

No. 895,679.

PATENTED AUG. 11, 1908.

T. J. PORTER.
HEATING APPARATUS.
APPLICATION FILED OCT. 30, 1907.

Fig. 1.

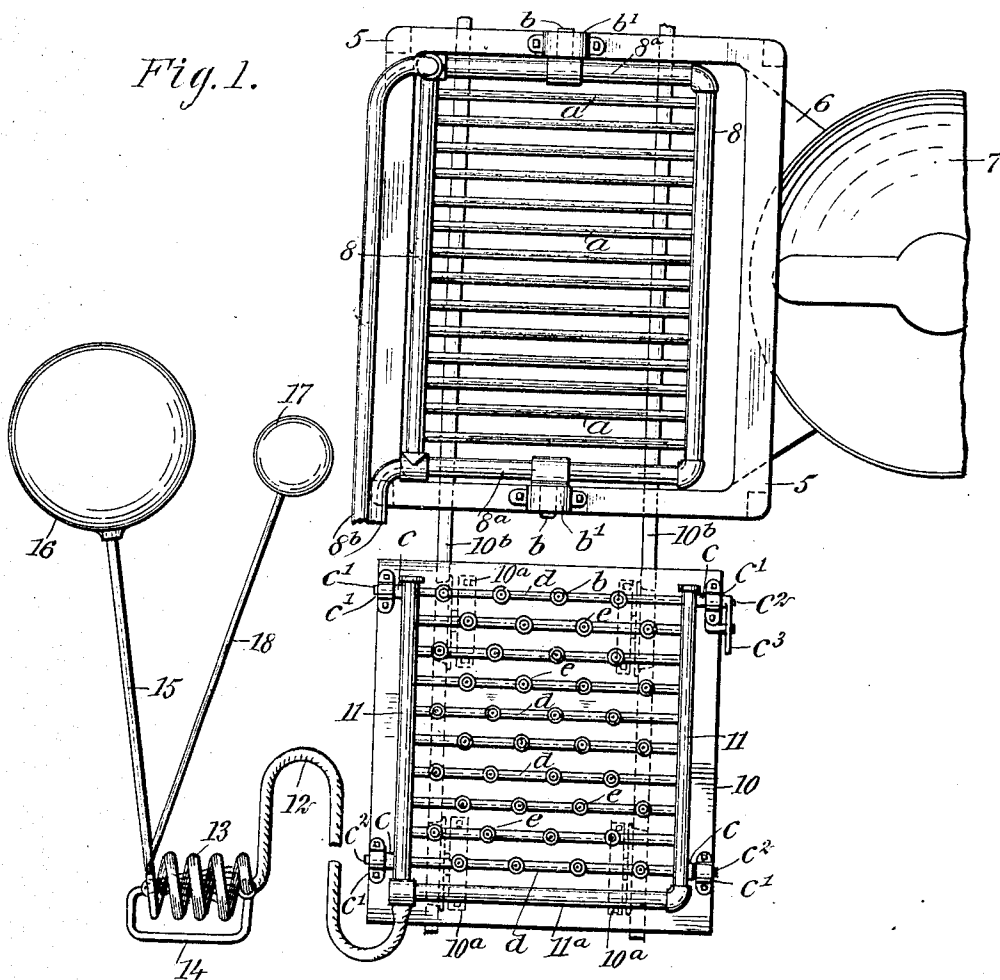
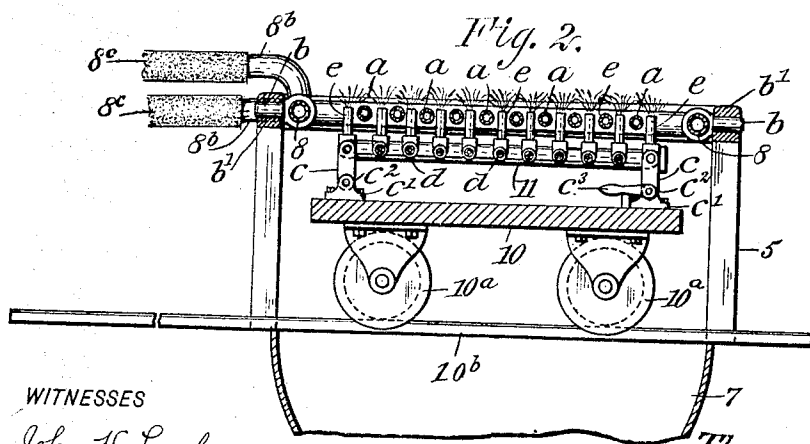


Fig. 2.



