BOILER EXPLOSIONS---WHAT CAN BE DONE TO PREVENT THEM.

The occurrence of several disastrous boiler explosions since we last referred to this subject, demands that we should again direct attention to this constant cause of the destruction of life and property. We have before us a large pile of letters on boiler explosions, the accumulation of several months; in these letters there is scarcely a word said about bad workmanship, bad material, improper design or carelessness or management. But the gas, electrical, and explosive compound theories are presented in nearly every conceivable way to account for these boiler catastrophes continually occurring. All these vague and useless, nay, positively injurious speculations should be discouraged in every possible way. They simply tend to distract attention from causes of a purely mechanical nature which are entirely within our control; further than this, this "mysterious agency" business is not unfrequently used by the blunderers who have built bad boilers, and employers who have hired incompetent attendants and who have used boilers which were known to be out of repair, or who have used them for long periods of time without having had them properly examined by competent persons, to shield them from the punishment which is their just due. Just as soon as the public are persuaded into belief in the opinion which is persistently urged in some quarters that boiler explosions are produced by inscrutable causes or that they are to be accounted for by some incomprehensible theory, just so soon will the time be at hand when the coroner's inquest or the victims of an explosion will be even a greater farce than it is now. And we intend to exert our influence to prevent the existence of this state of affairs which threatens us in this matter. No sooner does a boiler explosion occur than a bevy of boiler explosion theorists crawl out of their holes and either deluge the press with long-drawn theories or cunningly manage to be called as witnesses by the coroner whom they deceive by their pedantry, and in many cases prevent a proper examination into causes which, of course, tends to shield the culprits from punishment or censure.

We have no objections to, but on the contrary encourage speculation in abstract science, the nature of force and matter are fair subjects for the speculative philosopher, but when practical matters are to be examined into, common sense and analytical investigation is what is demanded, not desultory speculation.

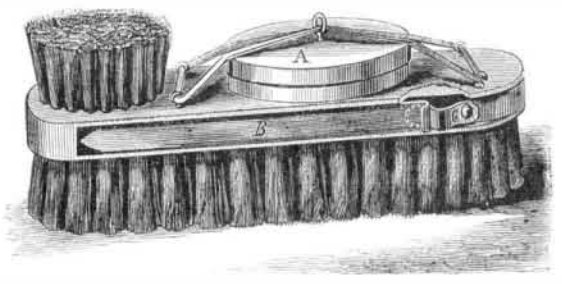
As the hydrogen gas theory is now in full blast, perhaps it may be well to devote a little attention to it and exhibit its fallacy. Hydrogen gas can only be generated in steam boilers by the decomposition of the steam or water, and it is easy to show that no such decomposition can possibly occur, to any extent worth mentioning, under any conditions arising in the use of steam boilers; and beside, if such decomposition did occur, the hydrogen so generated would have no oxygen to combine with, a condition absolutely indispensable in order that it may form an explosive compound. And still further, even if there was a sufficiency of oxygen at hand, the presence of the steam would preclude the temperature, necsssary for ignition, from being reached. Let us see what the late Professor Faraday says on this point. An apparatus having been introduced to superheat steam, by passing it through iron tubes which were placed directly in the furnace, where they could, of course, be made red hot, it was thought by some that the steam would be decomposed, that an explosive compound would be formed, and that consequently the apparatus was unsafe, and should not be used. This eminent physicist says "that as respects the decomposition of the steam by the heated iron of the tube, and the separation of hydrogen, no new danger is incurred. Under extreme circumstances the hydrogen which could be evolved would be very small in quantity—would not exert a greater expansive force than the steam—would not with steam form an explosive mixture—would not be able to burn with explosion, and probably not at all if it, with the steam, escaped through an aperture into the air, or even into the fire place. Supposing the tubes were frequently heated over much, a slow oxidation of the iron might go on within; this would be accompanied by a more rapid oxidation of the entire iron surface, and the two causes would combine to the gradual injury of the tube."

