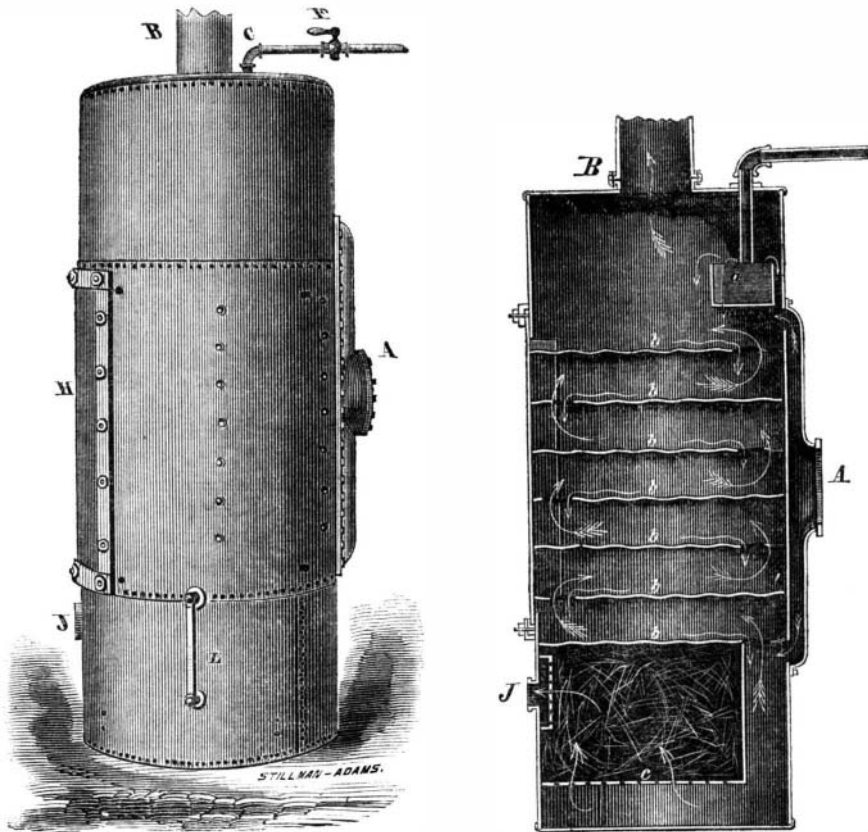


STILWELL'S LIME EXTRACTING HEATER AND FILTER.

The object of the invention, which we illustrate herewith, is to remove all foreign substances which produce scale from feed water before it enters the boiler, so that the water is supplied to the generator in a perfectly pure condition. The operation of the heater will be readily understood by reference to the sectional cut. The escape steam coming from the engine is divided and enters the apparatus in two currents. The upper current meeting the cold water as it flows in a thin sheet over the edges of the overflow box, dashes it into spray, and sets free the earthy salts held in solution, which are deposited upon the shelves. The lower current of steam enters beneath and meets the descending water as it passes from shelf to shelf, completing the work of thoroughly boiling the water. The water in passing over the large area of surface contained in the shelves deposits upon them all that portion of the salts held in solution that will crystallize. It then descends to the bottom of the heater and up through the filtering material contained in the chamber, *c*, which relieves it of all mud, sand, and other impurities, the water leaving the heater, at *J*, boiling hot and pure. The door, *H*, is held in place by rabbeted bars and can be taken off in a moment and the shelves all drawn out, thus giving ready access to every inch of the heater, and rendering its cleaning a short and easy task.

The device is claimed to be an established success, over 3,000 being now at work. We are informed that it has been fully tested over a period of nine years, and that it is guaranteed by its makers to completely prevent incrustation. It is considered especially suitable for use in southern and western sections of the country, where the water is almost uniformly impure. Several patents have been granted upon this invention, the latest of which is dated August 3d, 1869. Further particulars may be obtained by addressing the Stilwell & Bierce Manufacturing Company, Dayton, Ohio.



STILWELL'S LIME EXTRACTING HEATER AND FILTER.

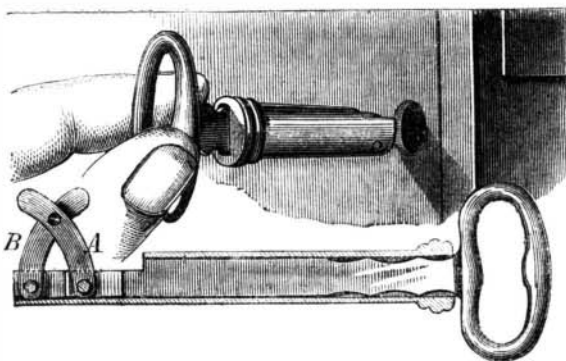
LOCAL BOILER INSPECTION.

