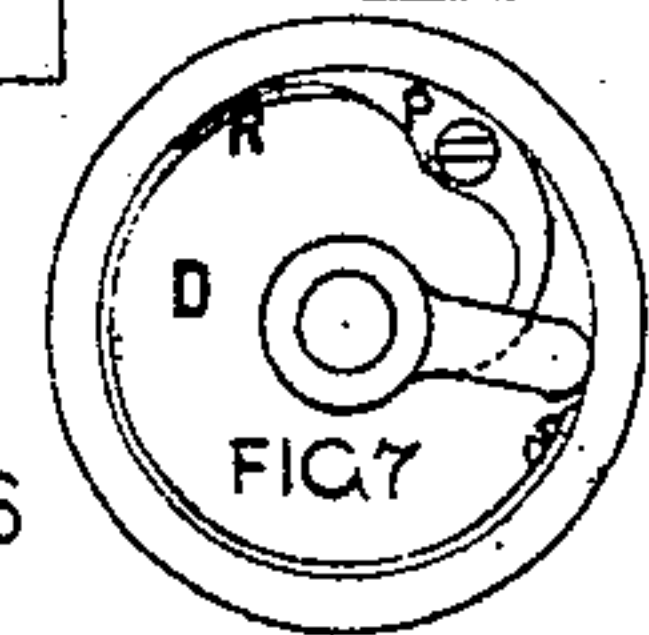
