Scientific Museum.

Scientific Memoranda.

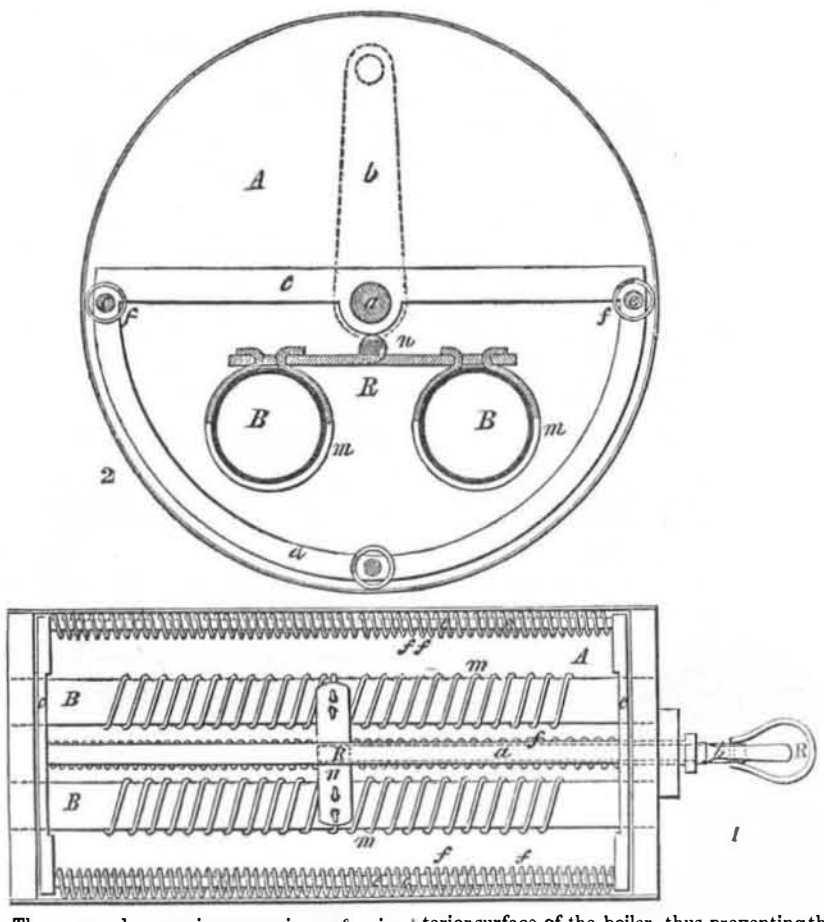
DETECTION OF POPPY OR NUT OIL IN OLIVE OIL.—Marchand gives the following process for detecting this common adulteration. When four drops of olive, poppy, or nut oil are placed separately upon a slab of porcelain, and pure concentrated sulphuric acid added, and mixed with the oils, by inclining the slab from side to side, the following results appear:—Olive oil acquires at the points of contact with the acid, a yellow color, passing into orange; the liquid portion surrounding the magna rapidly becomes a dirty gray, and then a brownish black, while the yellow color first produced by contact with the acid gradually passes into chesnut brown. There is never an appearance of blue or lilac shades. Poppy oil immediately takes, where it touches the acid, a fine lemon yellow, which darkens rapidly in some parts. The liquid part touching the colored part never acquires the dingy gray peculiar to olive oil. In 10 or 15 minutes we may observe, at several points of the liquid region bordering immediately upon the colored part, a rose shade, which quickly passes into bright lilac, increasing in intensity. In half an hour the lilac passes into a violet blue, and the original yellow gradually becomes a dead brown. Nut oil behaves nearly like olive oil, but the yellow matter is more plentiful, forms and turns more quickly, so that it acquires a chestnut brown in less than 10 minutes. Sulphuric acid may be more readily mixed with this oil than with the two former. The gray border characteristic of olive oil is produced here also, but instead of slowly becoming black, it passes rapidly into olive green. It never gives a lilac tint. Mixtures of olive and poppy oils may be tested by the same reactions. In time the colors characteristic of poppy oil—pink, lilac, violet, blue—present themselves in succession with an intensity proportioned to the quantity of poppy oil present. One-tenth part of poppy oil may, according to Marchand, be thus detected.

