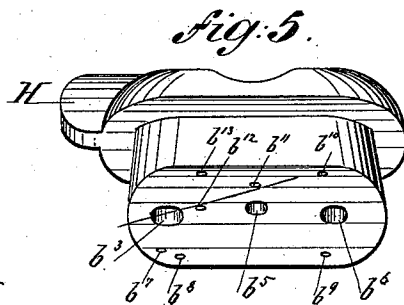
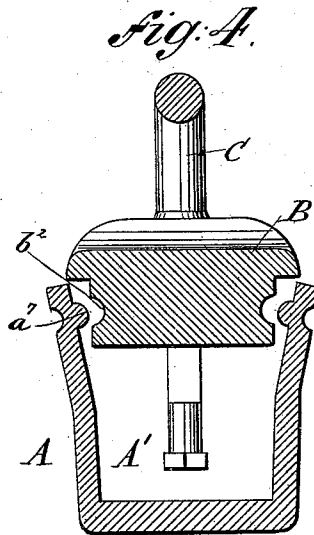
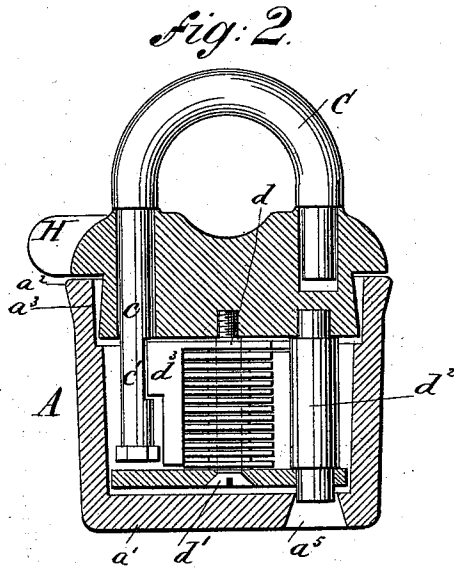


2 Sheets—Sheet 1.

No. 402,627.

Patented May 7, 1889.



Fr. Jacobson
M. F. Dufflog.

