

SMOKE CONSUMING FURNACE.

In our issue of August 22 last, we described an admirable smoke consuming furnace devised by Mr. John L. Peslin, of Appleton, Wis. Though it was susceptible of some improvements in the minor details, its construction embodied the correct principles of the chemistry of combustion. Since that time, Mr. Peslin has been at work making these improvements, and in the modified form illustrated in our present issue he has incorporated them in a construction applied to a battery of boilers. It will be noticed that the feeding is effected from the front instead of from the top, as formerly.

We show the end boiler of a battery, with the front plate broken away in order to disclose the construction. The grate bars immediately under the boiler are made with a straight pitch, and incline toward the center. At their upper ends they are in line with step grates of fire-clay, which receive the fresh fuel. These in their turn terminate against the sheet metal forming the sides of the smoke chamber. A cast iron guard, of curved cross section, extends over the top of this chamber to prevent the fuel from falling through into the ash pan. The fresh coal is introduced into the chamber over the step grate, where the heat is sufficient to partially coke the coal. The smoke and volatile products given off, instead of finding their way to the stack, are drawn into the smoke chamber by a downward blast of steam. They then pass under the grate and through the layer of burning coals, where they are thoroughly consumed, the gases being ignited and the suspended particles of carbon brought to the temperature of combustion. The fuel, now deprived of its smoke producing constituents, is ready to be brought upon the grate. This is effected by turning a lever that tilts the step grate into the position shown at the right hand of our engraving, by which the coke is thrown into the zone of combustion. A weight on the end of the lever counterbalances the grate and fuel, making this operation easier for the fireman.

Such an arrangement of the furnace insures the combustion of every part of the fuel, utilizing its entire heat energy, and at the same time preventing the smoke nuisance. It gives the advantages of coke and the heat economy of coal.

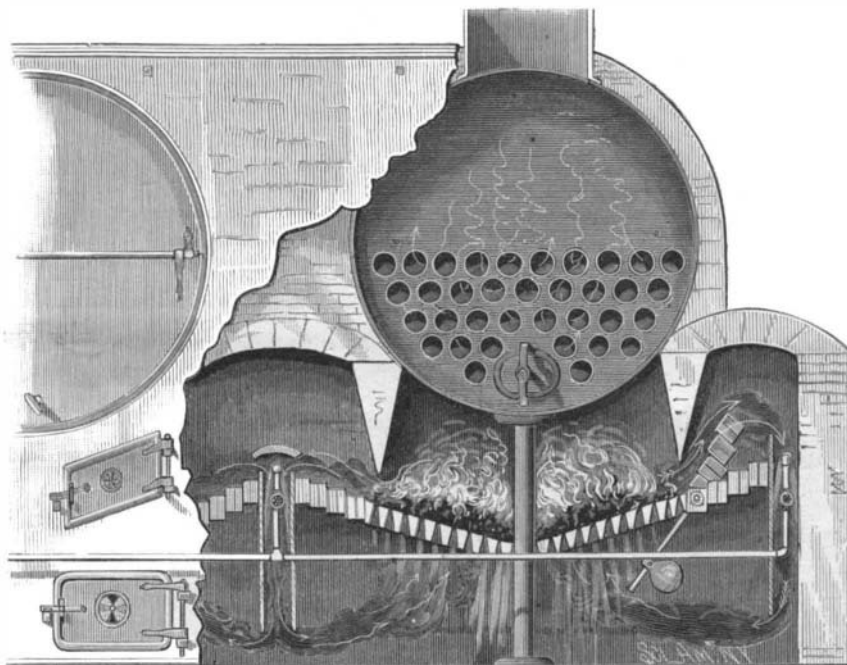
Oldest Habitations in America.

