

(Model.)

F. G. FARNHAM.  
Permutation Padlock.

No. 235,862.

Patented Dec. 28, 1880.

Fig. 1.

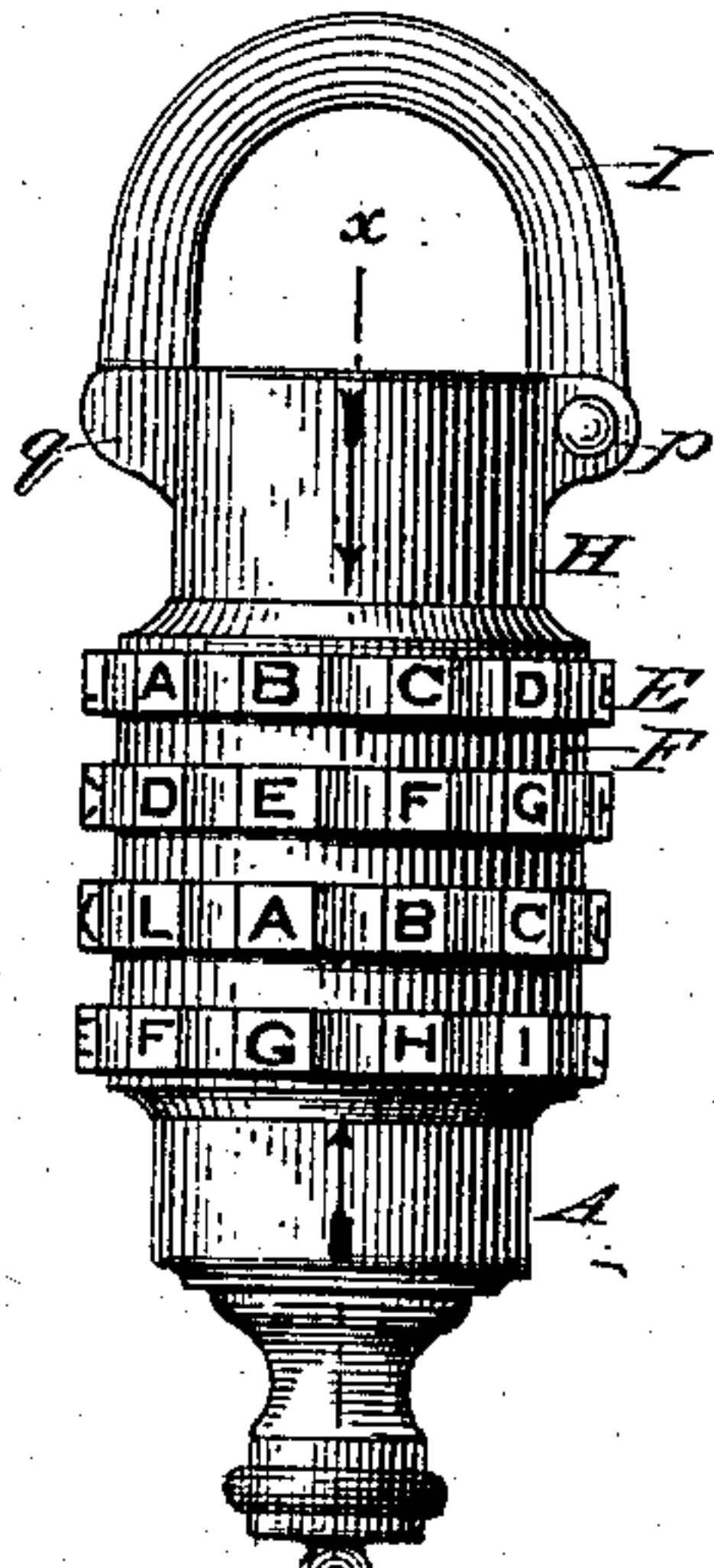


Fig. 2.