BI-SULPHATE OF SODA—A SUBSTITUTE FOR CREAM OF TARTAR.—At the present time the cream of tartar is about four times higher in price than it was two years ago, owing, it is said, to the failure of the grape crops in many parts of the world, during the past three years As the tartar is much used in dyeing woolen goods, a good and cheap substitute for it, is of no small importance. This, a German periodical "Deutsche Muster Zeitung," says, has been obtained in the bi-sulphate of soda, and that its use in the dyeing of woolen goods is becoming more general every day, and that it effects a saving of 100 per cent. The colors in the preparations of which it has hitherto been employed are chrome-black, chrome-brown, gray, all fancy colors, green, carmine, blue.—A decoction made in 4 lbs. of the bi-sulphate has the same effect as 4 lbs. of alum and 2 lbs. of tartar; in the dyeing of some colors some alum is, however, still employed. For every 50lbs. of wool to be dyed of a chrome-black, 1lb. of chromate of potash, and ½lb. of the substitute are required. The wool is to be introduced at a temperature of 190° Fahr., then boiled for fifty minutes, and dyed in a fresh bath of logwood, containing, according to the shade, ¼ to ½ lb. of the dye wood to the pound of wool. To dye the same quantity of wool of a chrome-brown, 1lb. of chromate of potash, 1½lb. of substitute, and ½lb. of alum are employed. The wool is boiled for one hour, and then dyed in a bath of Brazil wood; or for yellowish brown and bronze shade, in a bath of fustic, Brazil wood and logwood in certain proportions.

On the Employment of Water in Filling up Deep Bore Holes in Blasting Operations.

In working the great deposit of magnetic iron ore, which occurs under peculiar circumstances in the granite at Moravitza in the Banat, it has been found necessary, in consequence of the hardness of the rock and ore, to use bore holes from 2 to 2½ inches in diameter, and 36 to 40 inches deep. The packing of such holes with clay being a very tedious operation, Mr. A. Keszt endeavored to substitute water for the clay, with considerable success. One of Bickford's safety fuses, which burns in water perfectly, is attached to the cartridge and fastened with thread; this cartridge is let down to the bottom of the hole, and about 1½ to 2 inches of clay firmly packed over it, the remainder of the bore, nearly to the top, being filled with water. In the case of very oblique bores, where the pressure of the water upon the botton was small, he plugged up the orifice of the bore with a plug of wood, driven with considerable force into it, through a slit in which the fuse passed. More recently still he had used instead of a small quantity of clay first introduced, to keep the cartridge from becoming wet, a mixture of tar and pitch, which most effectually preserves the powder from damp. Great numbers of trials have convinced him that the blasts fired with this arrangement lose nothing in force, whilst there is a great saving of time and consequently of expense.—[Osterr. Zeitschrift fur Ber-u-Huttenwesen.

PREVENTING INCRUSTATIONS IN STEAM BOILERS.



The annexed engravings are views of an improvement for preventing incrustations in steam boilers, and increasing the production of steam, for which a patent was granted to John McMullen, of the city of Baltimore, Md., on the 20th of last May (1854.)

Figure 1 is a longitudinal section of a cylindrical steam boiler, and fig. 2 is a transverse section of the same, with the scale preventive attached. Similar letters refer to like parts. The nature of the invention consists in the employment of apparatus for agitating the water in the boiler along its contact with the surfaces of the same, for the purpose of preventing the adhesion of the sediment to the plates of the boiler. Another object of the mechanical action in the boiler, is an increase in the quantity of steam generated by the continual removal of the steam bubbles from the surface of the boiler.

