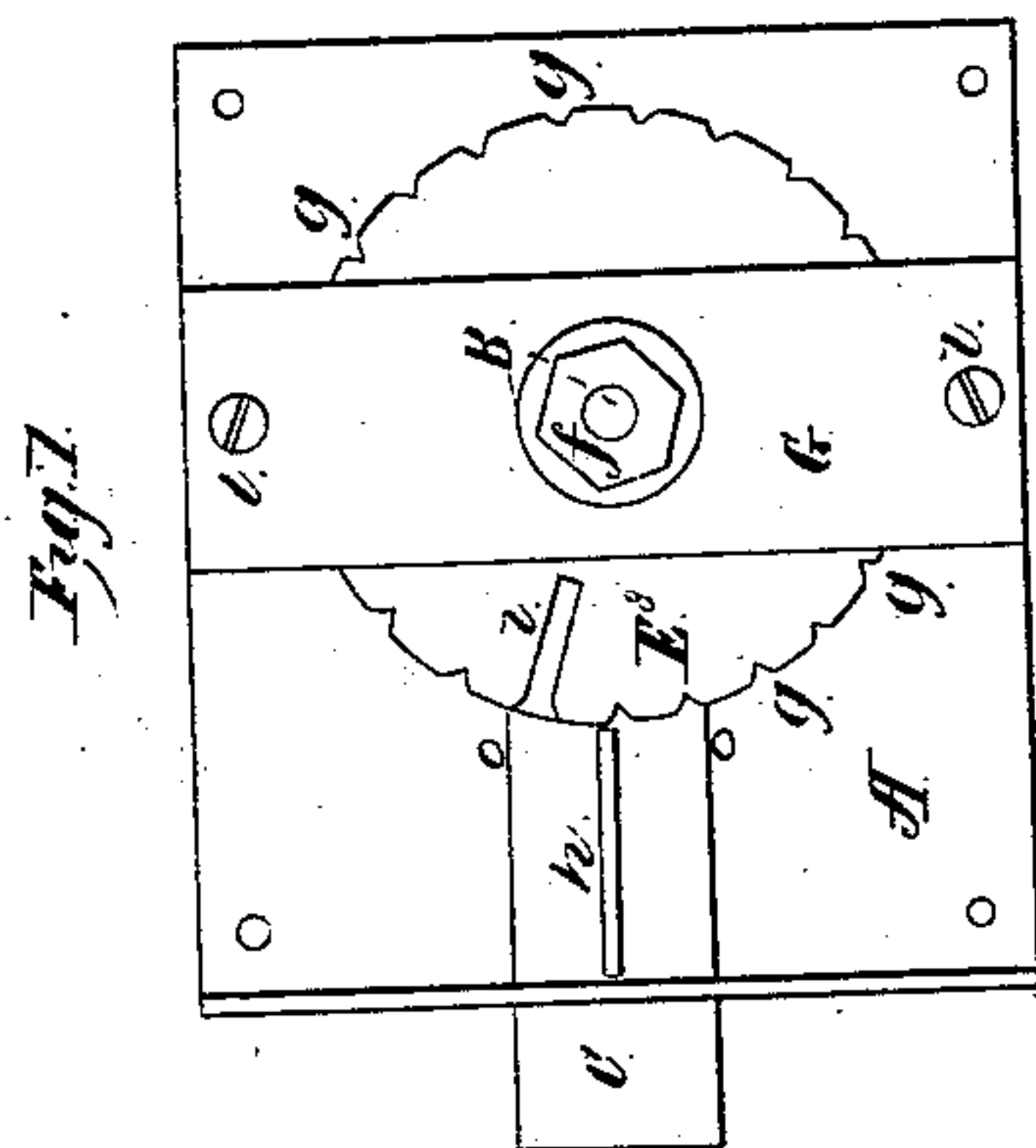