In our paper for February 22, a correspondent, Mr. T. Leon Chester, asserts that the State law for boiler inspection has been repealed. But notwithstanding the repeal, some of the deputies, so our correspondent alleges, are going about in Westchester county, inspecting boilers and demanding six dollars for such inspection. Is it not a fraud, he asks, to make manufacturers, brewers, etc., pay for inspection under a law which is not in existence?

Mr. John Worthington, who is the deputy inspector for the tenth Congressional district, which embraces Westchester, Rockland and Putnam counties, calls our attention to the fact that Mr. Chester has made a gross mistake. The law has not been repealed but is still in force, and Mr. Worthington is regularly engaged in the discharge of his duties as inspector, which we have reason to believe are faithfully and skillfully performed. Of course no one who knows Mr. Worthington would for a moment suppose him capable of being a party to the practice of a fraud. We think that our correspondent was very culpable in not looking to see whether the law had been repealed before making so positive an assertion in respect thereto, and in casting an aspersion upon the inspector of the district. It appears that a bill was introduced into one of the branches of the legislature looking to a repeal, but the bill failed to pass.

A NOVEL FORM OF KEY.

The key represented in our illustration is composed of four pieces of metal so combined as to form a perfect device, and to be used in any lock constructed with reference to its peculiar form. The bow or handle is attached to a stem which slides freely in a sheath. Pivoted to the latter by a rivet is the curved piece, *A*, while the similar piece, *B*, is secured in



like manner to the stem. Both pieces are connected together by a pin, and form a movable bit, which is thrown out or in as the handle of the key is pushed from or drawn toward the operator. By this means, when the bolt of the lock is properly constructed, it will not be necessary to turn the key at all to unlock the door, as the bolt is forced back simply by an inward pressure of the key bow. This novel device is the invention of Mr. Addison A. Stuart, of Cedar Rapids, Iowa.

The Western Union Telegraph Company has purchased the control of the telegraph cable between Florida and Cuba.

A Variety Manufactory.

In the city of Buffalo, N. Y., there is a large manufactory devoted to the construction of a remarkable variety of useful and curious machines and novelties. We allude to that of Mr. Parr, whose labor saving machines, tool chests, carpenters' and gardeners' implements, mathematical and artists' appliances, and a great variety of other articles are described more fully in our advertising columns. In addition to the above, he has recently added to his stock small sta-

SELF-LIGHTING SIGNAL LANTERN.

In 1871 we described a signal lamp, invented by Holmes, which, on immersion in water, was self-lighting, and produced a brilliant illumination. Its principle rests upon the use of phosphide of calcium which, in contact with the water, develops spontaneously combustible phosphuretted hydrogen gas. A German engineer has recently been experimenting with this lamp. A long tin tube, firmly closed, in which were contained 900 grains of phosphide of calcium, was kept afloat upon the water by being fastened to a piece of board. Before putting it into the water the bottom of the tube was perforated to allow the water to enter, and the upper point cut off so that, on the entrance of the water, the self-lighting phosphuretted hydrogen gas was developed.

A flame, four or six inches broad and 24 inches high, lighted up the steamboat and pilot boat, which had gone out four miles on the sea with a party to witness the experiments, so brilliantly that the vessels and men upon them were distinctly visible from the lighthouse at that distance. In a tolerably heavy swell the flame was preserved for three quarters of an hour, and appeared at the distance of one or two miles like a strong signal fire. In the immediate vicinity, for a distance of 28 yards, the light was strong enough to allow of any work being done. For pilot and wrecking service, this signal fire can be highly recommended.

The preparation of the phosphide of calcium can be accomplished as follows: In the lower part of a narrow deep crucible, a hole is drilled for the reception of the neck of a flask, which is luted into the aperture; a quantity of dry phosphorus is placed in the flask, and the crucible is filled with quicklime broken into fragments of about the size of a hazel nut; a lid is then luted upon the top of the crucible. Time having been given for the luting to become dry, the upper part of the crucible is raised to a red heat as quickly as possible by surrounding

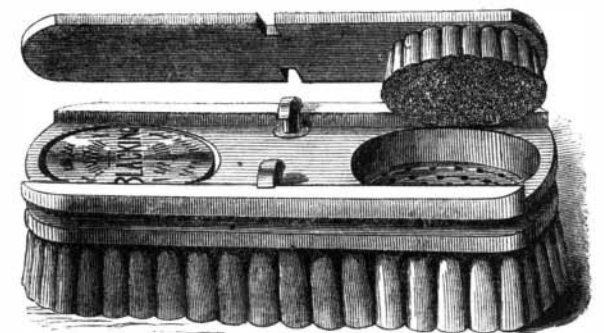
it with ignited charcoal, the lower part of the furnace having been filled with cold charcoal to prevent the heat from reaching the phosphorus too rapidly; the phosphorus becomes gradually volatilized as the heat reaches it.

