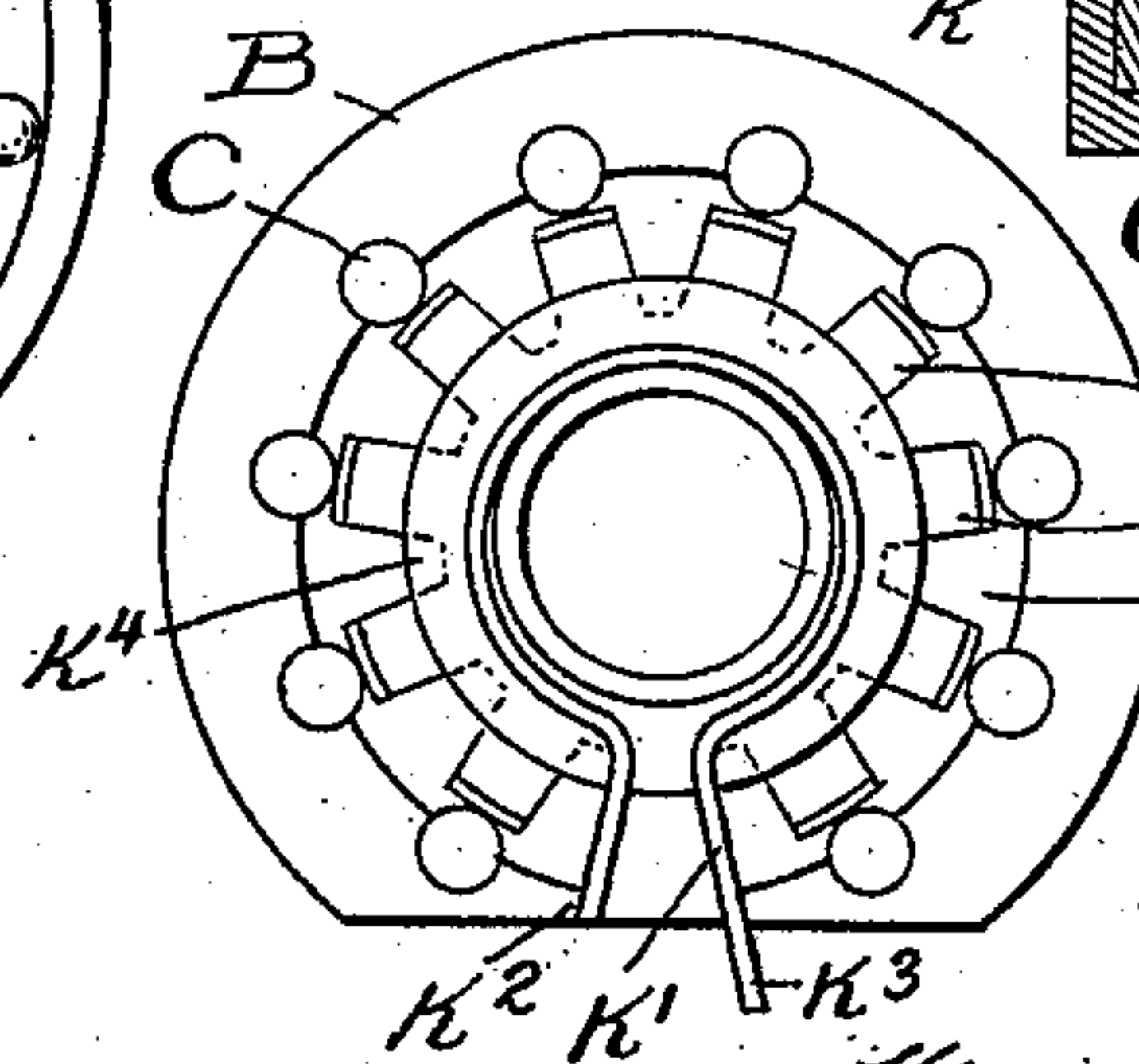
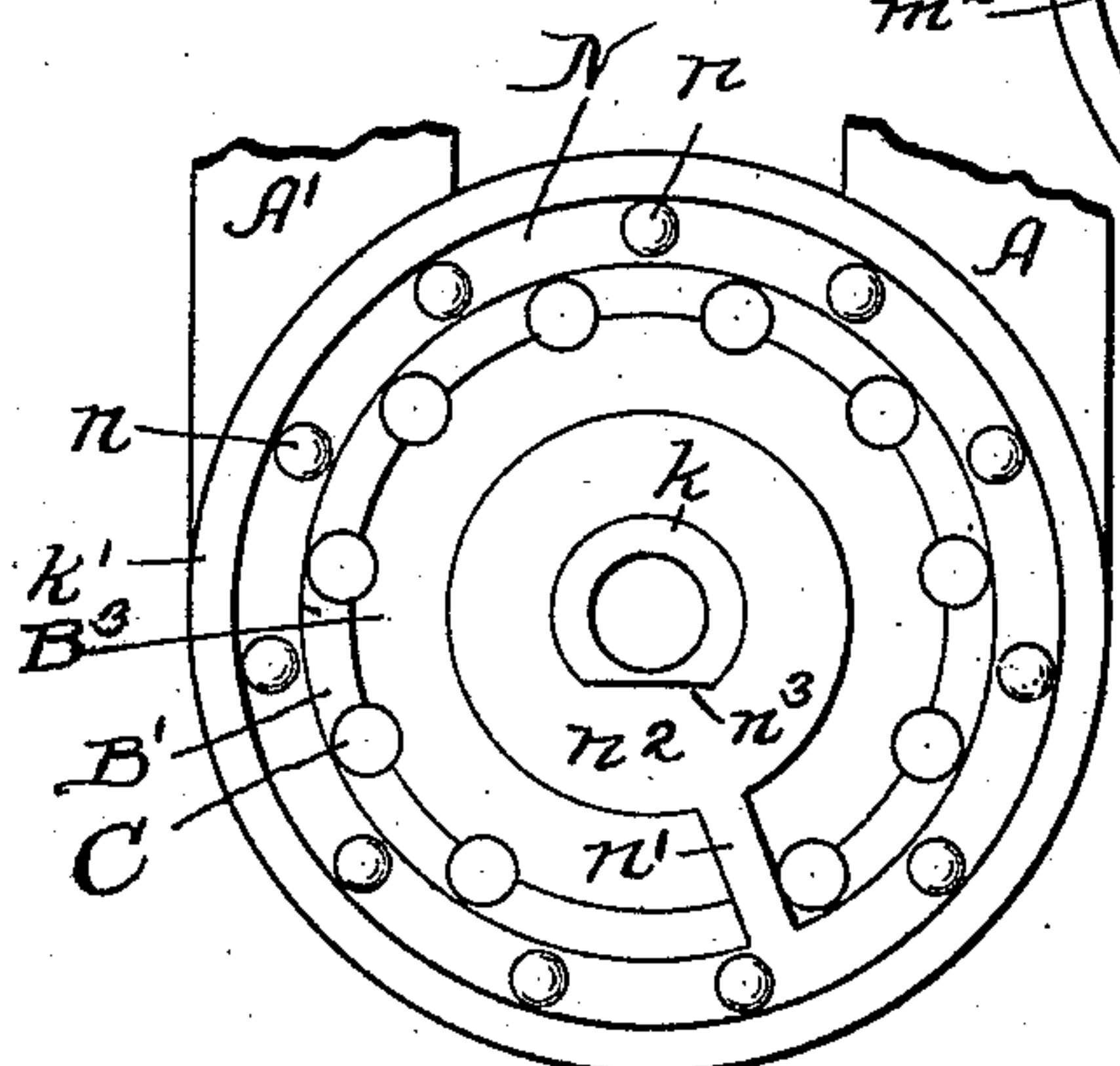