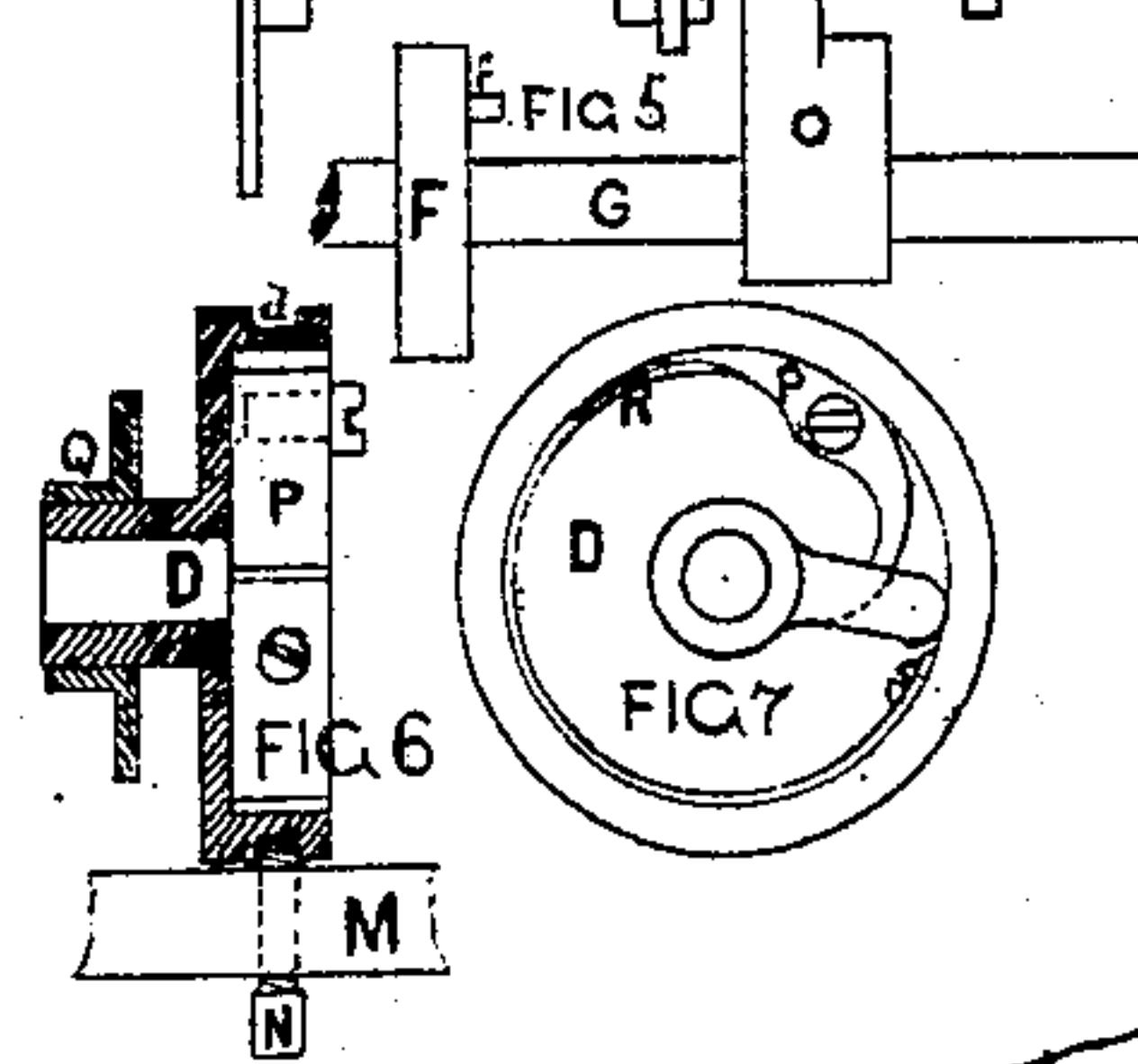