Engine C. Smith

E. Walter Brown

ATTORNEY,

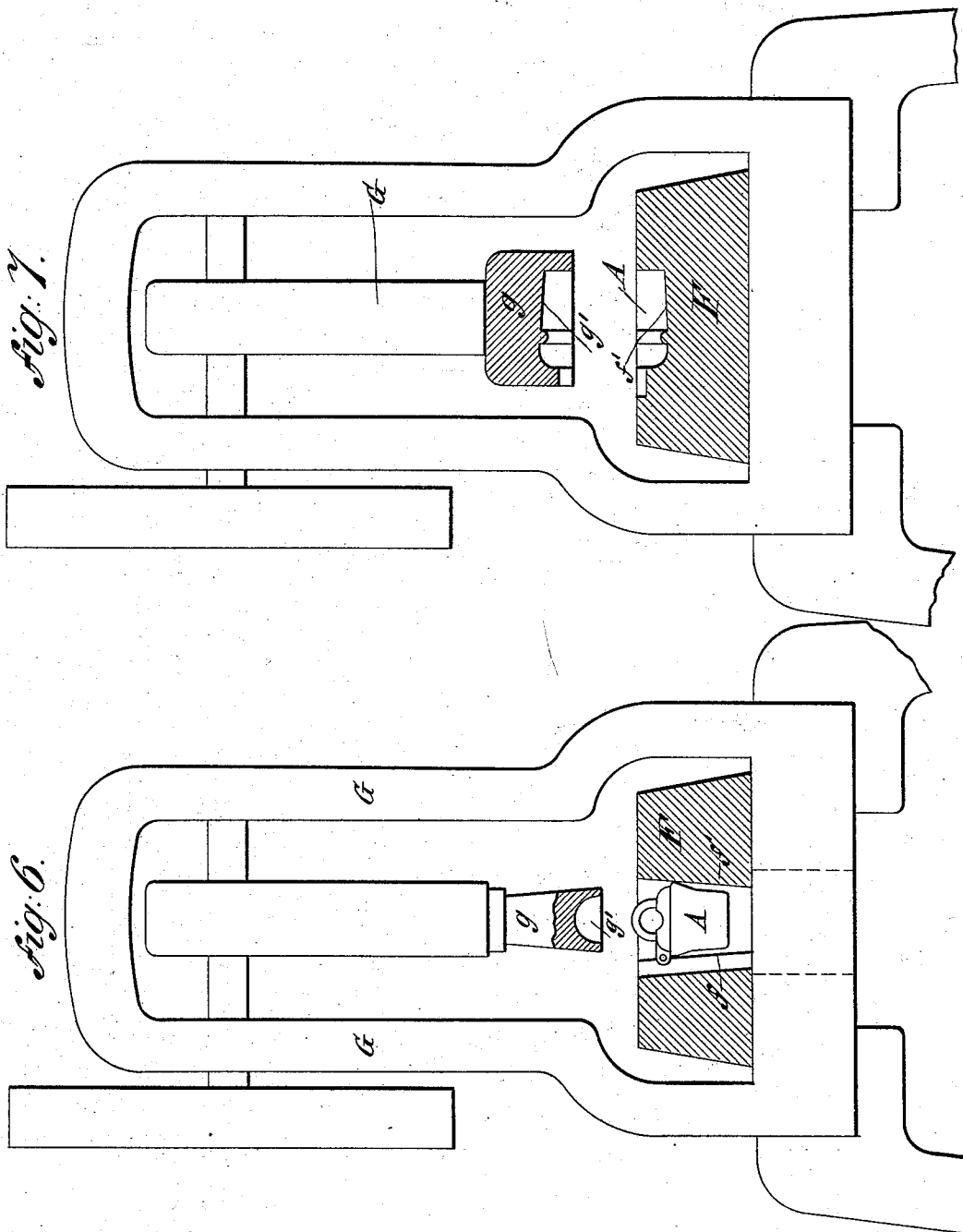
(No Model.)

2 Sheets—Sheet 2.

E. C. SMITH.
ART OF MAKING LOCKS.

No. 402,627.

Patented May 7, 1889.



WITNESSES:

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EUGENE C. SMITH, OF NEW YORK, N. Y., ASSIGNOR TO THE UNIVERSAL LOCK COMPANY, OF NEW YORK.

ART OF MAKING LOCKS.

SPECIFICATION forming part of Letters Patent No. 402,627, dated May 7, 1889.

Application filed January 31, 1889. Serial No. 298,199. (No model.)

To all whom it may concern:

Be it known that I, EUGENE C. SMITH, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in the Art of Manufacturing Locks, of which the following is a specification.

My invention relates to improvements in the art of manufacturing tumbler-locks, particularly of the kind known as "Scandinavian" locks, in which a shackle moves inward and outward in guide-openings in the lock-case and a bolt actuated by locking mechanism engages a bolt-socket in the shackle-shank; and it has for its object improvements in the method of uniting or amalgamating the body of the lock-case with the top or base which guides the shackles and supports the locking mechanism.

My invention also relates to new and greatly-simplified methods of assembling the locking mechanism and adjusting it to the bolt-socket in the shackle, whereby difficulties in the art as hitherto practiced are overcome, the adjustment reduced to a simple operation, and a great saving of cost effected in labor and special machinery.

In the manufacture of locks of the Scandinavian type two methods or processes have hitherto been followed: First, the sides of the lock-case are made of sections of tubing, the top and bottom are made of separate pieces of suitable size and shape to be inserted in the tubing, the shackle passed through openings in the top piece, the locking mechanism built up or "assembled," as it is technically called, on the top or bottom piece, or within a separate case, and the top and bottom piece with the mechanism or separable case inserted in the tubing and secured by rivets. This mode of construction fails to produce padlocks of sufficient security, since by the conditions of their use such locks are entirely exposed to the assaults of malicious persons, and it is easy to knock off the rivet-heads and break open the lock. To meet this difficulty the second method of manufacture is employed—viz., to form the top