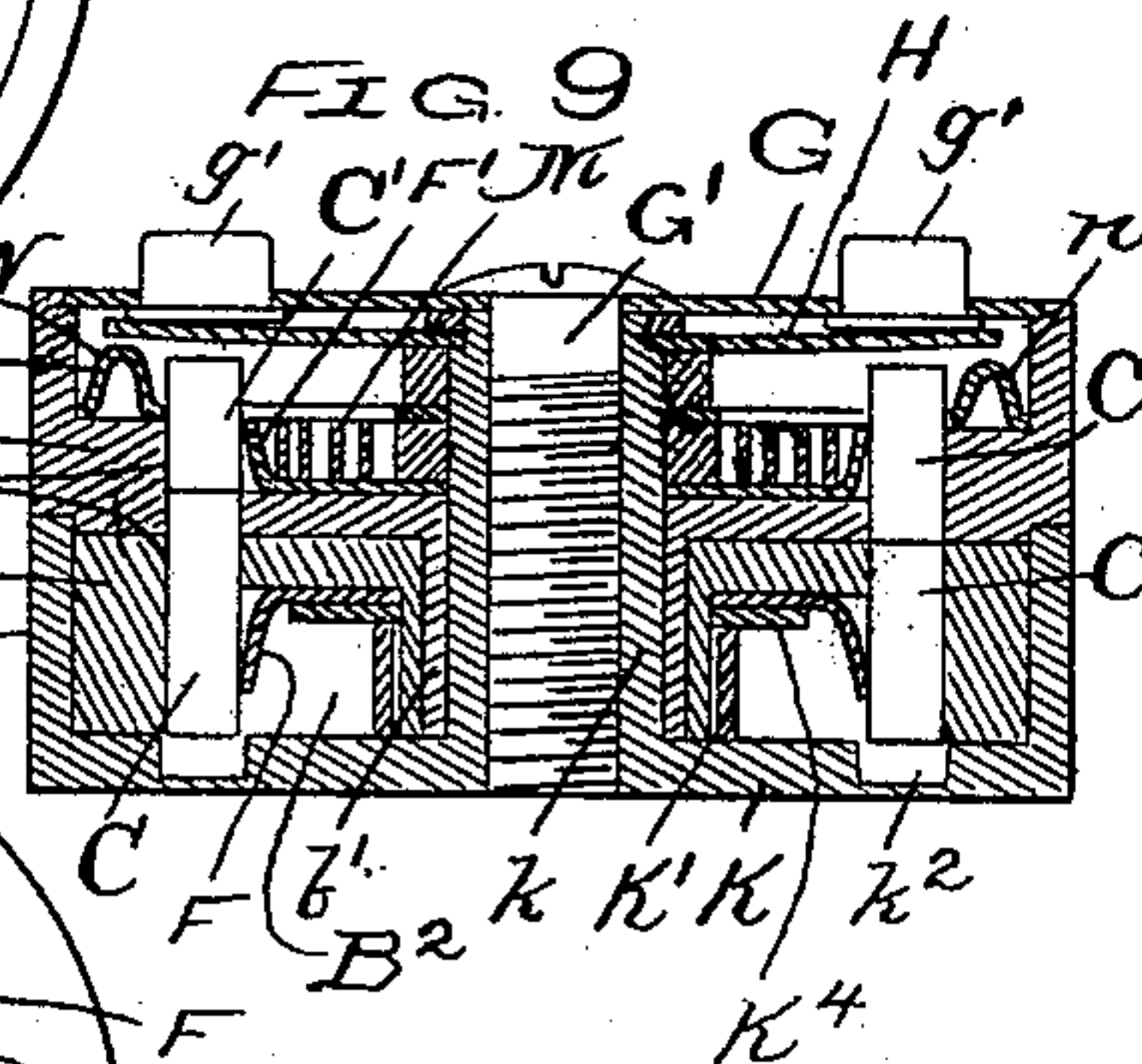
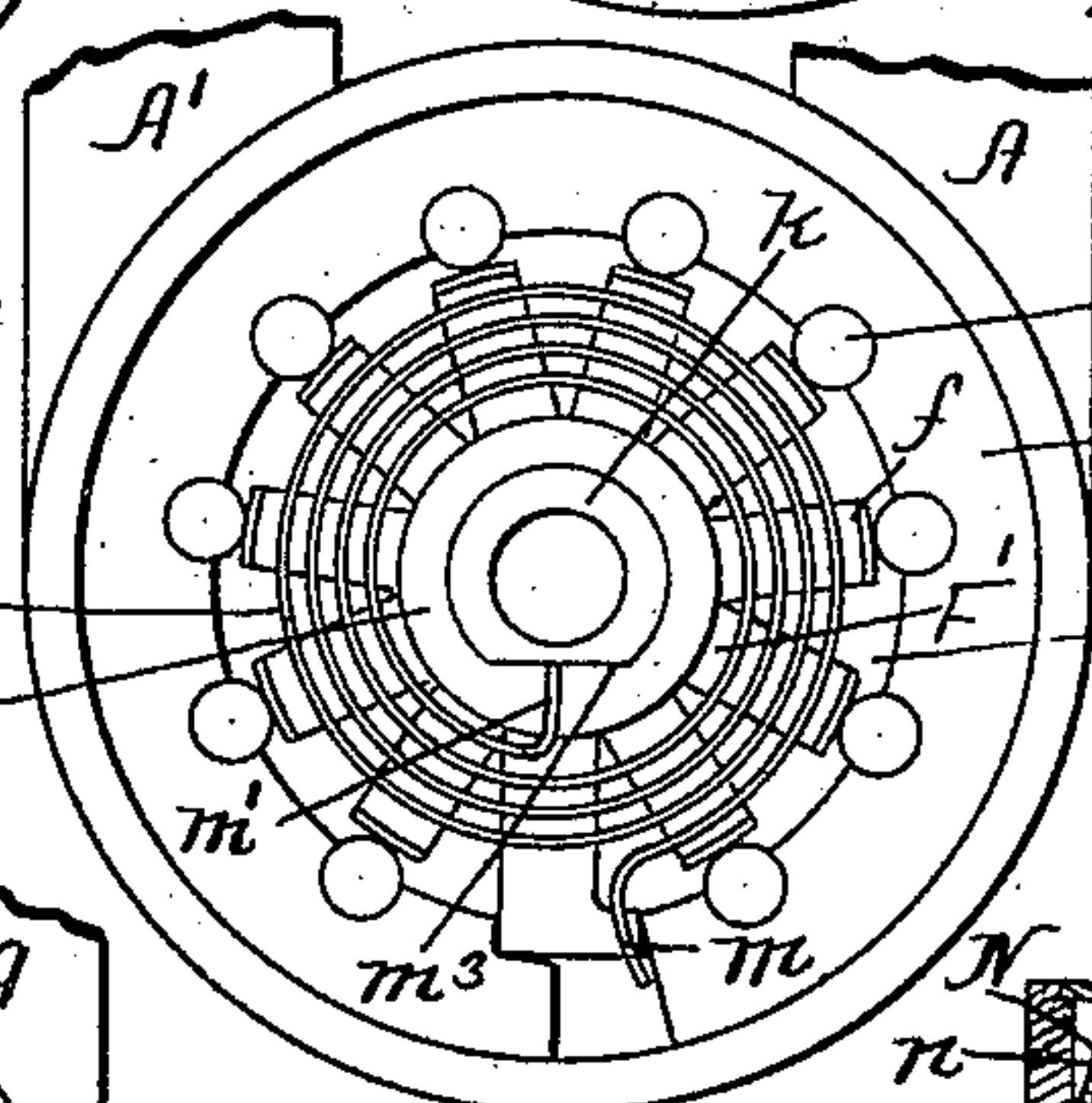