WITNESSES

John H. Lynch.

Wm. P. Patton

INVENTOR

Thomas J. Porter

BY

Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

THOMAS JEFFERSON PORTER, OF SACRAMENTO, CALIFORNIA, ASSIGNOR OF ONE-THIRD TO JAMES MCGILLIVRAY AND ONE-THIRD TO W. S. KENDALL, OF SACRAMENTO, CALIFORNIA.

HEATING APPARATUS.

No. 895,679.

Specification of Letters Patent.

Patented Aug. 11, 1908.

Application filed October 30, 1907. Serial No. 399,791.

To all whom it may concern:

Be it known that I, THOMAS JEFFERSON PORTER, a citizen of the United States, and a resident of Sacramento, in the county of Sacramento and State of California, have invented a new and Improved Heating Apparatus, of which the following is a full, clear, and exact description.

In the crushing of stone for road ballast and concrete manufacture, it is of great advantage for the easy and quick crushing of hard boulders, cobbles, and other stones of a like nature, that such rock material be first exposed to high heat, which will expand the same and open crevices therein, that will subsequently become fractures if at the termination of the heating process the rock is subjected to a spray of cold water.

The purpose of this invention is to provide a simple, practical heating apparatus of novel construction, which affords convenient economical means for simultaneously heating a number of hard boulders, or cobbles which is the preferred rock material, a sufficient degree for their subsequent disintegration by application of water; and finally crushing in a suitable machine.

The invention consists in the novel construction and combination of parts, as is hereinafter described and defined in the appended claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both views.

Figure 1 is a plan view of the improved apparatus, parts being broken away; and Fig. 2 is a transverse sectional elevation of details of the apparatus showing parts thereof as arranged for service.

In the drawings that illustrate one embodiment of the invention, 5 represents an upright frame preferably rectangular in contour and of sufficient dimensions for effective service, said frame being positioned above a hopper 6 for a stone crushing machine 7, indicated in Fig. 1 as positioned at one side of the hopper and connected therewith, said crushing machine being of any preferred construction.

Upon the frame 5 is supported a preferably quadrangular grille or grate, formed of tubular bars *a*, in open connection at their ends with a tubular frame 8. The frame 8 at opposite sides 8^a is provided with trun-

nions *b*, projected from said side tubes 8^a at their centers, which engage boxes *b'* on the frame, and adapt the grate for rocking adjustment. The grating in completed form has water conduit pipes 8^b, extended from the frame 8 to a source of water supply that will maintain a flow of water into and out of the grate, said pipes having flexible hose sections 8^c applied thereto to permit the free rocking movement of the grate upon its trunnions. In some cases where the rock operated upon does not require intense heat, the tubular grate bars may be dispensed with and solid grate bars be employed.

A gaseous fuel burner, comprising in part a tubular border frame having two parallel side members 11, joined together by a transverse member 11^a, is placed upon a platform 10 mounted upon wheels 10^a that rest on a track 10^b. It is essential that the support for the burner frame be such as will permit it to receive vertical adjustment on the platform; one practical means for effecting this adjustment is shown, and consists of four short links *c*, pivoted at their lower ends in boxes *c'* secured on the platform near its four corners.

