New Inventions.

Improved Lock for Banks, Safes, &c.

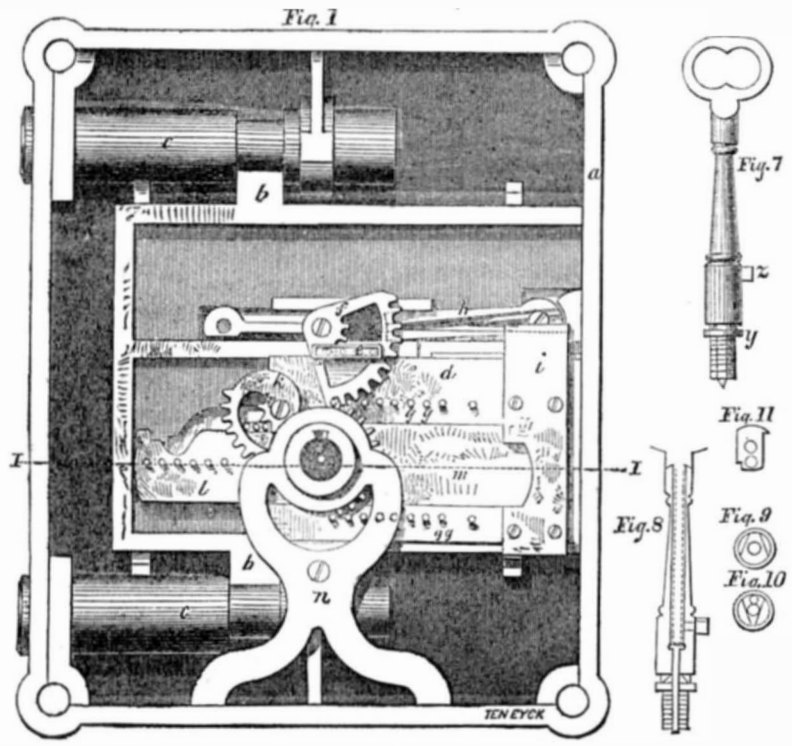
Our engravings illustrate the invention of Linus Yale, Jr., of Philadelphia, Pa., for which U. S. letters patent were granted May 22d, 1855. Patents have also been secured in Europe. The inventor needs no puffing at our hands, as he has already distinguished himself in the science of locksmithing here by picking the Day & Newell Parautoptic, or, as it is better known, the great Hobbs' Lock. This he has done repeatedly, and in a very short time, by making a wooden key from measurements taken through the key-hole. We are told that not only the Parautoptic but all other locks operated by a winged key are worthless as securities before the simple method devised by Mr. Yale. But it will be satisfactory to such to inform them that Mr. Yale—the son of the inventor of the Bacon lock—can furnish them with one perfectly reliable.

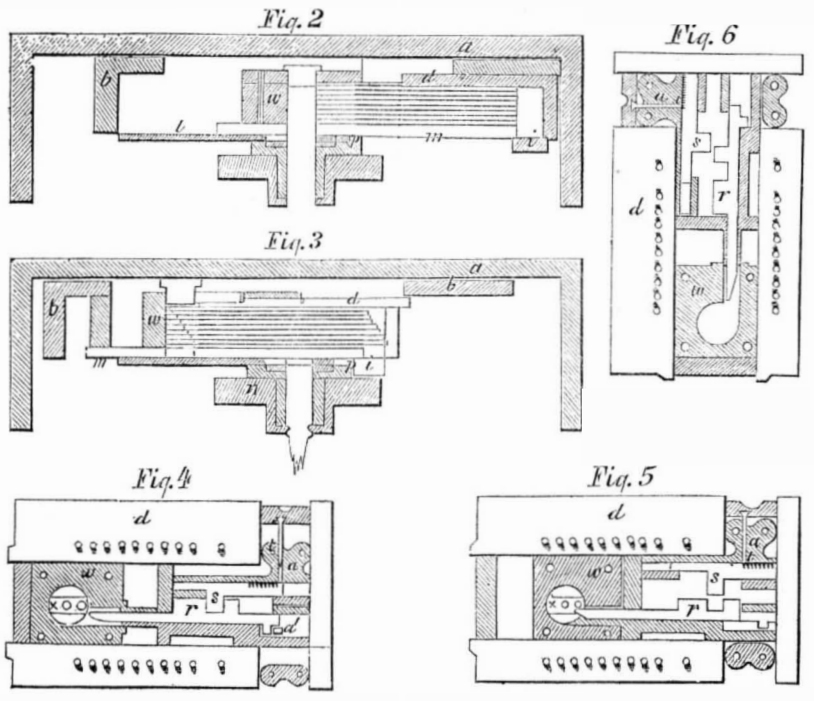
The present improvement is believed by the inventor to be absolutely burglar proof; to pick it is, in his opinion, utterly impossible. Among its advantages are, first, the infallible principle. The lock separates the key bits from the stem of the key, unconsciously to the owner, and carries them into the interior of the lock where they impress the tumblers—the external key-hole being closed up whilst the tumblers are free to act. This prevents Mr. Hobbs' method of picking by feeling; and as the key does not sweep the tumblers in its track, it prevents Mr. Yale's own method of picking by an impression. It has no springs to clog and refuse duty from dirt or rust. The dog which holds the bolt locked out takes all strain that may be applied to it, and by which tumblers of most kinds of locks can be crushed. The double notching the key bits doubles them in number, and vastly adds to the power of permutating the key beyond all ordinary keys—for instance, in an ordinary eight tumbler lock the key can be changed 40,320 times. In this lock, with the same number of tumblers, the changes are 4,314,240.

