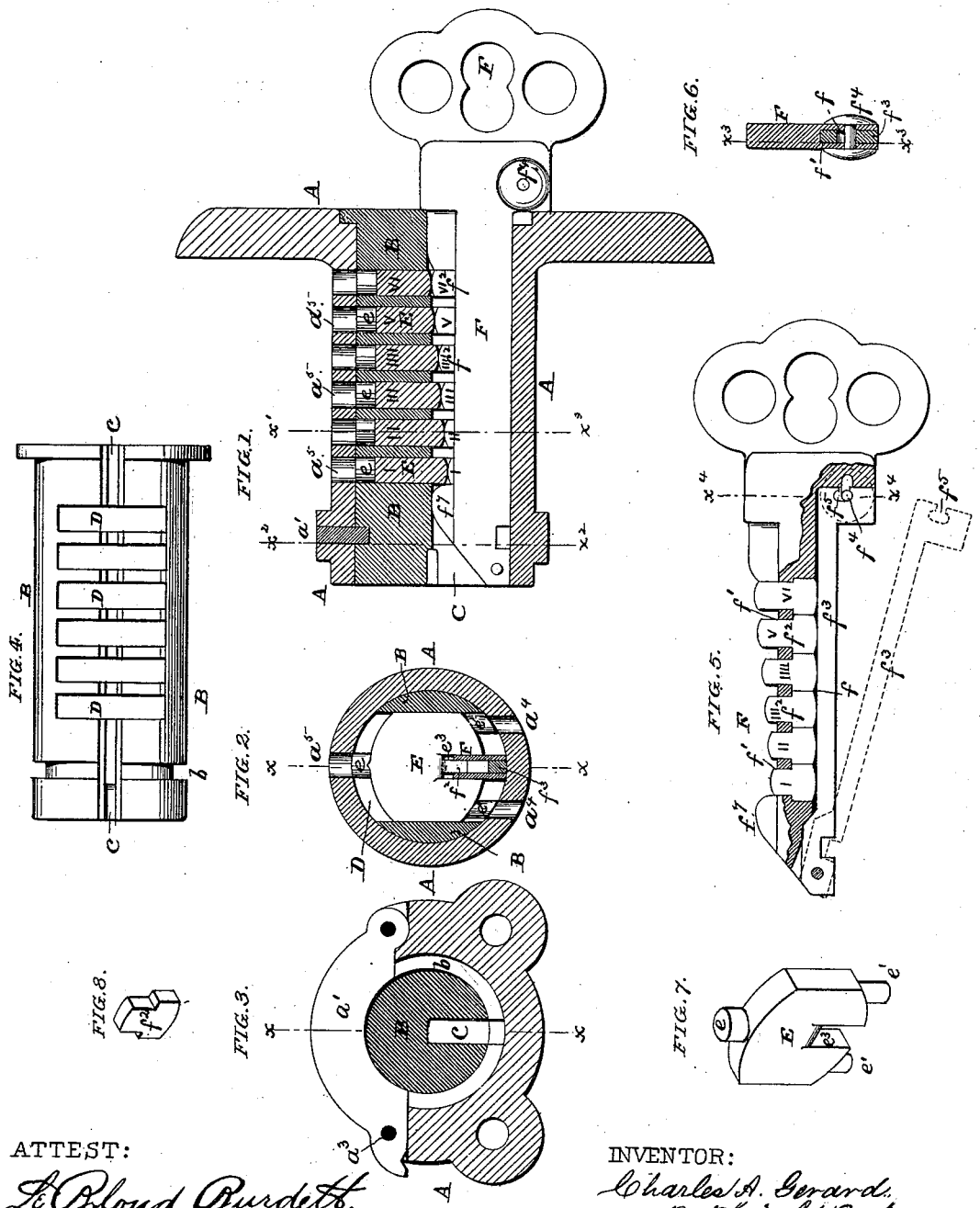
C. A. GERARD.
LOCKS AND KEYS.

No. 195,118. Patented Sept. 11, 1877.



ATTEST:
LeRoy Burdett.
Jac. Scheitlin

INVENTOR:
Charles A. Gerard.
By Knight Bros.
Attys.

UNITED STATES PATENT OFFICE.

CHARLES A. GERARD, OF KANSAS CITY, MISSOURI.

IMPROVEMENT IN LOCKS AND KEYS.

Specification forming part of Letters Patent No. **195,118**, dated September 11, 1877; application filed May 2, 1877.

To all whom it may concern:

Be it known that I, CHARLES A. GERARD, of Kansas City, Jackson county, Missouri, have invented a certain new and useful Improvement in Locks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My improvement relates to that class of locks having a barrel connected with the bolt or catch, so as to throw it or draw it back, the key being inserted in the barrel to turn it, and acting on the tumblers to allow the barrel to be turned.

