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Steam Boiler Incrustations and their Remedy

One of the greatest evils experienced by those who use *hard* water for steam boilers, is the crust or stony scale that forms on the plates inside, and which, being a non-conductor obstructs the passage of heat from the fire to the water, thereby causing a great loss of fuel; while, at the same time, it injures materially the metal, and is sometimes the cause of explosions.

Not apprehending difficulties from this source, the first locomotives that were placed, last year, by United States engineers on the Copiapo Railroad, in Chili, S. A., they supplied them with feed water from wells which in one week placed their engines *hors du combat*, by depositing a thick incrustation of carbonate of lime and magnesia, in the boilers.

From some parts of Ohio, we have received communications respecting incrustations forming in boilers in the same short space of time; and in our experience with feed water for a boiler, drawn from a deep well in the limestone formation, a crust used to be formed so thick and hard, that it had to be removed regularly every two weeks with a pick. The remedy in this case was the substitution of soft water. Two large ponds were constructed covering two acres. The engine was a large condensing one, and the water in the condenser was pumped out into the end of one pond—from which it slowly circulated—cooling in its progress—into the extreme end of the other, from whence it was taken to feed the boilers and condense the steam. The same water was used over and over again in the engine—the amount lost by evaporation and leaks being more than made up by rains.

In this city, before the introduction of the Croton water, boiler incrustations, caused by using well water, were a source of continual trouble and expense to every one using steam engines. With the Croton water, no scale is formed, the only deposit in steam boilers is mud, which can easily be removed by frequent "blowing out."

Various substances have been used to prevent incrustations in boilers, such as mahogany sawdust, muriate of ammonia, tannic acid compounds, oak wood blocks, &c., but the objection urged against all of these, is that they injure the metal. If soft water can be obtained, in any locality, *hard* water on no account should be used; but as many persons cannot obtain a sufficient supply of it, of course they must put up with what they have. To them, the best means of removing the incrusting matter from the water, before it enters the boiler, is the only information that would really be useful. One of our correspondents has stated that by exhausting the steam into the feed water box, raising the water to a high heat, then suffering it to flow through wood shavings in another box, before entering the boiler, the water will be purified, and deposit no scale. This method we really believe to be good, and its merits have been confirmed by an engineer—A. B. Von Rathen—who, in a recent communication to the *London Mechanics' Magazine*, states that for ten years he has used heated feed water, during which time no fixed incrustation was ever formed in the boiler. The feed water he heated in tubes before entering the boiler; using for this purpose, the waste heat of the furnaces, where it enters the chimney. M. Causte—a French engineer—asserts that *hard* water heated up to 318° Fah., will then deposit its earthy matter—carbonate of lime and magnesia, &c.; and thus, by heat, he contends that all water for steam boilers, no matter how much earthy matter it may contain, can be purified and thus obviate the possibility of forming incrustations. He also contends that a saving of 50 per cent. offuel will be effected by heating the feed water; but Von Rathen says that this is too much; still, he admits a gain of 25 per cent. On the 16th of January last, G. Weissenborn, of this city, obtained a patent for an apparatus to purify feed water, embracing heating the water and allowing it to flow through a substance on which it deposits all its encrustating mat-

ter. We have been assured that the method is capable of removing the incrustating matter from all kinds of hard water, and even the saline matter from sea water. Here, then, is data of no small value to those who use non-condensing engines and exhaust their steam into the atmosphere; and also to those who use cold feed water. The plan can be carried out at no expense at all, and it is worthy of the attention of every one who uses a steam engine.

The Marble Sawing Invention.

Those who have been accustomed to examine the pages of the SCIENTIFIC AMERICAN, well know that it never has been a part of our disposition to check or in any manner to retard the progress of new invention. On the contrary, they must have observed that we seldom lose an opportunity to put in a good word of encouragement to inventors, for the purpose of stimulating them to increased perseverance in the pursuit of whatever useful object may, at the time, occupy their attention,—or to urge them forward upon entirely new voyages of mental discovery. This we shall always do. The beneficial results of this course, continued as it has been for years past, now manifest themselves in the many noble inventions that have already been introduced, and that are so rapidly springing into existence,—inventions that have done much to promote the material prosperity of our people at home, and that have conferred high honor and glory upon the American name abroad.

