

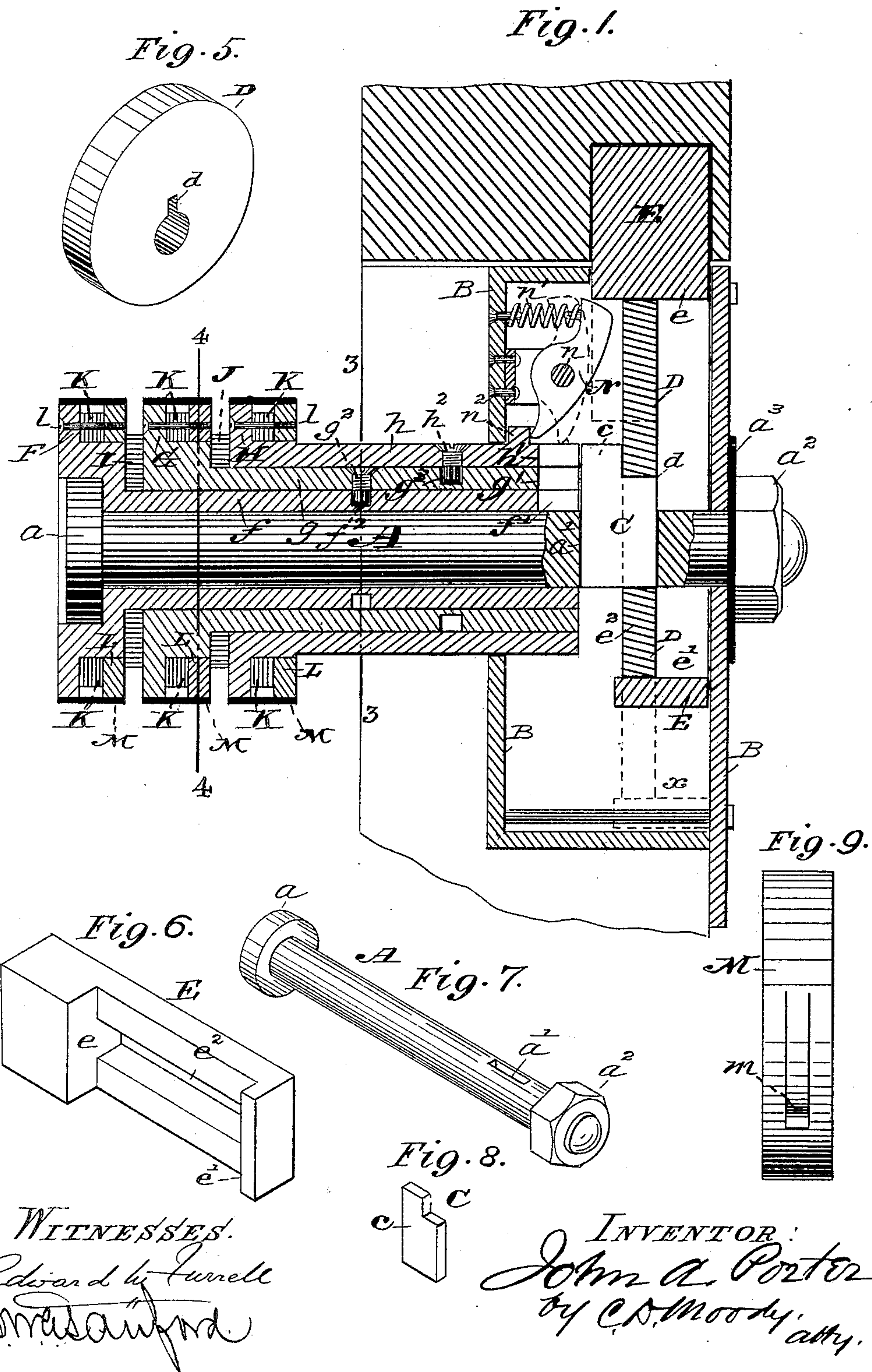
(Model.)

2 Sheets—Sheet 1.

J. A. PORTER.
PERMUTATION LOCK.

No. 394,009.

Patented Dec. 4, 1888.



