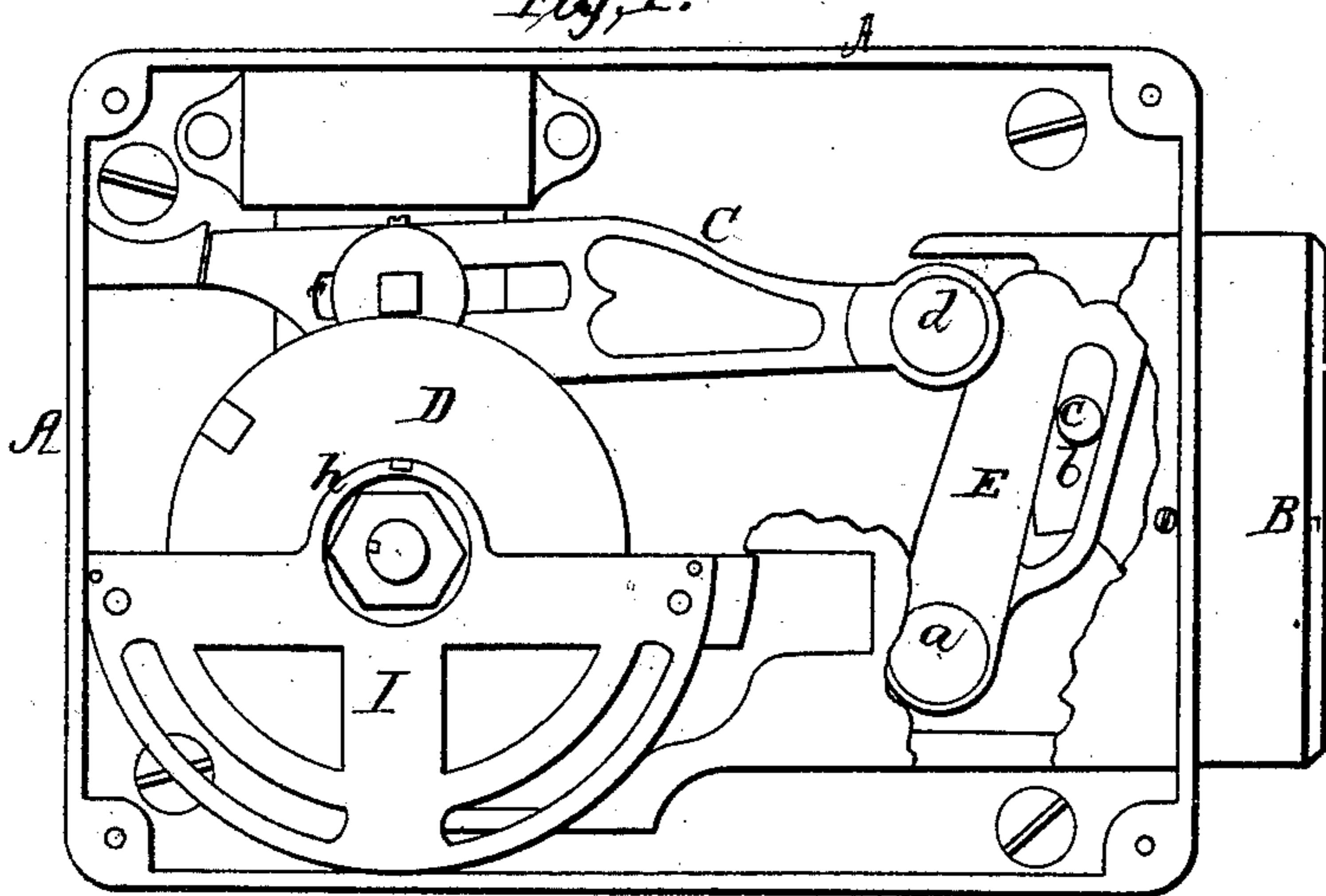


T. J. Sullivan
Permutation Lock.