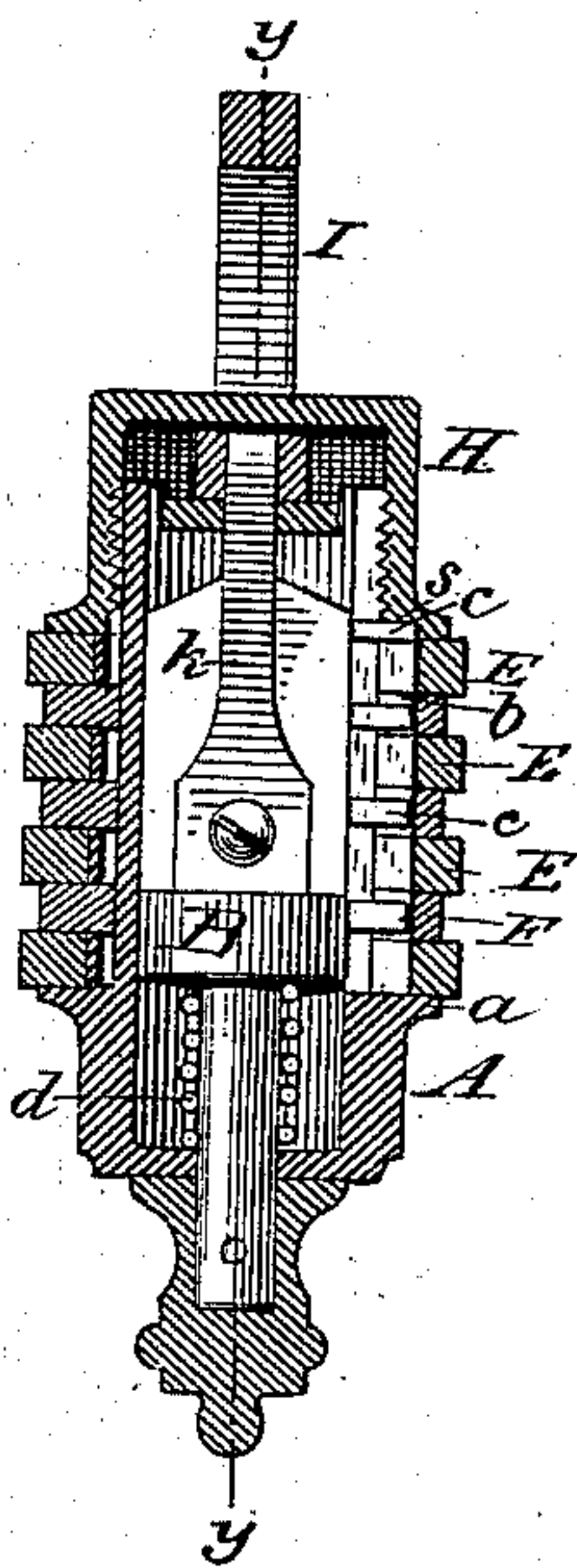


Fig. 3.

