(Model.)

2 Sheets—Sheet 1.

J. R. FORSTER & T. S. RACKLIFF.

LOCK.

No. 466,918. Patented Jan. 12, 1892.

Fig. 1.

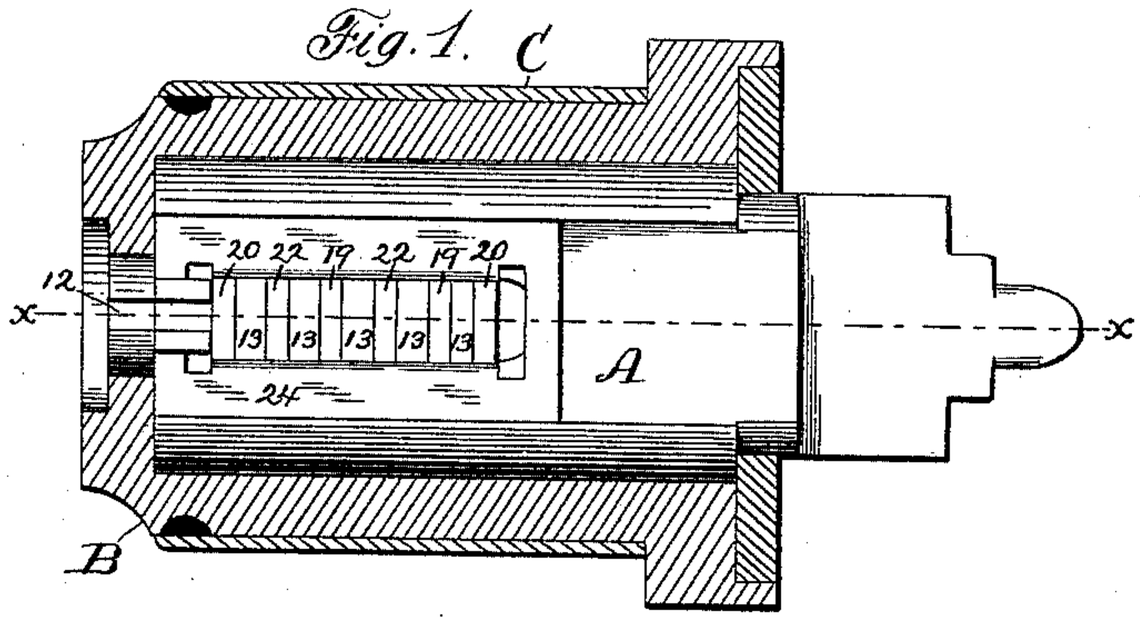


Fig. 2.

