G. E. BENDIX.

Lock.

No. 202,511. Patented April 16, 1878.

Fig. 1.

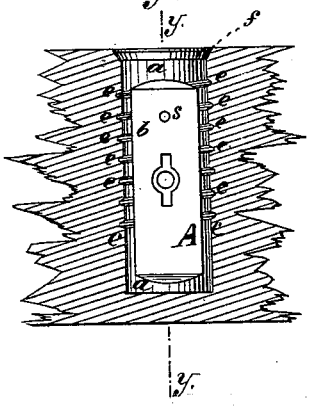

Fig. 2.

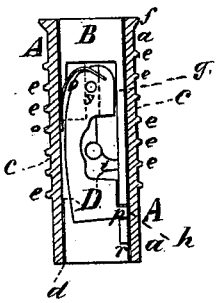

Fig. 3.

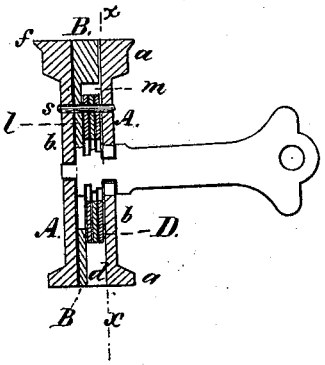

Fig. 4.

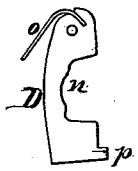

Fig. 5.

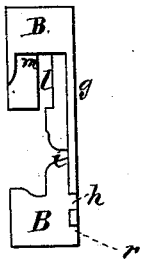

Fig. 6.

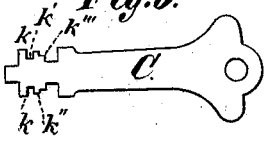

Fig. 7.

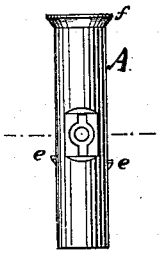

Fig. 8.

Witnesses:

Henry Eichling

Fred. Haynes

Inventor:

George E. Bendix

by his Attorneys

Brown & Allen

UNITED STATES PATENT OFFICE.

GEORGE E. BENDIX, OF BROOKLYN, NEW YORK, ASSIGNOR TO SOLOMON P. STODDARD AND WALTER LIPE, OF NEW YORK, N. Y.

IMPROVEMENT IN LOCKS.

Specification forming part of Letters Patent No. **202,511**, dated April 16, 1878; application filed February 18, 1878.

To all whom it may concern:

Be it known that I, GEORGE E. BENDIX, of the city of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Locks; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification.

My improvement relates to that class of locks known as "mortise-locks," or locks which are inserted in a mortise or recess formed in the article to which the lock is applied.

The invention has for its objects to secure as large a bolt as possible in a tumbler-lock with as small a case as possible, and to provide for the easy and secure attachment of the lock in such manner that it cannot be withdrawn from the mortise without shooting the bolt of the lock, for which purpose a special key fitted to the lock is necessary.

To secure these objects the invention consists in a novel construction of the lock-case, and in a novel construction and arrangement of the interior parts, said novel features being shown and illustrated in the accompanying drawing, in which—

Figure 1 is a section of a part of a drawer having my improved lock applied thereto, and a front-side view of said lock. Fig. 2 is a longitudinal section made on the line *x x* in Fig. 3. Fig. 3 is a longitudinal section made on the line *y y* in Fig. 1. Figs. 4, 5, and 6 are, respectively, details illustrating parts of the lock and a side view of the key. Figs. 7 and 8 are, respectively, a side view and a cross-section of a modified form of the case, in which that part of my invention pertaining to the case is carried out in a different way.

Said figures represent the parts in full size; but the locks may be made of larger size or smaller size than those shown.

A represents the lock-case, which, for locks of the size shown in Figs. 1, 2, and 3, is made in the general form shown in said figures; but for locks of smaller size, as shown in Figs. 7 and 8, the said lock-case is made cylindrical in form; and for locks of all sizes the said case is cast in a single piece.

For locks of the size shown in Figs. 1, 2, and 3, and for locks of larger size, the said case is made with cylindrical extremities *a a*, connected by a portion, *b b c c*, two opposite sides, *b b*, of which are preferably flat and parallel to each other, and the two other sides of which are parts of a cylindrical surface, having the same radius as the cylindrical parts *a a*. Through the entire length of said case is a rectangular chamber, *d*, for containing the working parts of the lock.

The object in constructing the exterior of the case in the form described is to enable the said case, in its larger sizes, to be cast without cracking in cooling, as it would otherwise inevitably do on the sides *c c* when cast over a metal core or chill to form the said chamber *d* if the case were cylindrical, on account of the difference in thickness of the metal, and also because it is important, for cheapness of construction, to use such metal core to avoid the expense of fitting or finishing the interior of said chamber.

Upon the sides *c c* of the lock-case A are formed opposite segments of the thread of a screw, the parts of which are represented at *e*. Said parts of said thread are preferably cast upon the said lock-case; but they may be formed upon said lock-case after casting the same.

In making the pattern for said lock-case I prefer to cut thereon the threads of a double screw, and then, beginning at one end of said screw, the second part of each segment of the thread is cut away; then the second part from the one so cut away is also cut away, and so on till only the odd-numbered parts are left, counting from the end at which the cutting commenced; or the odd-numbered threads may be cut away to leave the even-numbered threads, if preferred, the said cutting away of intervening threads being performed in both the segments. The purpose of this construction is to avoid a difficulty in molding met with when the intervening parts are not re-

moved, as described, to wit, the breaking of the sand in withdrawing the pattern between the said parts, the sand not having sufficient body to sustain itself when all the parts are left on.

