

FIG. 1.

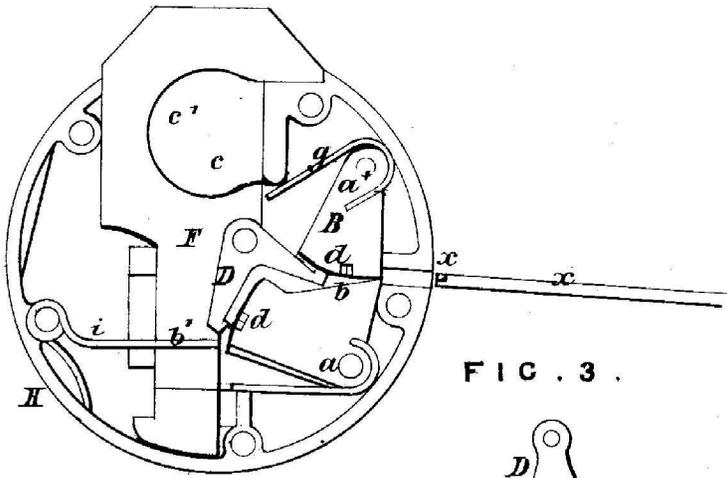


FIG. 2.

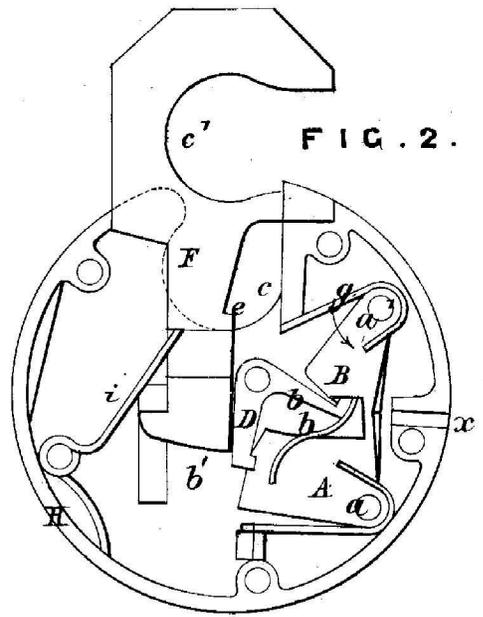


FIG. 3.

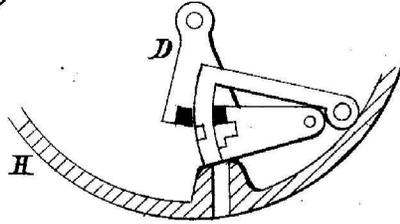


FIG. 4.

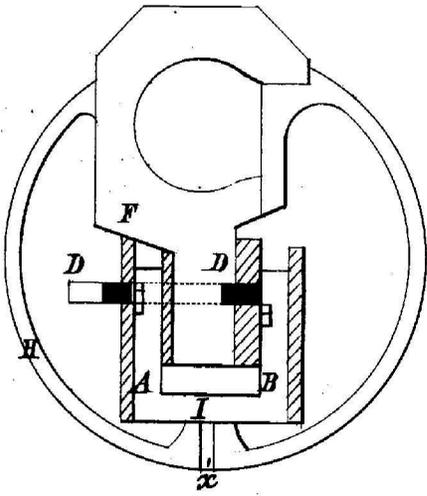


FIG. 6.

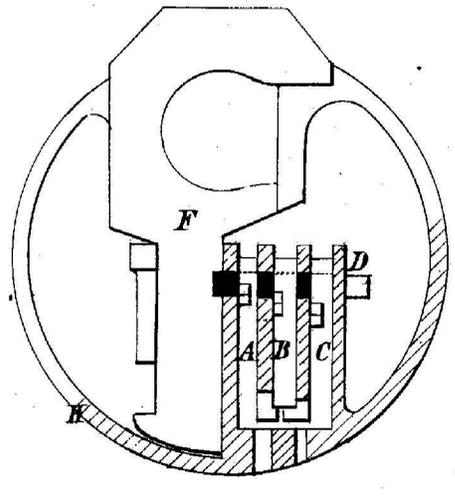


FIG. 5.

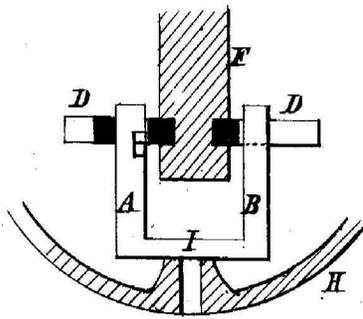


FIG. 7.