through which the shackle passes in one piece 50
integral with the sides of the lock-case, leaving the bottom open for the insertion of the mechanism. Now, it has hitherto been impracticable, on account of the great labor and expense, to build up the mechanism within 55
the case on the top of the lock, the small space within the case making it exceedingly difficult to insert tools and parts of mechanism and perform the delicate manipulations necessary to the adjustment of the mechanism. 60
Consequently the bottom has hitherto been made of a piece separate from the top and sides, of proper size and shape for insertion in the lock-case, and the locking mechanism has been built up either on said bottom piece 65
or within a separate case. The shackle having been passed through the openings in the top of the case, and the bottom piece with the mechanism or the separate case having been placed in the lock-case, the adjustment of 70
the mechanism and bolt to the bolt-socket in the shackle-shank is undertaken. This is difficult and expensive, requiring highly-skilled labor and special machinery, owing to the delicacy of the adjustment required, and 75
even when the adjustment is once effected it is liable to be again destroyed by the operation of closing the lock-case upon the bottom, said closing being effected by hammering or great pressure, which forces the metal of the 80
case over upon the bottom piece, or vice versa. The mechanism being built upon a different base from that which guides the shackle, the unequal yielding of the two bases during the operation of closing the lock-case aggravates 85
the liability to disturbing the adjustment of the mechanism.

To overcome the difficulties above pointed out and simplify and cheapen the process of manufacture are the objects of my improvement, to be immediately hereinafter described.

The drawings which accompany the specification show the following views, the same letters referring to like parts in the several 95
figures.

Figure 1 is a longitudinal vertical section of the lock-case and the top or base, showing

the latter inserted in the body before swaging and the shackle in its guides. Fig. 2 is a longitudinal vertical section, similar to Fig. 1, except that a diagrammatic representation is given of the locking mechanism. The lock is represented ready for the process of swaging. Fig. 3 is a vertical cross-section through the lock-case, showing the appearance of the lock after swaging. The locking mechanism is not represented. Fig. 4 is a vertical cross-section before swaging of a modification of the lock-body and the base, useful in drawn-metal cases. Fig. 5 is a perspective view of the top or base, showing the shackle-guide openings and the holes for the various pins, pivots, and axis of the locking mechanism. The base is shown ready to be built upon. Fig. 6 is a representation of one form of a press, die, and operation of swaging. Fig. 7 is a representation of another form of press, die, and operation of swaging adapted to drawn-metal cases.

I form by casting, forging, or other process adapted to the various metals of which lock-cases are made the body of the case A, with its sides a and bottom a' in one integral piece. In forged and cast cases the upper part of the exterior of the case is formed with an upward and outward flare, as at a^2 , Figs. 1, 2, and 3. This flare, extending all around the case A, forms an external circumferential ridge or bead, a^2 , about the upper edge of the case A. To facilitate the operation of swaging, hereinafter described, the upper part of the inner walls, opposite the aforesaid bead a^2 , is somewhat reduced in thickness, as shown at a^3 , forming an internal circumferential shoulder, a^4 . Through the bottom a' of the case A is formed an opening, a^5 , to receive the end of the key-cylinder d^2 and admit the key. Said opening a^5 is made of a size to fit the said key-cylinder loosely and require no exact adjustment of the key-cylinder to the opening when the lock is put together.

The top of the lock B, which I term the "base" of the mechanism, is made by any suitable process in a piece separate from the lock-case A, and the said base B is formed with a circumferential shoulder, b , about a downwardly-projecting part, b' . Said downwardly-projecting part b' is of a size and shape to fit loosely within the top of the lock-case A, and has its edge or wall b^2 formed with a downwardly and outwardly inclining bevel, as is clearly shown in Figs. 1, 2, 3, and 5. Said bevel, together with the aforesaid shoulder b , forms in effect a depression or shallow groove around the edge of the aforesaid downwardly-projecting part b' .