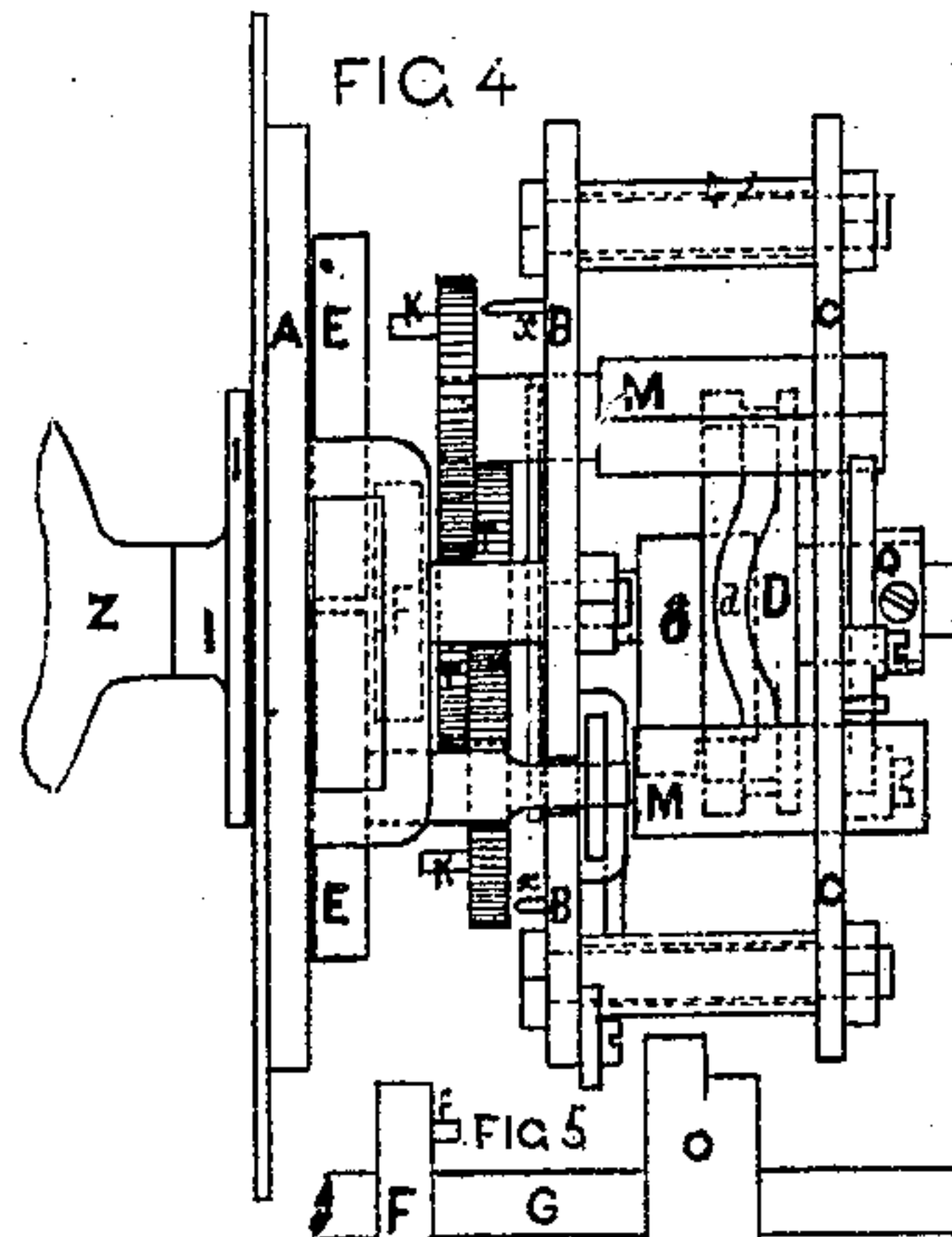
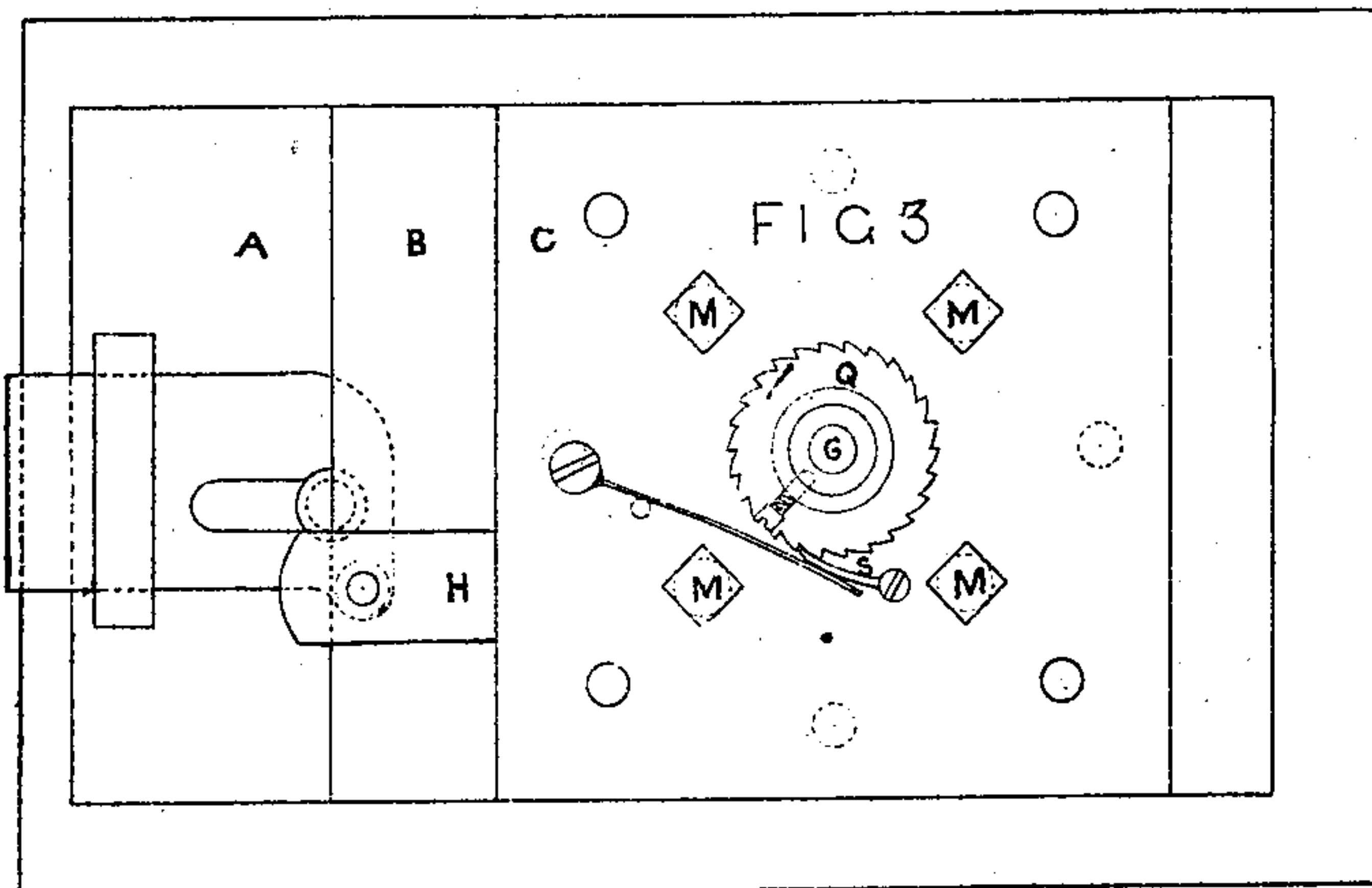