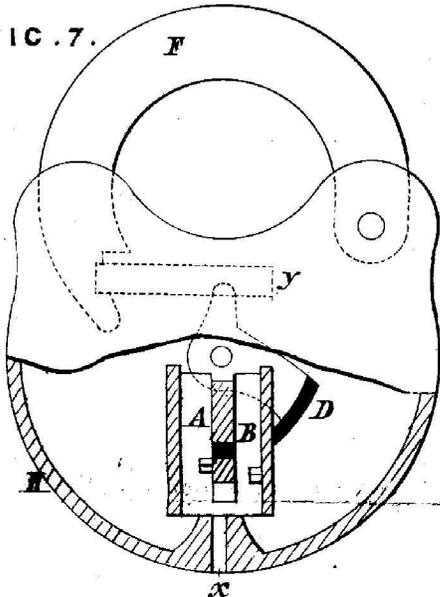


FIG. 8.

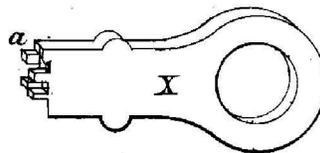


FIG. 9.



FIG. 15. FIG. 14.



FIG. 13.

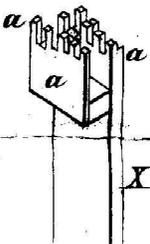


FIG. 10.

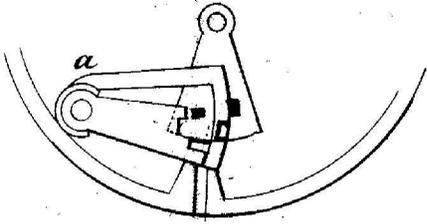


FIG. 7.

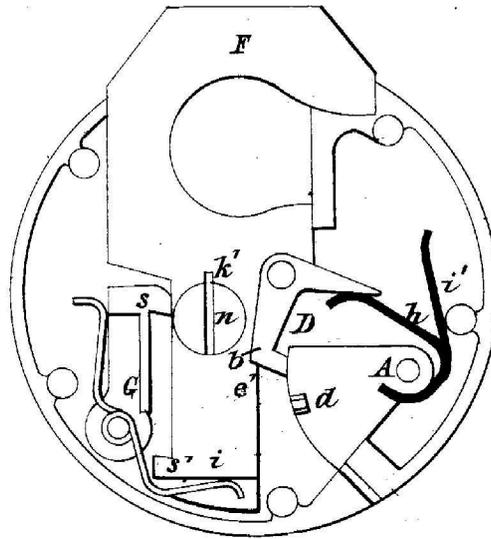


FIG. 18.

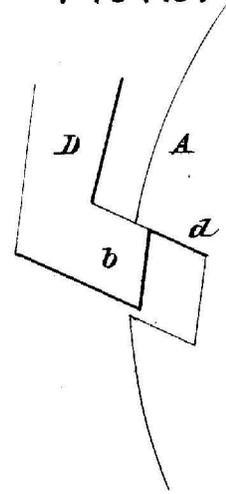


FIG. 11.

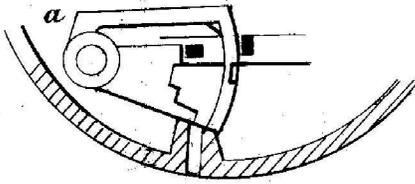


FIG. 12.



FIG. 20.

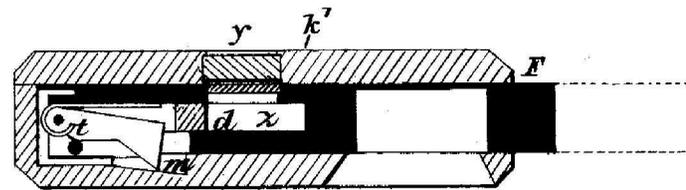


FIG. 21.

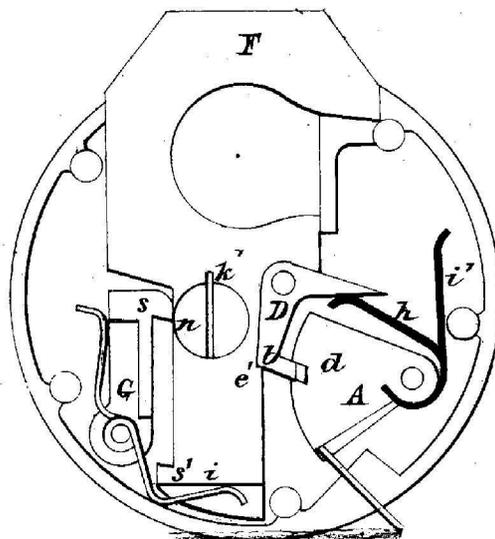


FIG. 16.