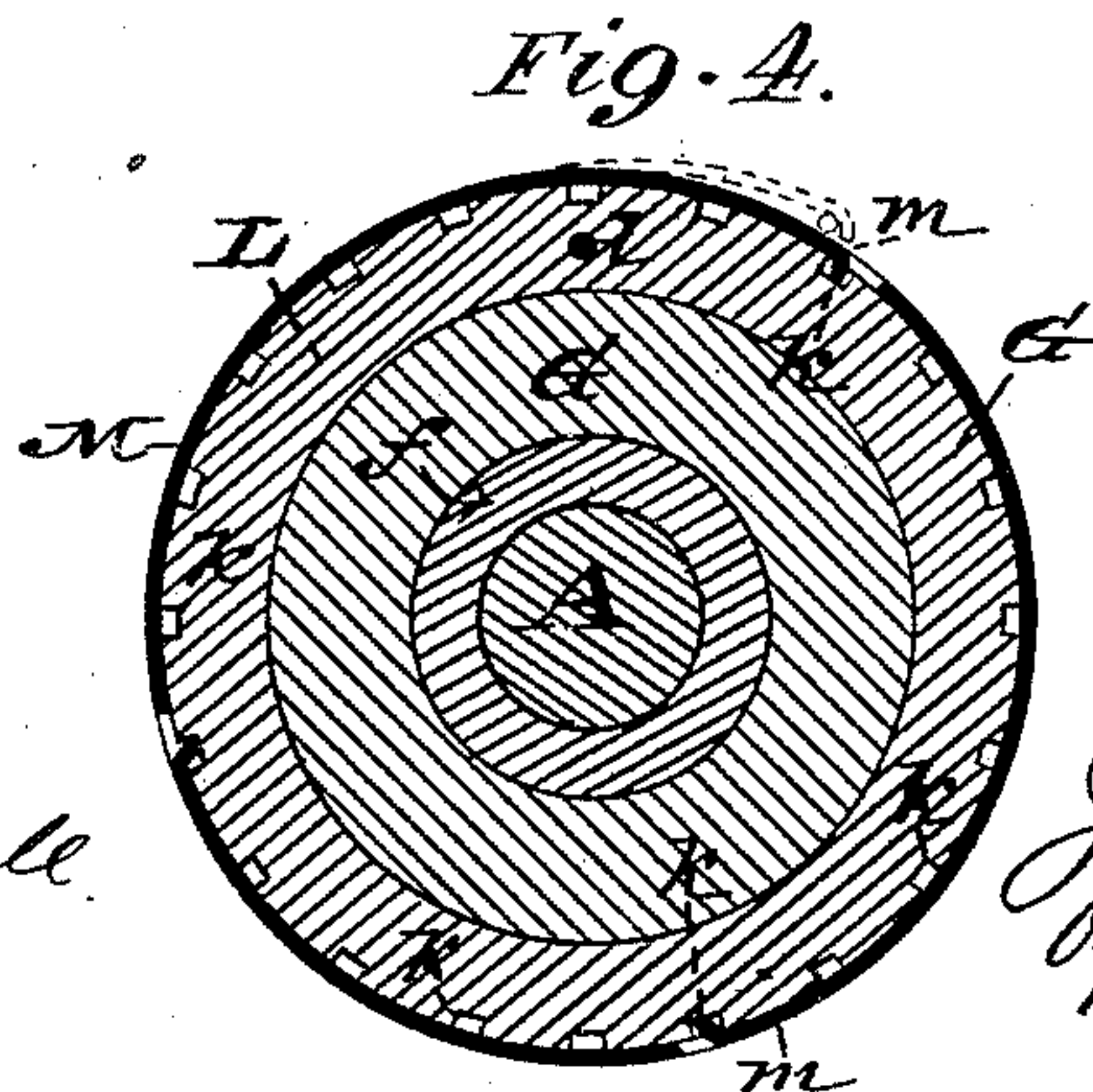
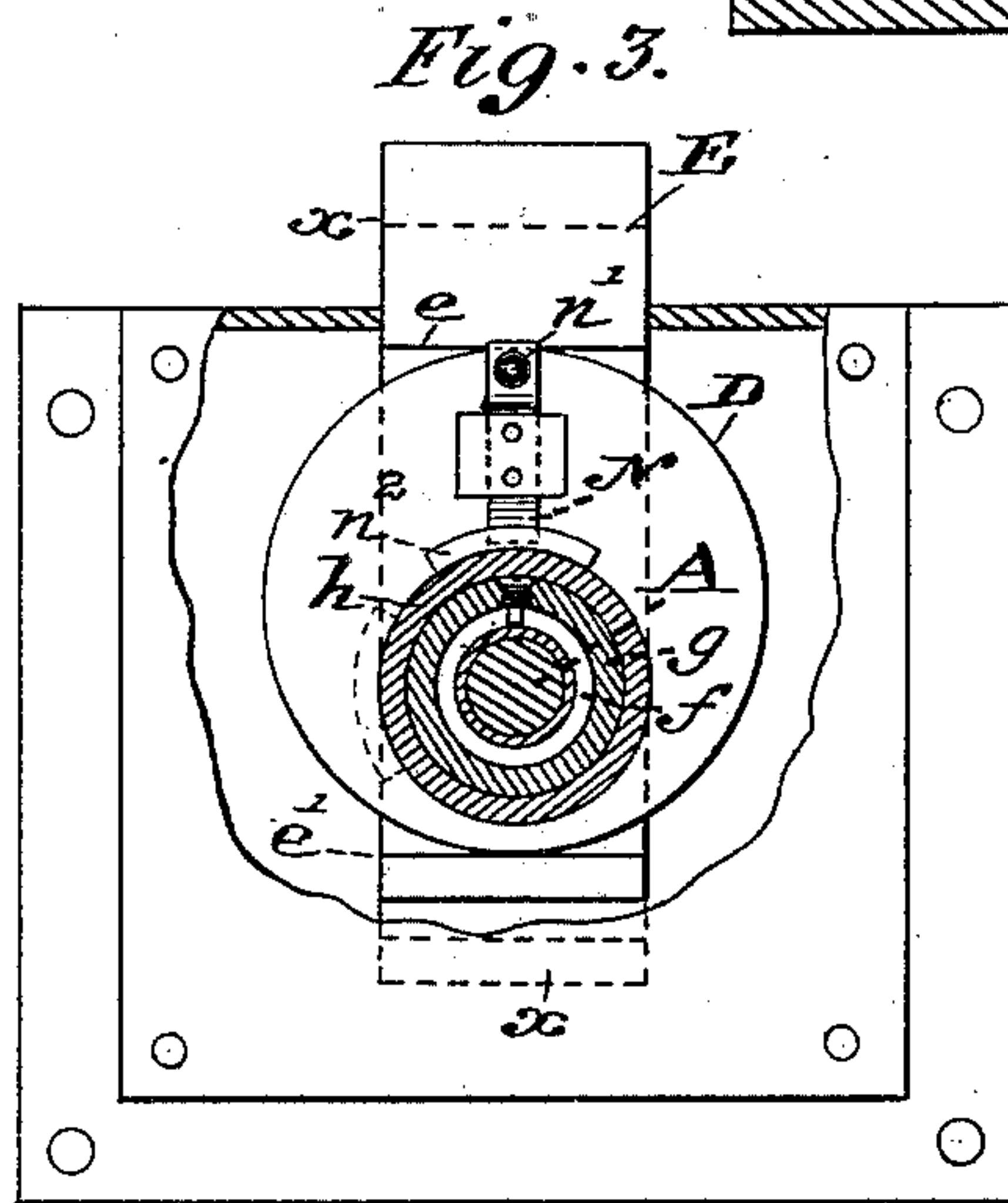