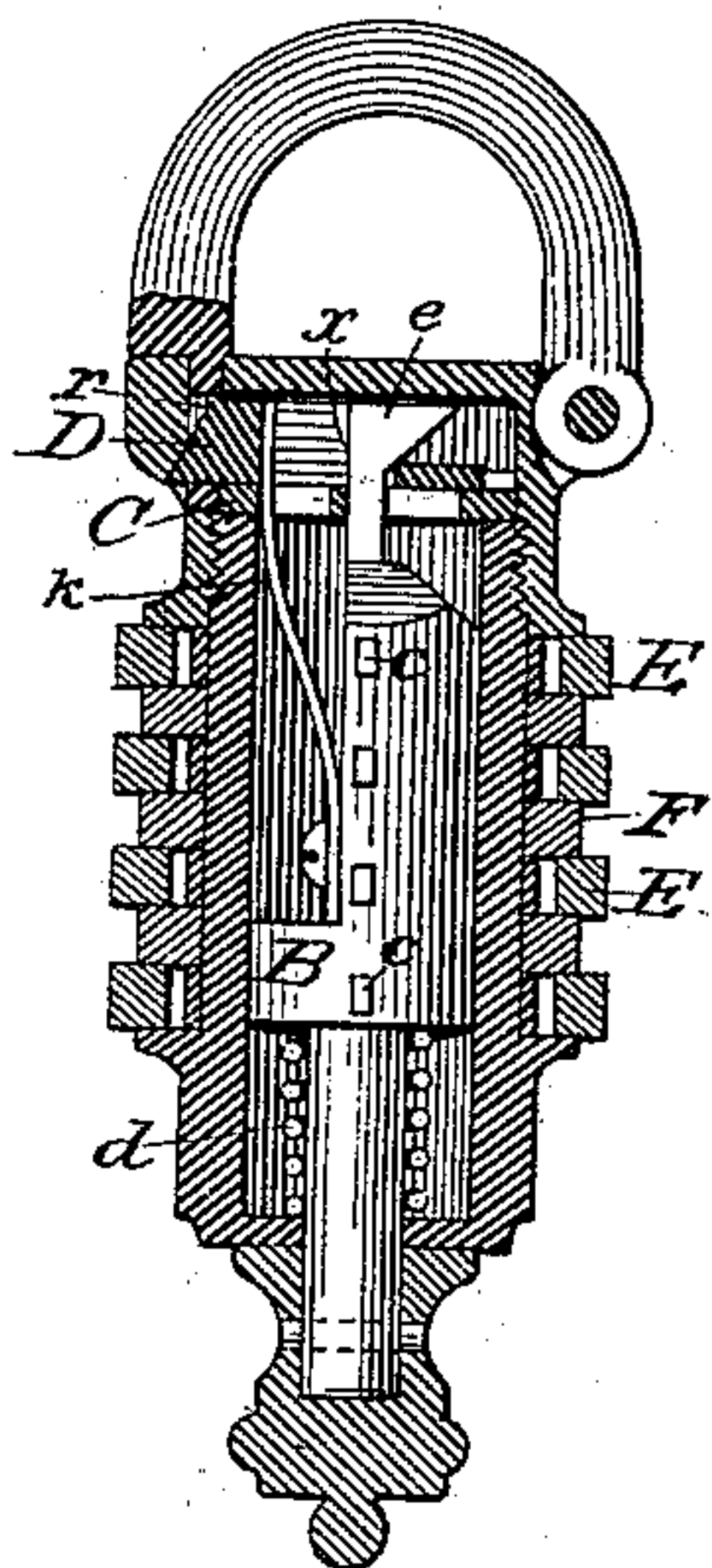


Fig. 4.

