

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.

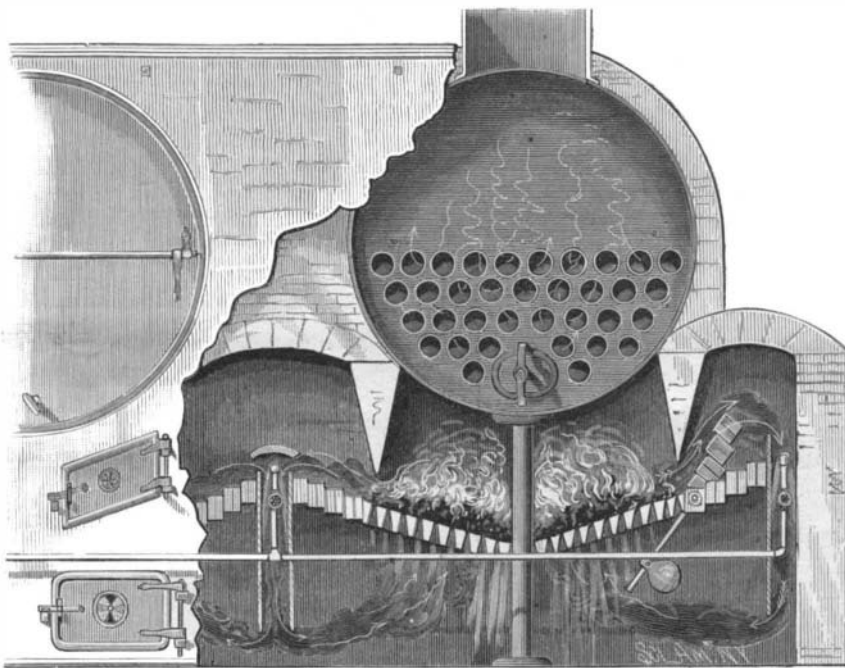
Oldest Habitations in America.

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 Ironworks, 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.

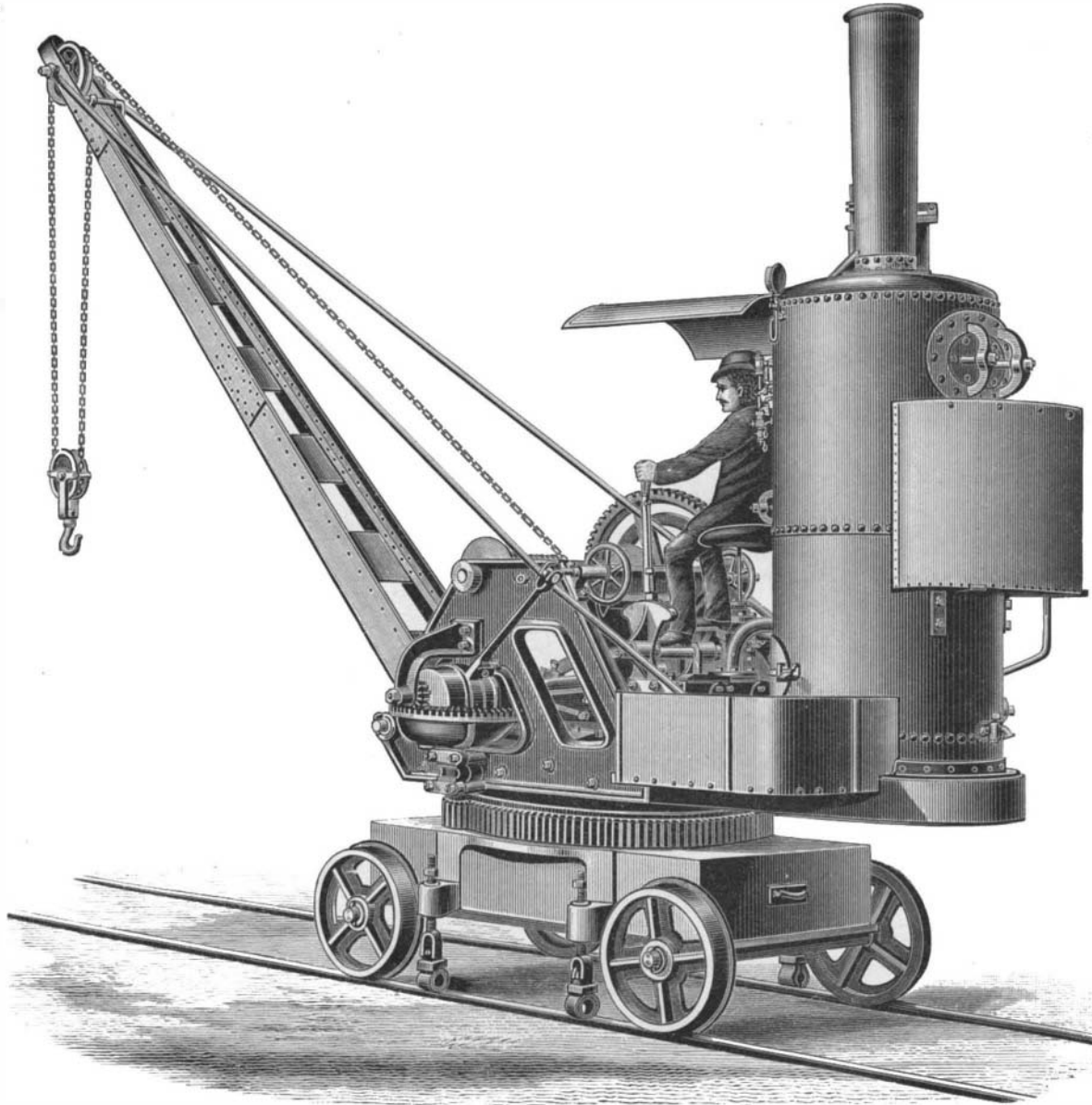
A water tank is attached to the boiler, which is fed by means of an injector. The jib, which has a radius of 16 feet, at an angle of 45°, is of wrought iron. A small canopy is provided to protect the driver, is within easy distance of the starting handles, and at the same time commands an uninterrupted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

