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TROUBLES INCIDENT TO STEAM BOILERS.

"I don't see what is the matter with my boiler," said a friend recently, "it used to make steam enough, but now it is all I can do to run the engine through the day." Upon having an examination, the mystery was found to consist of ashes in the smoke box and soot in the tubes; simple enough, certainly. The cure was, a shovel and half an hour's labor.

We receive frequently elaborate descriptions of boilers and engines by mail, giving full dimensions of each, with statements of the length of time they have run together, with a request to state (generally by return mail) the cause of their decay and general failure after years of service.

Many people have an idea, apparently, that a steam engine loses some portion of its vitality every year in some unknown way, so that its decline and fall is simply a question of time. This is true where no care is taken of machinery, but, with intelligent supervision, and repairs when needed, a steam engine one hundred years old will be as good as the first day it took steam. It is as unreasonable to expect a steam engine to run continually without repair and inspection, as for a human being to exist without eating. A little reflection would show that if a steam engine has run for a term of years, doing the same work continually, the failure, if there be any, arises from natural causes, and that examination of it by a competent person would be the course to adopt.

It often happens that shafting gets out of line in a shop, and that the machines generally are disordered in their relation with the power which drives them. Where this is the case, lining up the shafting and setting up the machines again would effect a great saving of power and fuel. It also happens that boilers sometimes give out, or cease to make steam freely, from the destruction of the draught.

If one building be erected by the side of another the draught of the chimney will be affected when the wind is in a certain direction, and this in spite of the general cleanliness and good condition of the boiler. The remedy for this is to increase the hight of the chimney or put in artificial draught.

It is also frequently the case where pine wood or bituminous coal is used for fuel that a resinous deposit forms on the inside of the tubes, to the very great detriment of the steaming qualities of the boilers. It is extremely difficult to remove this, as it is composed of soot and resin, and adheres to the iron with great tenacity. A whalebone brush is sometimes employed; also a brush made of steel wire, but these instruments merely scratch the surface of the deposit without removing it. It has occurred to us that a strong, hot solution of potash might be used with good effect in this case, and we recommend a trial of it at least. It cannot hurt the boiler externally, and is so easily tried that it should be.

Another acquaintance, some time since, called our attention to his boiler and engine, the boiler failing to make steam sufficiently, although in size it was ample. The defect here was in the setting. The boiler, an ordinary cylinder, was set on top of two brick walls, as the cover would be laid on a box, and the fire-place was simply a gaping cavern, in the further end of which the throat of the chimney loomed wide and voracious. If all the heat of Vesuvius in eruption were turned under the boiler it would hardly make steam enough in its condition. The steam would have been made in the chimney, for that was where the heat went, and its effect on the boiler seemed more like a passing favor than any actual duty it was bound to perform. When the furnace doors were opened a roaring wind passed through them, and the blaze went far up the chimney. The remedy in this case was to lessen or obstruct the draught; to add a bridge wall five or six feet from the furnace door, and to put a damper in the chimney, so as to arrest the heat when desired.

But lately we received a letter from a party desiring to be informed what size engine a boiler of certain dimensions would drive. He added, on closing, "If the boiler is not large enough it can be lengthened." Not large enough for what? the engine it would drive? This seems like a hasty inquiry.

As has been recently pointed out, the field for improvement is very wide. The proportion of heat utilized to that driven off or lost is very little—hardly one-tenth—and this waste is going on continually. Of course the quantity differs in different boilers, and can be greatly lessened by good management, but that great slovenliness in the use of fuel, and great indifference prevails on the part of proprietors toward getting competent engineers to attend their boilers, is apparent to any intelligent observer.

THE CORN SUGAR PATENTS.

The patents granted to Frederick W. Goessling and his assigns for a process of making sugar from corn and beet roots, are at last issued, and copies may now be obtained by parties desiring them. The unprecedented price for which these patents were sold, and the quantity of matter that has been published in relation to them, has created a wide interest in them; the following brief statement, therefore, of their leading features will doubtless be acceptable to many of our readers:—

On the 10th of May, 1864, two patents were issued, one for a process of making sugar from corn and beet roots, and the other for the sugar thus produced as a new article of manufacture. The specifications describe, first, a process of washing the starch out of corn, then a process of converting this starch into grape sugar. It is the well-known process of steeping the starch in very dilute sulphuric acid, with some slight modifications, one being the introduction of "the extract of potato eyes." Then a process is described of extracting sugar from beet roots. Before granulating the two sirups are mixed together, and after the mixture the sugar is granulated and drained.