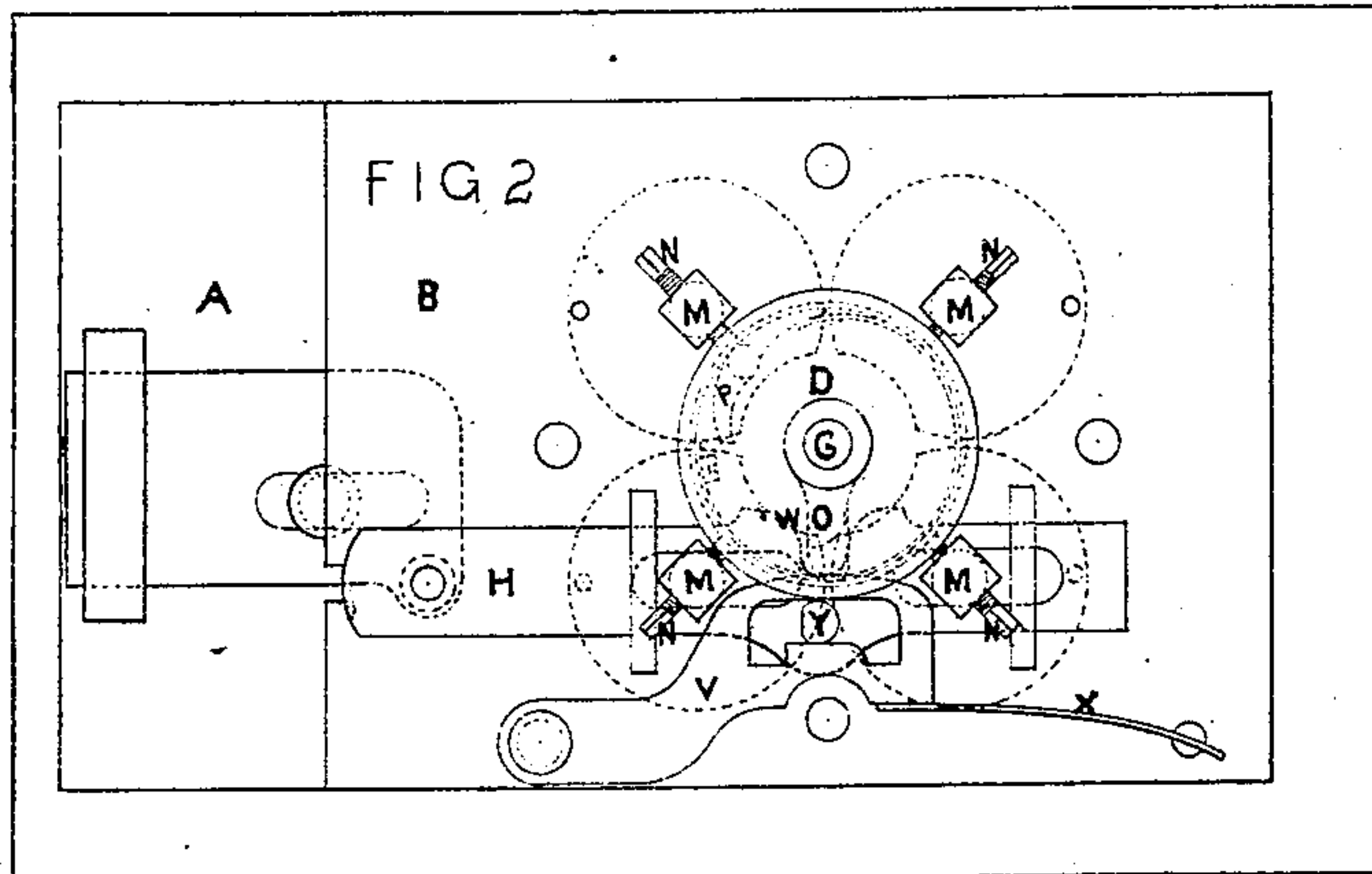