With this premise, we shall take occasion to give a delicate hint of caution to inventors, upon the subject of Marble Saws. Since Mr. Manly's liberal offer of \$10,000 for the best sawing machine, the inventive world appears to have gone all agog on the subject. There seems to have suddenly arisen a very general opinion that there never was such an easy task set before a man, as to carry off this prize.—We have been overwhelmed with letters from all parts of the country, containing drawings and descriptions of devices intended to accomplish the desired purpose, upon which our judgment has been solicited—and cheerfully given. Quite a large number of applications for patents and caveats have been made through us, and "the cry is still they come." If this rush continues much longer, we shall not only have to be petitioned to erect and set aside a new Patent Office building, for the exclusive accommodation of Marble Saw Models.

Now, we have no objections to make against inventors, turning their attention to the subject, and to their entering, heart and soul, in large numbers, upon this novel race. But we would correct the impression they seem so generally to have formed, as to the ease of the conquest. So far, they seem to fix upon the first device which comes into their minds, and without any deep study or examination, turn out a model, and enter the competing lists.—We feel certain that these are in many cases the facts, because so large a proportion of the devices submitted to us are alike. Of the many plans we have seen, all, with very few exceptions, contain the same general features. When the various applications for patents come up for official examination, at Washington, there will be a fine lot of interferences declared, and a grand scrabble among inventors in proving priority.

Our remarks are not intended to discourage any one from endeavoring to bring forth the desired improvement; but to make them think harder and observe closer. All the more primitive ways of arranging the saws so as to cut at an angle, with adjusting screws, guides and frames; also double and single cranks, and walking beams for applying the power,—have been invented. We have examined an endless variety of them, and before these lines reach the reader, many others will have passed under our notice. If there is, by possibility, any new path into which inventors can strike out, they will do well to try and find it, for the field of devices already described, is, to our view, pretty generally covered. It will be some time yet, probably, before the "trump" turns up. There is ample time and room for the display of real ingenuity.

In the meantime, as heretofore, we shall be happy to advise with inventors either personally or by letter, as to the novelty of their improvements—whether upon Marble Saws or

any other subjects,—and to prepare drawings and specifications for those who desire to apply for patents. Touching this last matter we must say that we dislike very much to act as agents in patent cases where we can see no novelty. It is like a lawyer trying to defend a client whom he knows, all the time, to be guilty. If, therefore, we are to have Marble Saws, let them not be all alike.

The Vermont prize cannot fail to produce important benefits. It has already set many an individual to thinking, who never knew before that he was capable of an idea. It will have a similar effect upon hundreds of others. Not only will they be led to cogitate upon the marble business generally, but upon various other subjects, and in the end their minds will be improved, and higher positions reached.—There is nothing more elevating than the squeezing out of ideas, and the practical application of them to the wants of mankind.

To All Whom it May Concern.

In the course of business we have been compelled to adopt the inflexible rule of discontinuing to send the SCIENTIFIC AMERICAN as soon as a subscription expires. If we did not carry out such a regulation, and treat all our subscribers alike with respect to it, our affairs would soon run into a very confused and disagreeable state.

While making this plain statement, we would call the special attention of all our readers to the fact that the present number of our paper is the last but one of the volume, and that, consequently, in one week from this date, nearly all of their subscriptions will expire. After what we have said, we presume they will perceive the necessity of renewing them without delay. This will save us the trouble of crossing off their names from our books, as well as prevent the risk, to them, of losing any of the first numbers of the new volume. No one should miss the reading of a single issue of the SCIENTIFIC AMERICAN, for in that copy, ten chances to one, will be found the very information he has for years been wanting. We have known this to be the case in more than one instance.

We have again to repeat the earnest request made not long since to our subscribers, for their special aid this year in extending the influence of our journal. Times are good, the harvests are abundant, and future prospects flattering. Those who have hitherto hesitated or neglected to supply their minds from the fountain of knowledge offered to them in the pages of the SCIENTIFIC AMERICAN, need not wait any longer.

If each of our subscribers will take the trouble to inquire around a little in his town or village, and show our paper, we presume he will find individuals who will not only be glad to subscribe, but will thank him for the favor done in calling their attention to the work. At any rate those who take this trouble will put us under obligations to them. We therefore trust that each of our old friends, in remitting the money for his own subscription, will endeavor to send with it at least one new name. The increase of our circulation, in any locality by such means, even by a single copy, will be a good deed on the part of whoever accomplishes the same, since the object of the SCIENTIFIC AMERICAN is to improve, to elevate, and to educate the human mind. "Whoever makes two blades of grass to grow where only one before sprang up, is a public benefactor."

