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IMPROVEMENT IN STEAM BOILER FURNACES.

The engraving shows what the inventor calls a rational construction for generating steam. And the reason why it is called a rational construction is because it utilizes heat that is wasted and lost in all other forms of steam boilers set in brick.

On the side walls of an ordinary boiler set in brick, and on the side of the grate bars, there are some sixty square feet of surface, that absorb fifty per cent. of the fuel.

If the users of steam boilers, as usually set, realized the full value of their fuel, they would, in most cases, be able to evaporate at least fourteen pounds of water to each pound of coal consumed, whereas, with imperfect construction and setting, it is a rare thing to find them that evaporate (allowing for dry steam) over seven pounds of water for each pound of fuel. To overcome this deficiency in the imperfect setting of steam boilers, Mr. Chas. D. Smith—who is connected with the house of Edward Barr, 78 John-street, New York City—has invented and constructed a furnace that has been applied to a large number of boilers, both new and old, and with great success.

Three years ago, two boilers, with furnaces attached, were placed at Lord & Taylor's, corner of Twentieth-street and Broadway. The chief engineer, Mr Scott, who has been in charge for eleven years, states that the furnace effects a saving of 28 per cent. in fuel alone.

The improvement has also been applied in the brewery of Donald Smith, on Eighteenth-street and Eighth Avenue, with the same results.

The improvement has also been adopted by the following large corporations:—Cambria Iron and Steel Works, Johnstown, Pa.; Merchants' Mills, of Fall River, Mass.; Manhattan Silver Mining Company, of Austin, Nev.; George Elvret, brewer, New York, who, after using it for three years, applied it to all his boilers. Many others have adopted it.

The judges' report of the test of steam boilers at the Centennial Exhibition in Philadelphia, 1876, shows that the application of these water walls to a horizontal tubular boiler gave

a higher evaporation by over 12 per cent., with an increased capacity of 74 per cent. over any other boiler competing in the test, showing that the fuel generally wasted amounts to 65 per cent. of the amount used.

Further information as to construction, operation, etc., may be obtained by addressing Mr. E. C. Hopkins, sole agent for the Dominion, 145 St. James-street, Montreal.

BLAKE'S CHALLENGE ROCK BREAKERS.

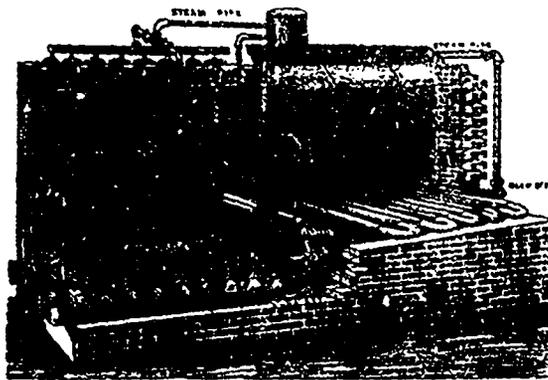
The construction of the machine is shown in the engravings, and its operation will be readily understood. A three-sided framework of cast iron, with broad flanged base, holding the movable jaw in suspension, forms the front part of the machine, between the upright convergent jaws of which the stone is crushed.

The jaw shaft is held in place by wrought iron or steel clamps, C, which serve to take part of the strain due to crushing in the upper part of the jaw space, and also serve as walls thereof. In the lower part of the three-sided frame or front part of the crusher, and on each side of it, are holes in the casting to receive the main tension rods which connect the front and rear part of the machine. The rear part, B, is called the main toggle block, and is also provided with holes

for the tension rods, R R, corresponding to those in the front casting.

These two parts of the machine are connected by the main steel tension rods, R R, each provided with screw thread and nuts, by which their lengths and the jaw opening are readily adjusted to crush coarse or fine, as may be desired.

The front and rear castings are supported on parallel timbers to the under side of which are bolted the boxes carrying the main eccentric shaft, provided with fly wheels and pulley. The timbers are thus made component parts of the machine, and take the transverse strain which comes upon the pitman connecting the main shaft and the toggle joint placed in the rear of the movable jaw, and between it and the main toggle block.



IMPROVED STEAM BOILER FURNACES.