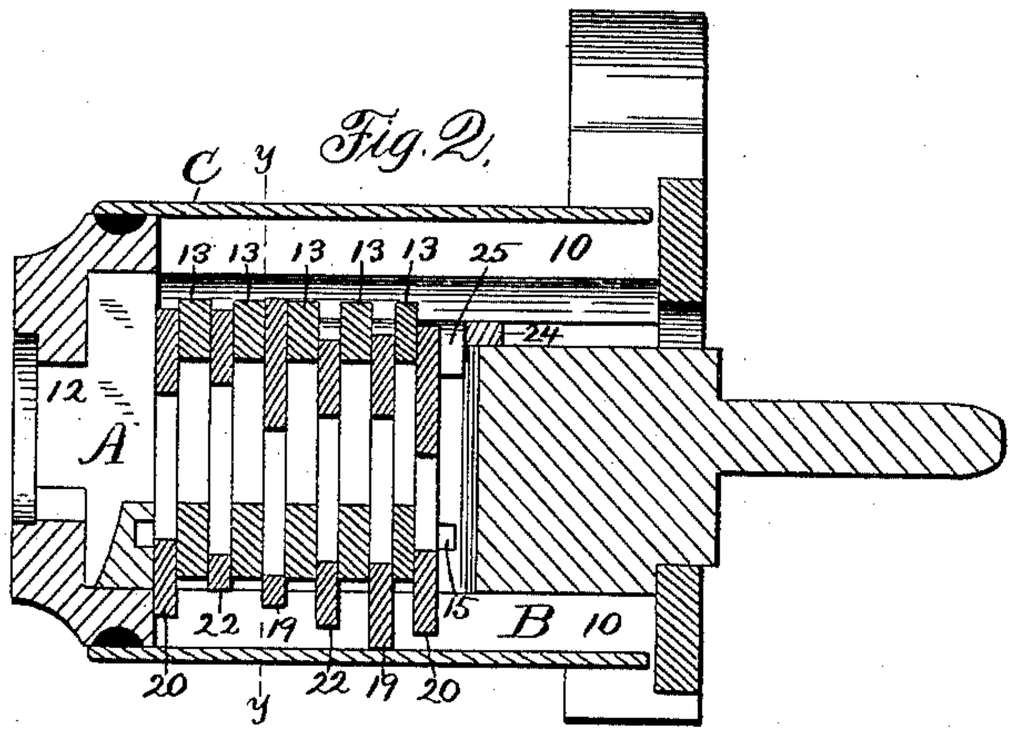


Fig. 3.

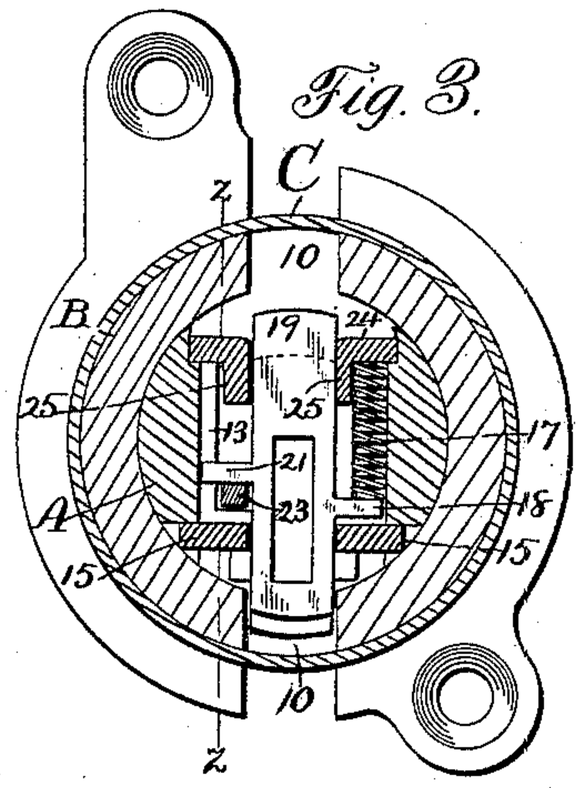


Fig. 4.