These facts thus clearly set forth effectually dispose of this "mysterious" cause, and at the same time it points out that if any portion of a boiler not covered with water is exposed to a high temperature from the furnaces slow oxidation of the iron is likely to go on, and then the boiler in that part may gradually become deteriorated or decayed until it can no longer stand the pressure on that part, and away it will go. But this is certainly a cause which can be prevented by proper vigilance, the part repaired, and if necessary protected from the action of the fire. And this leads us to consider the fact that if a boiler is so planned that proper circulation of the water over the heating surfaces is prevented. those parts in direct contact with the hottest part of the fire, are liable to be exposed to its action, while, instead of being covered with water, they are simply enveloped in a layer of steam, which not only is a bad conductor of heat and consequently permits the metal to be overheated, but also allows it to be deteriorated by oxidation. This state of affairs can and has existed in boilers whose gage cocks showed an ample supply of water. Hence those boilers which do not allow for an unobstructed departure of the steam bubbles from the heating surfaces, and for a circulation that will always keep those surfaces in contact with solid water are positively dangerous and should not be permitted to be used. We might mention several cases in our experience which bear on this point and conclusively show the great danger which may be incurred from this cause, but want of space warns us that we must proceed to the point it is our desire to impress upon our readers, and that is that boiler explosions with their appalling consequences are becoming so very frequent that practical measures are at once demanded, to at least diminish their frequency, if indeed they cannot be wholly prevented. We need scarcely remark that the first step which should be taken in this direction is to remove those causes, which it is known do produce the horrible disasters which makes one shudder to think of, and which are almost daily to be seen in the papers. These causes, we again repeat, to be bad workmanship, bad planning, incompetent attendance, deterioration, bad iron, and inoperative safety valves. We think that all of our readers will agree with us that these fruitful causes are almost wholly within our control. Legislative action we do not believe can wholly remove them, bad planning, bad workmanship and bad iron it certainly cannot, but we believe that much good may be effected by the passage of a law with respect to the competency of those who are to be allowed to have charge of steam boilers, and by providing for rigid periodical inspection prevent much of the danger from deterioration or corrosion, and we are sure that a law compelling the use of proper lock up safety valves on stationary boilers cannot fail to add to the security of the public.

But after all, let our legislation do their best, and pass the most perfect laws on this subject that can be enacted, yet we are confidently of the opinion that much more good is to be accomplished by Boiler Insurance Associations. In this, that important element, self interest, is made to act in a much more powerful manner than can be brought about by any system of legal inspection, no matter how rigid its provisions may be, or how carefully it is drawn up. The self interest of a corporation will be sure to discover flaws and causes of danger which will escape the less interested inspection of a paid official.

PARET'S IMPROVED BLACKING BRUSH.

A combination of brush, blacking, and mud scraper, forming a very compact and handy contrivance for household or



traveling use is presented in the accompanying engraving. A few words will explain its construction. The blacking box, A, is held in place, when not in use, by an endless elastic band, secured by hooks, which, being open at the shanks, permit the replacement of a new elastic for a worn out one. In a recess, in the side of the brush, slides a metal scraper, B, held in place by the spring, C. Thus we have combined, all the appliances for cleaning and polishing boots and shoes in a simple and compact form.

Patented through the Scientific American Patent Agency, Nov. 12, 1867, by Charles A. Paret, of 43 Union street, Nashville, Tenn. The patentee desires to dispose of the entire right, or to make arrangements for manufacturing on a royalty. Those interested will address as above.

YANKEE SAFETY POCKET.

The art of the pickpocket is successful not only because of the dexterity of its practitioners, but also because the preventives used are not usually effectual. A pocket, to be se

cure against the depredations of the light fingered, should not only be locked, but composed of such material as cannot be readily cut. Such are the characteristics of that shown in the accompanying engraving, which represents it as attached to the inside of a vest. The outside of the pocket is of leather, similarly lined, having between the two a network of steel, impenetrable by the knife of the operator. The top is a clasp resembling those used on porte monnaies, with the difference that the knob, by pressing which it is opened, is movable, the piston or stem being a screw on which the button turns; when down on the face of the jaws it cannot be depressed to operate the spring catch, while a few turns will raise it on the spindle or stem so that the pocket may be opened. A series of metallic eyelets around the edge of the pocket afford a ready means of attaching it to the garment, whether vest, coat, pants, or a lady's dress.