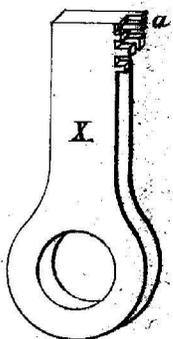


FIG. 7.

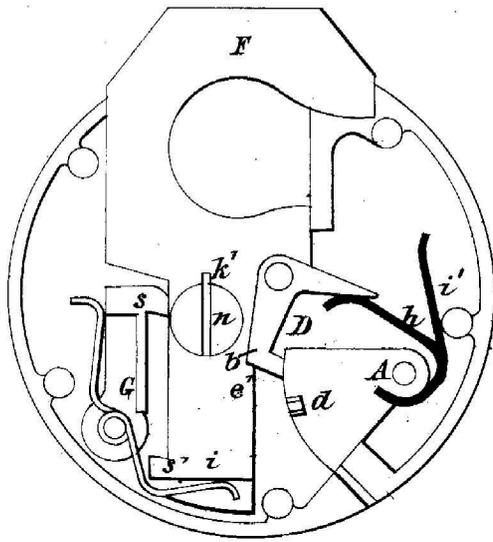


FIG. 18.

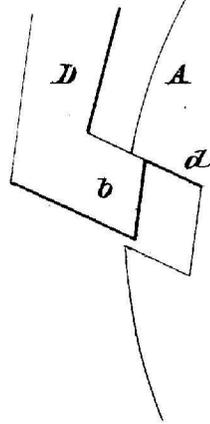


FIG. 19.

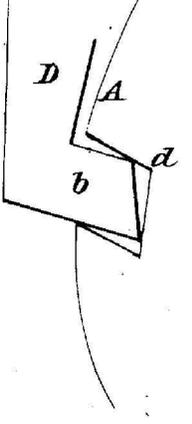
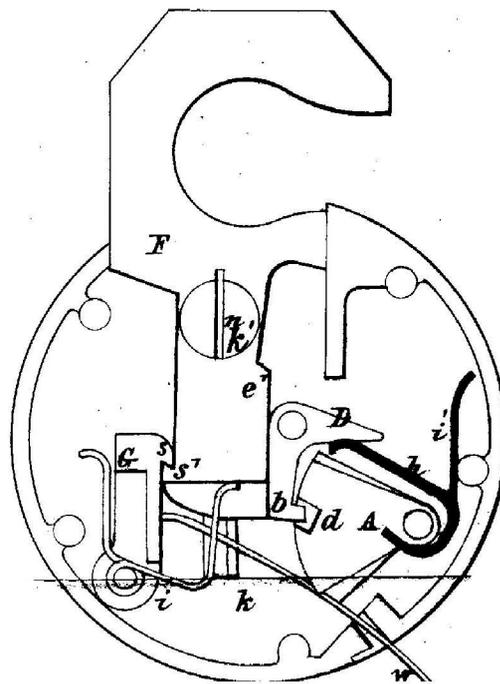


FIG. 22.





A.D. 1873, 25th August. N^o 2793.

Locks and Keys.



LETTERS PATENT to Bristow Hunt, of Serle Street, Lincoln's Inn, in the County of Middlesex, Gentleman, for the Invention of "**IMPROVEMENTS IN LOCKS AND KEYS.**"—A communication from abroad by Daniel Klahr Miller and Allen Middleton, jr., both of Philadelphia, Pennsylvania, United States of America.

Sealed the 20th October 1873, and dated the 25th August 1873.

PROVISIONAL SPECIFICATION left by the said Bristow Hunt at the Office of the Commissioners of Patents, with his Petition, on the 25th August 1873.

I, **BRISTOW HUNT**, of Serle Street, Lincoln's Inn, in the County of Middlesex, Gentleman, do hereby declare the nature of the said Invention for "**IMPROVEMENTS IN LOCKS AND KEYS,**" (a communication to me from abroad by Daniel Klahr Miller and Allen Middleton, junior, both of Philadelphia, Pennsylvania, United States of America), to be as follows :—

- 10 The objects of this Invention are to produce a strong and compact lock, and increase the difficulty of picking locks without unduly compli-

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cating or increasing the cost of the same, to facilitate the construction of keys for many tumblered locks, to prevent the destroying or defacing of a seal by mere tampering with the lock, and to enable a bolt or hasp to be readily withdrawn from and inserted into its place in a lock casing without removing the cap plate from the latter. 5

In one form of the improved lock the case is circular, with a portion of one edge cut away to form a recess, across which slides a bolt or hasp adapted to the interior of the case, and hooked at its outer end or recessed at one side for the reception of a staple, the latter being readily detached when the bolt is thrust outward, but retained within a circular 10 opening formed by two recesses when the said bolt is thrust inward.