In the aforesaid base B are formed the shackle-guide openings b^3 b^4 , and also the orifices b^5 b^6 b^7 b^8 b^9 b^{10} b^{11} b^{12} b^{13} for the various pins, axes, and pivots of the locking mechanism and key-cylinder d^2 , which are shown, in diagrammatic representations only, in Fig. 2. Said locking mechanism having been fully

described in my application for patent filed on or about November 12, 1888, and now pending in the United States Patent Office, requires no description here.

Thus in my method of construction the shackle C is guided by the base B, and all the locking mechanism is built upon the same base. Therefore it is evident that the hitherto difficult and costly process of assembling the locking mechanism and adjusting two parts to each other, and particularly to the bolt-socket c' in the shackle C, is reduced to the simple operation of properly locating the shackle-guide openings b^3 b^4 and the orifices for the axis of the mechanism aforesaid in the base B, and the exact location of the said openings and orifices is effected by simply drilling them in the base B, according to a templet. Such mode of adjustment, by templets or similar means, of the mechanism to the bolt-socket is impossible in the manufacture of Scandinavian locks as hitherto practiced, since the shackle-guide openings are in one piece of metal, as the top of the lock-case, and the locking mechanism is built upon another piece, as the bottom, or in a case separate from the lock-body; and, as I have hereinbefore explained, it has hitherto been impracticable in the art to assemble the locking mechanism upon the top, through which the shackle passes.

I assemble the mechanism of my lock and unite the base B with the body of the case A in the following manner: The base B having been prepared by drilling the shackle openings and orifices b^3 b^4 b^5 b^6 b^7 b^8 b^9 b^{10} b^{11} b^{12} b^{13} aforesaid, the shanks of the shackle C are placed in the guide-openings b^3 b^4 and a nut, c^2 , is placed on the longer shackle-shank, c , to prevent the shackle from being withdrawn and lost. The axes, pins, and pivots of the mechanism are then secured in the appropriate orifices aforesaid by screw-threads on their ends or other suitable means, and the various mechanism placed on the appropriate axes and pins, thus necessarily taking the exact position in the lock as respects other parts of the mechanism, and the bolt-socket c' in the shackle C. To maintain the aforesaid pins, pivots, and axes in their true position when set, and retain the mechanism on the axes and pins, I employ the bottom plate, D, in which the various orifices are accurately drilled by a templet to correspond with the aforesaid openings in the base B. The said plate D is secured by the screw d' on the tumbler-axis d and by riveting the ends of the pins upon said plate D. The base B, with its shackle and assembled mechanism, is then placed in the lock-case A, the shoulder b of said base B resting on the walls a , as shown in Figs. 1 and 2, and the end of the key-cylinder d^2 projecting into openings a^5 , as in Fig. 2.

The interior opening, A' , of the lock-case A is made larger than the space occupied by

the mechanism of the lock, so that the walls *a* of said lock-case do not touch the mechanism. The lock is then placed in a die, *F*, of a press, *G*. The opening of the said die *F* has a contour, *f*, corresponding to the exterior of the lock-case *A*, and said opening is formed with a slight downward and inward taper or contraction of area, and is just large enough at its smallest part to permit the base *B* to pass through.

The position of the lock and form of the die are clearly indicated in Fig. 6. The die *F* is recessed, as shown, to permit the chain-lug *H* to pass through it. The plunger *g* of the press *G* is recessed, as indicated in the drawings, to receive the shackle *C*, so that the pressure of the said plunger is relieved from the shackle and comes upon the solid base *B*. The press *G*, being operated in any well-known manner, forces the lock downward through the tapering die, whereby a gradually-increasing pressure is brought upon the bead *a*², and the upper part, *a*³, of the walls *a* is forced inwardly onto the bevel, depression, or groove *b*² of the base *B*, thereby firmly uniting the base *B* with the lock-case *A*. The plunger *g*, being shaped to accurately fit the convex top of the base *B*, acts as a guide to hold the lock true during its passage through the die *F*. The locking mechanism not being in contact with the walls *a* of the case *A*, as hereinbefore explained, and all parts of the said mechanism being built upon the same base, *B*, which guides the shackles, the adjustment of said mechanism is preserved from injury during the great pressure in the die. The projecting shoulder *b* of the base *B* is of a width equal to the thickness of the top of the walls *a* of the lock-case *A*, so that after swaging the base *B* and case *A* present a fair curved exterior, as shown in Fig. 3.