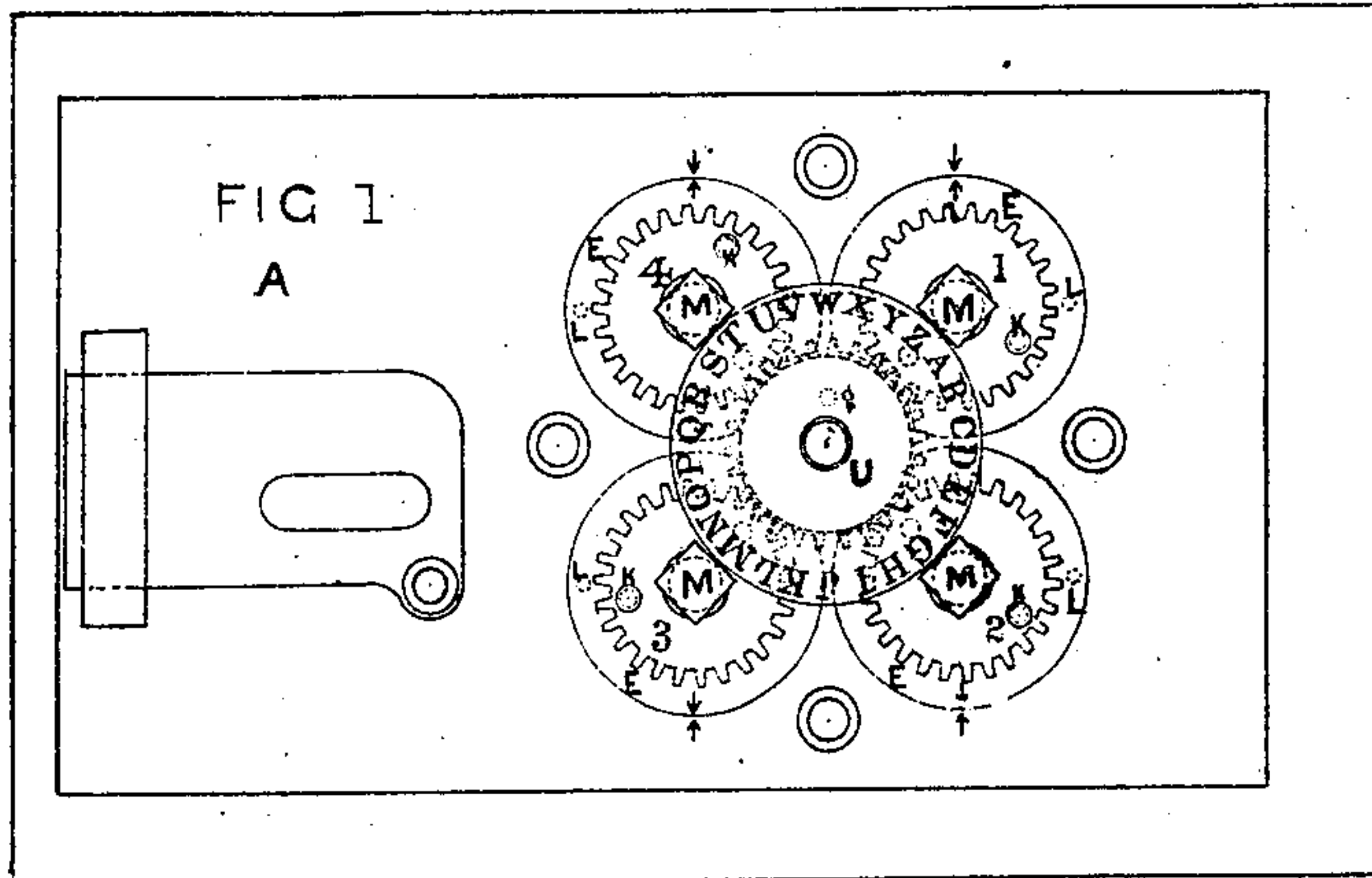