When locked the bolt or hasp is contained almost entirely within and protected by the casing, so that the difficulty of breaking or cutting the same in order to detach the said staple is much greater than with the exposed hasps of ordinary padlocks. In this form of lock two distinct 15 sets of vibrating spring tumblers, hung to separate pins and operated simultaneously by one key inserted through a keyhole, are combined with a single bell-crank lever or dog, the hooked arms of which when the whole of the tumblers are properly adjusted by the key enter notches in the said tumblers, thus permitting the dog to vibrate to a sufficient 20 extent to release the bolt or hasp, which springs outwards from the case, and releases the staple. When the bolt is pushed back into the case the dog releases the tumblers, which spring to their original positions, and at the same time the said dog enters a recess in the side of and retains the bolt. 25

One of the tumblers of the upper set has a cam-like incline, which when the said tumbler is turned, say to the right by a spring, acts upon one arm of the dog, and forces the latter into the recess of the bolt, and at the same time disengages the tumblers. The lower tumblers have also a spring, which bears against the same arm of the dog, and vibrates 30 the latter in the opposite direction, causing it to enter the notches of the tumblers and to disengage the bolt when the said notches have been brought into line by means of the key. If desired one of the tumblers of the lower set may also be formed with a cam-like incline to act upon the other arm of the dog simultaneously with the first incline. 35

The tumblers of the two sets are so arranged in respect to each other that the whole number of them overlap the keyhole, thus enabling all of

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them to be operated simultaneously by a flat key, the construction of which will be described hereafter.

The arrangement of the tumblers and the interior construction of the lock may be variously modified without departing from the Invention; 5 for instance, two sets of vibrating tumblers (operated simultaneously by one key), one of which overlaps the other in such a manner that the two sets occupy little if any more room than one.

The dog also, instead of being made in the form of a bell-crank lever, may have two projections adapted to the notches of the tumblers.

10 Or the tumblers of the two sets as well as the dog may reciprocate instead of vibrate, and the keyhole be at the bottom of the lock case directly beneath the bolt.

Or two reciprocating or vibrating dogs, adapted to notches on the opposite sides of the bolt, may be used in connection with the two sets of 15 tumblers.

Or there may be three sets of reciprocating tumblers and a single dog.

These tumblers may be operated simultaneously by separate keys, or by a single key described hereafter.

Or two sets of tumblers and a vibrating dog may operate in conjunction with a sliding bar to retain and release the swinging hasp of a 20 padlock.

Various other modifications suggest themselves; the different sets of tumblers might (for instance) be arranged to operate simultaneously in conjunction with a bolt without the intervention of a dog or dogs, and it 25 will be evident that the Invention can be applied not only to padlocks, but to drawer and trunk locks, and to any key locks in which tumblers are employed.

It is essential however in carrying out this part of the Invention that the tumblers should be operated directly by a key or keys to be simply 30 pushed into the lock without turning.

To simultaneously operate the two sets of tumblers above described I use a flat key compactly constructed with a series of wards or projection and recesses at the end which are in the present instance arranged in two continuous adjoining rows, and staggered in respect to each

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other, so as to produce an appearance of irregularity in their arrangement.

To operate the three sets of reciprocating tumblers above mentioned a key constructed with an arm for operating the third set is employed. By bringing the lower ends of the tumblers together however, so that all should overhang a single keyhole, the whole number in the three sets might be operated simultaneously by a modified form of key, wherein the projections and recesses are arranged in three parallel rows upon the end of the key. 5

For operating four sets of tumblers the projections and recesses are arranged in four rows. 10

It is not absolutely necessary in carrying out this part of the Invention that the projections of the key should be arranged in continuous parallel rows, as for some classes of locks they could be irregularly arranged or staggered. 15

In some instances the projections or projections and recesses might be arranged upon one or both sides of the key, instead of at the end.

In another form of lock the main peculiarities are,—

First. That it is provided with tumblers having notches so inclined in respect to the direction of the movement of the arm of the dog or bolt adapted to the same that in unlocking a continued simultaneous movement of the said tumblers will be required, after their notches have been brought opposite the bolt in order to permit the latter to fully enter the said notches, and so that in locking the said inclined notches shall serve as automatic ejectors to free the tumblers from the dog or bolt. 20 25

And, Second. That both a seal and device for defacing or destroying the same are attached to and caused to move with the bolt or hasp.

