

(No Model.)

H. B. SARGENT.
MASTER KEY PIN LOCK.

No. 564,029.

Patented July 14, 1896.

Fig. 1.

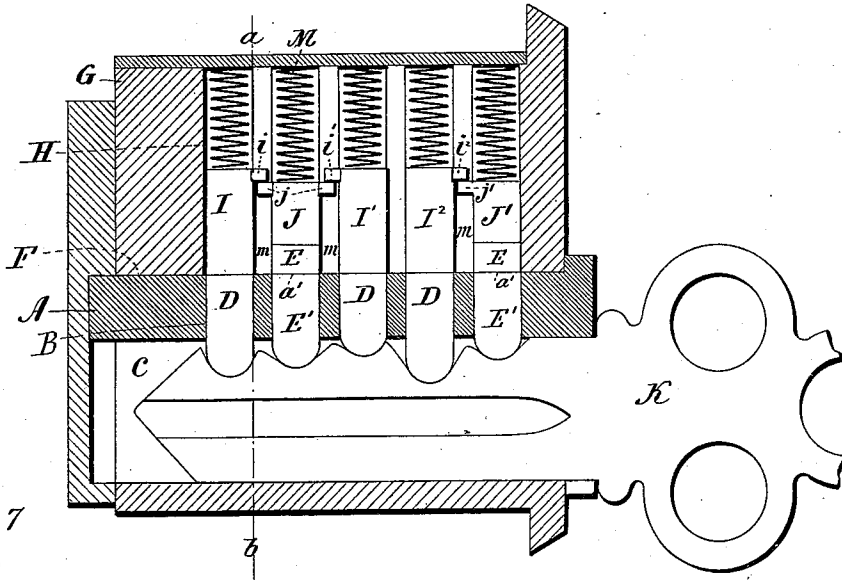


Fig. 6. Fig. 7

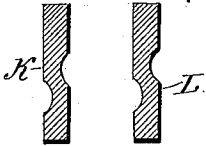


Fig. 2.

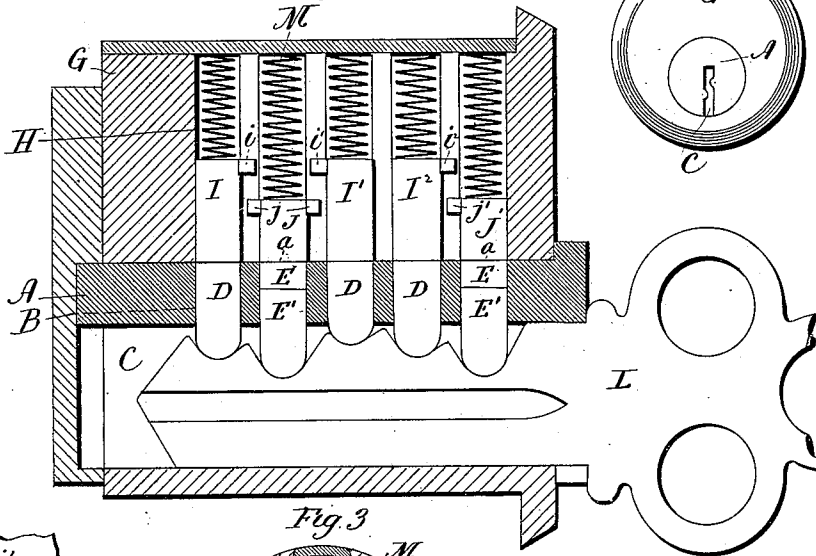


Fig. 5

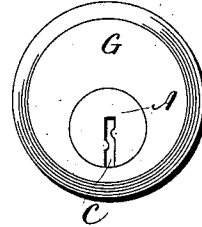


Fig. 4

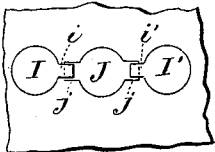
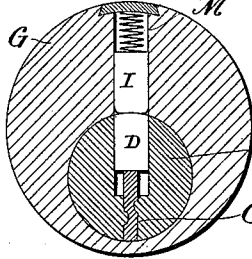


Fig. 3



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By
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UNITED STATES PATENT OFFICE.

HENRY B. SARGENT, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE
SARGENT & COMPANY, OF SAME PLACE.

MASTER-KEY PIN-LOCK.

SPECIFICATION forming part of Letters Patent No. 564,029, dated July 14, 1896.