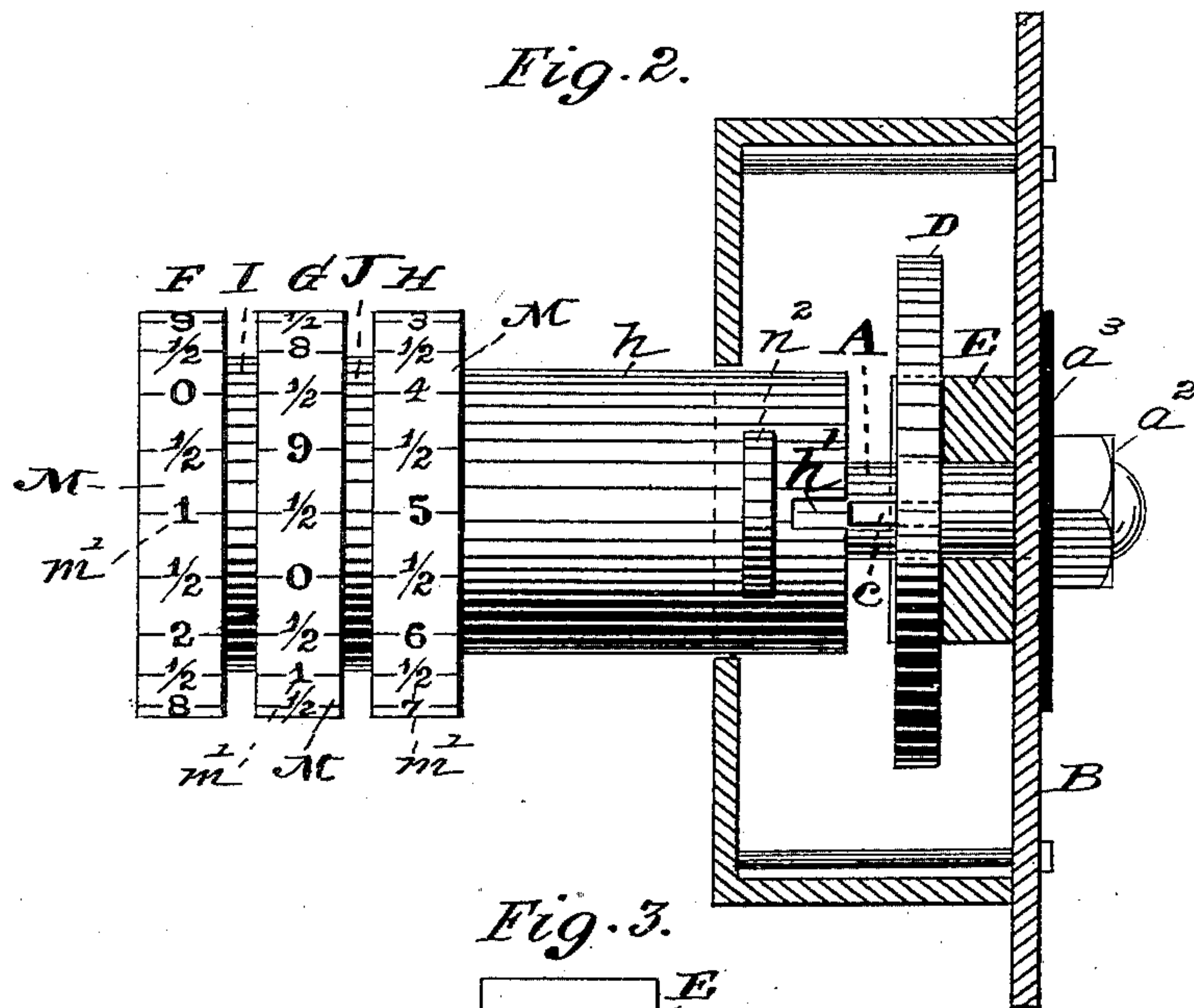
(Model.)