In our engraving fig. 1 is a plan of the lock in unlocked position; fig. 2 section of lock through line I I from above, key tumblers in normal position; fig. 3 the same, showing the key stem in key-hole, the key-hole closed by hard plate, the key bits carried into the lock, and the key tumblers impressed by them; the cross head is also shown in contact with the driving wheel. Fig. 4 is a plan of tumbler carriage, the hard plate and cross head being removed to show the tumblers in normal position held securely by the pin, a', also the key bits as just inserted, ready to be imprinted on the key tumblers. Fig. 5 is the tumbler carriage as above, showing the key bit in place, with key tumbler as pressed into it, the true tumbler, s, as arranged, moved away from key tumbler, and secured in its place by the knife edge, t, holding it in its notch. Fig. 6 tumbler carriage as above, the fence tumbler anchored by knife edge, the key tumbler back to normal position; this view shows the position of tumblers when the bolts are locked out and key withdrawn. Fig. 7 is the key; z, the square pin on handle which turns the driving wheel; y the key pod attached to the handle by a dovetail and spring dowel. Fig. 8 is a section of key showing spiral spring in handle, and spring dowel to retain the pod from slipping off. Figs. 9 and 10 show the dovetailing of the ends of handle and pod where they unite. Fig. 11 is a key bit with center hole to pass over the center pin, and side hole where the screw passes through it to hold it with the others in key pod.

To Lock—On inserting the key the sliding drill pin presses back the dowel pin in the key and detaches the pod or bits from the key handle, and the square pin of the key enters the notch in the driving wheel. Commencing to turn the handle the driving wheel, p, sets the quarter wheel, f, in motion, which, working in the rack, e, carries the bolt, b, to its locked-out position; simultaneously the driving wheel also matching into the pins, g g g, drives the tumbler carriage, d, to the left, bringing the cross-head, i, in contact with the cam of the driving wheel; the tumbler carriage in its journey carries the detached key pod away from the external key-hole, which is closed up by sliding the hard plate, m, across it. When the key-hole is closed the snail wheel, k, partially checks the advance of the hard plate, releasing the key tumblers, r, from the pressure of the pin, a', which is attached to the hard plate, thus setting the tumblers free to act, the key chamber or pod carrier, w, being screwed to the hard plate partakes of its motion and holds the key bits, which it contains against the advancing tumblers, which are pressed slowly but firmly against the key bits, which give both the key tumblers, r, and fence tumblers, e, the impress of their own arrangement. These motions are effected by about one-third of the revolution of the key handle. Continuing to turn the cam of the driving wheel moves the cross head, i, and through it the bolt dog, h, behind the bolt carriage, and holds it together with the bolts firmly locked-out. The cross head being

IMPROVEMENT IN BANK AND SAFE LOCKS.





screwed to the fence slide which holds and carries the fence tumblers, s, lifts them at the same time out of the key tumblers, r, fig. 5, and on to the knife edge, t, which enters one of the series of notches cut in their backs, holding them firmly in the arrangement given them by the key. In the remaining motion of the key the driving wheel matching into the pins, g g, in the lower side of the tumbler carriage carries it back again; the snail wheel moves the hard plate, and with it the key chamber is drawing the key tumblers away from the key bits, at the same time that the pin, a', is restoring the tumblers to their normal position and securing them immovably, every trace of their action being entirely erased, the key-hole is opened, the key pod presented to the handle again, which, on being withdrawn from the key-hole, is found self-attached.