And, Third. That a spring retainer or equivalent device, which will permit the free introduction of the bolt into its place in the lock casing, but prevent its withdrawal until the retainer is itself pushed back is combined with the said bolt. 30

The general character of the lock is the same as those already described, the sliding bolt or hasp being acted on by a spring tending to force it outwards, which tendency is resisted by a bell-crank lever or dog adapted to a shoulder on the bolt, and there retained by the pressure 35

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- of its arm against the edges of a single set of vibrating tumblers having notches, which, when brought into line opposite the said arm of the dog by means of a flat key, permit sufficient movement of the dog to free the bolt or hasp, which then springs outward.
- 5 The notches of the tumblers, instead of being straight and coinciding with the direction of the line of movement of the portion of the dog adapted to them, so as to permit the latter to freely enter when brought opposite the same as usual are inclined, so that when the notches are first brought opposite the dog the latter enters the same to a slight
10 extent, but not sufficiently to free the bolt, it being necessary to continue to move the tumblers by means of the key with the notches still in line until the dog has gradually entered the same to its full extent, when the said dog will have passed the shoulder of the bolt and the latter will be free to shoot outwards.
- 15 It is evident that with this arrangement of the notches in respect to the dog the difficulty of picking the lock will be much increased, for the notches of the tumblers must not only be brought into line by the lock picking instrument, but when brought into line they must be moved simultaneously to a still greater extent before the lock can be opened.
- 20 When the bolt has been pushed inwards in order to lock the same, and its recess and shoulder brought opposite the dog, the springs of the tumblers tending to turn the latter, and being in the aggregate of greater strength than the spring of the dog, causes the inclined edges of the notches in the tumblers to act upon and automatically eject the dog
25 from the said notches, turning the same until it has fully entered the recess above the shoulder of the bolt and freed the tumblers, which then spring to another position.

Tumblers having inclined notches for the purposes above described may be combined directly with a bolt or hasp, as well as with a dog and
30 bolt. They may also be used in locks provided with two or more distinct sets of tumblers, such as already described, and are applicable in fact to tumbler locks generally.

Upon the face of the bolt is a circular recess for the reception of a seal, and directly over this recess an opening in the lock casing covered
35 by a glass plate, through which the seal can be seen, the object being to arrange the seal so that it shall be positively defaced or destroyed if the

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lock is opened, but so that it cannot be injured maliciously or by merely tampering with the tumblers or other moving parts in attempting to pick the lock. The most certain way of effecting this object is to attach both the seal and the defacing device to the sliding bolt, so that both move with the same. Various devices may be used for defacing or destroying 5 the seal. In one arrangement a sliding rod is adapted to a recess in the bolt and has a spring dog hung to it, which, when the bolt is shot forward strikes a shoulder on the lock casing, and thus holds the rod, and causes a projection of the same to traverse a slot in the bolt and to tear or deface the seal immediately over the said slot. On the reverse 10 movement of the bolt the parts are restored to their original positions by the striking of the end of the rod against the lock case and by a pin of the bolt which lifts the dog.

Instead of the above a lever so hung to the bolt that when one arm strikes a shoulder on the casing the other will be dragged through the 15 seal would answer the purpose well. Any form of seal may be employed.

It is often desirable to remove the bolt from and replace it in the lock casing without detaching the cap plate from the casing, this being especially the case in locks of the character described, in which the cap 20 plate is rivetted fast.

A retainer, which may be variously modified in form, is hung to a projection of the lock case, and is so acted on by a portion of the same spring which actuates the bolt as to be maintained in constant contact with the side of the latter. A hooked projection of the retainer 25 catches a corresponding projection of the bolt, and thus determines the extent of the outward movement of the latter, but by simply inserting a rod through the key hole, and forcing the same against the retainer, the latter may be pressed back from the bolt, which will then spring entirely out of the lock case. The retainer has a bevilled upper edge, so 20 that it will yield and offer no obstruction to the reintroduction of the bolt into the case.

The shoulder may be straight or inclined in the opposite direction if desired, so as to enable the bolt to be pulled out of the casing by a slight effort without necessitating the use of an instrument to be inserted 35 through the key hole.

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SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Bristow Hunt in the Great Seal Patent Office on the 19th February 1874.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, BRISTOW
5 HUNT, of Serle Street, Lincoln's Inn, in the County of Middlesex, Gentleman, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-fifth day of August, in the year of our Lord One thousand eight hundred and seventy-three, in the thirty-seventh
10 year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Bristow Hunt, Her special licence that I, the said Bristow Hunt, my executors, administrators, and assigns, or such others as I, the said Bristow Hunt, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time
15 and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN LOCKS AND KEYS," (a communication to me from abroad by Daniel Klahr Miller and Allen
20 Middleton, junior, both of Philadelphia, Pennsylvania, United States of America), upon the condition (amongst others) that I, the said Bristow Hunt, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the
25 same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Bristow Hunt, do hereby declare the nature of the said Invention, and in what manner the same is to be
30 performed, to be particularly described and ascertained in and by the following statement in writing, and on reference being had to the accompanying Drawings, that is to say:—

The objects of this Invention are to produce a strong and compact lock, to increase the difficulty of picking locks without unduly com-
35 plicating or increasing the cost of the same, to facilitate the construction of keys for many tumbled locks, to prevent the destroying or defacing

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of a seal by mere tampering with the lock, and to enable a bolt or hasp to be readily withdrawn from and inserted into its place in a lock casing without removing the cap plate from the latter.

