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THE FIRMENICH SAFETY STEAM BOILER.

The annexed engraving represents the Firmenich safety boiler, which is claimed to contain a number of important advantages, and which, according to records of actual tests at the Centennial Exposition and elsewhere, has given successful results.

In Fig. 2 are illustrated the essential portions of a seventy-five horse power boiler of this type, from which the general method of construction will be understood. The mud drums, A, are connected by systems of slightly inclined tubes with the steam and water drums, B B. Through the space left between the tube section, at C, the bridge wall rises, and its effect is to cause the gases of combustion to take a course from the fire box upward over this wall, and then downward in the rear compartment, escaping through the smoke box into the chimney. The mud drums, heating tubes, and lower half of drums, B B, are filled with water, which is thus distributed over a large number of small spaces, the object of which is the heat resulting from combustion.

In Fig. 1 we represent two 150 horse power boilers of this system as put up for the Niagara Starch Works, of Buffalo. In the SCIENTIFIC AMERICAN of January 27, 1877, we represented this boiler incased in brickwork; it is now incased in a sheet iron jacket, as shown. This is stated to be cheaper and to occupy less room than the massive brickwork. A layer of brick is first placed around the boiler proper, and the space between this and the jacket is filled with ashes or other non-conductor.

In the large boilers there are two steam and water drums, and one steam drum above the tubes; in smaller ones of 50 horse power and below, only one drum is used. The lower or mud drums vary in diameter from 12 to 24 inches, and the upper ones from 27 to 40 inches, and in length from 6 to 18 feet, according to the capacity of the boiler. The heating tubes are from 2 to 3 inches in diameter, and from 3 to 16 feet long, arranged in two or three rows, expanded in the mud drums and water drums in the usual way. Large manholes are provided in all the drums to admit of easy access to the interior of the boiler.

Among the advantages claimed by the manufacturers are chiefly safety and economy. The boiler is made up entirely of tubes and small drums, to secure strength. It will also be observed that no part of the boiler is exposed to the intense heat of a small furnace, and that the furnace really constitutes the whole of the boiler, the heat being diffused over an exceedingly large surface, with the object of obtaining equality of expansion. The water tubes, in short, constitute the sides of the furnace. A perfect circulation is claimed to exist; a downward current taking place in those tubes most remote from the source of heat, causing the greater part of the scale to drop in the mud drums, from which it can be conveniently removed. As regards economy the Firmenich boiler, at the Centennial Exposition, produced, we are informed, the hottest and greatest quantity of steam per pound of anthracite coal. The cause of this economy the manufacturers state to be the large fire chamber, where more perfect combustion is secured than usual by giving ample room for the gases issuing from the coals to intermingle with the atmosphere. Their

combustion is not arrested by coming in contact with the relatively cold surface of the boiler containing water. The temperature of a boiler furnace is about 2,000° Fah., while that of steam and water at 70 pounds pressure is but 316°.

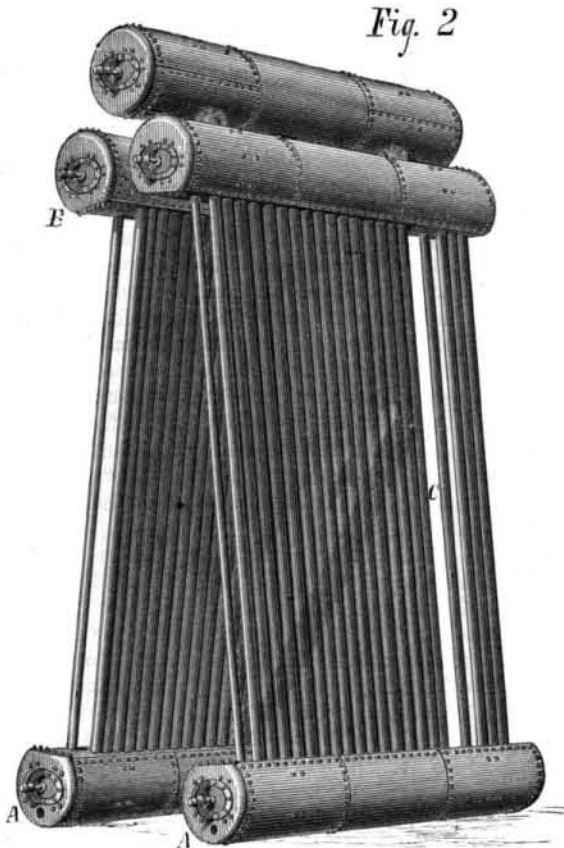


Fig. 2.—THE FIRMENICH SAFETY STEAM BOILER.

Through the room afforded combustion is effected before the gases reach the water surfaces. This the makers believe to be the very best arrangement for absorbing heat rapidly and properly, allowing perfect circulation of both steam and water, and never requiring cleaning from soot or ashes;

the soot being actually consumed, and the ashes falling back on and through the grate into the ash pit. A large number of boilers of this description have been in use, we are informed, for years, and are never cleaned, making steam as well as on the day when first put up.

Although the Centennial test was made with anthracite coal, these boilers are especially designed for burning soft slack coal, as economy consists also in using cheap coal, a point of some importance when one costs 50 per cent more than the other.

For further information address the manufacturers, J. G. & F. Firmenich, 13 Mortimer street, Buffalo, N. Y.

Turpentine as an External Application in Small-pox.