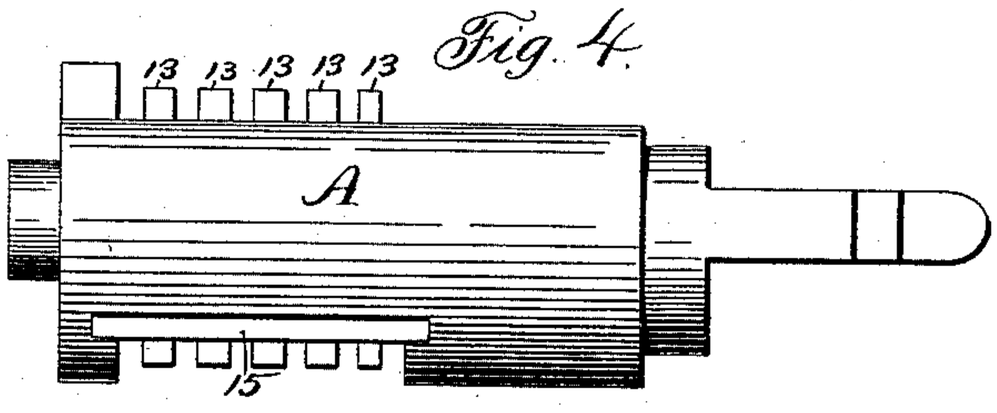
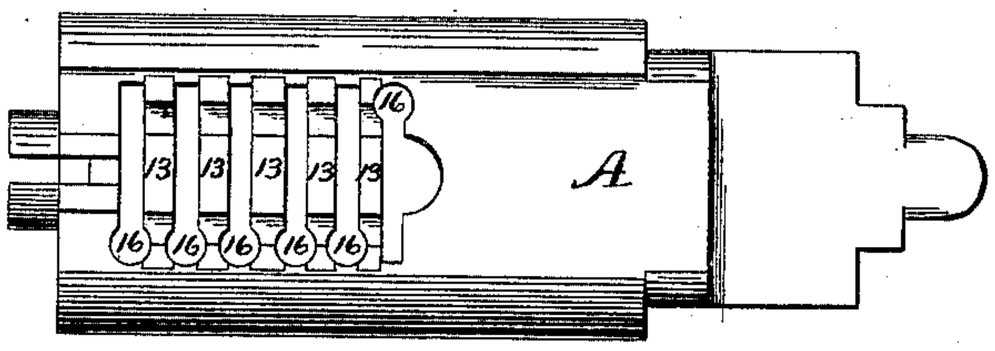
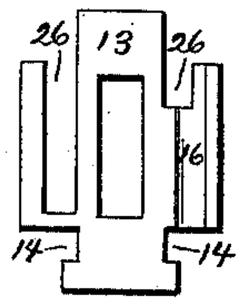


Fig. 5.



Witnesses.
John. Edwards Jr.
Hilmer Svenson.

Fig. 6.



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(Model.) 2 Sheets—Sheet 2.

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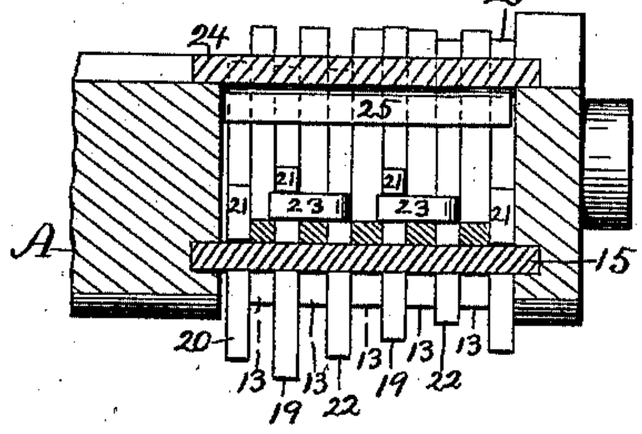
LOCK.

No. 466,918. Patented Jan. 12, 1892.

Fig. 7.