M. Hainque,
Permutation Lock.

No. 107,251.

Patented Sep. 13. 1870.



WITNESSES
George Parry
Edw. H. Bryant

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United States Patent Office.

MARTIAL HAINQUE, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO HIMSELF AND ALEXANDER STEIGER, OF SAME PLACE.

Letters Patent No. 107,251, dated September 13, 1870.

IMPROVEMENT IN PERMUTATION LOCKS.

The Schedule referred to in these Letters Patent and making part of the same

I, MARTIAL HAINQUE, of the city and county of San Francisco and State of California, have invented a certain new and improved Lock, of which the following is a specification.

Nature and Objects of the Invention.

My invention consists in a new and improved mode of constructing what are generally called permutation locks, such as have application on counting-house safes, treasure vaults, &c.

Description of Accompanying Drawing.

Figure 1 is a plan of the parts of the lock which are between the outer wall or plate A of the safe and the first inner plate B, (see fig. 4 of the drawing.)

Figure 2 is a plan of the parts between the plate B and the plate C, (see fig. 4.)

Figure 3 is a plan of the parts as seen outside plate C.

Figure 4 is an edge of the lock complete.

Figure 5 shows a view of the key-shaft.

Figure 6 is a section of the cam D.

Figure 7 is a plan of interior of the cam.

Figure 8 is a plan of the rollers E in position.

Figure 9 is a view of the index-plate outside of the safe.

In all the figures of the drawing like letters of reference represent like parts.

General Description.

The novelty of this invention consists in the means employed in operating the notched disks E, as shown in fig. 8.

Now, unless these notches be so placed in relation as to leave a perfect circular space in the middle, the collar F on the key-shaft G will form an obstruction against bringing forward the key to engage with the sliding bar H; but the key being beyond the sliding bar, it will pass over it when revolved; but if the notches of the rollers be so placed that there is left a perfect circular space in the middle, as shown by the dotted lines in fig. 8, then the collar will be unobstructed, and the key may be pulled forward to engage with the sliding bar, so as to act on the bolt of the lock.

The proper position to be given the rollers, so as to be enabled to draw forward the key will be indicated on the outside of the safe by the index-plate I, which will be rigidly secured to the key-shaft.

The rollers E will be set in position by revolving the toothed wheels 1 2 3 4, which have projecting pins K, which will be made to come in contact with similar pins L projecting from the face of each roller, the contact of these pins being made by the action of the cam and the revolution of the wheels.

The toothed wheels 1 2 3 4 will be carried by and revolve loosely on the shafts M, which have bearings in the plates B and C.

These shafts and the gears thereon will be made to slide back and forth by the action of the cam D, which has the irregular-shaped groove *d* cut in its periphery. Into this groove little pins or adjustable set-screws N will project from the four shafts, (see figs. 2, 4, and 6;) thus, when the cam is revolved, the shafts will be pushed forward and back, one after the other in regular order, because the groove *d* at one point is made to diverge a little to one side, (see fig. 4.)

The cam D is itself revolved by turning the key O in one direction, which may either be to the right or to the left, accordingly as the pawl P, fig. 7, has been set; but the cam is not revolved when the key is drawn away from contact, as when the rollers E are set and the key is drawn forward in the act of opening the lock, for then the key escapes the cam entirely.

In the drawing the cam operates by turning the key to the right, and, when so turning, no action whatever is had on the rollers, nor at any time will there be any movement of the rollers, unless the cam has thrown forward some one of the four wheels 1 2 3 4.

Now, it will easily be seen that the central part of the diverging portion of the groove D must be in one of four divisions or points of the circle, otherwise none of the wheels 1 2 3 4 will be thrown forward. When the cam is at one of these four points it will be indicated outside the safe by the index-plate I, in this manner:

Let it be supposed that when the key is turned to the right, and brought to bear against the pawl P, which is easily felt by the resistance occurring, and also, it may be known by the clicking of the ratchet-wheel Q, the letter W on the index denotes the position of the divergent part of the groove, and whether the cam has thrown out any one of the four wheels. Thus, if W is at the top, it is known that wheel 1 is thrown forward, and it may be engaged with its corresponding roller. Again, if W is at the first right quarter of the circle, wheel 2 is thrown forward, and may be engaged with its roller, and so on. Place W at the lower quarter and left-hand quarter to engage wheels 3 and 4.

If W comes between and not exactly on one of the four quarterings of the circle, then none of the four wheels will operate on the rollers when revolved, because the pins K and L will not be near enough to strike each other.

The construction of the cam D is shown in figs. 6 and 7. It is a circular disk, having groove before described cut in its periphery. In the recess where the key revolves the pawl P is set, which is operated by

the spring R. If the pawl points to the right the cam is to revolve to the left, or *vice versa*.