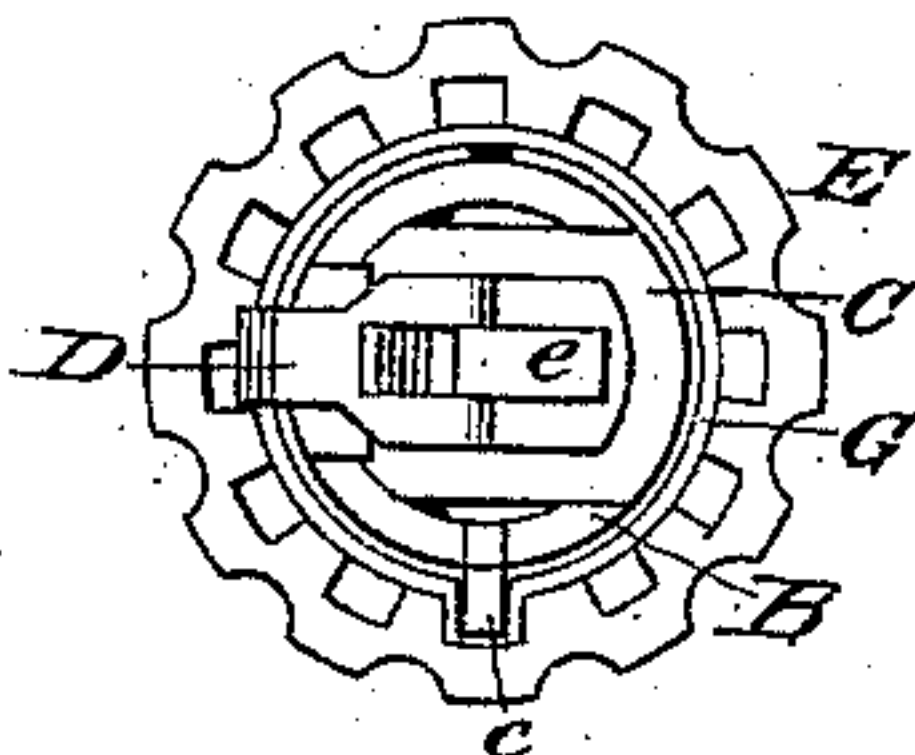


Fig. 5.

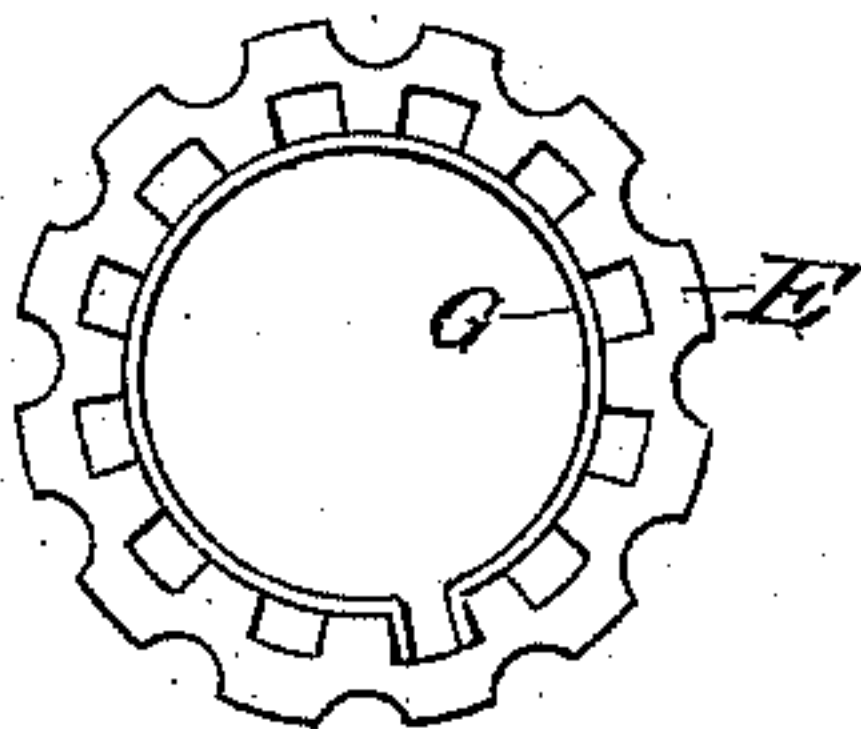


Fig. 6.

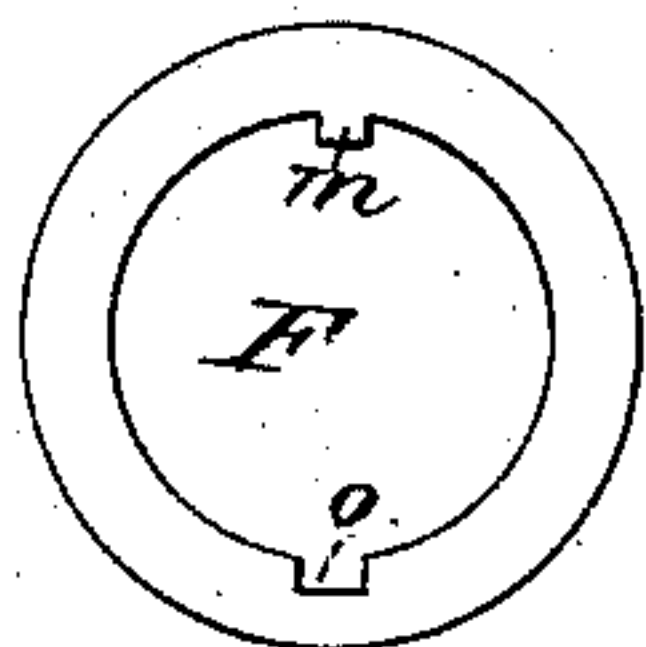


Fig. 7.