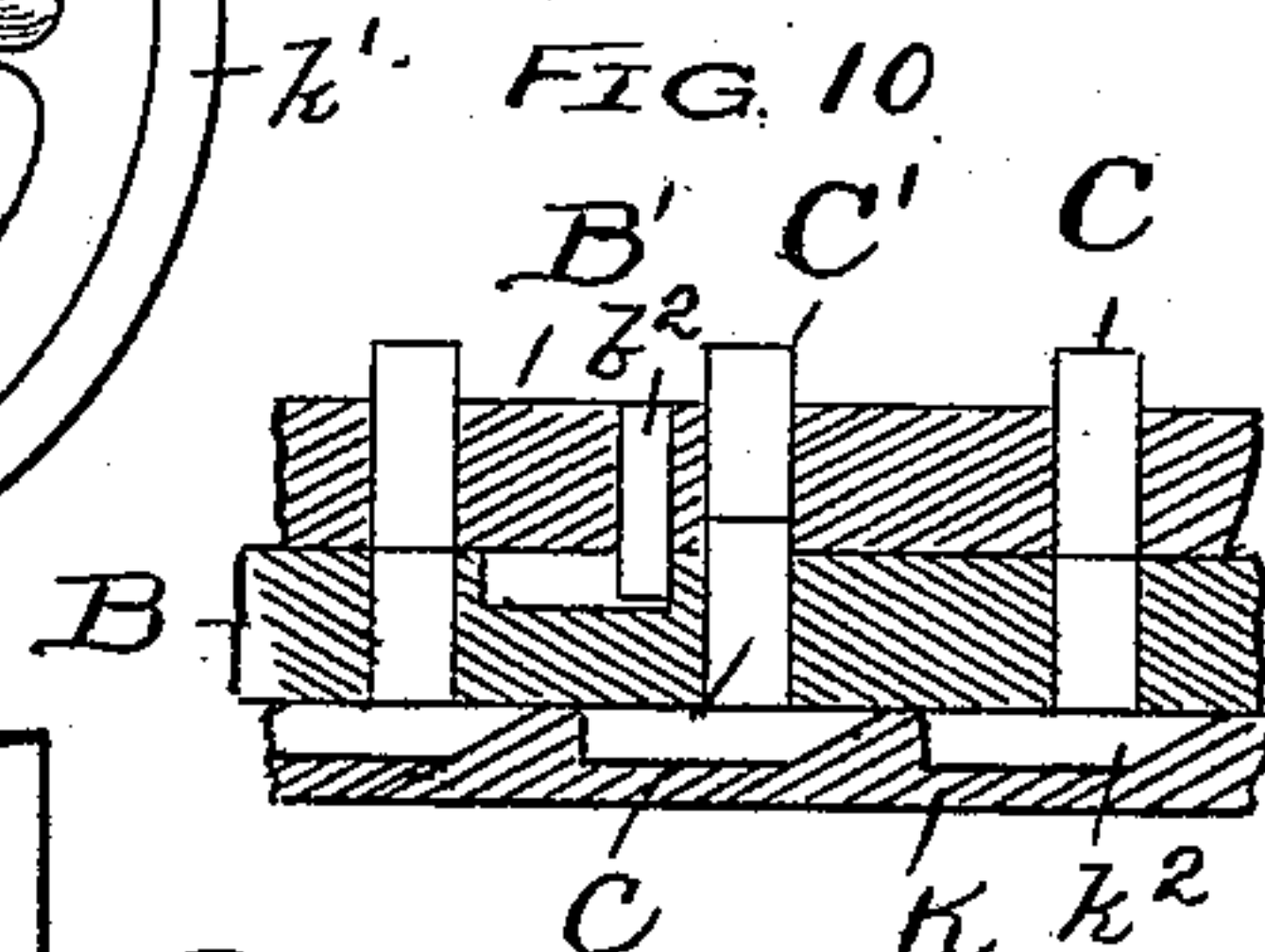