A is the boiler; B B are two tubes passing longitudinally, and *a* is a shaft running longitudinally through the boiler. One end of the shaft may be keyed on the inside of the boiler; the other passes through a stuffing box outside for the attachment of suitable gearing—a crank, *b*, is shown attached. If the boiler is of very large dimensions, one or more hangers may depend from the boiler to sustain the shaft, *a*, at intermediate points. At each extremity of the shaft is a cross bar, *b*, permanently keyed to it; the circular pieces, *d*, are also attached to this bar; these pieces and the bar, *c*, are arranged to be capable of motion with the shaft, *a*, inside, as close to the ends of the boiler as possible, without touching. In case of a number of hangers being employed in a boiler, cross and circular pieces, *c d*, must be placed upon the shaft, *a*, near each hanger. Running between *c d* are bars, *e*, (the number to be decided upon by circumstances,) each covered with a loose spiral, *f*, or any equivalent arrangement, such as chains, instead of spirals and bars. This is the arrangement of apparatus for a plain cylindrical boiler, which will be kept free from incrustations by the alternate revolutions of the shaft, *a*, causing the spirals, or their equivalents, to rub over near the interior surface of the boiler, thus preventing the settling and adhering of sedimentary matter to the metal. Impurities are by this means kept continually mixed with the water, and are blown out at stated periods during the operation of the apparatus.

The tubes, B B, are surrounded by spirals, *m*, connected by a brace, *n*, to which is attached the rod, R, one extremity of which protrudes through a stuffing box in the end of the boiler. The reciprocating motion of the rod, R, caused by a suitable connection with the engine, moves the spirals, *m*, alternately backwards and forwards over the tubes, thus agitating the water surrounding them, and preventing the deposition and adhesion of incrustations.

The general arrangement of apparatus described would require but slight modifications to adapt it to tubular and *many* flue boilers; the principal change required being in the form of the frames *c d*.

The continual action of the spirals near the surfaces of the tubes and the plates, removes steam bubbles as fast as they arise, therefore the interior surface of the boiler is kept in constant contact with the water instead of being separated from it by innumerable bubbles or spheroids, which, as is well known, obstruct the quick absorption of the heat by the water. This improvement, therefore, facilitates the rapid generation of steam.

It has been stated that explosions have sometimes taken place in boilers, in which thick incrustations had been formed, in consequence of the iron becoming red-hot (the incrustation being a good-non-conductor,) then scaling off, and exposing a large highly heated surface to the water, whereby steam was rapidly generated, and a pressure suddenly raised above that which the weakened hot plates could sustain. This invention will prevent explosions from such a cause.

The apparatus can be applied to all cylindrical flue or tubular boilers, and it is especially applicable to marine boilers with lap-welded tubes. In such boilers, a saline incrustation is formed during every voyage; this requires considerable trouble and labor to remove; it injures the metal and shortens its term of duration; the scale obstructs the action of the heat, and thus causes the consumption of more fuel. This apparatus appears to be of great utility for such boilers, by preventing the three evils specified; it should therefore receive the prompt attention of every steamship company in our country. In flue boilers, with stay bolts irregularly arranged, this apparatus could not well be applied.

It is well known that much trouble is experienced in almost all boilers. especially when the water is impure, and in locomotives which are fed with different kinds of water; this apparatus by agitating the water, will prevent foaming, and consequently priming.

If the water falls below the water line in the boiler, the action of the spirals, will keep what would otherwise be an exposed surface, continually wet, even when the water falls considerably below the line by throwing the water over such surface, and thus it will prevent the frequent explosions from water getting below the water line.

It is a singular fact, that while many chemical compositions and substances have been tried and proposed, to prevent incrustations in steam boilers, that this, to us, should be the first mechanical apparatus applied for such a purpose. The principle of the invention is a correct one, and the objects proposed to be accomplished by the inventor are such as every intelligent engineer, and owner of a steam boiler cannot fail to appreciate.

More information may be obtained by letter addressed to the patentee, No. 73 South street, Baltimore.

New Cure for Burns.

Mr. A. Bronson, of Meadville, Pa., says, from fifteen years' experience, he finds that Indian meal poultice covered over with young hyson tea, softened with hot water, and laid over burns or frozen flesh, as hot as can be borne, will relieve the pain in five minutes. If blisters have not arisen before they will not after it is put on, and that one poultice is generally sufficient to effect a cure.