Application filed March 19, 1894. Serial No. 504,210. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. SARGENT, of New Haven, in the county of New Haven and State of Connecticut, have invented a new
5 Improvement in Master-Key Pin-Tumbler Cylinder-Locks; and I do hereby declare the following, when taken in connection with accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and
10 exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in vertical longitudinal section of one form which a lock constructed
15 in accordance with my invention may assume, showing the lifting of the day-key bolts by the master-key bolts through the medium of the two-part or doubly-racked master-key tumblers under the action of the master-key;
20 Fig. 2, a similar view showing the lifting of the day-key bolts through the medium of the day-key tumblers and the day-key without disturbing the master-key bolts; Fig. 3, a view of the lock on the line *a b* of Fig. 1 on
25 a smaller scale; Fig. 4, a detached broken plan view of the day-key bolts I and I' and the master-key bolt J; Fig. 5, a view in front elevation of the lock drawn to ordinary size; Figs. 6 and 7, views in transverse section of
30 the day and master keys drawn to the same scale as Figs. 1 and 2.

My invention relates to an improvement upon the master-key pin-tumbler cylinder-lock disclosed in United States Patent No.
35 469,950, granted March 1, 1892, to Sargent & Co. on the application of John H. Shaw, the object being to improve the lock of the said patent and to produce a comparatively simple, durable, and safe master-key pin-tumbler cylinder-lock constructed with particular
40 reference to preserving the integrity of a series of the locks by providing against the unlocking of any lock in the series by more than one day-key, while providing for unlocking
45 all of the locks of the series by one master-key.

Before proceeding to a description of my present invention, I will briefly discuss the Shaw lock, as in that way I can make my particular
50 invention more clearly understood.

In a series of locks constructed under the

Shaw patent, the day-keys of all of the locks will correspond to each other so far as their master-key cuts are concerned, and will be differentiated from each other so far as their
55 day-key cuts are concerned. Furthermore, the master-key cuts of all of the day-keys will exactly correspond to the master-key cuts of the master-key which has no day-key cuts. Some of the day-keys will have low day-key
60 cuts and some high day-key cuts, and the range between the highest and the lowest of these day-key cuts will represent the range of differentiation which may be resorted to to secure the required dissimilarity between
65 the several day-keys of the series. Under the Shaw construction, those day-keys which have low day-key cuts will become master-keys for locks adapted to be opened by day-keys having high day-key cuts. The reason
70 for this is that the low day-key cuts of such day-keys permit the day-key tumblers to drop away from the racking-line, while at the same time the day-key bolts of those day-key tumblers are lifted above the racking-line by
75 means of the master-key bolts which have themselves been lifted by the master-key tumblers through the relatively high master-key cuts of the said day-keys having low day-key cuts. It will thus be seen that day-keys
80 having low day-key cuts when introduced into locks fitted for keys having high day-key cuts and therefore provided with short day-key tumblers permit those short tumblers to drop away and clear the racking-line, while
85 the master-key cuts of those same keys operate through the master-key tumblers and master-key bolts to lift the day-key bolts above the racking-line. In this manner a day-key performs the functions of a master-
90 key through the medium of the master-key bolts. This unlocking of the locks may be said to be indirect, because the day-key bolts are lifted above the racking-line, not by the day-key tumblers, which ordinarily lift them
95 above the racking-line, but through the agency of the master-key tumblers and master-key bolts. In the Shaw construction the master-key always unlocks the locks on this indirect, so to say, principle. It follows,
100 therefore, that every day-key for a series of locks constructed under the Shaw patent be-

comes a master-key for every lock of the series which is fitted to be unlocked by a day-key of higher day-key cut.

The object of my invention is to improve upon the said Shaw lock and to produce a master-key pin-tumbler cylinder-lock in which every lock of the series shall be inviolable by every other key except its own and by the master-key.

With these ends in view my invention consists in a lock of the character described in which the master-key tumblers are made in two parts—namely, a key part with which the keys directly coact and a double-racking part which racks at each end, within the length of which the entire range of differentiation in the day-key cuts is confined and to the length of which the difference between the master-key cuts of the master-key and the low neutral or clearance cuts of all of the day-keys exactly corresponds.

My invention further consists in certain details of construction and combinations of parts, as will hereinafter be described, and pointed out in the claims.