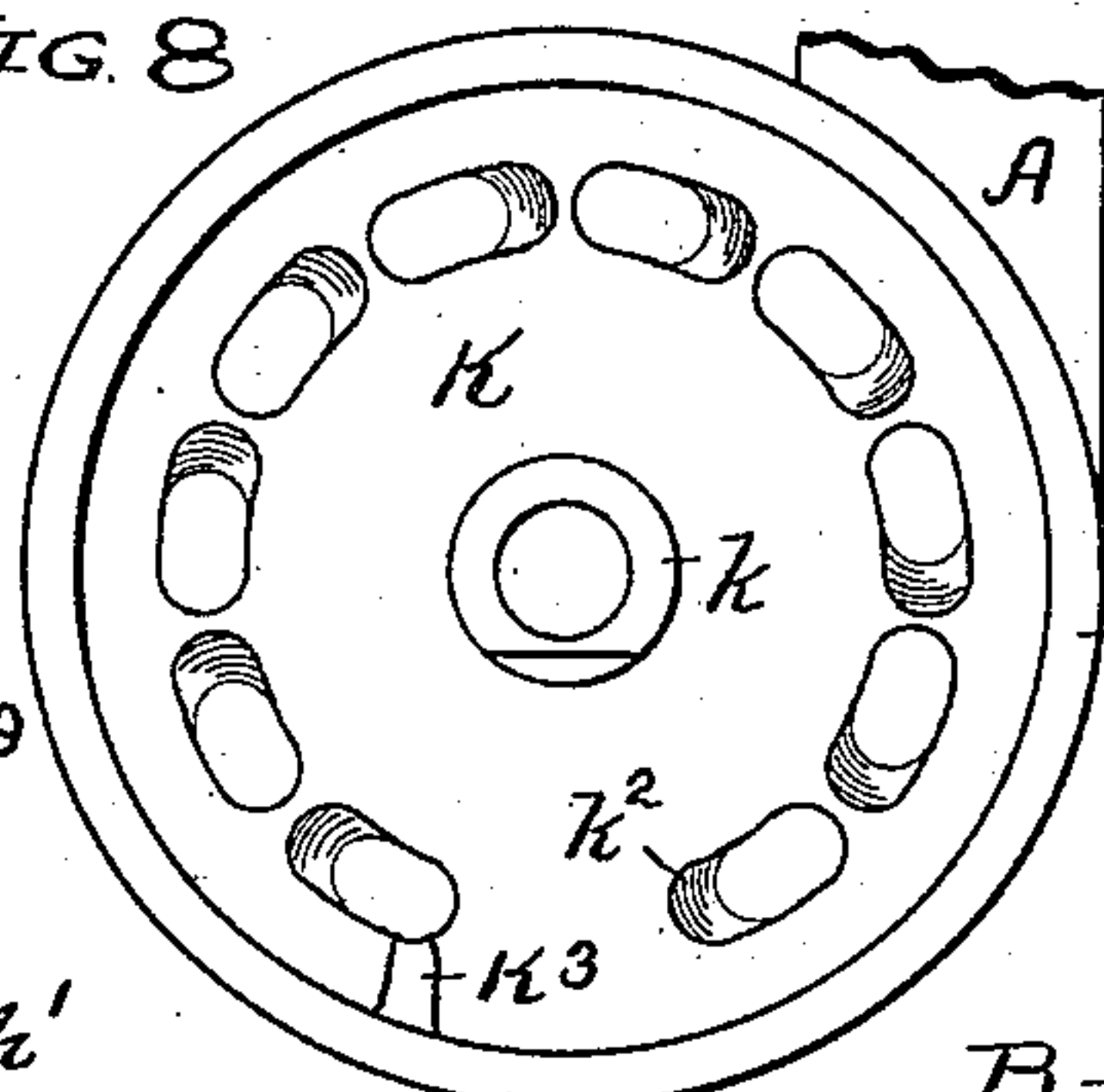
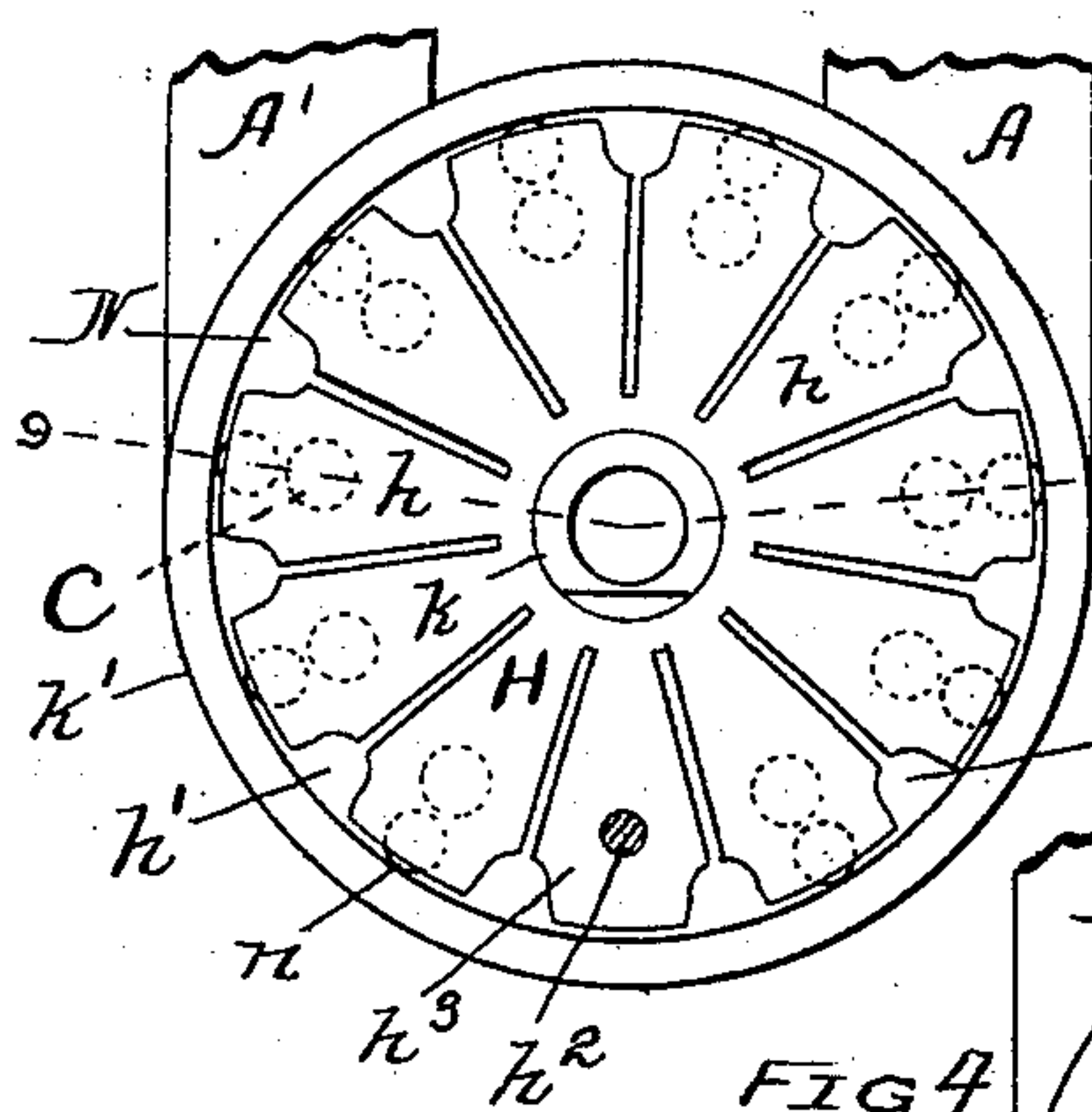