Major Powell, Chief of the Geological Survey, who has been about a month in the field, has discovered in New Mexico, near California Mountain, what he pronounces to be the oldest human habitation upon the American continent. The mountains in this vicinity are covered with huge beds of lava, in which the prehistoric man and his comrades excavated square rooms, which were lined with a species of plaster made from the lava, and in these rooms were found various evidences of quite an advanced civilization, among them a species of cloth made of woven hair and a large number of pieces of pottery. In the sides of the rooms cupboards and shelves were excavated. In one room, sticking out of the bare face of the wall, was a small branch of a tree. When this was pulled out, it was found that there was a hollow space behind the wall. Colonel J. H. Stephenson, Major Powell's assistant, broke this with a pick and found a little concealed niche, in which was a small carved figure resembling a man done up in a closely woven fabric, which with the touch of the hand turned to dust. It was blackened and crisp, like the mummy cloths of Egypt. In all, some sixty groups of these lava villages were found, there being twenty houses in each group. The evidences of civilization were similar, but removed

by their crudity and want of skill a good deal from the articles found in the cliff houses.—*Santa Fe New Mex.*

A New Island in the Pacific.

The United States Consul in Samoa has advised the Merchants' Exchange of San Francisco that a new



PESLIN'S SMOKE CONSUMING FURNACE.

island has been thrown up in the Pacific Ocean. It is about forty miles off the Tonga group, bearing toward the Fiji Islands. Its appearance has a practical importance, since it is in the track of California vessels. The island is two miles long and 250 feet high. It is in latitude 20 deg. 28 min. south, and longitude 175 deg. 21 min. west.

THE CONTRACTOR'S CRANE.

A new portable crane, embodying all the essential features which should be present in an apparatus of this class, and which are here combined with lowness in price, has recently been brought out by Messrs. Alex-

ander Shanks & Son, London, Eng., and Dens Iron works, Arbroath. From an inspection of our engraving, for which we are indebted to *Iron*, it will be seen that the carriage on which the crane rests is formed of one strong casting—an arrangement which secures rigidity

in working, and is thereby a decided improvement over the more yielding wrought iron carriage. The sole plate which carries the boiler, and to which the side frames are bolted, is also one strong casting. The engine has two cylinders placed horizontally on the sole plate, and motion is communicated to the crank shaft by connecting rods in the usual way. The center post on which the crane turns is of wrought iron. Link motion for reversing is provided. The cranes are made to hoist or lower and turn round by steam, the two motions being performed simultaneously if desired. A powerful friction brake is provided, by means of which the load may be suspended or lowered. The crane is fitted with single motion, and lifts its maximum loads by double chain.

The same speed of lift can be attained in this way as by double gear and single chain, and the former arrangement possesses the advantage of having fewer working parts and clutches than the latter, and less liability to derangement. A separate and larger winding barrel, 14 inches diameter and 14 inches long, can be provided if required. This barrel can be attached to the crane barrel in a few minutes, and by means of it light loads can be raised by single chain at a very quick speed.

The crane has thus the advantage of the following variations in the speed of lifting its load, which in practice will be found of the utmost convenience, viz.: By double chain, the maximum load can be lifted at about 40 feet per minute; by single chain, half the maximum load at about 80 feet per minute; and by the barrel of larger diameter lighter loads can be lifted at about 160 feet per minute. The boiler, a most important part of a steam crane, has large heating surface, and steam can be kept up without extra effort in firing.