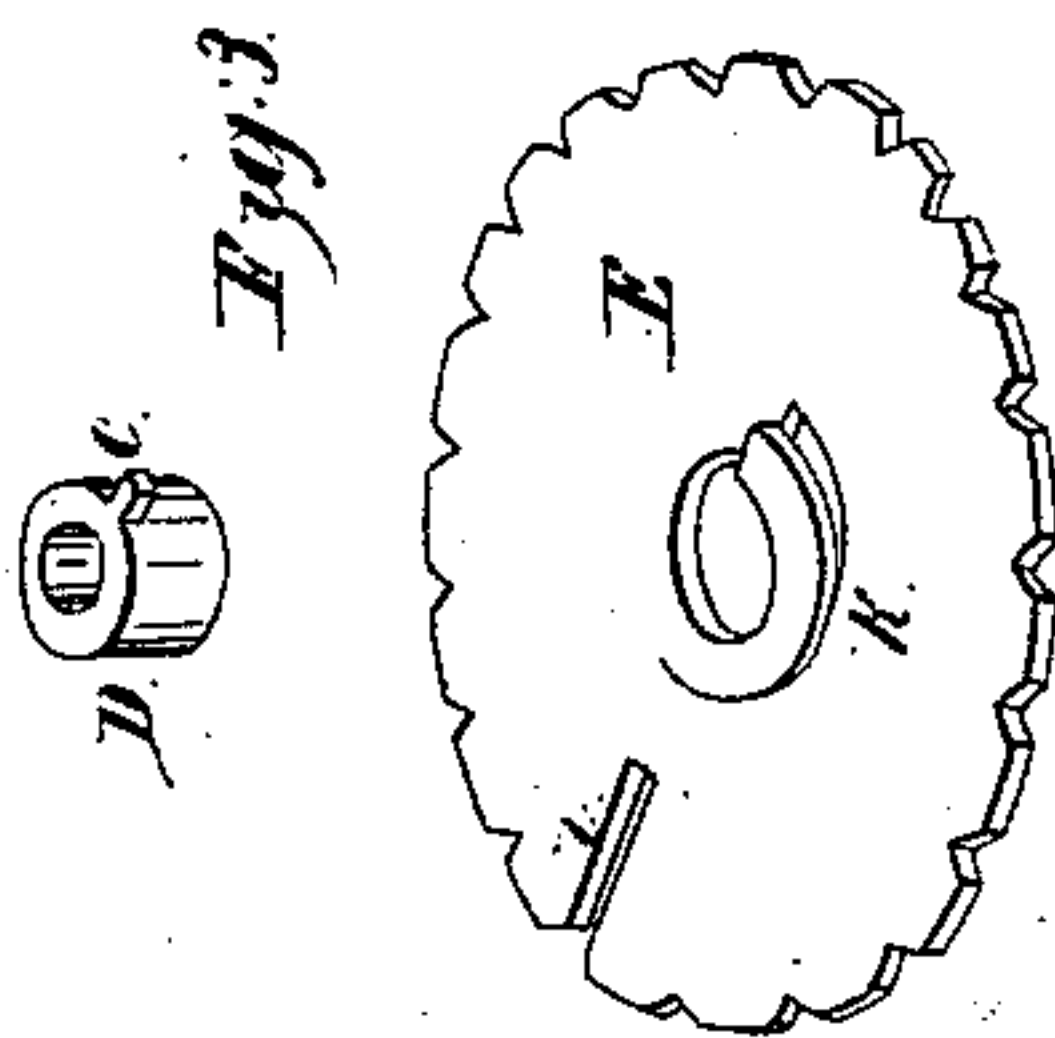