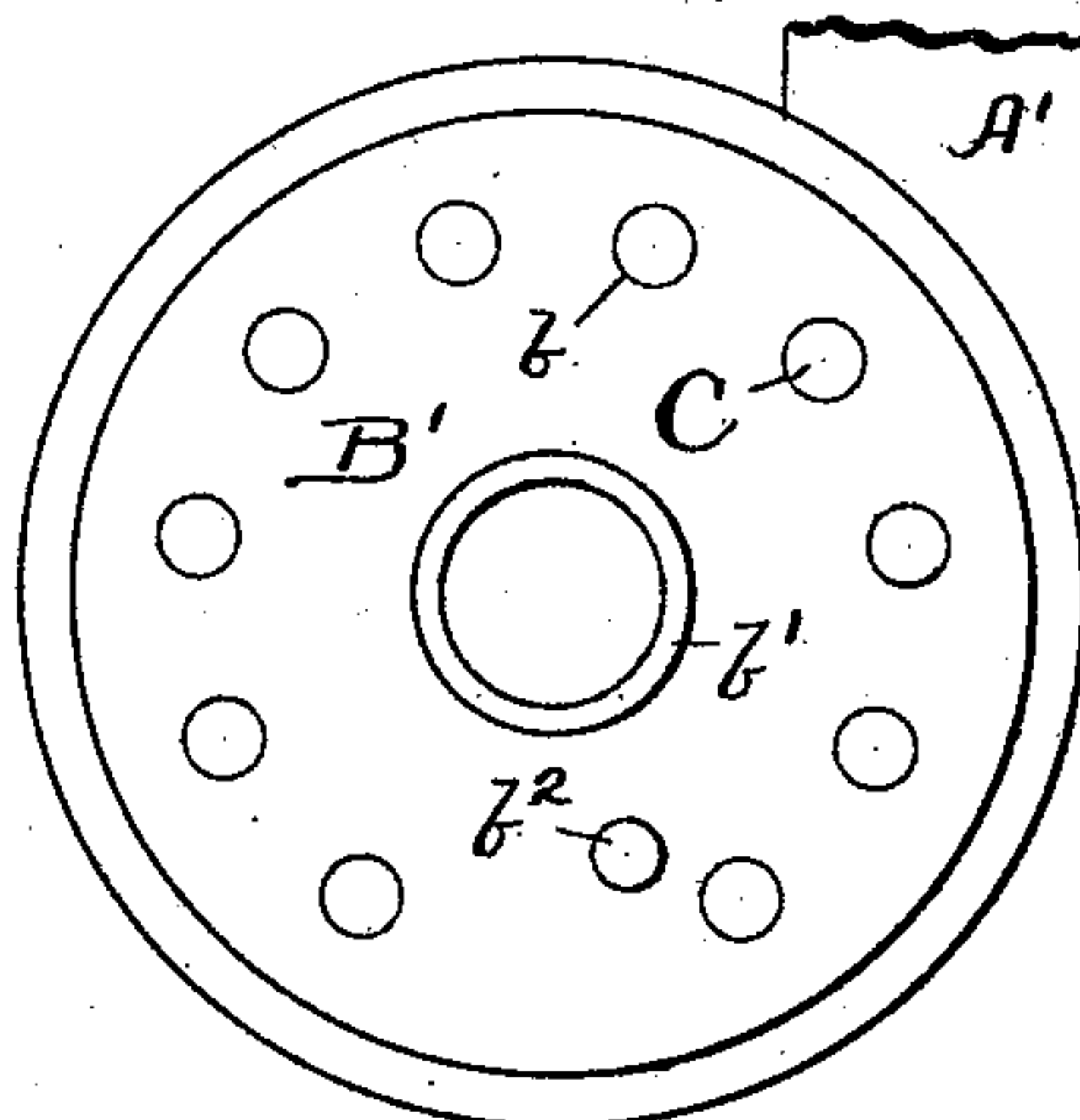
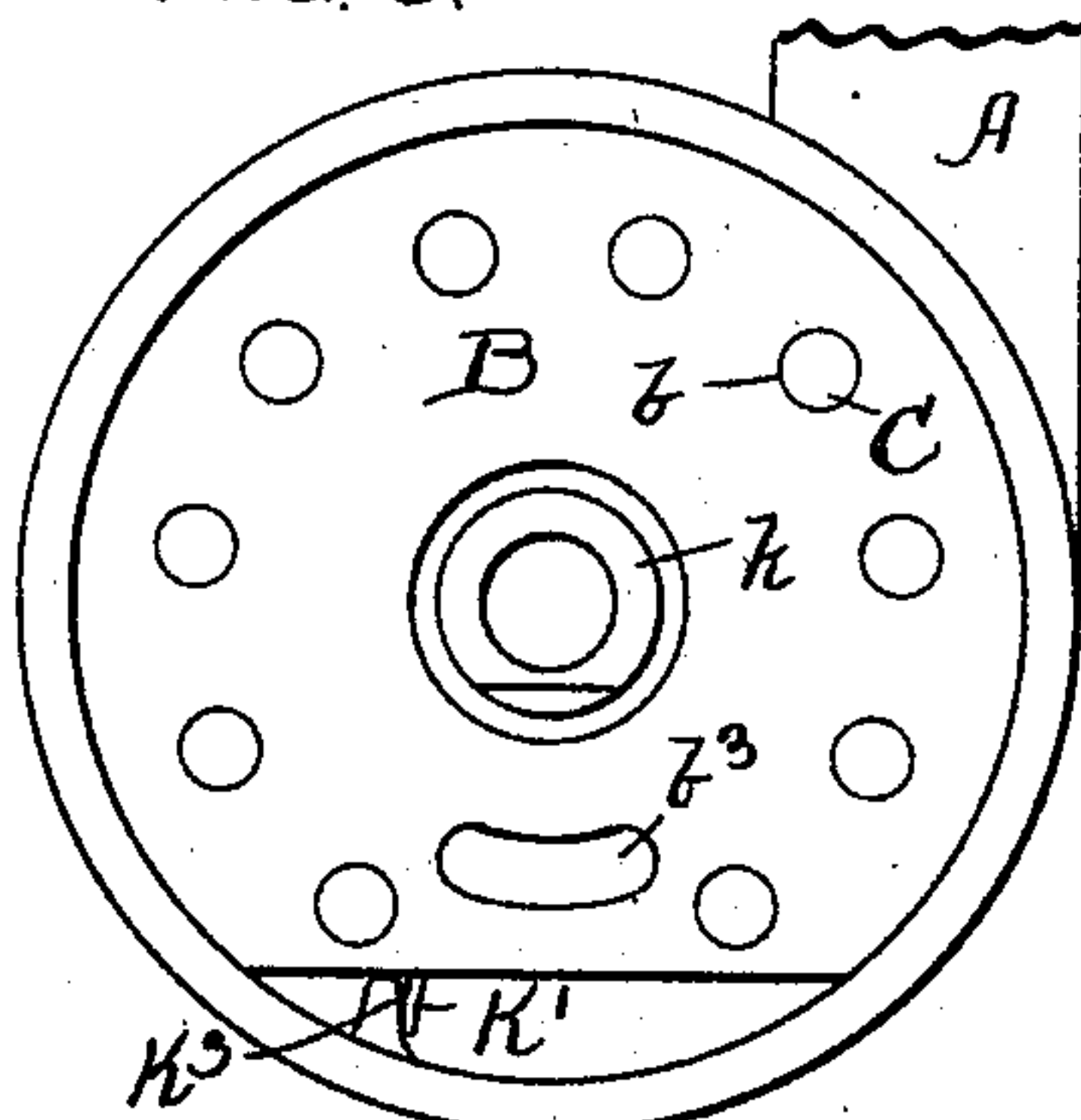