In carrying out my invention, as herein shown, I have constructed the cylinder A with a series of five radial pockets B and with a longitudinal key-slot C, centrally intersecting the bottom walls of all of the said pockets. In these pockets I have arranged three day-key tumblers D and two two-part master-key tumblers, each comprising two members E and E', of which the former may be said to be the inner members and the latter the outer members. The said members E are double-racking, which is to say they rack at each end. In length they correspond exactly to the difference between the high master-key cuts of the master-key K and the low neutral or clearance cuts of all of the day-keys, one of which is shown and designated by the letter L. Furthermore, the entire range of differentiation in the day-key cuts of the day-keys is confined within the length of the said double-racking members E, which correspond to each other in all the locks of a series, as do also the members E', which coact directly with the keys, and on that account may with propriety be called the "key members" of the two-part key-tumblers. It may be said in this connection that the day-keys employed with my improved lock have no master-key cuts, as do the day-keys of the Shaw lock; but instead thereof they have "neutral" or "clearance" cuts, which I choose to so call because they permit a passive action of the master-key tumblers rather than bring the same into active operation. Thus the said neutral or clearance cuts permit the said master-key tumblers, and hence the master-key bolts J and J', to move inward, whereby the latter are cleared from the day-key bolts I, I', and I², which are never operated indirectly except by the master-key. Therefore, as the day-keys have no master-key cuts, but only neutral or clearance cuts, no day-key can ever, under any circumstances,

have master-key functions or unlock any lock of the series but the one lock it was designed to unlock. The said cylinder A is located in the usual manner in a longitudinal cylindrical chamber F, formed below the center of a lock-case G, constructed with a series of five small radial chambers H, arranged in correspondence with the pockets B of the cylinder, and intersecting at their inner ends the large chamber F. In the said radial chambers H, I locate the day-key bolts I, I', and I² and the master-key bolts J J' in accordance with the corresponding arrangement of the day-key and master-key tumblers in the cylinder. It will be understood that whatever be the shape in transverse section of the said day-key and master-key bolts they will be adapted at their inner ends to enter the outer ends of the pockets B in the cylinder to lock the same against rotation. These bolts are constructed and arranged so that the master-key bolts will operate the day-key bolts without having the day-key bolts operate the master-key bolts. To this end the upper end of the master-key bolt J is constructed with two oppositely-projecting fingers *i i*, located directly below and arranged to engage with corresponding inwardly-projecting fingers *i' i'*, formed upon the upper ends of the day-key bolts I and I', while the upper end of the master-key bolt J' is constructed with a finger *j'*, located below and arranged to engage, when the bolt is lifted, with a corresponding finger *i²*, formed at the upper end of the day-key bolt I². Under this construction, when the master-key bolts J J' are lifted by the master-key K, the fingers *j j* of the bolt J will engage with the fingers *i i* of the day-key bolts I and I' and lift the same so as to clear their inner ends from the pockets of the cylinder, and free the same for rotation, while the lifting at the same time of the master-key bolt J' will engage its finger *j'* with the corresponding finger *i²* of the day-key bolt I², and lift the lower end of the same out of engagement with the cylinder, and permit the same to rotate. This result follows because the master-key cuts of the master-key are high enough to lift the double-racking members E of the two-part master-key tumblers high enough to bring their inner ends A' to the racking-line, as shown in Fig. 1, whereby the said members E are forced entirely out of the cylinder H into the case G, with the effect, as aforesaid, of causing the master-key bolts J and J' to coact with the day-key bolts, so as to lift the same clear of the cylinder. This may be said to be an indirect action of the mechanism of the day-key bolts, as they are not operated directly through the agency of the day-key tumblers, but indirectly and through the agency of the two-part master-key tumblers and the master-key bolts. On the other hand, when any one of the day-keys L is introduced into the lock, its low neutral or clearance cuts allow both members E and E' of the two-part master-key tumblers to remain in the cylinder A,

the outer ends *a* of the double-racking members *E* being brought to the racking-line, as shown in Fig. 2. The master-key bolts *J* and *J'* will not, therefore, be brought into active play, as their fingers *j* and *j'* will not be brought into engagement with the fingers *i*, *i'*, and *i''* of the day-key bolts *I*, *I'*, and *I''*, but, on the contrary, will escape engagement therewith by a distance which exactly corresponds to the length of the members *E* of the two-part master-key tumblers. The day-key will therefore unlock the lock in the usual way by coaction with the day-key tumblers, which act directly on the day-key bolts, which will not in turn act upon the master-key bolts, as the fingers thereof are located below the fingers of the day-key bolts.

From the foregoing it will be understood that no day-key of the series can have a master-key function, because the range of the day-key cuts in the keys for the entire series of locks is confined within the length of the said members *E*, which will not engage with and lift the master-key bolts, so as to cause the same to lift the day-key bolts, unless moved outward a distance equal to their length, so that the day-keys having the highest day-key cuts will fall short of lifting the members *E* enough to operate the master-key bolts in operating the day-key bolts of any lock of the series, whereas in a series of locks of the Shaw construction the day-keys having low day-key cuts become master-keys and will unlock those locks of the series which are fitted for use with day-keys having high day-key cuts.