If the heat be too high, the phosphorus distils over without combining with the calcium. The phosphide of calcium, when procured in this manner, forms an anhydrous mass of a dull red color, hard enough to strike fire with steel; it experiences no change in dry air or in oxygen at the ordinary temperature. At a high temperature it becomes partially decomposed by oxygen, chlorine, or hydrochloric acid; in a moist atmosphere it slakes, emits phosphuretted hydrogen, and crumbles to a brown powder. The phosphide of calcium, in its insulated form, is decomposed when thrown into water; phosphuretted hydrogen gas is evolved, which takes fire spontaneously. It is necessary to keep the preparation in hermetically closed vessels. Where the phosphide is required to be attached to life preservers or signal buoys, it can be enclosed in tubes which are stoppered with some salt that will dissolve off in contact with water. In case of a man overboard in the night, his position could be detected by the employment of floating grenades of phosphide of calcium thrown from the ship.

It has been stated that, by fusing magnesium filings and phosphorus together, a compound results which can be employed as a substitute for the phosphide of calcium in the evolution of phosphuretted hydrogen gas. As magnesium can now be procured in considerable quantity, this method may be worthy of a trial.

COMBINED BLACKING BRUSH, BOX, AND HOLDER.

This device is especially adapted to the needs of travelers, as it enables two blacking brushes and box of blacking to be stowed in very small compass, without danger of soiling any article which may be near them. The handle of an or-



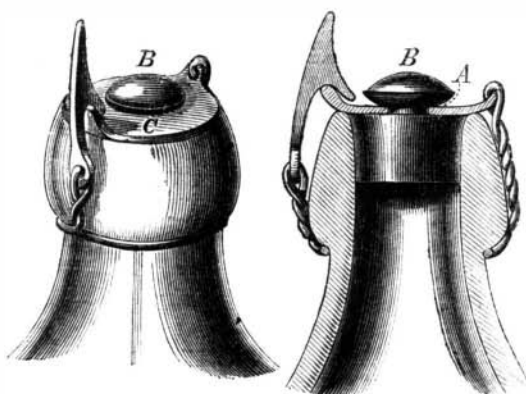
inary brush is made into a case, in which are cut two circular mortises, one of which receives the box of blacking and the other the bristle portion of the dip brush. The handle of the latter closes the recess, forms a cover, and is secured in place by the two buttons shown. The dip brush is reversible, and fits on either of the circular mortises. To Mr. E. W. Woodruff, of Washington, D. C., is due the credit of this useful little invention.

THE rate of telegraphing between this country and Europe is one dollar a word; but the price is to be reduced on the 1st of May, next, to 75 cents per word.

tionary, marine, locomotive, and fire engines, and steamboats; also all the various implements used in fabricating Sorrento work, which has become quite a fashionable employment among amateurs and ladies of industrious and mechanical proclivities. Boxes of assorted chemicals, with directions for performing amusing and instructive experiments, are among Mr. Parr's latest novelties. One of the larger boxes contains some 150 different chemicals, making quite an extensive portable laboratory for simple experiments. To enumerate and describe all of the articles of utility and novelty made and sold at this manufactory would occupy several columns of newspaper space. We would recommend parties to send 25 cents to Mr. George Parr, Buffalo, N. Y., and obtain a copy of his illustrated catalogue. They will find it entertaining, even if they do not wish any of his goods.

A NEW BOTTLE STOPPER.

Mr. William Morgenstein, of New York city, is the patentee of the ingenious device, for closing the mouths of bottles,



represented herewith. The stopper is made of india rubber, cork, or other elastic material. Around its upper portion a recess or groove is cut, as at *A*, so that when the head, *B*, of the stopper is pushed through a hole in the supporting plate, *C*, the latter, engaging in the recess, firmly retains the stopper in place. The wire represented is passed through an eye on the plate and made into two loops, opposite to each other, to one of which is attached a cam-shaped catch. The latter presses over a raised lip on the plate, *C*, holds the same down and thus securely closes the bottle. By forcing the catch back, the supporting plate is released and the stopper can be readily withdrawn.

What Our Friends Think of the Scientific American.

An esteemed correspondent, writing from Mound City, Ill., sends us a variety of useful items and says: "I send these items partly to gain instruction, and partly to instruct others; you will read them and give place to such as are worthy to be in the SCIENTIFIC AMERICAN, the 'paper of papers.' I do not like to run any risk of doing without a single number, because this paper helps me to support my family. True, it does not bring greenbacks tacked to its edges, or family groceries in its folds; but by carefully reading the valuable matter in its columns, I am better able to manage, operate and control the machinery with which I earn my livelihood."