The pivots for the links *c* are upon the ends of two shafts *c*², that extend across the platform and are adapted to rock in the boxes *c'*, the upper ends of said links being pivoted laterally upon the side members 11, as indicated in the drawings. Upon the end of one shaft *c*², a lever *c*³ is secured, which, by rocking adjustment, will cause the four links to be erected simultaneously, and in like manner depressed if the lever is rocked correspondingly to effect this arrangement of the links. The fuel burner further embodies a plurality of similar feeder tubes *d*, which at their ends are secured in holes in the side members 11 at spaced intervals, preferably parallel with each other. In the upper side of each feeder tube *d*, a plurality of burner tubes *e* are inserted and secured, said tubes being adapted for permitting the combustion of fuel gas in jets.

Upon the tubular border frame of the burner device, one end of a pliable hose section 12 is secured, which hose in completed condition is extended a distance for an attachment of its remaining end upon one end of a preferably tubular fuel gas generator 13. The generator 13, preferably is in the form of a coiled pipe, which is supported in or on

a fire box 14 adapted for receiving fuel of a suitable character that by combustion will heat the generator.

The opposite end of the tubular generator 13 is attached upon one end of an oil pipe 15, that leads to a tank 16, containing a supply of hydrocarbon liquid of a character that will adapt it for vaporizing when exposed to heat in the retort or generator 13. It is to be understood, however, that if a very volatile hydrocarbon liquid is used, heat may be dispensed with. An air compressor 17 of approved construction, is connected by means of a pipe 18 with the fuel gas generator 13, preferably at its point of junction with the hydrocarbon supply pipe 15. Steam may be substituted for air under pressure, if this is preferred.

To arrange the apparatus for service, there is a quantity of stone, such as hard boulders or cobble stones, not shown, placed upon the grate hereinbefore described, and the evolution of fuel gas that is in the form of aero-hydrocarbon vapor, is generated in the coil 13 by feeding hydrocarbon liquid thereinto from the tank 16, and also forcing air under pressure through the pipe 18 for assimilation with the liquid carbon when heat is applied to the coil 13 by means of fuel combustion in the fire box 14. When the generation of fuel gas has been started, the burner device is moved upon the track 10^b so as to locate it below the grate structure, the burner thereof being positioned between the hollow grate bars *a* by proper location of the heater. The lever *c*³ is now manipulated, so as to elevate the links *c* and thus dispose the burner tubes *e* between the grate bars *a*, and the character of said burners is such that the aero-carbon fuel vapor will burn fiercely with a blue flame, evolving intense heat. It will be seen that the impingement of the flames from the burner tubes *e* will quickly heat the stones that rest on the grate, and so expand them that fissures therein will be opened. Upon application of a spray of water applied by any suitable means, and that will enter the crevices in the stones, steam evolved by the heat will further expand the fissures in the

rocks and reduce them to fragments. The grate and its burden of broken stones, is rocked so as to discharge the latter from said grate into the hopper below it, the burner device having been previously removed to permit such a removal of the debris, and obviously the fractured stones will pass into the crushing machine 7, to be further broken, which may now be readily effected, owing to the treatment previously given to the hard boulders or cobble stones.

As minor details of the apparatus may be altered somewhat without departure from the principle of my invention, I claim all such changes as may be effected within the scope and spirit of the claims.

Having described my invention, I claim as new and desire to secure by Letters Patent:

1. In an apparatus for heating stone for its fracture, the heating device, embodying a burner composed of a tubular frame, a plurality of fuel feeding tubes joined at their ends to the frame, burners on said feeding tubes, and a gaseous fuel generating device that is flexibly connected with the tubular frame.

2. In an apparatus for heating stone for its fracture, the heater device, comprising a rectangular hollow border frame, spaced feeder tubes joined at their ends on the border frame, burners on the feeder tubes, a movable platform, and vertically adjustable means for supporting the heater on the platform.

3. In an apparatus for heating stone for its fracture, the heater, comprising a hollow frame, feeder tubes thereon, burners on said feeder tubes, an aero-carbon vapor generating device, and a flexible tubular connection between the generator device and the heater device.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS JEFFERSON PORTER.

Witnesses:

N. N. DENTON,
W. S. KENDALL.