This device was patented Oct. 24, 1865, by T. S. Lamborn, who desires to dispose of territorial rights, and may be addressed at Marshallton, Pa. [See advertisement on another page.]

New Locomotive for Common Roads.

Mr. R. W. Thomson, C. E., Edinburgh, has invented and patented a new locomotive for common roads, which was lately tried in the neighborhood of Edinburgh.

The tires are made of bands of vulcanized india-rubber, about twelve inches wide and five inches thick. Incredible as it may appear, this soft and elastic substance not only carries the great weight of the road steamer without injury, but it passes over newly broken road metal, broken flints, and all kinds of sharp things without leaving even a mark on the india-rubber. The tires do not sink into the road in the least degree. They pass over stones lying on the surface without crushing them.

The india-rubber tires require scarcely any more power to propel them over soft bad roads or over loose gravel roads than on the best paved streets. The reason of this is quite obvious; they do not sink into roads, and do not grind down the stones in the least degree.

On Monday, the trials commenced by running the road steamer across a soft grass field, and it was afterward taken across a part of the field which had just been covered with loose earth to the depth of one or two feet, and run straight across, and then back through the deep soft soil. The weight of the road steamer is between four and five tuns; and yet the wheels, in passing over the loose earth, compressed it so little that a walking-stick could easily be pushed down in the track of the wheels without any exertion. After various evolutions, showing the ability of the road steamer to run about where there were no roads, it passed out into the street, and, taking a large omnibus full of passengers in tow, it proceeded up the Bonnington road to Messrs. Gibson and Walker's mills, where it took a large wagon, weighing, with its load of flour, about ten tuns, up a steep lane full of holes and ruts, and rising with a gradient of one in twenty. It was obvious that the road steamer was able to do a great deal more than it had to do in this trial. The bite on the road is something marvellous, and the easy way in which it floated along on its soft and elastic tires was very curious. When riding on the road steamer, the feeling is like what would be experienced in driving over a smooth soft grass lawn. There is, absolutely, no jarring at all. There was no appearance of wear on the india-rubber tires. The original surface which the rubber had when it left the manufactory is still visible. The engine is destined for Java, where it will be employed in drawing trains of wagons between two ports. The steamer, which was the subject of the experiments, had another specialty besides the wheels, it being fitted with one of Mr Thomson's patent vertical boilers.—*Engineering.*

Experiment on the Formation of Aniline Colors.

Pour into an ordinary test tube one fluid dram of pure concentrated sulphuric acid and add to the same one-tenth to three-tenths fluid dram of a diluted solution of sulphate of aniline. When, now, the solutions of different oxydizing agents, as those of chlorate or nitrate of potassa, hypochlorite of soda, chromic acid, bichromate of potassa, iodic acid, peroxide of hydrogen, or others, are allowed to flow upon the mixture of the tube, a characteristic coloration ensues at the place where the two fluids come in contact, in shaking the same is communicated to the whole liquid. Hypochloric acid or its respective salts produce a beautiful blue, nitric acid or its salts a rich carmoisin, chromic acid a bright violet. The nuances vary according to the strength of the liquids, and as there are but traces sufficient to produce a certain color, reactions may be founded upon them for the recognition of said oxydizing agents.

Preservation of Photographs.

H. Cooper, Jr, of England, gives the following formula for a preservative varnish which is stated to be an entire protection against fading:—

1 dram of gum dammar dissolved in one ounce of benzole.

1 dram of paraffin, dissolved in one ounce of benzole.

Mix four parts of the paraffin solution with one part of the dammar solution.

Prints covered with this varnish are impermeable to water. A solution of the paraffin only will do; but is better with the gum dammar.

THE ARAB JUGGLERS.—Mr. Frank Buckland gives in *Land and Water* the result of his observations of these performers. The snakes they handle are not poisonous, but belong to a harmless species common in France and England. The man who thrusts skewers through his tongue and the back of his neck has permanent holes for their introduction, and does not suffer more pain than when a lady puts on her earrings after leaving them off for some time. Other features of the exhibition remain unexplained. Mr. Buckland concludes "Altogether, I do not recollect having seen an exhibition which combines so many horrible and truly sensational sights in so short a space of time."