2 Sheets—Sheet 2.

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PERMUTATION LOCK.

No. 394,009.

Patented Dec. 4, 1888.



WITNESSES:
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UNITED STATES PATENT OFFICE.

JOHN A. PORTER, OF ST. LOUIS, MISSOURI.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 394,009, dated December 4, 1888.

Application filed August 30, 1887. Serial No. 248,246. (Model.)

To all whom it may concern:

Be it known that I, JOHN A. PORTER, of St. Louis, Missouri, have made a new and useful Improvement in Permutation-Locks, of which the following is a full, clear, and exact description.

The features of the improvement will appear hereinafter, and be designated in the claims.

The annexed drawings, making part of this specification, exhibit the most desirable mode of carrying out the improvement.

Figure 1 is a longitudinal section of the lock, its bolt being thrown out. Fig. 2 is a view showing the knob portion of the lock and the parts thereto attached, including the cam, in plan view, and the casing and bolt in section. Fig. 3 is a section on the line 3 3 of Fig. 1, the casing being broken away. Fig. 4 is a section on the line 4 4 of Fig. 1. Fig. 5 is a view in perspective of the cam upon the knob-shaft and used in operating the bolt, which is shown in perspective in Fig. 6. Fig. 7 is a view in perspective of the knob-shaft. Fig. 8 is a view in perspective of the part used to fasten the cam upon the knob-shaft and in effecting the connection between the knob-shaft and the sleeves encircling the knob-shaft, and Fig. 9 is a plan of the band upon each of the knob-disks.

The same letters of reference denote the same parts.

A, Figs. 1, 2, 3, 4, and 7, represents what may be termed the "knob-shaft." It is flanged or provided with a shoulder, a , at its outer end, is slotted at a' , and at its inner end it is threaded and provided with the nut a^2 and washer a^3 , and it passes through the casing B, as shown in Figs. 1 and 2. By means of a spline, C, inserted in the slot a' , the cam D, Figs. 1, 2, 3, and 5, is attached to the knob-shaft, so as to be rotated therewith. The spline enters the slot d in the cam, and it is extended at e in front of the cam, for the purpose presently explained.