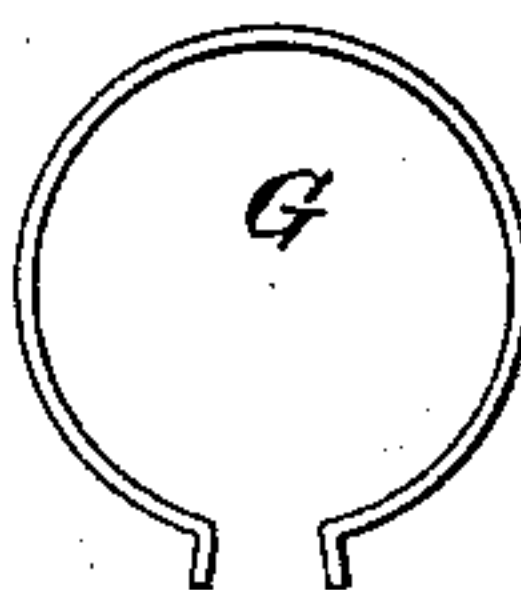


Fig. 8.

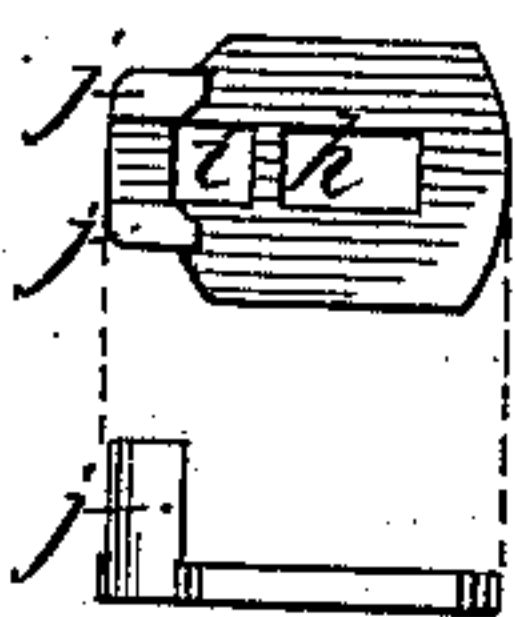


Fig. 9.