H. CLARKE.
COMBINATION LOCK.

Patented Feb. 16, 1897.



INVENTOR:
HENRY CLARKE

BY *Munday, Everts & Adcock.*
HIS ATTORNEYS:

UNITED STATES PATENT OFFICE.

HENRY CLARKE, OF CHICAGO, ILLINOIS, ASSIGNOR TO HENRY LOVE CLARKE AND EUGENE H. GARNETT, OF SAME PLACE.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 577,358, dated February 16, 1897.

Application filed November 6, 1896. Serial No. 611,195. (No model.)

To all whom it may concern:

Be it known that I, HENRY CLARKE, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Combination-Locks, of which the following is a specification.

My invention relates to improvements in the construction of combination-locks, and more particularly to improvements upon the combination-lock shown and described in my pending application, Serial No. 595,342, filed June 12, 1896.

The object of my invention is to simplify the construction of the lock and increase its proficiency by guarding against the picking of the lock and to adapt it for use as a pad-lock.

My invention consists, in connection with two adjacent lock-disks, one adapted to turn in respect to the other on their common axis, each furnished with a series of holes for receiving a series of lock-pins, two series of lock-pins, the pins of the one series being longer than those of the other, of a safety ring or device provided with a series of humps or projections to prevent the movement of the lock-pins except in a certain position of the lock-disks.

It further consists, in connection with two adjacent disks adapted to turn in respect to each other on their common axis, each furnished with a hasp-arm adapted to open and close, in combination with means for locking the disks together.

It further consists, in connection with the lock-disks and series of lock-pins, of a movable setting-plate adapted to turn on the same axis as the lock-disks and furnished with a series of cams for engaging the lock-pins.

It further consists in the novel construction of parts and devices and in the novel combinations of parts and devices herein shown and described, and more particularly specified in the claims.

In the accompanying drawings, which form a part of this specification and in which similar letters of reference indicate like parts throughout the several views, Figure 1 is a perspective view of a device embodying my

invention. Fig. 2 is a detail plan view with the dial-plate removed. Fig. 3 is a similar view with the spring or springs which bear against the push-buttons removed. Fig. 4 is a similar view showing the spring for throwing the lock open or separating the arms of the hasp. Figs. 5 and 6 are plan views showing the meeting faces of the two lock-disks. Fig. 7 is a bottom view of the lower lock-disk. Fig. 8 is a top or plan view of the setting-plate. Fig. 9 is a section on the line 9 9 of Fig. 2, and Fig. 10 is a diagrammatic sectional view illustrating the operation.

In said drawings, A and A' represent the two arms of the hasp; B and B', the lower and upper lock-disks, each furnished with a series of lock-pin holes *b*, preferably ten in number.

C and C' are the lock-pins, the series of longer pins being lettered C and the series of shorter pins C', all the long pins excepting those constituting the particular combination being in the upper disk and all the short pins excepting those constituting the combination being in the lower disk, so that when the particular pins of the combination alone are depressed the meeting ends of all the pins will be flush with the meeting faces of the lock-disks, thus allowing the lock-disks to turn and the lock to be opened. The upper lock-disk B' has a central hub *b'* extending through the lower lock-disk to journal the two together.