In one form of the improved lock (which is illustrated in the side views Figures 1 and 2 of the accompanying Drawings, which show the 5 working parts in different positions, and the cap plate removed) the case H is circular with a portion of one edge cut away to form a recess *c*, across which slides a bolt or hasp F adapted to the interior of the case, and hooked at its outer end or recessed at one side as shown at *c*¹ for the reception of a staple, the latter being readily detached when the bolt 10 is thrust outward, as shown in Figure 2, but retained within a circular opening formed by the two recesses *c* and *c*¹, when the said bolt is thrust inward as seen in Figure 1.

When locked the bolt or hasp is contained almost entirely within and protected by the casing, so that the difficulty of breaking or cutting the 15 same in order to detach the said staple is much greater than with the exposed hasps of ordinary padlocks. In this form of lock two distinct sets of vibrating spring tumblers A and B, hung to separate pins *a* and *a*¹, and operated simultaneously by one key X inserted through a key-hole ×, are combined with a single bell-crank lever or dog D, the hooked 20 arms *b*, *b*¹, of which, when the whole of the tumblers are properly adjusted by the key enter notches *d* in the said tumblers, thus permitting the dog to vibrate to a sufficient extent to release the bolt or hasp F, which springs outwards from the case to the position shown in Figure 2 and releases the staple. When the bolt is pushed back into the case 25 the dog releases the tumblers, which spring to their original positions, Figure 1, and at the same time the said dog enters a recess *e* in the side of and retains the bolt.

One of the tumblers B¹ of the set B (see Figure 2) has a cam-like incline *f*, which, when the said tumbler is turned in the direction of the 30 arrow by a spring *g*, acts upon the arm *b* of the dog D and forces the latter into the recess *e* of the bolt, and at the same time disengages the tumblers. The tumblers A have also a spring *h*, which bears against the same arm *b* of the dog, and vibrates the latter in the opposite direction, causing it to enter the notches of the tumblers and to 35 disengage the bolt when the said notches have been brought into line by means of the key. If desired one of the tumblers of the set A may also

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be formed with a cam-like incline to act upon the arm b^1 of the dog simultaneously with the incline f .

The tumblers of the two sets are so arranged in respect to each other that the whole number of them overlap the keyhole \times , thus enabling
5 all of them to be operated simultaneously by the flat key X, the construction of which will be fully described hereafter.

The arrangement of the tumblers and the interior construction of the lock may be variously modified without departing from the Invention. In Figure 3, for instance, two sets of vibrating tumblers to be operated
10 simultaneously by one key are shown, but one set overlaps the other in such a manner that the two sets occupy little if any more room than one.

The dog also instead of being made in the form of a bell-crank lever may have two projections i, i , adapted to the notches of the
15 tumblers.

In Figure 4 the tumblers of the two sets as well as the dog D reciprocate instead of vibrate, and the keyhole is at the bottom of the lock case directly beneath the bolt.

In Figure 5 two reciprocating or vibrating dogs adapted to notches
20 on the opposite sides of the bolt are used in connection with the two sets of tumblers.

In Figure 6 there are three sets of reciprocating tumblers A, B, and C, and a single dog D.

These tumblers may be operated simultaneously by separate keys, or
25 by a single key of the character described hereafter.

In Figure 7 two sets of tumblers and a vibrating dog operate in conjunction with a sliding bar y to retain and release the swinging hasp of a padlock.

Various other modifications suggest themselves, for instance, the
30 different sets of tumblers might be arranged to operate simultaneously in conjunction with a bolt without the intervention of a dog or dogs; and it will be evident that the Invention can be applied not only to padlocks but to drawer and trunk locks, and to any key locks in which tumblers are employed.

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It is essential however in carrying out this part of the Invention, that the tumblers should be operated directly by a key or keys to be simply pushed into the lock without turning.

To simultaneously operate the two sets of tumblers illustrated in Figures 1, 2, 3, 4, 5, and 7, the flat key X illustrated in the perspective view, Figure 8, and end view, Figure 9, is used, the said key being compactly constructed with a series of wards or projections and recesses *a* at the end, which are in the present instance arranged in two continuous adjoining rows, and staggered in respect to each other so as to produce an appearance of irregularity in their arrangement. A key of this character may also be used for simultaneously operating the nests of tumblers illustrated in Figures 10, 11, and 12, which can scarcely be considered as arranged in two sets, inasmuch as the whole number in each case vibrate upon a single pin *a*.