It will be seen that the most important feature is the mixture of the two kinds of sugar—the grape sugar, made from starch, and the cane sugar, extracted from the beet root—this mixture being made before the granulation. What virtue there may be in "the extract of potato eyes," and in the other modifications of the modes at present employed for converting starch into sugar, we do not know.

On the 20th of December, 1864, a third patent was granted for a compound sugar made by mixing the sirups of cane sugar and grape sugar, by whatever process these sirups might be produced.

It has been stated, positively and repeatedly, by men of the highest respectability, that the sum of six hundred thousand dollars in cash was paid for these patents; it is certain that the parties alleged to have made the purchase are abundantly able to pay this enormous sum.

CLOSE WEATHER.

During the first days of September the heat has been more oppressive than in any part of the summer, though the temperature, as indicated by the thermometer, has not been as high, by several degrees, as in the warmest of the summer days. Why should there be at different times this difference in the relative effect of heat upon the expansion of mercury, and upon the sensations of the human system? The answer is, doubtless, to be found in the different hygrometric conditions of the atmosphere.

The temperature of the body is prevented from rising above 98° by evaporation. The heat of the system is generated by the slow oxidation—in other words, by the slow burning of the food, and, when it is generated too rapidly, the glands, by some mysterious action, are stimulated to secrete perspiration, which, as it comes to the surface, is evaporated, absorbing and rendering latent 1,000° of heat in the operation, and thus keeping the body cool. When the air is already saturated with moisture, the evaporation is obstructed, and hence the feeling of oppression.

Could the property of matter by which the glands are made to increase their action at 98° be discovered, it might be of great value in the chemical laboratory, and in many of the arts. The power of maintaining a constant temperature of 212° by the boiling of water, is now in daily use in all households, and the power of maintaining without variation a far lower temperature, might be of equally extensive application. It is probable, however, that this property belongs to matter only when organized in animal systems, and will, therefore, never be available to human art.

A HEAVY LOCOMOTIVE.

The Jersey City Locomotive Works have recently completed a very heavy engine for the Atlantic and Great Western Railway.

This engine has some points of novelty in the general arrangement of the details, but the great weight of the machine, and the size of the cylinders, strike every one immediately.

The weight of the engine is 42 tuns, of which 13,800 is on the two small wheels forward, and the remainder on the three pair of driving wheels. The wheels are four feet in diameter, and have Krupp's steel tires. The cylinders are 18 inches diameter by 24 inches stroke, and the steam ports to the same are 1 inch by 14 inches. The exhaust is $2\frac{1}{2}$ by 14.

The drivers are connected, and have flanges on the tires, and the cross-head works on guides, above the piston rod. The guides consist of two steel bars, about $2\frac{1}{2}$ inches square, and the cross-head has a bearing of nearly 20 inches on them. There are brass gibs fitted to the cross-head, but the wear of them is a source of trouble. The boiler has 180 iron tubes, about 12 feet long, and burns soft coal.

The tender weighs twenty tuns, with coal and water. The water capacity is 2,000 gallons, and the coal 6,000 pounds. With this amount of fuel we are assured that the engine can run one division of the Erie Railroad, which, we believe, is 120 miles.

This engine is a fine piece of work, and does credit to the establishment where it was built. Twenty-six of the same pattern have been constructed for different roads. We are indebted to Mr. J. J. Barton, engineer of the Atlantic and Great Western Railroad, for these particulars.

Fair of the American Institute.

We remind our readers that the great fair of the American Institute opens on the 12th of September. Unusual efforts have been made to have this the most extensive and interesting exhibition that the Institute has ever had. It is said that the display of moving machinery will be especially attractive, and will embrace a number of novelties. Full reports of the exhibition will be published in the SCIENTIFIC AMERICAN.

THE CHICAGO TUNNEL.—The distance now reached in the Chicago lake tunnel for the water-works is 3,500 feet, and the work is progressing at the rate of 17 feet a day; the authorities confidently expect a completion of this gigantic labor of tunneling the lake for two miles, and the accompanying works, by the close of next year. The city has over 129 miles of water pipe laid and in operation. The income from the water rates for the last fiscal year was $224,902.