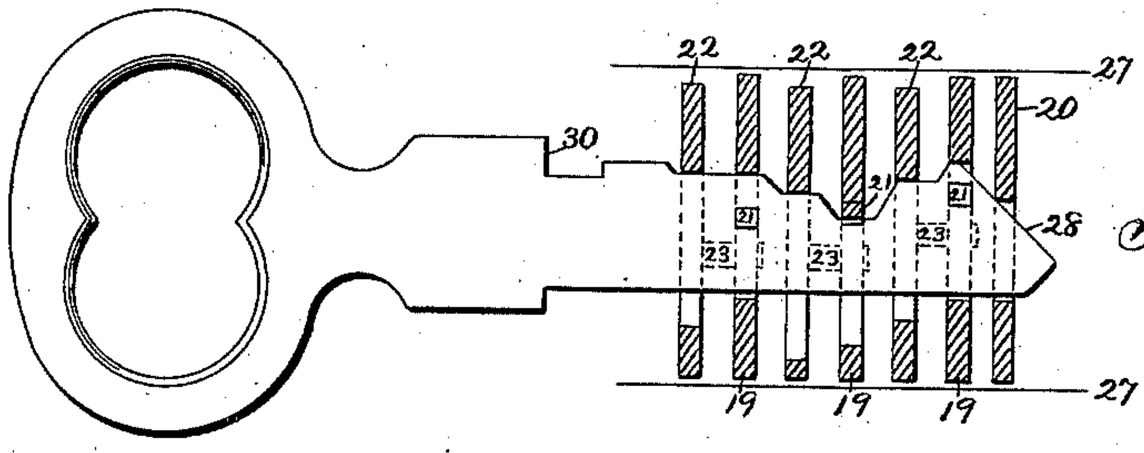


Fig. 8.

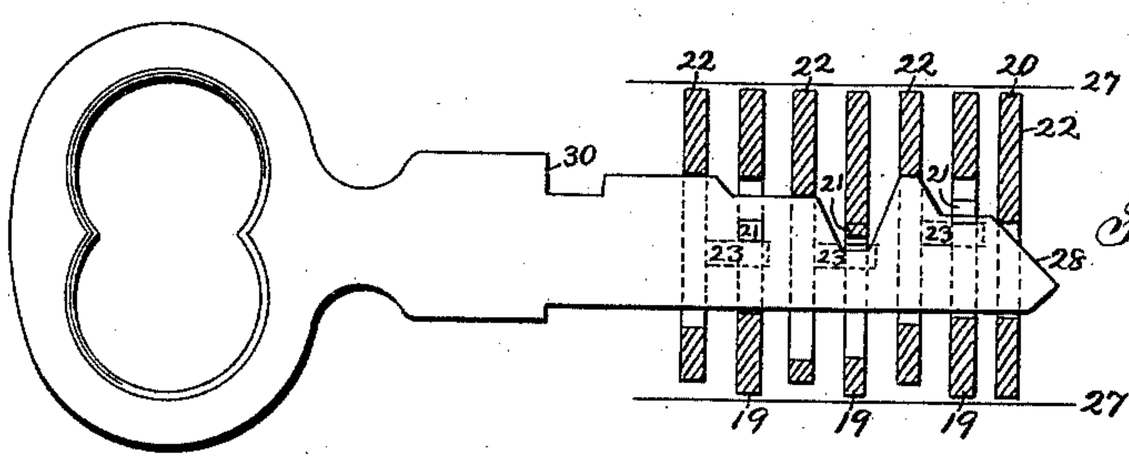


Fig. 9.

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UNITED STATES PATENT OFFICE.

JOHN R. FORSTER AND THOMAS S. RACKLIFF, OF NEW BRITAIN, CONNECTICUT, ASSIGNORS TO THE RUSSELL & ERWIN MANUFACTURING COMPANY, OF SAME PLACE.

LOCK.

SPECIFICATION forming part of Letters Patent No. 466,918, dated January 12, 1892.

Application filed June 26, 1891. Serial No. 397,601. (Model.)

To all whom it may concern:

Be it known that we, JOHN R. FORSTER and THOMAS S. RACKLIFF, both citizens of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Locks, of which the following is a specification.

Our invention relates to improvements in that class of locks which contain a series or set of transverse tumblers arranged in a revolving cylinder and adapted to lock said cylinder by engagement of the ends of the tumblers with the surrounding case of said cylinder, the same being generally known under the name of "cylinder-locks."

The objects of our improvement are to provide a master-key lock of this class, and in general to improve the construction with reference to its efficiency and cheapness of manufacture.