F F' are the spring-disks which bear against the lock-pins C C' to hold the same in whatever position they may be pushed or set. These spring disks or plates are each furnished with radial tongues *f*, one for each lock-pin.

G is the dial or cover plate, furnished with a series of index-figures *g* and with a series of keys or push-pins *g'*, corresponding to and registering with the lock-pins.

H is a spring disk or plate interposed between the keys or push-pins *g'* and the lock-pins to hold the push-buttons in their normal position. This spring disk or plate H is furnished with a series of tongues *h*, one for each key or push-pin, and with a series of notches *h'* in the periphery between the tongues. It

is secured to the dial-plate G by a rivet h^2 , extending through the extra or additional tongue h^3 .

K is the movable setting plate or disk. It is furnished with a central hub k , extending through the lock-disks B B', so that the setting-plate and lock-disks thus turn all upon the same common axis. This setting-plate K has an external flange k' to enable it to serve as a case for the lower lock-disk to fit in. The setting disk or plate K is furnished with a series of cams k^2 , one for each of the lock-pins in the lower lock-disk. These cams k^2 are in the nature of cavities having one inclined side. By the rotary movement of this setting-plate in respect to the lower disks it will be seen from Fig. 10 that the lock-pins will all be set or restored to their locking position. The arm A of the hasp is preferably formed integral with this setting plate or disk K and the other arm A' of the hasp is preferably made integral with the upper lock-disk B'. The setting-plate and the lower lock-disk B are held in their normal position in relation to each other by a spring K', which fits in an annular cavity or recess B² in the lower face of the lower lock-disk, one end of which spring bears against the lower lock-disk at K² and the other end of which bears against the setting-plate at K³. A washer K⁴ is preferably interposed between the spring K' and the spring-disk F.

M is a spring for throwing the lock or the two arms of the hasp open. It is preferably a coiled spring and inserted in an annular cavity or recess B³ in the upper face of the upper lock-disk B'. One end m of this spring M bears against the upper lock-disk and the other end m' is inserted in a collar m^2 , which is fixed in the hub k of the setting-plate K, the collar m^2 having a flat side m^3 fitting a corresponding flattened portion of the hub k to prevent the collar turning on the hub. It will thus be seen that the spring M tends to turn the upper lock-disk B' and the setting plate or disk K in opposite directions, and thus to throw open the two arms A A' of the hasp attached to these two disks.

N is the safety device, the function of which, in combination with the other parts, is to prevent the picking of the lock by pushing the pins down and thus determining which are the short pins or the ones forming the combination. This safety device N consists, preferably, of a ring furnished with a series of humps or projections n , approximating in height the upper ends of the lock-pins in the upper lock-disk and adapted to be engaged by the keys or push-buttons or spring H, interposed between the keys or push-pins and the lock-pins except when the upper lock-disk is turned into the particular position which brings the humps n into registry with the peripheral notches h' in the spring plate or disk H, and at this particular point or position the locking-pins register with one another and with the cavities or cams k in

the setting-plate, so that all the lock-pins, those not of the combination as well as those of the combination, will all move alike and with equal freedom, so that it will be impossible to detect any difference between those of the combination and those not of the combination, and when the humps n are out of registry with the notches h' the humps or projections n prevent the keys or push-pins being depressed so as to detect which are the short lock-pins or the pins of the combination. The safety device or ring N is fixed in the setting-plate K and thus supported in proper relation to the other parts. It is for this purpose preferably provided with an internal radial arm n' , furnished with an enlargement n^2 , having a flat-sided opening n^3 to fit over the flattened portion of the hub k of the setting plate or disk K. The dial-plate G is fixed to the upper lock-disk B' and is held in place by a screw or rivet G', passed through or threaded into the hollow hub k of the setting-plate K. A pin or stud b^2 , fixed in the upper lock-disk B' and fitting in a slot b^3 in the lower lock-disk B, permits the necessary limited rotary movement of the two lock-disks in respect to each other to throw the lock open and the pins out of registry with each other and in the return or closing movement to cause the two lock-disks after their pins are brought into registry with each other to move together in respect to the setting-plate and thus cause the cams of the setting-plate to push the lock-pins into their locking position.

The two arms A A' of the hasp shut the one within the other, the arm A being provided with a socket a to receive the end a' of the arm A'. This prevents the two disks to which the arms of the hasp are secured from being separated by removing the screw or rivet G'.

The operation of the lock is as follows: The hasps are brought toward each other, and when the locked position is reached the pin b^2 on the lock-disk B' engages the end of the slot b^3 in the lock-disk B. (At this point the lock-pins in each disk are in registry with one another.) The two disks B B' now move together and in relation to the setting-plate K, which causes the cams k^2 to push the pins so that the meeting ends of all of the pins will be flush with the meeting faces of the two lock-disks except the pins forming the combination, which will be pushed through the lower disk B and their ends entered into the holes of the disk B' and the disks locked together. When the pressure of closing the lock is removed, the spring M throws the hasps slightly apart, thus causing the lock-disks to carry the lock-pins over the cavities k^2 in the setting-plate K and at the same time exert a lateral tension between the disks. At this point the safety-ring N has been moved with the setting-plate and the projections n out of registry with the notches h' in the spring H, so that the push-pins g' cannot act upon the lock-pins C C'. In order to open the lock,

the tension of the spring must be removed from the disks, and this is done by moving the hasps toward each other slightly, and by the engagement of the pin b^2 with the slot b^3 5 the tension of the spring is removed and at the same time the projections n on the safety device are brought into registry with the notches h' in the spring H as the safety device N carrying the projections n rotates with the setting-plate, owing to the connection $n^2 n^3$ between the two, said setting-plate being connected with one of the hasps. At this point 10 all of the lock-pins may be operated by the push-pins g' with equal freedom, and as the lateral tension on the disks is removed it will be impossible to discover which are the pins forming the combination. 15

While I have described the exact form of lock shown in the drawings, it will be understood that its construction may be greatly varied without departing from my invention. 20

The cavities or cams k^2 in the setting-plate K should be of such length as to prevent any of the lock-pins engaging the abrupt end 25 walls of the cavities and thereby holding the lower disk B from rotating and causing the spring M to exert a tension between the lock-disks. It is particularly desirable to prevent this engagement when the lock-pins are not 30 protected by the safety device N, for the reason that if the lock-pins are in a position to be operated while a tension exists between the lock-disks it is possible by very delicate manipulation to discover the pins in the combination, because their resistance to depression 35 would be greater than that of the pins not in the combination. In the construction shown the length of the cavities is slightly greater than the movement of the lower lock-disk. 40

I claim—

1. In a combination-lock the combination with two adjacent lock-disks, of two series of lock-pins mounted therein, a series of keys 45 or push-pins, and a safety ring or device to prevent the lock-pins being moved by the keys or push-pins except when said safety ring or device is in a certain position, substantially as specified.