Dr. Farr, in a communication to the *Lancet*, states it as his opinion that body disinfection in the treatment of infectious fevers is not nearly so strictly observed by medical men as its importance demands, and calls attention to the great prophylactic value of rectified spirits of turpentine as an external application in small-pox. He states that it at once relieves any smarting or irritation, effectually corrects the unpleasant odor given off in the more confluent form of the disease, and seems in a marked degree to arrest pustulation, and so modifies to a great extent, and in some instances prevents entirely, pitting. Its powerful antiseptic and disinfectant properties, too, are indisputable; and in this it possesses an additional advantage in preventing the spread of the infection. He used it with great success in the epidemic of 1871-2; and since then it has been used with most satisfactory results by others. It should be applied every night and morning by means of a feather, in the proportion of one part of the turpentine to four of olive-oil. Dr. Farr believes that if this plan of antiseptic inunction were carried out in all cases, the mortality from that loathsome and dreaded disease, small-pox, would be considerably reduced, and its ravages proportionately checked.

The Virginia Gold Mines.

Mr. J. E. Emerson, a valued correspondent of this journal, who has recently visited the Spottsylvania (Va.) gold mines, sends us a communication calling attention to the necessity of some improved process for saving the fine gold which is covered or incased with iron. As in this condition it cannot be amalgamated it goes to waste and only the coarse gold is saved. Mr. Emerson says he was at an abandoned quartz mill

where thousands of tons of quartz tailings remain, and by washing down a sample of this, heating it, treating with sulphuric acid, amalgamating the residue, he obtained a fine specimen of amalgam gold. The miners are now sluicing off the surface in California style and are taking sufficient gold to pay. One lump of pure metal weighing 100 pennyweights was recently found.

A narrow gauge railroad runs within three miles of where the principal mines are now being worked about 20 miles in a westerly direction from Fredericksburg. The gold belt is the continuation of the North Carolina one, and covers a vast region of country. It also contains other valuable minerals, consisting of beds of iron ore and copper, lead, and other sulphurets in superabundance.

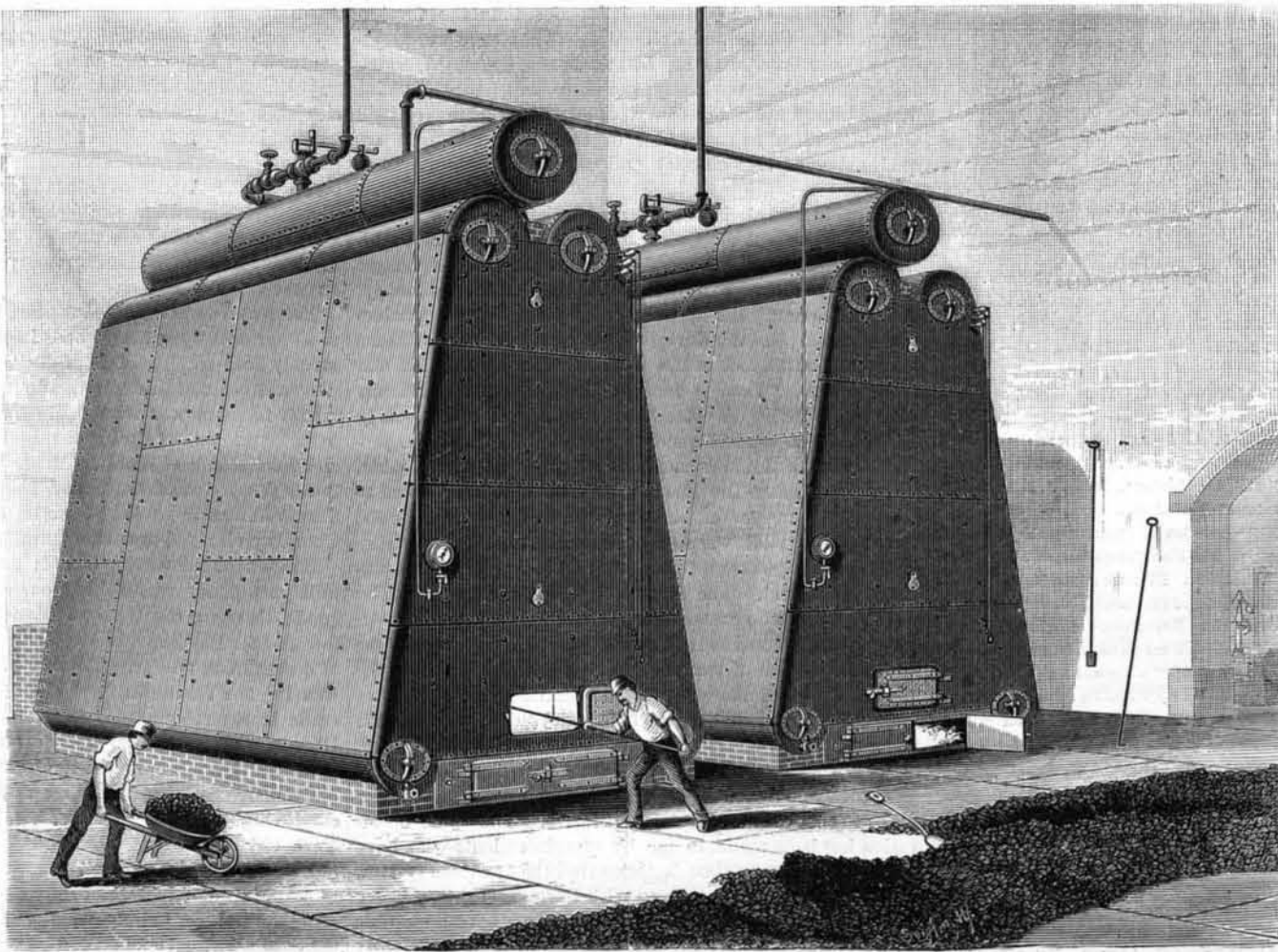


Fig. 1.—THE FIRMENICH SAFETY STEAM BOILER.