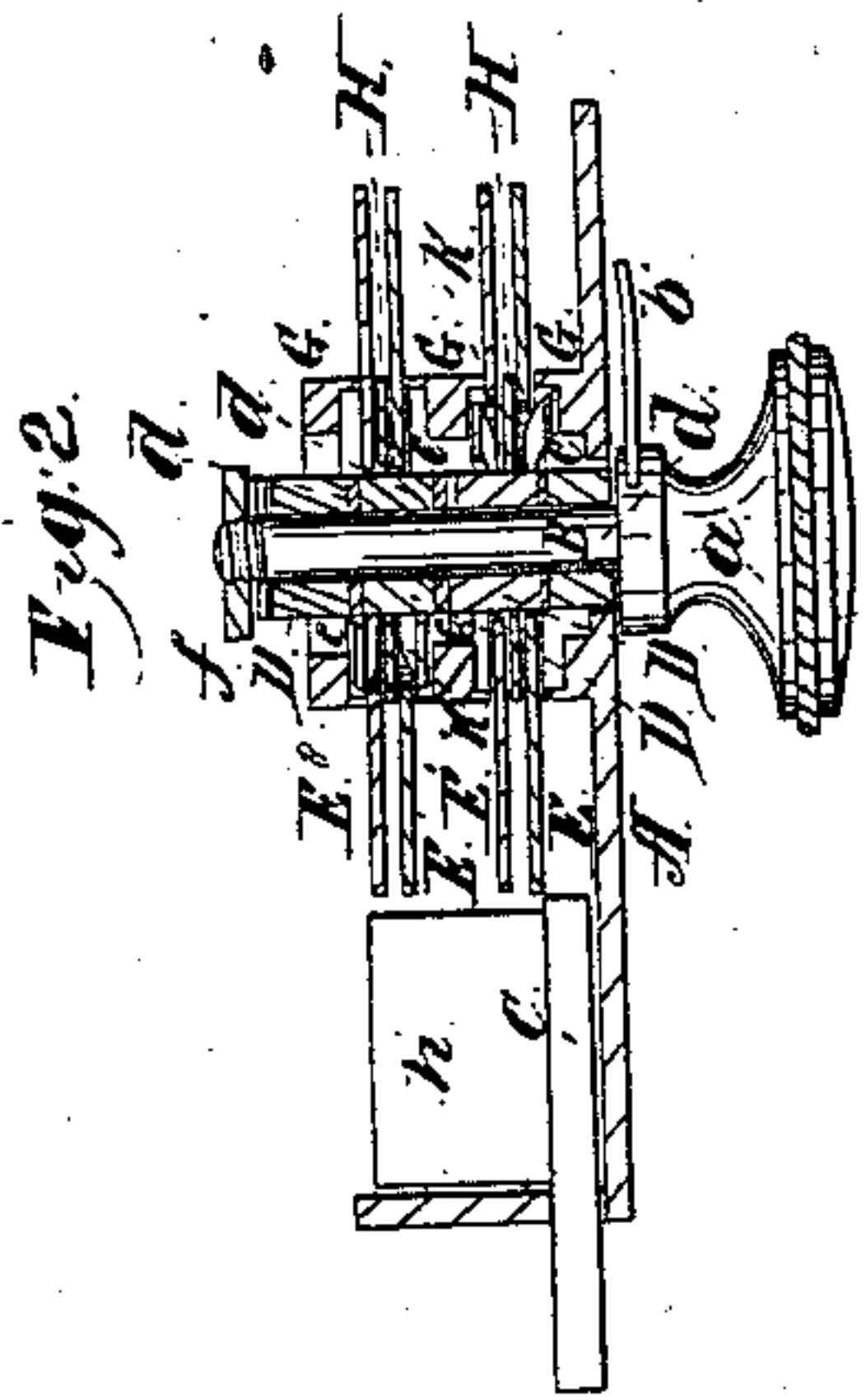