E, Figs. 1, 2, 3, and 6, represents the bolt of the lock. Its movement is indicated by the broken lines x , Figs. 1 and 3, and it is operated by means of the cam D, which in its rotation works between the shoulders $e e'$ of the bolt. The slot e^2 in the bolt admits the knob-shaft and provides for the movement of the bolt. Encir-

cling the outer end of the knob-shaft is a series of disks, F G H, Figs. 1, 2, and 4, which, with the parts thereto immediately attached, constitute the knob of the lock. The outermost disk, F, is provided with a sleeve, f , which encircles the knob-shaft, extending thereon to the spline C, and at f' being slotted, for the purpose presently explained. The sleeve f is also grooved at f^2 , and the disk F comes against the inner face of the knob-shaft flange a , and the disk is preferably shaped to include the periphery of the flange, substantially as shown. The disk G and its sleeve g encircle the sleeve f , and the disk H and its sleeve h in turn encircle the sleeve g . The two sleeves $g h$ extend inwardly evenly with the sleeve f and are similarly slotted at $g' h'$, respectively, and the sleeve g is provided with a stud, g^2 , which engages in the groove f^2 of the sleeve f , and the sleeve h is similarly provided with a stud, h^2 , which engages in a groove, g^3 , in the sleeve g . A washer, I, separates the disks F and G, and a washer, J, separates the disks G and H. Each disk is provided with a ring, K, Figs. 1 and 4, having in its periphery a series of notches or perforations, k . The ring—say by means of the confining-ring L and rivet l —is secured to the disk to rotate therewith. Encircling each disk and its ring K is a band, M, Figs. 1, 2, 4, and 9, which, say by slitting it and shaping the slit portion substantially as shown, is provided with one or more inwardly-extending projections, m . These projections, as shown in Fig. 4, engage in the perforations k , and thereby the band M is secured to the disk to be rotated therewith.

The band M, as shown in Fig. 2, bears a series of numerals, m' . They correspond to the perforations k in the ring K, and, as indicated by the broken lines in Fig. 4, the projection or projections m can be sprung out of engagement with the ring K, and then the band M can be slipped around upon the disk F to bring the desired numeral of the series m' into line with or opposite to slot f' in the inner end of the sleeve f , after which, by releasing the projections m , the band can be fastened again upon the disk F. In this manner all of the disks and bands can be relatively adjusted and the desired combination formed.

The lock is operated as follows: The disks

F G H are respectively rotated—the disk F upon the knob-shaft, the disk G upon the sleeve f , and the disk H upon the sleeve g —to bring the numerals or numbers of the combination to which the lock is set, as described, into line. This movement effects the alignment of the slots $f' g' h'$ with each other and with the part c of the spline C. The three disks can now be pushed inwardly upon the knob-shaft, and the spline part c thereby caused to enter the slots $f' g' h'$, and then the entire knob and knob-shaft can be rotated as one part, and the bolt E, through the cam D, moved in the desired direction.

To prevent the knob-shaft from being rotated without previously moving the disks longitudinally inward upon the knob-shaft, the bolt E is caused to be held in its out position, Fig. 1, until the disks have been thus slipped inward upon the knob-shaft. This is accomplished, preferably, as follows: N, Figs. 1 and 3, represents a dog pivoted at n to turn as indicated by the broken lines, Fig. 1. A spring, n' , acts to press the upper end of the dog beneath or within the shoulder e of the bolt E, saving when its action is overcome. This is accomplished in the present instance by means of the projection n^2 upon the sleeve h , which, as the sleeve is moved toward the bolt, encounters the lower end of the dog, causing the dog to turn on its pivot and to be dislodged from the bolt, whereupon the dog is free to be moved by the cam. The several sleeves $f g h$ cannot be separately moved longitudinally toward the bolt E because of the engagement of the studs $h^2 g^2$ in the grooves $g^3 f^2$, respectively. These studs and grooves in no manner interfere with the sep-

arate rotation of the sleeves, but serve to prevent the sleeves from being moved upon the bolt E, saving as one part. The part c may be a separate piece from that part of the spline C used to key the cam D upon the knob-shaft; but it is conveniently made in one piece therewith.

I claim—

1. The combination of the knob-shaft, the spline C, provided with the part c , the disks provided with the slotted sleeves, the rings K, having the series of perforations, and the bands M, having the series of numerals m' and the projection m , substantially as described.

2. The combination of the disk F, the perforated ring K, and the band M, said band being adjustable upon said disk and having the projection m and series of numerals m' , as described.

3. The combination of the knob-shaft, the spline C, provided with the part c , the cam, the bolt, the disks, the slotted sleeves, the projection n^2 , and the pivoted dog, substantially as described.

4. The combination of the knob-shaft, the spline C, provided with the part c , the cam, the bolt, and the disks F G H, said disks being provided, respectively, with the slotted sleeves, and said sleeves $f g$ being respectively grooved at f^2 and g^3 , and said sleeves $g h$ being provided, respectively, with the pins $g^2 h^2$, as described.

Witness my hand.

JOHN A. PORTER.

Witnesses:

C. D. MOODY,
WM. ASSHETON.