To operate the three distinct sets of reciprocating tumblers shown in Figure 6 a key constructed in accordance with the Invention, but having an arm *g* for operating the third set of tumblers, as shewn in the perspective view, Figure 13, is employed. By bringing the lower ends of the tumblers together however so that all should overhang a single keyhole, the whole number in the three sets might be operated simultaneously by the modified form of key shown in the end view, Figure 14, where the projections and recesses *a* are arranged in three parallel rows upon the end of the key.

For operating four sets of tumblers the projections and recesses *a* are arranged in four rows as illustrated in the end view, Figure 15. 25

It is not absolutely necessary in carrying out this part of the Invention that the projections *a* of the key should be arranged in continuous parallel rows, as for some classes of locks they could be irregularly arranged or staggered.

In some instances the projections or projections and recesses, might be arranged upon one or both sides of the key, as seen in Figure 16, instead of at the end. 30

In another form of lock (which is illustrated in Figures 17 to 22 inclusive) the main peculiarities are,—

First. That it is provided with tumblers A having notches *d* so inclined in respect to the direction of the movement of the arm *b* of the 35

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dog or bolt adapted to the same, that in unlocking a continued simultaneous movement of the said tumblers will be required after their notches have been brought opposite the bolt in order to permit the latter to fully enter the said notches, so that in locking, the said inclined
5 notches shall serve as automatic ejectors to free the tumblers from the dog or bolt.

And, Second. That both a seal Z and device *j* for defacing or destroying the same are attached to, and caused to move with the bolt or hasp F, as shown in Figure 17, and in the transverse section, Figure 20.

10 And, Third. That a spring retainer G or equivalent device which will permit the free introduction of the bolt into its place in the lock casing but prevent its withdrawal until the retainer is itself pushed back, is combined with the said bolt, as shown in the face view, Figure 22.

The general character of the lock is the same as those already
15 described, the sliding bolt or hasp F being acted on by a spring *i* tending to force it outwards, which tendency is resisted by a bell-crank-lever or dog D, adapted to a shoulder *e* on the bolt, and there retained by the pressure of its arm *b* against the edges of a single set of vibrating tumblers A having notches *d*, which when brought into
20 line opposite the said arm *b* of the dog by means of a flat key X permit sufficient movement of the dog to free the bolt or hasp, which then springs outward (see Figures 21 and 22).

It should be observed that the notches *d* of the tumblers instead of being straight and coinciding with the direction of the line of move-
25 ment of the portion of the dog adapted to them, so as to permit the latter to freely enter when brought opposite the same as usual, are inclined as best observed in the enlarged views, Figures 18 and 19, so that when the notches are first brought opposite the dog the latter enters the same to a slight extent, as shown in Figures 18 and 21, but
30 not sufficiently to free the bolt, it being necessary to continue to move the tumblers by means of the key with the notches still in line until the dog has gradually entered the same to its full extent, as shown in Figures 19 and 22, when the said dog will have passed the shoulder *e* of the bolt, and the latter will be free to shoot outwards.

35 It is evident that with this arrangement of the notches in respect to the dog the difficulty of picking the lock will be much increased, for

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the notches of the tumblers must not only be brought into line by the lock picking instrument but when brought into line they must be moved simultaneously to a still greater extent before the lock can be opened.

When the bolt has been pushed inwards in order to lock the same, 5 and its recess and shoulder *e* brought opposite the dog the springs *i* of the tumblers tending to turn the latter in the direction of the arrow (Figure 21), and being in the aggregate of greater strength than the spring *h* of the dog, causes the inclined edges of the notches *d* in the tumblers to act upon and automatically eject the dog from the said 10 notches, turning the same in the direction of the arrow (Figure 21) until it has fully entered the recess above the shoulder *e* of the bolt and freed the tumblers, which then spring to the position shown in Figure 17.

Tumblers having inclined notches *d*, for the purposes above described, 15 may be combined directly with a bolt or hasp, as well as with a dog and bolt. They may also be used in locks provided with two or more distinct sets of tumblers, such as already described, and are applicable in fact to tumblers locks generally.