To Unlock—Insert the key as before; on turning in the reverse direction the key bits are separated from the handle and carried away into the lock as before, the key tumblers arranged by being pressed into the steps of the key bits; the cross head is again brought to the wheel, which now moves it downward, carrying with it the fence tumblers into the key tumblers as they were originally, and also the bolt dog, h, from behind the bolts; the remaining motion of the key handle retracts the bolts, restores the key tumblers, and through them the fence tumblers to their normal position ready to receive a new key, opens the key-hole and attaches the key pod to the handle ready for a withdrawal.

But if, while in the locked position, a changed or false key be applied, and the first one-third revolution effected, the key tumblers are wrongly arranged and not in a position to receive the fence tumblers, which have retained the form of the first and proper key, consequently the fence slide is obstructed in its movements, which in its turn prevents the cross head from coming down, and, of course, it cannot bring down the bolt dog to relieve the bolts which continue to project until all their preceding movements regularly occur.

The bolt cariage, b, carries the round tempered steel bolts, c c, in such a manner that they would roll under the action of a saw; this prevents them from being cut off. The dog, h, takes all the pressure applied to the bolts to force the lock relieving the tumblers from all possibility of being crushed.

No powder can be introduced into the basin of the lock to blow it off. The keyhole alone can be charged, and the explosion would no more harm it than it would a pistol barrel of the same size.

For further information address the inventor at No. 13 Chestnut st., Philadelphia, Pa., or apply to Samuel Hammond, Merchant's Exchange, Wall st., New York City.

Mariner's Time Compass.

Ralph Reeder, of Cincinnati, Ohio, has recently been on a visit to Washington and this city, with a model of his above-named instrument—secured by patent—to make arrangements for their manufacture in this great sea port. The instrument consists of a chronometer, and a horizontal dial, with a style on its face, and a stationary equatorial brass ring laid out in degrees minutes, and seconds. These are supported on a movable axis, forming the focus of a vertical quadrant laid out in angles at each side, so that the angle of dial and ring can be changed by a thumb screw. Below the dial is the common mariner's compass, with a spirit level on its table or standard-top. The instrument is designed to be used with the compass in steering ships. and its object is to indicate the position of the ship at any hour of the day when the sun shines, thus operating as a correcter of the compass, which is liable to be affected by local attraction in iron ships, and by masses of metal such as a cargo of wrought or pig iron.

Wire Rope.

At a meeting of the Mechanics Club in this city on the evening of the 25th ult., William H. Wallace read an able paper on the above subject. He urged the practicability of its application for the most common purposes. He cited its employment with the fullest success for window cords and the like minor purposes, but dwelt with particular force on the applicability of this manufacture to the standing rigging of vessels. He asserted it to be only one-quarter as bulky as hemp rigging of the same strength, and consequently offering much less resistance in sailing by the wind, or in steaming against a gale. It is also but two-thirds as heavy as hemp, and consequently adds materially to the stability of a vessel; and if employed for back-stays, and the chains are extended to meet the copper, a complete lightning conductor is established on every side of the vessel.

The ordinary means employed for protecting the wire was a simple coating of Spanish brown and linseed oil applied thoroughly to each in the process of manufacture The toughness of wire was argued to depend much on the quality of the iron and the annealing process. Mr. Backas gave the Messrs. Washburn, of Worcester, the credit of having made wire on a large contract with which he was connected, the test of which was that it should wind tightly around another wire of the same diameter without exhibiting any roughness when examined by the microscope. The iron employed in this contract was American iron, and proved considerably stronger than that given by English tables.

Mr. Wallace explained the processes employed in laying up the wire at the Roebling Works in New Jersey. The ropewalk is 4000 feet in length, and the greatest care is taken to insure a perfectly equal strain on every strand. The amount of twist, and the fineness of the wire employed depended on the uses for which the rope was intended. Stationary rope is sometimes made from wire as large as No. 5, while tiller ropes are made from fine wires put together with considerable twist.

Cause of the Explosion of the Steamboat Metropolis.

We have not been able to find room in this number for an important communication from Local Inspectors, Haldiman and Guthrie, giving their account of the cause of the recent boiler explosion on the steamboat *Metropolis* on the Ohio river; the letter will appear next week.

Good News for Inventors.

One of our London correspondents writes us as follows:—"The close of the European war will no doubt stimulate American inventors to bring out their good things, for there will be an improved market for patents here in consequence of the Peace."