In the accompanying drawings, Figure 1 is a plan view of the main parts of our lock with a horizontal section of the case that incloses the cylinder. Fig. 2 is a longitudinal section of our lock on the line *x x* of Fig. 1. Fig. 3 is a transverse section of the same on line *y y* of Fig. 2. Fig. 4 is a detached side elevation of the cylinder with the tumblers removed. Fig. 5 is a plan view of the same. Fig. 6 is a side view of one of the bridge-wards. Fig. 7 is a detached longitudinal vertical section of the cylinder and parts carried thereby on line *z z* of Fig. 3. Fig. 8 is a diagram of a set of tumblers, together with a side view of the pass-key; and Fig. 9 is a like diagram of the same set of tumblers with a side view of the master-key.

This class of locks is so well known that we consider it unnecessary to represent the bolt-work of the lock and its connection with tumbler-cylinder A and its case B. The case B is provided with diametrically-opposite slots 10 for engaging the respective ends of the several tumblers as in ordinary locks of this class, and for convenience in manufacture these slots are cut wholly through the wall of the case and then covered up by a tubular sheet-metal cap C. The cylinder A is provided with the ordinary longitudinal keyway 12, while its middle portion is cored out for making an enlarged transverse chamber through it, the side walls of said chamber being slotted to receive the edges of the separately-formed bridge-wards 13, as shown most clearly in Fig. 5. Each bridge-ward is provided on both sides with a notch 14, as shown at the lower end in Fig. 6, and in addition to having their edges rest in the transverse slots of the cylinder, as shown in Fig. 5, they are secured against moving longitudinally by means of side plates 15, the ends of which engage tangential notches in the cylinder A, as best shown in Figs. 5 and 7. Figs. 4 and 5 show the cylinder with the bridge-wards thus fastened to the cylinder, all other parts being removed. The bridge-wards may be grooved on their side or sides, as at 16, Fig. 6, to form spring-pockets for the spiral springs 17, Fig. 3, that actuate the tumblers. We prefer, however, to secure the bridge-wards in the cylinder and then form the spring pockets 16, Fig. 5, by drilling between the bridge-wards, cutting away sufficient metal from the cylinder and bridge-wards to form said spring-pockets. Each bridge-ward is of course provided with a central opening to make room for the insertion of the key. These wards serve the purpose of separating the several tumblers and prevent them from being pressed flatwise one against the other. The tumblers are all flat sheet-metal tumblers, each provided with an arm 18, as in Fig. 3, for being acted upon by the spring 17 and provided with the usual central opening for the key. The pass-key tumblers 19 and common tumblers 20, (common to both the master-key and the pass-key,) are provided with a side lug 21. The master-key tumblers 22 are provided with an arm 23, that extends from the edge of said tumblers to a point underneath the side lug 21 of the pass-key tumbler immediately to the back of each master-key tumbler. One side of the cylinder (the upper side, as shown in Figs. 2, 3, 4, and 7) is grooved longitudinally to receive the flanged holding-cap 24. This cap is of a width that will fill said slot, and its middle portion is split longitudinally and turned downwardly to form the flanges 25. The space between the two flanges is of a

width corresponding to the width of the tumblers at their ends and serves the purpose of guiding their ends at one side of the cylinder, while the opposite ends of the tumblers are guided edgewise by the side plates 15, that hold in the bridge-wards, as before described. This flanged cap-plate not only serves to guide one of the tumblers, but also furnishes a cap against which one end of the springs 17 abut. This cap-plate is simply crowded down into place, after which, if desired, the side walls of the longitudinal slot in the cylinder which receives said cap-plate may be hammered down a little to more firmly secure the same in place. The bridge-wards are slotted at their cap-plate ends, as at 26, Fig. 6, and such bridge-wards as are used between a pass-key tumbler and a master-key tumbler have this slot made deeper upon one side to allow room for the arm 23 of the master-key tumblers to move up and down.