By constructing the upper ends of the day-key and master-key bolts, as shown and described, with coacting fingers, the outer ends of the master-key bolts are as much exposed practically as the outer ends of day-key bolts. I am thus enabled to provide each master-key bolt, as well as each day-key bolt, with a spring *M*, the said springs being located in the outer ends of the radial chambers *H*, formed in the case *G*. Under this construction the master-key bolts are as perfectly controlled as the day-key bolts.

I wish to call attention to the fact that the springs of the master-key bolts are as large and powerful as the springs of the day-key bolts, and are as readily assembled with the lock as the same, and also equally convenient of access for renewal or any other attention that may be required. It is very desirable, of course, that the master-key bolts should be provided with springs for controlling them, for otherwise they are liable to get out of place in case the lock is turned upside down.

It will be observed also that the chambers provided for the day-key bolts are of the usual size, instead of being much larger than usual, as in the Shaw lock. This is, of course, an advantage, and is made possible by furnishing the bolts with coacting fingers, instead of making the day-key bolts larger in

diameter at their outer ends than the master-key bolts, so as to overhang the same. In my construction passage-ways *m* have to be formed in the case *G* to permit the said fingers to play back and forth, but those passages are easily formed and at small expense.

The number of tumblers and bolts may be varied, and also their construction and relative arrangement. Furthermore, they may be changed in form without departing from my invention. As shown in Fig. 4 of the drawings, the day-key bolts *I* and *I'* and the master-key bolt *J* are circular in cross-section, as well as in the chambers *H*, in which they are located, but obviously such form is not essential.

I might omit the projecting fingers on the master-key bolts and adapt the fingers of the day-key bolts to extend inward over the master-key bolts far enough to be engaged thereby when the same are raised by the action of the master-key. This construction would require the omission of springs for the master-key bolts, or else the use of master-key-bolt springs of different construction from these shown.

It will be clear that the construction just referred to would secure for my improved lock the advantage specified of reducing the cutting of the lock-case to the minimum. The construction just described would not, perhaps, require the cutting away of the lock-case less than the construction shown, but it would permit the use of simpler master-key bolts. It is apparent, therefore, that in carrying out my invention I may make some changes in the construction herein shown and described, and would have it understood that I do not limit myself to the same, but hold myself at liberty to make such changes as fairly fall within the spirit and scope of my invention.

I am aware that it is old in pin-tumbler master-key locks to employ two-part master-key tumblers, one part of which racks at both ends. I do not, therefore, claim that construction broadly.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a master-key, pin-tumbler, cylinder-lock, the combination with day-key tumblers, and two-part master-key tumblers, of which the inner members are double-racking, of master-key bolts and day-key bolts constructed and arranged so that the master-key bolts will operate the day-key bolts without in turn being operated thereby, substantially as described.

2. In a master-key pin-tumbler, cylinder-lock, the combination with day-key tumblers, and two-part master-key tumblers, of which the inner members are double-racking, of master-key bolts, and day-key bolts constructed at their upper ends with projecting fingers located above the master-key bolts so

that the master-key bolts will operate the day-key bolts without in turn being operated thereby, substantially as set forth.

3. In a master-key, pin-tumbler, cylinder-
5 lock, the combination with day-key tumblers, and two-part master-key tumblers, of which the inner members are double-racking, of master-key bolts and day-key bolts, both constructed at their upper ends with projecting
10 coacting fingers, of which those of the master-key bolts are located below those of the day-key bolts, so that the master-key bolts will operate the day-key bolts without in turn being operated thereby.

15 4. In a master-key, pin-tumbler, cylinder-lock, the combination with a cylinder constructed with a longitudinal series of radial pockets, and a longitudinal key-slot intersecting the bottom walls of all of the said pockets, of day-key tumblers and two-part master-key tumblers located in the said pockets,
20 the inner members of the master-key tumblers

being double-racking a lock-case having a longitudinal cylindrical chamber to receive the cylinder in which it rotates, and constructed with a series of radial chambers arranged in correspondence with the pockets in the cylinder, and day-key bolts and master-key bolts located in the said chambers in correspondence with the arrangement of the day-key tumblers, and the two-part master-key tumblers in the pockets of the cylinder, the said bolts being constructed and arranged so that the master-key bolts will operate the day-key bolts without in turn being operated
25 30 35 thereby.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRY B. SARGENT.

Witnesses:

ELLIOTT LITTLEJOHN,
WILLIAM L. COOKE.