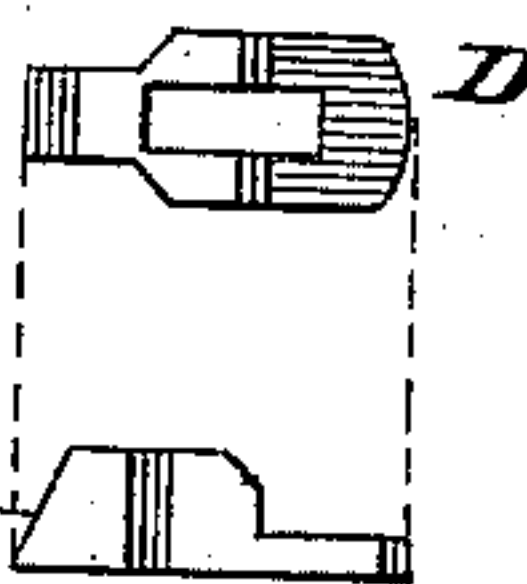
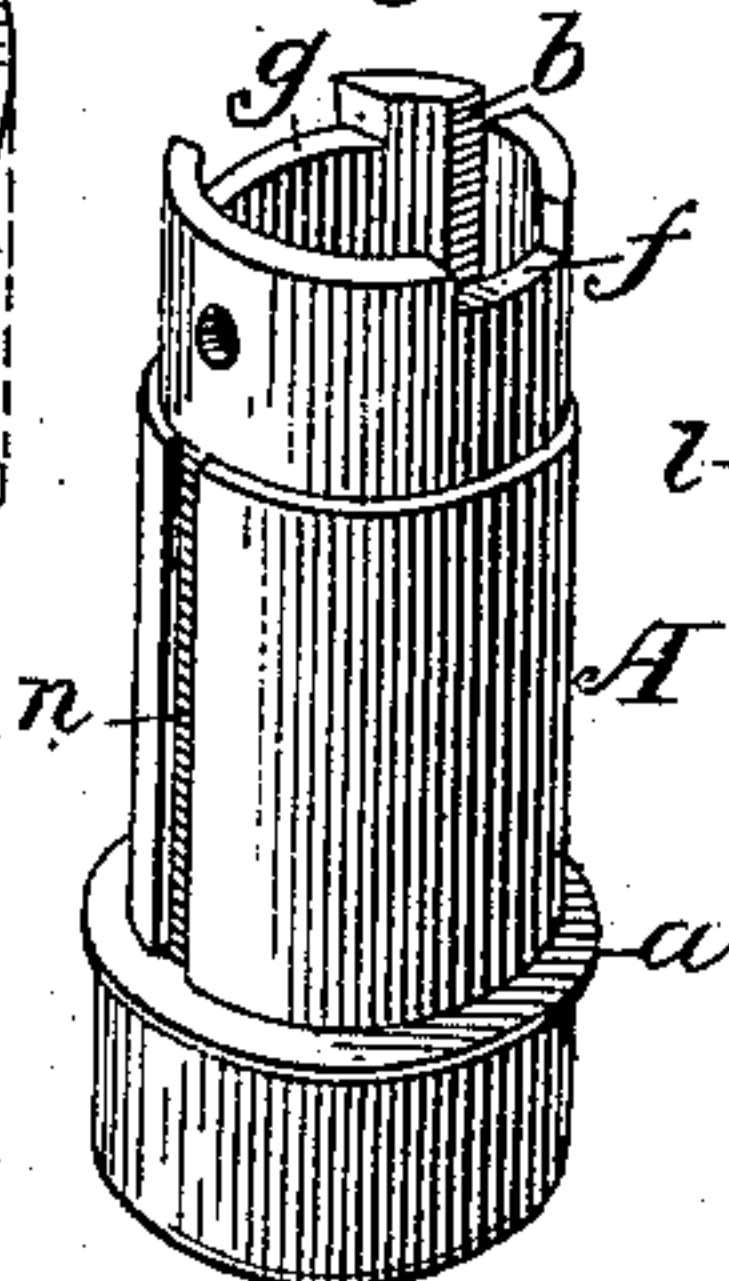


Fig. 10.



Attest:

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# UNITED STATES PATENT OFFICE.

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## PERMUTATION-PADLOCK.

SPECIFICATION forming part of Letters Patent No. 235,862, dated December 28, 1880.

Application filed April 8, 1880. (Model.)

*To all whom it may concern:*

Be it known that I, FRANK G. FARNHAM, of White Mills, in the county of Wayne and State of Pennsylvania, have invented certain new and useful Improvements in Permutation-Padlocks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to that class of padlocks which, when locked, can only be opened by the proper arrangement of the parts, as indicated by a combination of letters, figures, or other symbols, and it is adapted to be used in all cases admitting the employment of an ordinary padlock, which it greatly exceeds in security.

My object is to provide a lock of more simple construction than those heretofore used, yet equally effective, to cheapen the cost of manufacture, and in general to improve upon the state of the art as shown in patents already granted.