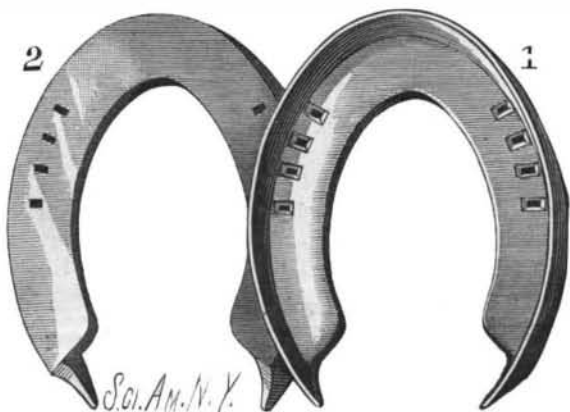
GAS was struck a depth of 50 ft., near Cameron, N. Y.

The Proper Weight of Man.

Professor Huxley asserts that the proper weight of man is 154 lb., made up as follows: Muscles and their appurtenances, 68 lb.; skeleton, 24 lb.; skin, 10½ lb.; fat, 28 lb.; brain, 3 lb.; thoracic viscera, 3½ lb.; abdominal viscera, 11 lb.; blood which would drain from the body, 7 lb. The heart of such a man should beat 75 times a minute, and he should breathe 15 times a minute. In 24 hours he would vitiate 1,750 cubic feet of pure air to the extent of 1 per cent. A man, therefore, of the weight mentioned should have 800 cubic feet of well ventilated space. He would throw off by the skin 18 oz. of water, 300 grains of solid matter, and 400 grains of carbonic acid every 24 hours; and his total loss during that period would be 6 lb. of water and a little more than 2 lb. of other matter.

AN IMPROVED HORSESHOE.

The improved form of horseshoe shown in our illustration is the invention of Mr. James S. Charles, lock box 694, Omaha, Nebraska. In the first figure the under side of the shoe is represented, and in the second the top view. The body of the shoe is provided with a continuous, vertical flange, which has its edge sharpened and hardened by means of a new process devised by the inventor. The flange extends somewhat beyond the ends of the main body of the shoe, and is beveled into a sharp point. This feature is intended to give the shoe a greater hold on the roadway than can be obtained by the ordinary construction. The nail holes formed in the web are countersunk, as shown. They have their longer dimensions radiating toward the center, so that the thin part of the nail shall enter the hoof in the direction of its fiber, and do as little injury as possible. By driving the nail in the line of least resistance, the labor of shoeing is reduced, and there is less danger of splitting the hoof. While this form of nail hole is not essential to the invention, it is regarded