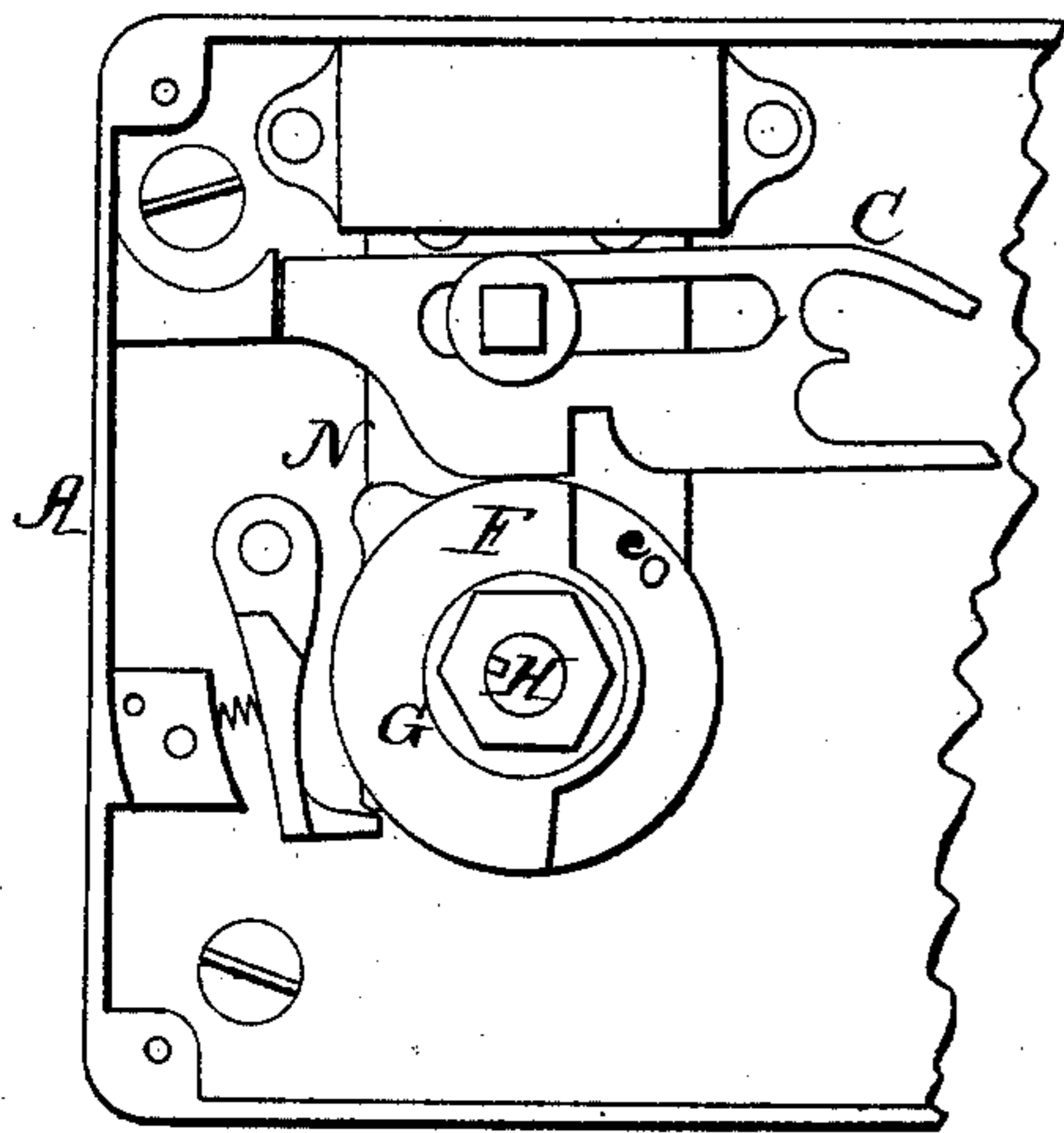
N^o 94,789.

Patented Sept. 14, 1869.