My invention consists, partially, in combining with a rod carrying projecting teeth and an inclined projection to operate a bolt, and sliding within a barrel or cylinder, a series of notched rings carried on said barrel, and capable of rotation around it to bring the proper notch into alignment with the toothed rod; further, in the peculiar device for changing the combination; further, in the novel construction of the mechanism for operating the bolt or catch which engages with the hasp carried by a cap on the end of the barrel; and, finally, in the general construction and arrangement and the various novel combinations of the operative parts, all as fully hereinafter explained and specifically claimed.

In the accompanying drawings, Figure 1 represents an external view of my lock; Fig. 2, a section on line *xx* of Fig. 1; Fig. 3, a section on line *yy* of Fig. 2; Fig. 4, a top view with cap removed; Fig. 5, a view of one of the working-rings; Fig. 6, a view of one of the holding-rings; Fig. 7, a view of the device for

changing the combination; Fig. 8, a view of the bed-plate; Fig. 9, a view of the bolt; Fig. 10, a separate view of the barrel.

In these drawings, A represents the barrel or cylinder, which contains and holds the operating parts of the lock. The barrel may be made of any suitable metal, and the exterior for the greater portion of its length is smooth, to receive the movable rings and allow them to turn freely. At the rear end of this barrel is a flange, *a*, against which the last of the series of rings bears. From this flange to the extreme forward end the barrel is slotted, as at *b*.

B is a rod or piston, semi-cylindrical for the greater portion of its length, and adapted to fit within the barrel A and have a longitudinal motion therein. Upon one side of this rod is a series of projecting pins, *c*, made of brass, steel, or other metal, preferably forming an integral portion of the part B, which project through the slot *b*, for a purpose hereinafter to be described, but which also serve to guide the rod B in its longitudinal motion. The rear portion of the rod is cylindrical, and of slightly less diameter than the bore of the barrel, and attached to it is a rod which passes through the end of the barrel, a suitable pull or draw being secured to its end, by which it can be drawn out until the end of the cylindrical portion bears against the end of barrel A. A coil-spring, *d*, serves to retract the rod, it being thrown forward when in its normal position, where it is held by such spring. The extreme forward end of the rod B forms an inclined projection, *e*, the shape of which is shown in Fig. 3.

The barrel A is provided at its forward end with two notches or recesses, *f g*, placed on opposite sides thereof. These recesses secure and hold in place a bed-plate, C, Fig. 8, which has rounded edges to fit the circumference of the barrel, and is provided on its face with slots *h i*, placed directly in line, and with two standards, *j*, at that point on its edge which enters the recess *g*. The slot *h*, which is of larger size than the slot *i*, receives the inclined projecting end *e* of the rod B, its straight surface *x* bearing against the edge of the slot and preventing the part B from binding



against the interior of the barrel A. The outer face of the part *e* is just of sufficient size to fit within the said slot when the rod B is drawn back. In the slot *i* works the free end of a leaf-spring, *k*, the other end of which is secured in any suitable manner to the flat side of the sliding rod B, and which bears constantly outward.

D represents the bolt, which is adapted to slide on the bed-plate C at right angles to the motion of the rod B. It is illustrated separately in Fig. 9, and consists of a slotted plate and an inclined catch, *l*, the latter being guided in its movements by the standards *j* of the bed-plate. Through the slot in the bolt passes the end *e* of the bar B, and against the rear straight surface of the catch *l* bears the spring *k*, by which the bolt is thrown outward, the catch projecting beyond the bed-piece and barrel, in which position it is held by the spring. When, however, the bar B is drawn back, carrying with it the spring *k*, the inclined bearing-surface of the end *e*, as it is withdrawn, acting on the slotted bolt, will overcome the pressure of the spring, and the bolt will be withdrawn until, by releasing the rod B, the parts will resume their normal position. It is evident, then, that were catch *l* engaged with a hasp their disengagement could only be effected by the movement of the bar B. For preventing such movement, except under certain circumstances, I use the locking device, which will now be described.