The said lock-case has, moreover, a flange, *f*, at the outer end of said case, said flange being beveled on the inner side, as shown. Said flange enters the wood when the lock is applied, as hereinafter described, said wood, when of a hard variety, being countersunk to receive it.

The lock-case is applied by boring a hole or cylindrical mortise in the edge of the drawer, door, sash, or other article to which the lock is to be attached, said mortise having the same radius as the cylindrical parts *a a* of the lock-case. The lower extremity of the case is inserted in the said cylindrical mortise in such manner that the parts *e* of the segments of the screw-thread stand crosswise of the cut grains of the wood. The case is then driven into the wood by a hammer or mallet, and the ends of the cut grains of the wood so firmly engage the parts *e* that the lock is firmly retained, and can only be taken out of the mortise in the following manner: To take out the lock, the bolt is shot out, and is seized by a wrench or other suitable instrument. The entire lock is then turned by the bolt in such manner as to screw it out of the mortise.

The lock is driven into the mortise rather than screwed in, because, in screwing in a lock, as has heretofore been done, it is difficult to start the thread so accurately in the hole or cylindrical mortise as to insure that the key-hole in the lock shall, when the lock is screwed in, fall accurately under the key-hole in the wood; and it is to permit the driving in of the lock in thin wood that the portion of the screw-thread is removed on the sides *b b c c*, which sides are, moreover, preferably flattened, to permit a lock having a bolt of maximum size to be inserted in wood of minimum thickness. The difficulty of matching the key-hole in the lock to the key-hole in the wood is entirely overcome by constructing the lock-case in such manner that it can be driven into the mortise.

I also bevel off the ends of the extremities of the parts *e* of the screw-thread at and near their junctions with the flat sides of the case, which prevents their tearing the wood when the lock-case is driven in, as described.

B represents the bolt of the lock. Said bolt has formed on one of its borders a notched longitudinal rib, *g*, for the engagement of the stumps of tumblers, hereinafter described, and a notch, *i*, for the engagement of one or other of the steps *k*, Fig. 6, of the key C, which actuates said bolt. Said bolt has, moreover, a slot, *l*, cut through the same, through which extends the common pivot of the tumblers, hereinafter described, one end of said tumblers entering a recess, *m*, in said bolt when the said bolt is shot inward.

The general form of said tumblers is shown in Fig. 4. One or more of said tumblers, D, may be used, three being a good number, as shown in the drawing. Said tumblers are alike in form, except the notches *n*, formed in the same, which are varied for different locks to suit the form of the key, which is made differently for different locks. In the example of the lock shown in the drawing the said tumblers are actuated by the steps *k' k'' k'''* of the key C. Springs *o* are attached to the ends of the said tumblers nearest the outer end of the bolt B. When said bolt is shot in, said springs cause the stumps *p* of said tumblers to enter the notch *h* in the rib *g* of the bolt *b*. When the bolt is shot out, said tumblers having been raised and let fall by the key, the said stumps drop behind the end *r* of the said rib. The said tumblers are held by a common pivot, *s*, which passes through the case A, the tumblers, and the slot *l* of the bolt B. Said pivot also performs the function of a stop for the bolt B, preventing the outward shooting of the bolt farther than the distance between said pivot and the inner end of the said slot *l*, through which said pivot passes.

By this construction and arrangement of parts I am enabled to secure a much larger bolt, in proportion to the size of the case, than has heretofore been attained in a tumbler-lock, and to make the same with great economy of material and labor.

For very small locks I may take off all the parts of the thread except one in each segment on opposite sides of the case, and bevel off the said parts only at one extremity, as shown in Figs. 7 and 8. For such locks, designed to be inserted in thin wood, it is advisable to insert them turned, so that the part or parts *e* enter on a different line from that on which they will stand when the lock is fully attached. To do this the bolt is shot out, and left out while inserting the lock. The lock is then driven in, and afterward turned about one-eighth of a revolution, which brings the key-holes into proper relation, and also causes the said part or parts *e* to enter into and engage unbroken wood.

I am well aware that lock-cases have been made with screw-threads upon their outer surfaces, for screwing the said cases both in and out of the wood. I therefore do not claim, broadly, a lock-case having a screw-thread formed thereon; but

What I do claim, and desire to secure by Letters Patent, is expressed in the following claims:

1. The lock-case herein described, of cylindrical or partly cylindrical form, and having upon its exterior surface two opposite segments of a screw-thread, to permit the said lock-case to be driven into the wood for inserting the same, and to be screwed out for removing the same, substantially as and for the purpose specified.

2. The lock-case cast in a single piece, having the cylindrical parts *a a* and the inter-

vening part *b b c c*, connecting said cylindrical parts, the sides *b b* of said intervening part being nearer the center than the sides *c c*, and the sides *c c* having thereon opposite segments of a screw-thread, substantially as and for the purpose specified.

3. The combination, with the lock-case A, of the bolt B, having therein a slot, *l*, the tumblers D, and the pivot *s*, common to said tumblers, and passing through the slot *l* in said bolt, to form a stop for said bolt, substantially as described.

GEORGE E. BENDIX.

Witnesses:

VERNON H. HARRIS,

FRED. HAYNES.