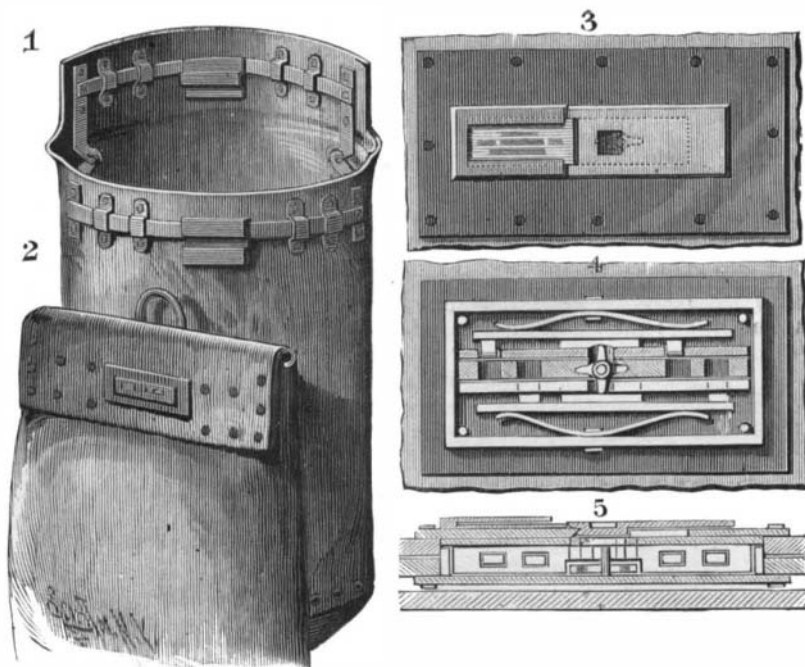
CHARLES' IMPROVED HORSESHOE.

as much the preferable construction. Should it be desired, however, the shoe may be made with the ordinary openings.

IMPROVED MAIL BAG AND LOCK.

The accompanying illustrations show a mail bag and lock designed to do away entirely with the long strap, the staples, and the padlock heretofore used, substituting a lock which becomes a part of each mail bag, and is never detached therefrom. Figs. 1 and 2 show the bag open and closed, Fig. 3 is an enlarged face view of the lock, Fig. 4 showing the same with the front plate removed and parts shown in section, while Fig. 5 is a longitudinal sectional view. The bag has springs on the inside of the flap, and permanently attached thereto, to keep the mouth of the bag open when the flap is raised, thus holding it in the best position to facilitate the emptying and filling of the bag with mail matter. The lock is simple in construction, and perfectly solid when closed, so that if run over by a wagon it will not be injured. It is difficult to pick or force open in any way the locking bars carrying lugs, and being pressed by springs against recessed partitions of the lock casing. On the top surface of the front plate undercut ribs are formed for receiving and holding a ticket on which may be printed the station to which the pouch is to be returned, or the postal division, etc. The lock casing is attached to one flap of the bag, and the top plate to the other. The bag is locked by a slight pressure on closing, and the lock, springs, hinges, and swivels surrounding the mouth of the bag cannot be cut or removed by any ordinary means. This improvement is applicable, at but moderate cost, to all the old mail bags, while it can be applied to all new ones at an expense not to exceed that incurred for the present unsatisfactory fastenings.

These inventions have been patented by Mr. Dennis P. Brophy, of Nokomis, Ill.



BROPHY'S IMPROVED MAIL BAG AND LOCK.

Access to the back combustion chamber is had by means of a manhole in the rear head of boiler, through which the exhaust nozzles and lift pipes are put in position. The lower or 2 in. tubes are arranged as in the ordinary locomotive, while the upper or 3 in. tubes are grouped around the dry pipe as it passes from the

STOCK AND COLLAR.

This invention particularly relates to stocks and collars such as are used by clergymen, in which a band-like collar, designed to encircle the neck and opening at the back, is used and combined with a stock usually made to present a black fall in front and to expose a portion of the collar above it. One end of the collar is formed with a pocket that receives the other end when the collar is placed around the neck. This construction forms a ready means for putting the collar on and taking it off, and also gives an easy or yielding fit, and adapts it to different sized necks; it also provides for expansion of the collar without exposing a break where the two ends meet. An inner encircling spring serves to support the collar and give it elasticity circumferentially. This spring forms part of the stock, the material of which covers it; one end of the spring enters a socket in the other end. The stock is also made with an outer black strip, above the fall, arranged to encircle or partly encircle the collar, which is exposed above it. The collar and stock are held firmly together, but may be easily separated when necessary. It will be seen that the stock and collar present a neat appearance, and the latter is free from the unsightly break so common in articles of this description.

This invention has been patented by Mr. B. J. Kolb, of Glandorf, Ohio.

The Coventry Locomotive Boiler.

At a recent meeting of the Engineers' Club at Philadelphia, Mr. John T. Boyd presented an illustrated description of the "Coventry" locomotive boiler, which is probably the latest novelty in locomotive construction.