To prevent any movement of the cam in the wrong direction, a ratchet-wheel, Q, with the pawl S, is supplied and secured on the hub of the cam, (see figs. 3 and 6.)

The wheels 1 2 3 4 gear with and are driven by a central gear, T, on the key-shaft, shown in figs. 1 and 4. This center gear must be a little broader faced than the others, because of the four wheels sliding back and forth; it may revolve loosely on the key-shaft, and a little projecting pin, f, on the collar F, may strike a similar pin, g, projecting from the side gear, so as to push it around.

In figs. 1 and 4 I show an interior index-plate, U, similar to the one outside the safe; it is used as a guide in setting the "combination," in this manner:

The lock being removed from the safe, that is, all attached to the plates B and C, which are purposely made for convenient removal, the cam is turned as to throw forward gear 1; then note what letter is at the top. Let us say, as in fig. 1, W is at the top; it may then always be known that if W is set at one of the four quarters of the circle, the corresponding gear is set forward to operate its roller; the two indexes correspond. The cam is set by turning the knob to the right, then the gears are operated on the rollers by turning to the left.

As above, the cam has set forward gear 1; now turn to the left till roller 1 is set exactly in position for opening the lock; this may be known by an arrow point on the roller and the plate A coming in line.

According to the index we find, let us say G, is on top; then turn to the right, as before, and set forward wheel 2, then to the left, until roller 2 is set; say we find O is the top letter; proceed as before for the remaining rollers 3 and 4, and suppose we have L and D as our top letters; then the key-word for opening the lock is G O L D, and W is the index for setting the wheels.

When it is desired to change the key-word, proceed as follows:

First, note what tooth of the gear 1 is opposite any given point when its roller is set for opening the lock. For convenience of doing this, there is a pin, x, projecting from the plate B, (see fig. 4,) which points to a marked tooth of the gear; then turn the index around until the first letter of your new key-word comes to the top. Say the new word is R O S E; then, when R is at the top, remove gear 1 from its spindle, and change it around until the marked tooth is opposite the pin x; then set the second gear in like manner, O being the top letter; then the third gear S being on top, and, lastly, the fourth gear, E, being at the top.

It will not be convenient to alter the index-letter which sets the cam, for that would necessitate changing the position of the pawl P.

In fig. 1 I have shown the letters on the index-plate, although, being on the other side of the plate, they would not appear in this view; however, it explains better to show them as I have done.

In a properly-constructed lock there should be as many teeth in each gear as there are letters on the index-plate, making a tooth for a letter.

The sliding bar H and the catch V are of common construction, and no elaborate description need be made of them.

When the key has been drawn forward it is turned until it enters the notch W of the sliding bar, and, when further revolved, it lifts the catch which holds the sliding bar, and, the bar being released, it can be moved forward.

The spring X throws the catch at each end of the stroke of the bolt, when the pin Y will enter the recesses, and thus the sliding bar is "locked." The device is well understood by those acquainted with such locks.

The plates A, B, and C are fastened together with bolts, with sockets or thimbles between, to keep the plates the proper distance apart.

Z is the knob or handle of the lock.

The index-plate I should be so secured to the key-shaft that it may not be easily moved, and a mark should be made to indicate its exact position with reference to the key-shaft.

From the foregoing the operation may be known; but in condensed form I will describe the manner of opening the lock as follows:

Operation.

Let W be the index-letter for setting the wheels, and G O L D the key-word for setting the rollers; then

First, turn the knob to the right till W is at the top quarter of the circle. Be sure the key has moved the cam, which may be known, as before stated, by the click of the ratchet; if not, give the knob another turn; then turn the knob to the left, and set the first letter of your key-word G at the top quarter. Always make a complete revolution, even if you pass the point for setting your letter once.

Second, now turn the knob to the right, and bring W on the right quarter; then turn to the left, and set O on top.

Third, turn to the right and set W at the lower quarter, then to the left, and set L at the top of circle.

Fourth, turn to the right and set W on the left quarter, and then to the left, and place D at the top. Now pull the knob forward, and turn till the bolt is shot back, and the safe can be opened.

Claim.

I claim as my invention—

The combination of the cam D, the sliding shafts M, and the train of gears having the projecting pins thereon operated by the key O in setting the notched disks, as and for the purpose described.

MARTIAL HAINQUE.

Witnesses:

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CHAS. W. BRYANT.