

White Paste which will adhere to any Substance.

Make the following mixture:—Sugar of lead, 720 grains; and alum, 720 grains; both are dissolved in water. Take 2½ ounces of gum-arabic, and dissolve in two quarts of warm water. Mix in a dish one pound of wheat flour with the gum water cold, till in pasty consistence. Put the dish on the fire, and pour into it the mixture of alum and sugar of lead. Shake well, and take it off the fire when it shows signs of ebullition. Let the whole cool, and the paste is made. If the paste is too thick, add to it some gum water till in proper consistence

Practical Memoranda.

To Prevent Rats from Damaging Leather Belting.

It is not an uncommon occurrence in factories where steam power is used, that during the night, or periods that the machinery is stationary and the shop abandoned, the rats will eat the leather belting, where it is accessible to them; for instance, where it passes through openings in the floor; cases have even happened that they gnawed holes in the floor just over the place where a belt was running horizontally in order to reach and eat pieces out of it.

Now, it is a singular fact that rats will not touch anything containing castor oil, or even only covered with it, and, therefore, to guard belting against the voracity of these animals, all we have to do is to touch it at every place where belting is exposed to their attacks with a brush previously dipped in castor oil.

The antipathy of the rats against this useful oil is really strange. Probably their instinct teaches them that it is injurious to them; but it is useful for man to know this in order to guard many substances against their voracious appetite.—*Scientific American*.

To keep Mercurial Steam Gauges Perfectly Clean Inside.

General experience has shown that the mercurial steam gauges in the course of time often become dirty in their interior by mercury and its oxide adhering to the glass, so that it is very difficult to see the position of the surface of the mercury. The consequence is, of course, an uncertainty as to the amount of steam pressure. A simple and very effective remedy is, to bring on the surface of the mercury a little glycerin, this serves as a lubricator for glass and mercury, covering the surface of both, preventing their immediate contact, and consequently all adhesion, and keeping it always clean and bright. This simple remedy is spoken very highly of by all who have tried it.—*Ibid*.

Notes on Steam Engines & Boilers.

One of James Watt's engines, the second erected by Boulton and Watt in London, is still in excellent working order at Messrs. Coombe, Delafield & Co.'s brewery, Long-acre. It has a 24-inch cylinder, and 6-foot stroke, and works at a pressure of 10 lbs. per square inch.

As bearing upon the probability of steam boiler explosions by the admission of water upon heated iron, a simple experiment will show that the heat contained in a given mass of red-hot iron is insufficient to convert any part of its own weight of water into steam. A pint claret bottle may, when filled with cold water, be safely held in the hand while a red hot poker is thrust into it. If care is taken to keep the hot iron from actual contact with the glass, the bottle will not be cracked, and there will be no disengagement of steam.

The brasses of paddle-shafts always wear most on their forward sides.

Four steam engines were in existence in the year 1714, two of them being employed in the coal mines near Newcastle.

Cast-iron boilers were formerly extensively employed, and at the present time many boilers at work on the island of Cuba and elsewhere have flat cast-iron ends, although the boilers of 45-inch diameter are worked under a pressure of from 60 lbs. to 80 lbs. per square inch.

The seventh division of James Watt's patent of 28th of April, 1784, describes a steam carriage intended probably for common roads. The boiler was to be of wood, strongly hooped to prevent bursting, and having an internal metal vessel containing the fire.

Less coal is frequently consumed in steam vessels by working three, instead of two, boilers out of four, when it is desired to go under half power. This fact proves the advantage of large heating surfaces.

The application of felt to the outside of marine boilers has been sometimes found to accelerate their internal corrosion.

Not only is the resistance of tubes to collapse inversely as their length, but the resistance of cylindrical boilers to rupture from internal pressures bears some proportion, although contrary to that of their length. A cylindrical boiler, when subjected to gradually increasing pressure, yields first at the middle. It is believed by many that the strength of cylindrical boilers would be very considerably increased if hoops were shrunk at intervals around them.

A boiler, 3 feet in diameter, with plates of ¾-inch iron, will burst at a pressure of 708 lbs. per square inch.

Dr. Ernest Alban at one time worked a steam engine, in London, to a pressure of 1,000 lbs. to the square inch.

Steam boilers constructed of wood were at one time employed to some extent.

Steam was conveyed in pipes to a distance of over 800 feet to drive engines which worked in the Great Exhibition.

The Giffard injector, when supplied with steam of 25 lbs. per square inch from one boiler, has forced water into another boiler against a pressure of 48 lbs per square inch.—*Engineering*.

The velocity of the sun has been estimated at 422,000 miles per day.