A. B. Vandemark,
Permutation Lock.
N^o 84,659. Patented Dec. 1, 1868.



witnesses:
J. A. Davis
W. J. Creelman.

Inventor:
A. B. Vandemark.
By J. Fraser & Co. Attys.

United States Patent Office.

A. B. VANDEMARK, OF PHELPS, NEW YORK.

Letters Patent No. 84,659, dated December 1, 1868.

IMPROVEMENT IN COMBINATION-LOCKS.

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

To all whom it may concern:

Be it known that I, A. B. VANDEMARK, of Phelps, in the county of Ontario, and State of New York, have invented a certain new and useful Improvement in Combination-Locks; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a view of my lock, with the back plate removed.

Figure 2, a central section.

Figure 3, a perspective view of one of the tumblers, and the cam that operates it.

Like letters of reference indicate corresponding parts in all the figures.

My invention consists in making the tumblers with spring-bearings, cut out of and struck up from the surface, and combining therewith an arrangement of cams on the spindle, in such a manner that when the spindle is pressed out, the cams engage with two of the tumblers, by turning in opposite directions, and, when drawn in, they engage with the other two in the same manner.

In the drawings—

A indicates the case of the lock;

B, the spindle; and

C, the lock-bolt, which may or may not be thrown by the action of the spindle, as may be desired.

The spindle has the ordinary knob, *a*, and pointer, *b*, which latter is used in connection with a scale on the outside of the lock, to indicate the position of the tumblers.

On the spindle is a series of cams, D D D, which are in the form of sleeves or cylinders, and have the cam-points *c c c* projecting so as to operate the tumblers, as will presently be described. Between these cams are inserted the washers *d d d*, which are kept from turning by having feathers or lugs, which rest in a longitudinal groove of the spindle. This is for the purpose of preventing the cam, operating one tumbler, from imparting motion to the next by friction.

The cams and washers are all clamped in place by a set-nut, *f*, screwing on the end of the spindle.

The tumblers E E¹ E² E³ are simply disks cut from thin sheet-steel.

I prefer to notch the periphery, as shown at *g g*, so that when the tang *h* of the bolt is brought in contact, the touch cannot distinguish between said notches and the tang-notch *i* which allows the bolt to retract.

A raised concentric spring-bearing *k* is cut out of and stamped up from the material of each tumbler, as clearly shown in fig. 3, which is for the purpose of the engagement of the cam-points, as will presently be described.

These tumblers are arranged in pairs, as shown in fig. 2, the pairs being situated between clamp-bars G

G, and the individual tumblers of each pair being separated by washer-plates H H.

Screw-bolts *l l*, at the ends, passing through both clamp-bars and washer-plates, clamp the tumblers down to just the desired degree of pressure to produce the necessary friction to retain them in place in the position to which they are set by the cams.

This is a very convenient arrangement for the purpose, since the degree of clamping-action may be exactly adjusted to meet the exigencies of the case; and, besides, it forms a convenient means of applying and removing the tumblers, and retaining them in place.

The operation is as follows:

The spindle has end-motion sufficient to engage and disengage the cam with and from the spring-bearings of the tumblers. When the spindle is pressed in, the cams engage with E E², and when drawn out, they engage with E¹ and E³. The spring-bearings of the said cams stand in opposite directions, so that the one tumbler is set by turning to the right, and the mate by turning to the left. In going back, the cam rides over the inclined plane of the spring-bearing, and does not displace the tumbler.

The construction of the tumblers, as above described, is exceedingly simple and cheap. They are stamped from the sheet-metal, and the one below forms the whole, with the peripheral notches and the spring-bearing complete. In most combination-locks the tumblers are made of several parts, which are expensively fitted and adapted together. The great advantage of mine is apparent.

The arrangement of the cams upon the spindle, with sufficient end-play to engage first with two tumblers, by turning in opposite directions, and then withdrawing and engaging with the other two in the same manner, has never before been known, to the best of my knowledge and belief.

To change the combination, the tang of the bolt is set back into the tumblers to retain them in place. The set-nut *f* is then loosened on the spindle, which is then turned to the desired position to make the change.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination and arrangement, with the disk-tumblers E E¹ E² E³, provided with spring-bearings *k k*, of the cams D D on the spindle, having an end-motion to engage in one position with two of the tumblers, and, in the opposite position, with the other two, said tumblers, by twos, being set by the reverse turns of the spindle, as herein set forth.

In witness whereof, I have hereunto signed my name, in the presence of two subscribing witnesses.

Witnesses:

A. B. VANDEMARK.

J. A. DAVIS,

W. J. CREELMAN.