My improvement has a number of tumblers, each having pins projecting into holes in the turning barrel, so as to be flush with the circumference of the barrel when held in position by the insertion of the key, so as to allow the barrel to be turned. At other times the pins project beyond the surface of the barrel at the bottom, and prevent it from turning. The tumblers are held in position (when the key is inserted) by small interchangeable blocks or wards in the key, each of which is made to suit a certain tumbler, the tumblers being made interchangeable in the barrel. Thus it will be seen that the combination of the lock may be changed. Each tumbler and its proper key-block have the same number.

In the drawings, Figure 1 is a vertical axial section through the lock at line $x\,x$, Fig. 2, showing the key in side view. Fig. 2 is a transverse section at $x^1\,x^1$, Fig. 1. Fig. 3 is a transverse section at $x^2\,x^2$, Fig. 1. Fig. 4 is a bottom view of the turning barrel with the tumblers removed. Fig. 5 is a side view of the key, partly in section at $x^3\,x^3$, Fig. 6, with the bar by which the blocks or wards are locked (shown in dotted lines) thrown out on its pivot to release the key-blocks. Fig. 6 is a transverse section of the key at $x^4\,x^4$, Fig. 5. Fig. 7 is a perspective view of one of the tumblers. Fig. 8 is a perspective view of one of the key blocks or wards.

A is the case in which the barrel B is inclosed, and in which it turns. This barrel B has attached to or connected with it any suitable appliance to operate the bolt or catch of the lock when it (the barrel) is turned; but it will not be necessary to describe such appliance, as my invention does not extend thereto. The barrel has a longitudinal key-slot, C, extending from end to end, to receive the flat key F. D D are a number of transverse slots or mortises extending through the barrel, and each of them containing a tumbler, E. Each tumbler has three projecting pins, $e\,e^1\,e^1$, whose ends are flush with the circumference of the barrel B when the key is inserted; but when the key is withdrawn the tumblers descend, so that the pins e^1 enter holes a^4 in the case A, so as to prevent the barrel from turning. The key has a number of removable blocks or wards, f^2, one for each tumbler, and when the key is inserted each tumbler is sustained by its proper block, and thus it is necessary that each block should occupy the right position in the key to be beneath its proper tumbler when the key is in the lock. Each tumbler is slotted more or less deeply at e^3 for the passage of the key, and the proper block in the key made just the right height to hold the tumbler in proper position to allow the barrel to turn by bearing against the upper end of the slot.

Thus it will be seen that the combination of the lock may be changed by a different arrangement of the tumblers in the barrel, the blocks in the key being also arranged to suit the lock. With six tumblers, as shown, it admits of seven hundred and twenty different combinations. There may be any suitable number of tumblers, six, as shown, or more or less, and of course an equal number of blocks in the key.

The barrel B is held in the case A by a curved bar, a^1, which fits in a transverse slot in the case, and in a circumferential groove, b, in the barrel, so as to allow the barrel to turn freely, but to hold it in place in the case. This bar a^1 is hinged to the case at one end, and its other end is held down by a screw, a^3, that passes through it. The key has in the under side a longitudinal slot, f, extending from the end, and from this slot upward extends a number of mortises, f^1, through which pass the upper ends of the tumbler-blocks f^2. The lower ends of the blocks are wider than the upper ends, forming shoulders, which prevent the upper end projecting more than a certain distance through the mortise. f^3 is a

spring-bar, hinged at the point of the key lying in the slot f, and bearing against the lower ends of the blocks f^2 to hold them in place. The bar f^3 is held in the slot f by a sliding catch, f^4, which engages notch f^5 in the end of the bar. At the end of the key, upon the under side, is a notch, to give place to the latch-bar a^1 when the key is turned. The key can be inserted or withdrawn from the lock only when the barrel is in the position shown, because the tumblers are then in the only position when the pins c will allow the tumblers to rise, and, in the insertion and extraction of the key, the projection f^7, near its point, passes beneath the tumblers and lifts them, so that the pins e enter the holes a^5 of the case.

It will be observed that the tumbler-pin e is made of greater diameter than the pins e' so that it is too large to enter the holes a^4 of the case as it passes over them.

It will be understood that the possessor of the key can change the combination at will, so that it will not unlock the lock. Thus perfect security may be had, even though the key should be lost or stolen. A new key may be purchased and arranged to the proper combination by a person acquainted with it.

I claim—

1. The tumblers E, provided with pins e e^1, in combination with the case A, provided with perforations for the engagement of said pins.

2. The combination of the case A, transverse latch a^1, and barrel B, grooved at b, substantially as set forth.

3. The combination of wards or blocks f^2, bar f^3, and catch f^4, substantially as and for the purpose set forth.

CHARLES A. GERARD.

Witnesses:

CHAUNCEY N. OLMSTEAD,

EDWARD N. LA VEINE.