2. In a combination-lock the combination with two adjacent lock-disks, of two series of lock-pins mounted therein, a series of keys 50 or push-pins, a safety ring or device to prevent the lock-pins being moved by the keys or push-pins except when said safety ring or device is in a certain position, and furnished with a series of humps or projections, substantially as specified. 55

3. In a combination-lock the combination with two adjacent lock-disks, of two series of lock-pins mounted therein, a series of keys 60 or push-pins, a safety ring or device to prevent the lock-pins being moved by the keys or push-pins except when said safety ring or device is in a certain position, and furnished with a series of humps or projections, and a 65 spring plate or disk interposed between the

lock-pins and push-pins, and furnished with a series of notches adapted to be brought into registry with the humps or projections on 70 the safety ring or device, substantially as specified.

4. The combination with two adjacent lock-disks, one adapted to turn in respect to the other on a common axis, of two series of lock- 75 pins mounted in holes in said disks, the pins in the one series being longer than those in the other, and part of each series being in each disk, and a setting plate or disk turning upon the same axis as the lock-disk, substantially 80 as specified.

5. The combination with two adjacent lock-disks, one adapted to turn in respect to the other on a common axis, of two series of lock- 85 pins mounted in holes in said disks, the pins in the one series being longer than those in the other, and part of each series being in each disk, and a setting plate or disk turning upon the same axis as the lock-disk, said setting-plate having a series of cams or cavities 90 with inclined sides, substantially as specified.

6. The combination with two adjacent lock-disks, one adapted to turn in respect to the other on a common axis, of two series of lock- 95 pins mounted in holes in said disks, the pins in the one series being longer than those in the other, and part of each series being in each disk, a setting plate or disk turning upon the same axis as the lock-disk, said setting-plate having a series of cams or cavities with 100 inclined sides, and said setting-plate having a central hub extending through the lock-disks, substantially as specified.

7. The combination with two adjacent lock-disks, one adapted to turn in respect to the 105 other on a common axis, of two series of lock-pins mounted in holes in said disks, the pins in the one series being longer than those in the other, and part of each series being in each disk, a setting plate or disk turning upon 110 the same axis as the lock-disk, said setting-plate having a series of cams or cavities with inclined sides, and said setting-plate having a central hub extending through the lock-disks, and an external flange to form a case 115 to receive the lower lock-disk, substantially as specified.

8. The combination with two disks turning on a common axis and each furnished with a hasp-arm, with means for locking the disks 120 together, a series of keys or push-pins, a spring H having notches h' , and a safety ring or device N having humps or projections n , substantially as specified.

9. The combination with two disks turning 125 on a common axis and each furnished with a hasp-arm, with means for locking the disks together, a series of keys or push-pins, a spring H having notches h' , and a safety ring or device N having humps or projections n , 130 said safety-ring N being connected with the setting-plate and adapted to turn therewith in respect to the lock-disks, substantially as specified.

10. The combination with two disks turning on a common axis and each furnished with a hasp-arm, with means for locking the disks together, a series of keys or push-pins, a
 5 spring II having notches h' , and a safety ring or device N having humps or projections n , said safety ring or device having an internal arm n' attached to the hub of the setting-plate, substantially as specified.
- 10 11. The combination with two adjacent lock-disks, one adapted to turn in respect to the other on a common axis, of two series of lock-pins mounted in holes in said disks, the
 15 pins in the one series being longer than those in the other, and part of each series being in each disk, a setting plate or disk turning upon the same axis as the lock-disk, and opening and closing hasp-arms secured to two of said disks, substantially as specified.
- 20 12. The combination with two adjacent lock-disks, one adapted to turn in respect to the other on a common axis, of two series of lock-pins mounted in holes in said disks, the
 25 pins in the one series being longer than those in the other, and part of each series being in each disk, a setting plate or disk turning upon the same axis as the lock-disks, opening and closing hasp-arms secured to two of said disks, and a spring for opening the lock
 30 or the arms of hasp, substantially as specified.
13. The combination with two adjacent lock-disks, one adapted to turn in respect to the other on a common axis, of two series of
 35 lock-pins mounted in holes in said disks, the pins in the one series being longer than those in the other, and part of each series being in each disk, and a setting plate or disk turning upon the same axis as the lock-disk, said set-
 40 ting-plate having a series of cams or cavities

with inclined sides, and a spring for opening the lock or turning the setting-plate in respect to the lock-disk, substantially as specified.

14. The combination with two adjacent lock-disks, one adapted to turn in respect to
 45 the other on a common axis, of two series of lock-pins mounted in holes in said disks, the pins in the one series being longer than those in the other, and part of each series being in each disk, a setting plate or disk turning
 50 upon the same axis as the lock-disk, and a spring connection between the setting-plate disk and the lower lock-disk, permitting a limited movement of the one in respect to the other, substantially as specified.

15. The combination with two adjacent lock-disks, one adapted to turn in respect to the other on a common axis, of two series of lock-pins mounted in holes in said disks, the
 60 pins in the one series being longer than those in the other, and part of each series being in each disk, and a setting plate or disk turning upon the same axis as the lock-disks, said setting-plate having a series of cams or cavities
 65 of length adapted to prevent engagement between their abrupt end walls and the lock-pins, substantially as specified.

16. In a combination-lock, the combination with two adjacent lock-disks, of two series of lock-pins mounted therein, a safety device
 70 preventing the pins being moved when the safety device is in its acting position, and a setting-plate having a series of cams or cavities adapted to prevent engagement between their abrupt end walls and the pins, substan-
 75 tially as specified.

HENRY CLARKE.

Witnesses:

L. E. CURTIS,
 EDW. S. EVARTS.