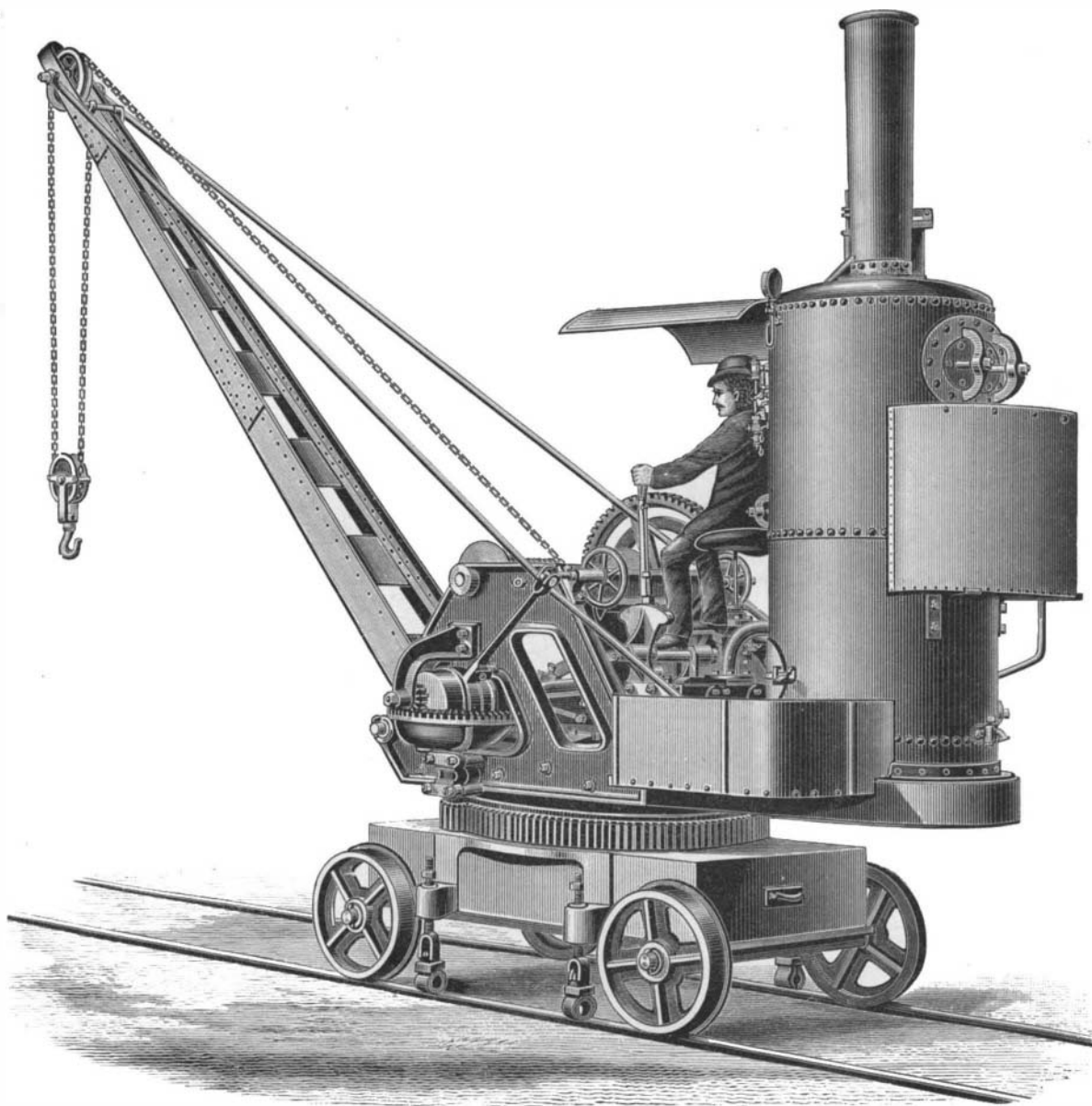
A water tank is attached to the boiler, which is fed by means of an injector. The jib, which has a radius of 16 feet, at an angle of 45°, is of wrought iron. A small canopy is provided to protect the driver, is within easy distance of the starting handles, and at the same time commands an uninterrupted view of the hoisting chain.

New British Army Service Rifle.

The decision of the committee which was appointed some time since to consider what form the new military rifle should take is that the diameter of the bore is to be 0.40 inch in place of the 0.46 inch of the Martini-Henry, and the weight of the bullet is to be reduced 96 grains, being 384 grains in place of the old weight of 480 grains. The powder charge, however, remains as before, namely, 85 grains. There will be 9 grooves in the rifling in place of seven as before, and the pitch will be 15 inches in place of 22 inches. The muzzle velocity will, by these means, be increased 255 feet a second, that is to say, from the original 1,315 feet per second to 1,570 feet per second. The practical advantage that will follow will be that the trajectory will be so far lowered, and at 500 yards the bullet would not go much, if any, above the head of an average soldier if fired from the ground. In the old rifle the rise would be between 8 feet and 9 feet in the same distance.

The recoil is said to be much less with the new weapon, and, to judge by trials made, accuracy of shooting generally has been far more nearly approached than before.

Trials are yet to be made with a view to determining whether it will be advisable to add a detachable magazine to the arm.



THE CONTRACTOR'S CRANE.

GAS was struck a depth of 50 ft., near Cameron, N. Y.