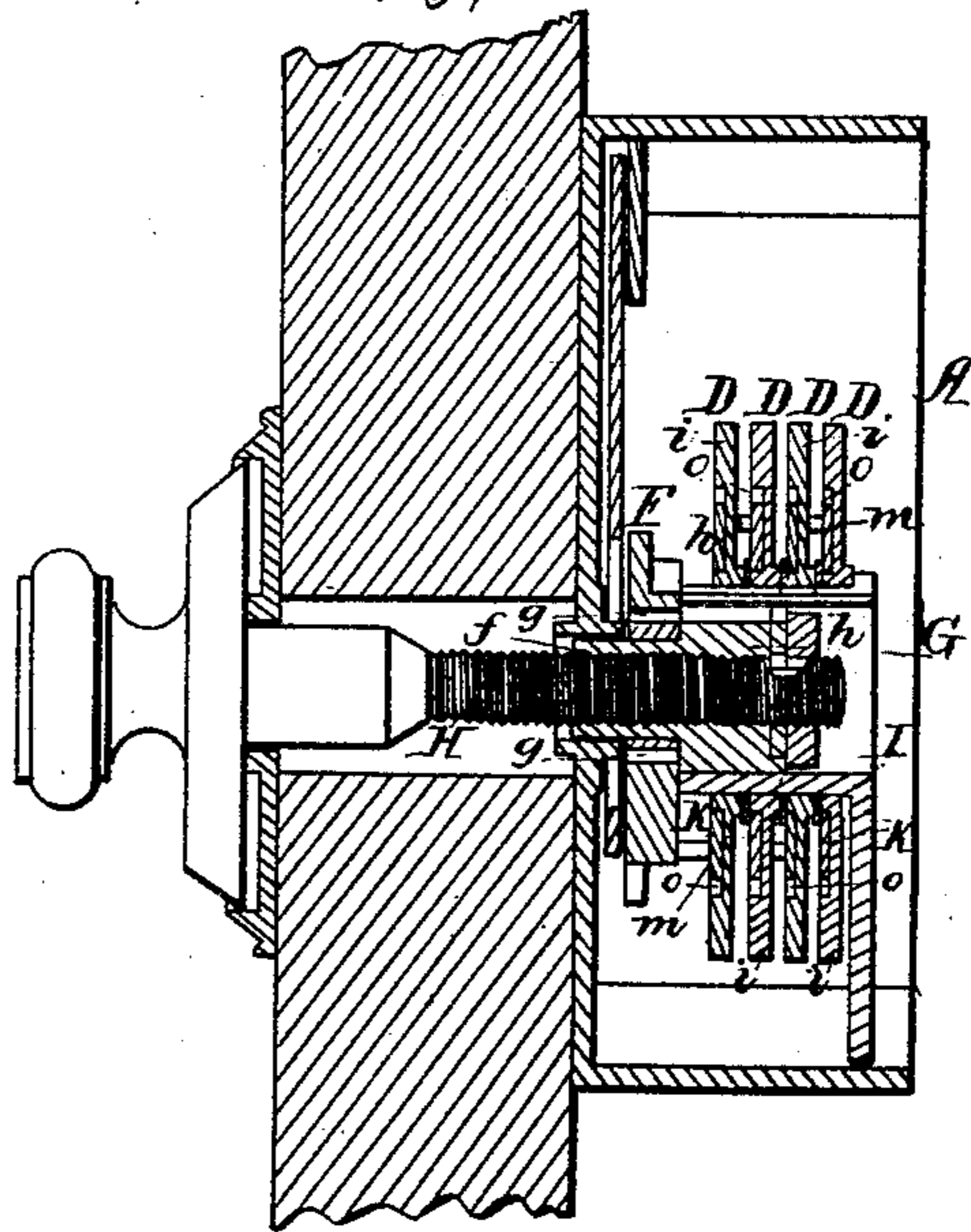
Fig; 1.



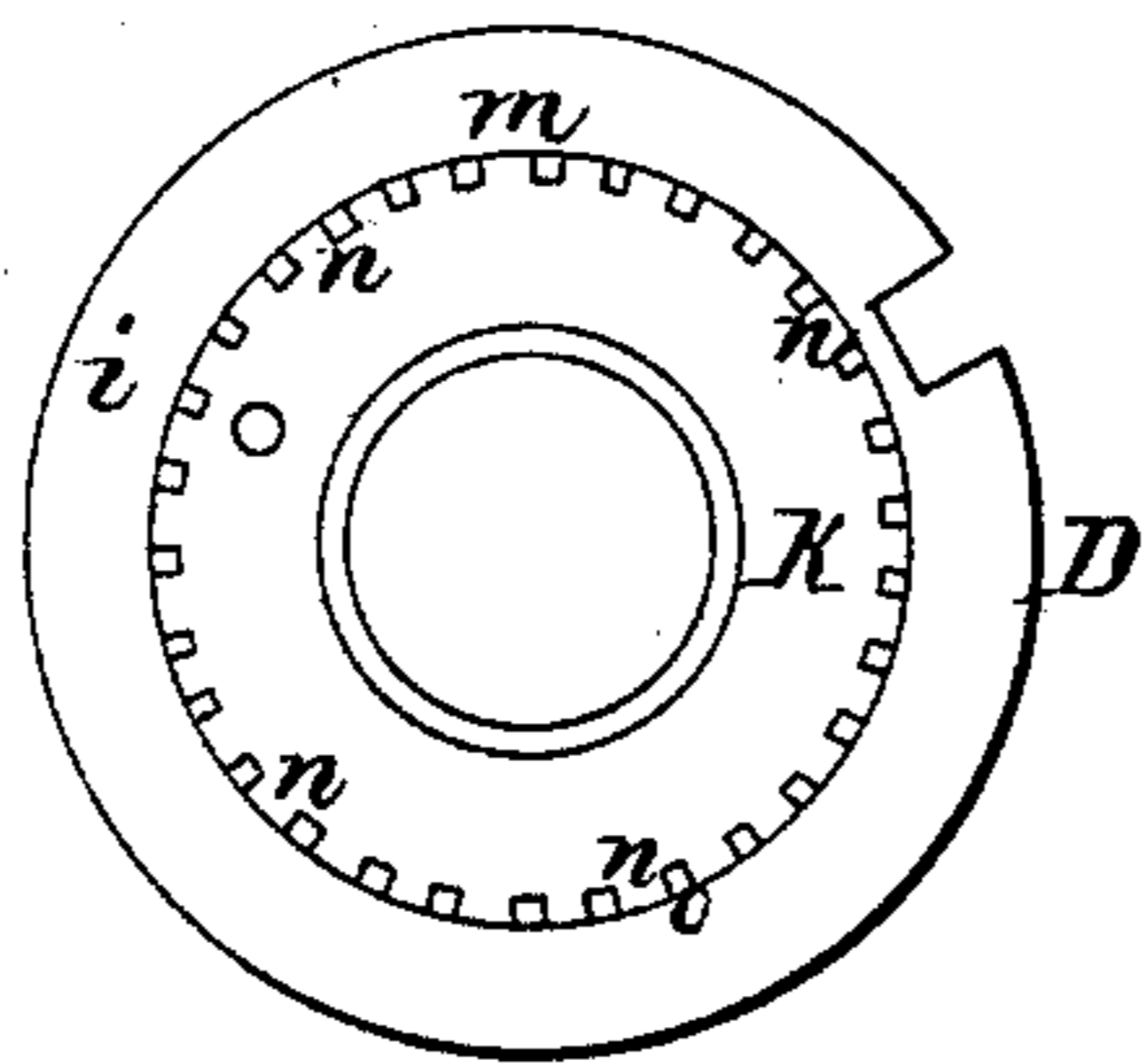
Fig; 2.