Upon the face of the bolt *F* is a circular recess for the reception of 20 a seal *Z*, and directly over this recess and opening *y* in the lock casing, covered by a glass plate, through which the seal can be seen; the object being to arrange the seal so that it shall be positively defaced or destroyed if the lock is opened, but so that it cannot be injured 25 maliciously or by merely tampering with the tumblers or other moving parts in attempting to pick the lock. The most certain way of effecting this object is to attach both the seal and the defacing device to the sliding bolt, so that both shall move with the same. Various devices may be used for defacing or destroying the seal. In Figure 20 a sliding rod *k* is adapted to a recess in the bolt, and has a spring dog *t* 30 hung to it, which when the bolt is shot forward in the direction of the arrow strikes a shoulder *m* on the lock casing, and thus holds the rod *k*, and causes a projection *k*¹ of the same to traverse a slot *n* in the bolt, and to tear or deface the seal immediately over the said slot. On the reverse movement of the bolt the parts are restored to their original 35 positions by the striking of the end of the rod *k* against the lock case, and by a pin *p* of the bolt, which lifts the dog *l*, as shown,

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Instead of the above, a lever hung to the bolt, so that when one arm strikes a shoulder on the casing the other will be dragged through the seal would answer the purpose well. Any form of seal may be employed.

- 5 It is often desirable to remove the bolt from and replace it in the lock casing without detaching the cap plate from the casing, this being especially the case in locks of the character illustrated, in which the cap plate is rivetted fast.

- A retainer G which may be variously modified in form is hung to a
10 projection q of the lock case, and is so acted on by a portion of the same spring i which actuates the bolt as to be maintained in constant contact with the side of the latter. A hooked projection s of the retainer catches a corresponding projection s^1 of the bolt, and thus determines the extent of the outward movement of the latter, as shown in
15 Figure 22, but by simply inserting a rod w through the keyhole, as shown in Figure 22, and forcing the same against the retainer the latter may be pressed back from the bolt which will then spring entirely out of the lock case. The retainer has a bevelled upper edge so that it will
20 yield and offer no obstruction to the reintroduction of the bolt into the case.

The shoulders s and s^1 may be straight or inclined in the opposite direction, if desired, so as to enable the bolt to be pulled out of the casing by a slight effort without necessitating the use of an instrument to be inserted through the key hole.

- 25 Having now described the nature and object of the said Invention for "Improvements in Locks and Keys," together with the manner in which the same is to be or may be performed, or carried into practical effect, I would remark in conclusion that I claim as the Invention communicated to me by the above-named Daniel Klahr Miller and Allen
30 Middleton, junior,—

First. In a lock, the combination, substantially as described of a casing H having a recess c at one edge with a hooked or recessed bolt or hasp arranged to slide across said recess in the casing, as and for the purpose specified (see Figures 1, 4, and 17).

- 35 Second. The bell-crank lever or dog D adapted to notches in the edges of one or more sets of vibrating tumblers, and to a recess and

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shoulder on a sliding bolt F, substantially as and for the purpose described (see Figures 1 and 17).

Third. The combination, substantially as described, of two or more distinct sets of tumblers with a key lock (Figures 1 and 7).

Fourth. In a keyhole, the combination substantially as described, of two or more sets of tumblers, a bolt or hasp, and one or more dogs interposed between the said tumblers and bolt (Figures 1 to 7).

Fifth. The arrangement within a lock case in respect to a single keyhole \times of two or more sets of tumblers, substantially as specified (Figures 1 to 7). 10

Sixth. The combination with the dog D of one or more tumblers having springs and cam-like inclines for moving the said dog in opposite directions, substantially as herein described (Figures 1 and 2).

Seventh. A key having a series of projections α of different lengths, or projections and recesses arranged in two or more rows, or staggered in respect to each other, substantially as herein described (Figures 8 to 16). 15

Eighth. A lock having tumblers with notches so inclined in respect to the direction of the movement of the portion of the dog or bolt adapted to the same that a continuous simultaneous movement of the said tumblers will be required after their notches have been brought opposite the dog or bolt in order to permit the latter to fully enter the said notches, all substantially as and for the purpose specified (Figures 17 to 22). 20

Ninth. A lock having tumblers with notches so inclined in respect to the direction of the movement of the portion of the dog or bolt adapted to the same as to serve as automatic ejectors for the said dog or bolt in locking, all substantially as described (Figures 17 to 22). 25

Tenth. A seal lock in which the seal and the device for destroying or defacing the same are attached to and move with the bolt or hasp, substantially as herein described (Figures 17 to 20). 30

Eleventh. The combination with a sliding bolt or hasp F, of a spring retainer G or equivalent device which will permit the free introduction

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of the bolt into its place in the lock casing, but prevent the withdrawal of the same until the said retainer is itself pushed back, all substantially as specified.

5 In witness whereof, I, the said Bristow Hunt, have hereunto set my hand and seal, this Eighteenth day of February, in the year of our Lord One thousand eight hundred and seventy-four.

BRISTOW HUNT. (L.S.)

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1874.