In the diagrams Figs. 8 and 9 the lines 27 indicate the dividing line between the cylinder and its case. The common tumbler at the inner end of the key and the two adjacent pairs of pass-key and master-key tumblers are the same as hereinbefore described. Instead of a common tumbler 20 at the outer end of the cylinder, we have represented a pass-key and master-key tumbler. The arms 23 of the master-key tumblers are indicated by broken lines, and the arms on the pass-key tumblers, under which said arms pass, are represented in full lines. The pass-key is shown in Fig. 8 and the master-key in Fig. 9. The common tumbler 20 at the inner end of the cylinder is arranged to be lifted by the beveled end 28 of the key, so that it will fall very quick upon the withdrawal of the key. The other bittings on the key are either straight for a short distance longitudinally or formed on a summit, so as to constitute in effect straight seats and permit the key to move a little longitudinally after the tumbler 20 falls before the other tumblers can fall. This common tumbler serves as a safety-tumbler, so that when either key is used this tumbler will move very quickly upon the withdrawal of the key and immediately lock the cylinder within the case, so as to prevent it from being turned while the key is being removed and thereby crowd the corners of the tumblers against the corners of the slot in the case with so much friction as to prevent them from moving under the influence of their springs, and thereby leaving the tumblers so that the cylinder might be turned without the application of the proper key. The keys are provided with stop-shoulders 30 for engaging a stop on the cylinder for stopping the key in the positions illustrated in Figs. 8 and 9. The tumbler 20 at the outer end of the cylinder in Figs. 1, 2, 3, and 7 is common to both the pass-key and master-key, and consequently both keys must be bitted alike at the point which sets said tumbler. The master-key tumblers are made somewhat shorter than the pass-key tumblers, and if they are so arranged as to be forced beyond the meeting line of the cylinder and case they will be lifted to that extent by the pass-key, and if they do not so project when the key is withdrawn then they will remain idle when the pass-key is used. The pass-key sets the pass-key tumblers and so many of the master-key tumblers as it affects by the direct action of its respective bits. The master-key sets the master-key tumblers by direct action on its bits, and sets the pass-key tumblers through the arms 23 of the master-key tumblers acting upon the side lugs 21, as shown most clearly in Fig. 7 and by the diagram Fig. 9.

By our improvements the cylinder may be cast with a large opening or chamber and the bridge-wards and holding-cap inserted much more economically than the same could be formed by cutting out from a solid piece. The bridge-wards separate the tumblers and prevent them from crowding one upon the other. The flanged cap is cheaply formed, and its flanges serve to guide and support the tumblers, even though they may be so arranged as to have their ends forced by their springs to a point inside the under surface of the body of said cap.

We claim as our invention—

1. In a lock of the class described, the cylinder chambered out in its middle portion and provided with transverse bridge-wards 13, formed of plate metal and secured therein, substantially as described, and for the purpose specified.

2. In a lock of the class described, the combination of the cylinder A, the separately-formed bridge-wards having side notches 14, said wards being arranged transversely within said cylinder, and side plates 15, engaging said notches 14 and with their ends resting in tangential grooves in said cylinder, substantially as described, and for the purpose specified.

3. In a lock of the class described, the cylinder A, having bridge-wards 13 secured therein, the tumblers, and springs confined in the transverse spaces by the sides of said bridge-wards, substantially as described, and for the purpose specified.

4. In a lock of the class described, the combination of a set of tumblers and a flat or sheet-metal key having the beveled end 28, while its other bittings have straight seats, the inner one of said tumblers being arranged to be set by said beveled end, while the other tumblers are set by the straight seats of said other bittings, substantially as described, and for the purpose specified.

5. The herein-described lock, consisting of a revolving cylinder and its case and a set of transverse master-key and pass-key tumblers for locking said cylinder against rotation within its case, the master-key tumbers in said set being provided with an arm for engaging a side lug on said pass-key tumblers,

substantially as described, and for the purpose specified.

6. The combination of the cylinder and its case with a set of transverse tumblers mounted in said cylinder for being set by the direct contact with the proper keys, consisting of pass-key tumblers, master-key tumblers, and a tumbler common to both keys, substantially as described, and for the purpose specified.

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THOMAS S. RACKLIFF.

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