We suppose it is almost unnecessary to call the attention of the members of clubs, societies, institutions of learning, and canvassers, to the splendid list of cash prizes which we offer this year as special inducements to their activity. They will of course observe that in addition to the liberal discount offered them by our club rates, they have also the opportunity of competing for those premiums. We trust they will "spread themselves" this year, and see what they can do. The season is propitious, and with a little effort they can procure a host of new names.

We hope readers will excuse us for so often troubling them with domestic matters. But like the parson, we feel compelled to repeat the same notice both afternoon and morning, in order that those who failed to hear on the first occasion will be duly apprised on the next.

The Hon. Abbot Lawrence has left \$50,000 by his will to the Lawrence Scientific School.

The Mason Testimonial.

Annexed we continue the list of contributions to this fund, kindly furnished by S. T. Shugert, Esq., Acting-Commissioner of Patents. It will be perceived that the amount begins to augment very flatteringly.

We would again remind all readers of the SCIENTIFIC AMERICAN who are about to renew their annual subscriptions, that they are at liberty to enclose to our care, any contributions they may wish to make to the fund. This will be more convenient to many than the sending of separate remittances.

The indications are that a very liberal response will be made to the call for this testimonial. The object is an important one; we hope soon to see a large addition of names to the "roll of honor."

SUBSCRIPTIONS TO THE "MASON TESTIMONIAL."

NAME.	RESIDENCE.	AMOUNT
FORBUSH & CROMPTON,		\$10
JAS. M. THOMPSON,		2
G. H. TALBOT,		1
5 GENTLEMEN, who requested their names not to be published,		90
JAS. EMERSON,		2
J. F. MASCHER,		5
Previously received,		81
Total received to Aug. 22, 1855,		\$191

A Large Tailor Shop—American Genius Abroad

We have before chronicled the sale to the French government, for the sum of \$21,000 cash, of the right to use Avery's Patent American Sewing Machine. A correspondent of the New York *Tribune* states that there is a "large Government establishment in Paris, under the orders of the Minister of War, where about two thousand men and women are employed in making soldiers' clothes, tents, and outfits for the army, and about thirty of Avery's sewing machines have been put in operation recently by steam.

The director or superintendent of this large number of operatives and machines is a young American woman—Miss Alice Ames. She possesses a peculiar mechanical genius, being able to see through a sewing machine almost without looking. It is said that no one can operate an Avery machine equal to her. Even the inventor himself has to stand one side. She was employed here by the Avery Company for a long time, and when they began to operate in France she was sent over there. She is now in the service of his Imperial Majesty Napoleon III.

Under Miss Ames's able direction the soldiers are capable of making twenty-five to thirty pairs of pantaloons each per day—a success which has induced the Minister to give a great extension to the operations of this useful invention.

In connection with the sewing machines, the French government has also purchased the right to use another very ingenious American invention. We allude to Harraday's machine for cutting out clothing, illustrated on page 353, Vol. 9, Sci. Am. This invention is at work in the same shop. One machine is capable of cutting out 1000 pairs of pantaloons per diem. The French patents for both Avery's and Harraday's machines were taken out through the SCIENTIFIC AMERICAN Patent Agency.

SPLENDID CASH PRIZES!

The proprietors of the SCIENTIFIC AMERICAN will pay in cash the following splendid prizes for the fourteen largest list of subscribers sent in between the present time and the 1st of January, 1856; to wit:

For the largest List	\$100
For the 2d largest List	75
For the 3d largest List	65
For the 4th largest List	55
For the 5th largest List	50
For the 6th largest List	45
For the 7th largest List	40
For the 8th largest List	35
For the 9th largest List	30
For the 10th largest List	25
For the 11th largest List	20
For the 12th largest List	15
For the 13th largest List	10
For the 14th largest List	5

Names can be sent in at different times, and from different Post Offices. The cash will be paid to the order of the successful competitor immediately after the 1st of January, 1856.—Southern, Western, and Canada money taken for subscriptions. Post-pay all letters, and direct to

MUNN & CO., 128 Fulton st., New York.

See prospectus on the last page.