E E are rings, a detail view of one of which is given in Fig. 5. On their inner circumference these rings are provided with notches placed closely together, such notches being of greater width than the pin on the rod B, and on their outer circumference, and opposite such notches on raised faces, are placed any desired series of letters or figures, the depressions between the faces carrying the symbols serving to give a secure hold in turning the rings. Any desired number of rings may be used; but I prefer to employ from three to five, a larger number than the latter being unnecessary, it being desirable to reduce the size of the lock to the greatest possible degree consistent with efficiency. The last of these rings E, which I denominate "working-rings" to distinguish them from others to be hereinafter described, bears against the flange *a* on the barrel A, and resting between two of the pins *c* is enabled to turn freely on the smooth cylindrical surface of the barrel.

Between each pair of working-rings is placed a holding-ring, F, (shown in Fig. 6,) which is stationary and prevented from turning by means of the projection *m* on its inner periphery, which engages with a groove, *n*, on the under side of the barrel A. Opposite this projection *m* is a notch, *o*, on the inner circumference of the ring F, of sufficient size to permit the ring to be slipped off and on over the pins *c*, such pins *c* projecting up into the notches *o* when the rings are in position.

It will thus be seen that when one of the

notches in each of the rings E and the notches *o* in the rings F are in line with the pins *c* the bar B may be drawn back and the device unlocked. In order, however, that particular notches in these rings E may be brought in line and that such combinations may be changed at will, I use the device shown in Fig. 7. This consists of a simple band, G, of spring metal, having its ends bent at right angles, which is adapted to be incased within the ring E, and the ends secured in one of the notches corresponding to any desired letter or figure on the outer face of such ring. The spring G, being smooth on its interior surface, allows a free rotary movement to the working-rings, but will only permit the rod B to be withdrawn when the proper notch is in line with the pins *c*, because under other circumstances the spring interposes between the projections *c*, so that it is necessary that all the rings should be in proper position.

It is evident, then, that an almost unlimited variety of combinations may be effected where four or five working-rings are employed, and the changes may be made with the greatest ease. In this case the model is set on the combination-word "bolt."

The outer end of the barrel A is screw-threaded for the reception of a cap, H, which is correspondingly threaded internally. As this cap fits over and retains in place the bolt-operating mechanism, it is provided with two ears, *p q*, in one of which is pivoted the curved hasp *l*, the other receiving the catch *l* when the cap is in place, a slot, *r*, allowing the end of the hasp to engage with such catch. On the inner edge of the cap is a recess, *s*, which engages with the first projection, *e*, on the rod B and holds the cap in place, and a screw may be passed through the cap and barrel to prevent the cap from unscrewing when unlocked.

The operation of the device has, it is thought, been sufficiently explained in connection with the foregoing description, and will be readily understood by those skilled in the art.

The device may be finished in any neat and ornamental style desired, and is preferably nickel-plated. The ease with which the combination may be changed specially adapts it to mail-bags and other situations where frequent changes are desirable.

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

1. In combination, a barrel, a sliding rod having pins and having an inclined projection, a series of notched rings carried by such barrel, and a bolt operated by such sliding rod and engaging with a hasp, as set forth.

2. The combination of the barrel A, having recesses *f g*, the slotted bed-plate C, having standards *j*, the bolt D, the spring *k*, and the sliding rod B, having inclined projection *e*, substantially as described.

3. The combination of the barrel, the sliding toothed bar, the movable rings, and the spring inclosed by such rings, as set forth.



4. The device for changing the combination in a permutation-lock, consisting of an internally-notched revolving ring and a spring inclosed therein, as set forth.

5 5. The combination, with the barrel A, having screw-threaded end, of the cap H, having recess s, and the rod B, having a pin to engage with such recess, as described.

10 6. A permutation-padlock consisting of a slotted barrel adapted to receive and hold a series of rings, a sliding rod provided with pins to operate in connection with the notches

in the series of rings, a device carried by such rings adapted to permit only a single notch to pass over such pins, and a series of symbols, all substantially as described and shown, and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

FRANK G. FARNHAM.

Witnesses:

L. F. BISHOP,  
S. A. LIND.