Fig; 3.



Fig; 4.



Witnesses;
J. A. Davis.
W. J. Creelman.

Inventor;
T. J. Sullivan
By J. Fraser

United States Patent Office.

T. J. SULLIVAN, OF ALBANY, NEW YORK.

Letters Patent No. 94,789, dated September 14, 1869.

IMPROVEMENT IN PERMUTATION-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, T. J. SULLIVAN, of the city of Albany, in the county of Albany, and State of New York, have invented certain new and useful Improvements 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 rear elevation of the lock, with the back plate removed, to show the interior.

Figure 2, a similar view of a portion of the lock, with the tumblers removed from place.

Figure 3, a vertical section in plane of the spindle.

Figure 4, a view of one of the tumblers.

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

My invention consists in the arrangement of the lever-work connected with the bolt for throwing it out and in.

In the accompanying drawings—

A indicates the casing of the lock;

B, the bolt;

H, the spindle;

C, the dog-lever;

D, the tumblers; and

N, the sliding gate that elevates the dog from the notches of the tumblers.

To the casing of the lock is pivoted, at *a*, a rock-arm, E, provided with a slot, *b*, or equivalent, with which connects a bearing, *c*, of the bolt, and at *d*, the dog-lever C is pivoted to the rock-arm E.

The pin or bearing *c* of the bolt, being placed at an intermediate position between the pivot *a* of the rock-shaft, and the pivot *d* of the dog-lever, the strain produced in throwing the bolt forward or back, is divided between the points *a* and *d*, and a leverage is obtained whereby much less power is required for operating the parts. And besides, when the dog-lever C is engaged with the cam-head F, it preserves the same parallel position at all times, while the bolt is being thrown forward or back, and thus prevents it from being thrown off the cam-pin *e*, by any sudden action.

This mean parallel position of the dog-lever at all times, is of very great importance in preserving the connection so that the bolt may be thrown, and is in-

sured by the lever-work described; but the effect would not be produced by pivoting directly to the bolt alone. The transferring of the strain, also, to the two points *a d*, instead of one, produces greater security, and involves greater difficulty in feeling and ascertaining the position of the tumblers.

The cam-head F, and the sleeve G, through which the spindle H passes, are made in separate pieces, the cam-head having a central opening which slips on over bearing *f* of the sleeve, and the sleeve G, having pins *g g*, that fit loosely in holes formed in the cam-head, and thus impart revolving motion to the cam when the spindle is turned.

By this arrangement, if the spindle with the sleeve attached is driven in, the sleeve will pass freely through the hollow bearing *h* of frame I, which is attached to the casing. Thus the tumblers, being on the outside of bearing *h*, can in no wise be affected by the driving in of the spindle, which has a clear passage through. In ordinary locks, the cam-head F and sleeve G are made in one piece, fast to the spindle, and if the latter is driven in, the tumblers and other parts must go with it.

The tumblers D are constructed in two parts, *i k*, the first forming the rim, and the latter the centre. The recess or eye *m*, in which the centre fits, is cut but half way through the body of the rim, thus leaving the latter solid and entire on one side, while the centre rests flush or slightly sunk on the other, as clearly shown in fig. 3.

The centre is provided with teeth, *n n*, which engage with a tooth or cog, *o*, of the rim, to keep it from turning.

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

The combination with the bolt B, and dog-lever C, of the rock-arm E, arranged as described, and operating in the manner and for the purpose specified.

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

T. J. SULLIVAN.

Witnesses:

J. A. DAVIS,

W. J. CREELMAN.