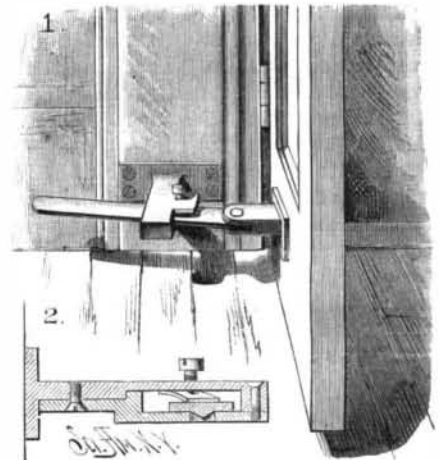
It was built at the Brooks Locomotive Works, Dunkirk, N. Y., and placed on one of their standard 17 in. by 24 in. engines, with 61 in. drivers. The economy of the boiler as a steam generator has not been made public, but while in service on the New York division of Penna. R.R. it has proved to be almost absolutely free from smoke and cinder discharging qualities. The boiler is of the straight top return tubular type, is made of Otis steel throughout, and is remarkable in having but two barrel sections, excluding the smoke box. The stack is "behind instead of before," and is located over the front end of what might be called the upper crown sheet, which forms the bottom of the back combustion chamber, which is directly over the fire box, the stack itself rising from top of boiler between the cab and dome. The crown sheets are self-sustained by long stay bolts opposing the pressure in inside of boiler.

dome to the "T" head in smoke box. In order to get the exhaust steam from the cylinders into the stack, side pipes, provided with expansion joints after leaving the smoke box, are placed outside of but close to the boiler jacket, and enter the back combustion chamber close to the base of the stack.

The throttle lever is turned "upside down" to get a pulling motion to open the throttle, and the rod is forked to pass around stack at its base in order to reach the bridge pipe at dome. The steam supply for injectors, air brake pump, heater cocks, cylinder oilers, blower, etc., is brought from bridge pipe in two pipes, one on each side of boiler. The mud ring in water leg is shaped to take the curved sides of the back head, and allow the outside side sheets of the fire box to lie straight against the edge of the ring, thereby reducing "scarfing" the edges of the back head to a minimum, if not dispensing with the "scarfing" altogether. The boiler is 61 in. in diameter, 23 ft. 4¼ in. long, and is of ½ in. steel. The barrel contains 152 2-in and 43 3-in. tubes, each 11 ft. 5½ in. long. The fire box is 5 ft. 10 in. long by 34 in. wide, and crown sheet about 4 ft. above grates. Total heating surface is about 1,265 sq. ft. Weight of boiler alone is 23,000 lb.

DOOR CHECK.

The device herewith illustrated holds the door open when desired, and yet does not interfere with the opening and closing. Secured to the door frame, near the floor, is a plate from which a flat jaw projects horizontally, the top of the jaw being provided with a lug projecting toward the door. In the jaw is an opening, through which is passed a flat bar, one end of which is pivoted in jaws projecting from a plate secured to the door. In the bottom of the opening is a hole for receiving a beveled nipple on the under side of the bar,



MAURER'S DOOR CHECK.

as shown in the sectional view, Fig. 2. A flat spring provided with an adjusting screw presses the bar down. When the door is being opened or closed, the bar slides through the opening; and when the nipple enters the opening, it is pressed into the hole by the spring and the door held. By exerting sufficient power the nipple can be pulled out of the hole, when the bar is free to slide in the opening. The pressure of the spring on the bar produces enough friction to prevent the door swinging too easily. The door can be held open more or less by placing the nipple at different distances from the end of the bar.

This invention has been patented by Mr. Adam Maurer, of 210 Elm Street, San Antonio, Texas.

Caution to Amateur Electricians.

Certain printed instructions for the preparation of the chromic acid solution for batteries direct that the sulphuric acid be poured into hot solution of potassium dichromate; unless this be carefully done, small portions of the oil of vitriol may be projected into the face of the operator. Bunsen's method is preferable; mix the dichromate, in granular form, with the sulphuric acid, then add cold water, with continued stirring; the union of the acid and water generates sufficient heat to speedily effect the solution of the salt.

Carp Planted in Rivanna River.

On June 25, 1885, Colonel M. McDonald took from the carp ponds at Washington seventy-five thousand carp from three to ten days old, and deposited them without loss at Charlottesville, Va., in the Rivanna River. The oldest of the fish were from 1¼ to 1½ in. in length.

Only a few of the fish died in transit. The river selected is a muddy stream containing no other fish, except suckers. The dams below Charlottesville prevent the ascent of bass and other predaceous fish from the James River.—*Bulletin U. S. Fish Commission.*