When lock-cases are formed of drawn-metal, the modified construction and method of swaging shown in Figs. 4 and 7 are employed. The lock-case walls are formed with an internal circumferential projection or bead, *a*⁷, and about the edge of the downwardly-projecting part *b*¹ of the base *B* is formed a circumferential groove, *b*², corresponding to the aforesaid bead *a*⁷. To permit the insertion of the part *b*¹ in the case *A*, the walls *a* of said case may be flared somewhat upwardly and outwardly, as shown in Fig. 4. The base *B*, with its shackle and mechanism assembled and adjusted as hereinbefore described, is placed in the case *A* and the lock placed in a die, *F*, of a press, *G*, Fig. 7, horizontally as respects the longitudinal axis of the lock-case. The said die *F* and the plunger *g* of the press *G* are recessed to correspond with the exterior of the lock, and so as to bring an inwardly-acting pressure upon the lock-case when the plunger descends, whereby the walls of the said lock-case *A* are forced inward and the bead *a*⁷ driven into the groove *b*² of the base *B*. The die *F* and plunger *g* are recessed to re-

ceive the shackle-shank and relieve the same from pressure, as is clearly indicated in Fig. 7.

I do not claim the press and die as novel, nor restrict myself to their use. My invention in this respect consists, essentially, in the exerting of great pressure by suitable means upon the lock-case *A*, whereby the metal of said case is forced into or upon the groove, recess, or bevel of the base *B*.

I claim—

1. The hereinbefore-described art of manufacturing locks of the kind shown, to wit: forming the sides and bottom of the lock-case in one integral body, forming the top of the lock in a piece separate from said body and with a circumferential depression in its edge, assembling the said body and the said top pieces together, and then uniting said body to said top by exerting great pressure upon the said body, whereby its metal is forced into the aforesaid depression in the said top, as hereinbefore described.

2. The hereinbefore-described art of manufacturing locks of the kind shown, to wit: forming the bottom and sides of the lock-case in one integral body, forming the top of the lock-case in a piece separate from the said body and with a downwardly-projecting part of a size to fit loosely the said body, said downwardly-projecting part having a circumferential depression around its edge and a circumferential shoulder around its upper part, assembling the said body and the said top pieces together, and then uniting the aforesaid body to the aforesaid top by exerting great pressure upon said body, whereby its metal is forced into the aforesaid depression in the aforesaid downwardly-projecting part of the aforesaid top, as herein described.

3. The hereinbefore-described art of manufacturing locks of the kind shown, to wit: forming the sides and bottom of the lock-case in one integral body and with an external outwardly-projecting ridge around its upper part, forming the top of the lock in a piece separate from the said body and with a downwardly-projecting part of a size to fit loosely the aforesaid body, said downwardly-projecting part having a circumferential depression around its edge and a circumferential shoulder around its upper part, assembling the said body and the said top pieces together, and then uniting the aforesaid body and the aforesaid top by exerting great pressure upon the aforesaid ridge of the aforesaid body, whereby its metal is forced into the depression in the aforesaid downwardly-projecting part of the said top, as herein described.

4. The hereinbefore-described art of manufacturing padlocks of the kind shown, to wit: forming the sides and bottom of the lock-case in one integral body, forming the shackle-guide openings and the orifices for the axis of the locking mechanism in the same base separate from the said body, building up and adjusting the locking mechanism on the said

base before insertion in the said body, assembling the said body-piece and the said base and mechanism together, and then uniting the said body and the said base into one lock-case
5 by exerting great pressure upon the said body, whereby its metal is forced into a depression on the edge of said base, as herein fully described.

In witness whereof I have hereunto set my hand this 29th day of January, 1889.

EUGENE C. SMITH.

Witnesses:

G. A. SCHELLENGER,
FR. JACOBSON.