A. Q. ROSS.

Charging Gas-Retorts.

No. 212,570. Patented Feb. 25, 1879.

Fig. 1

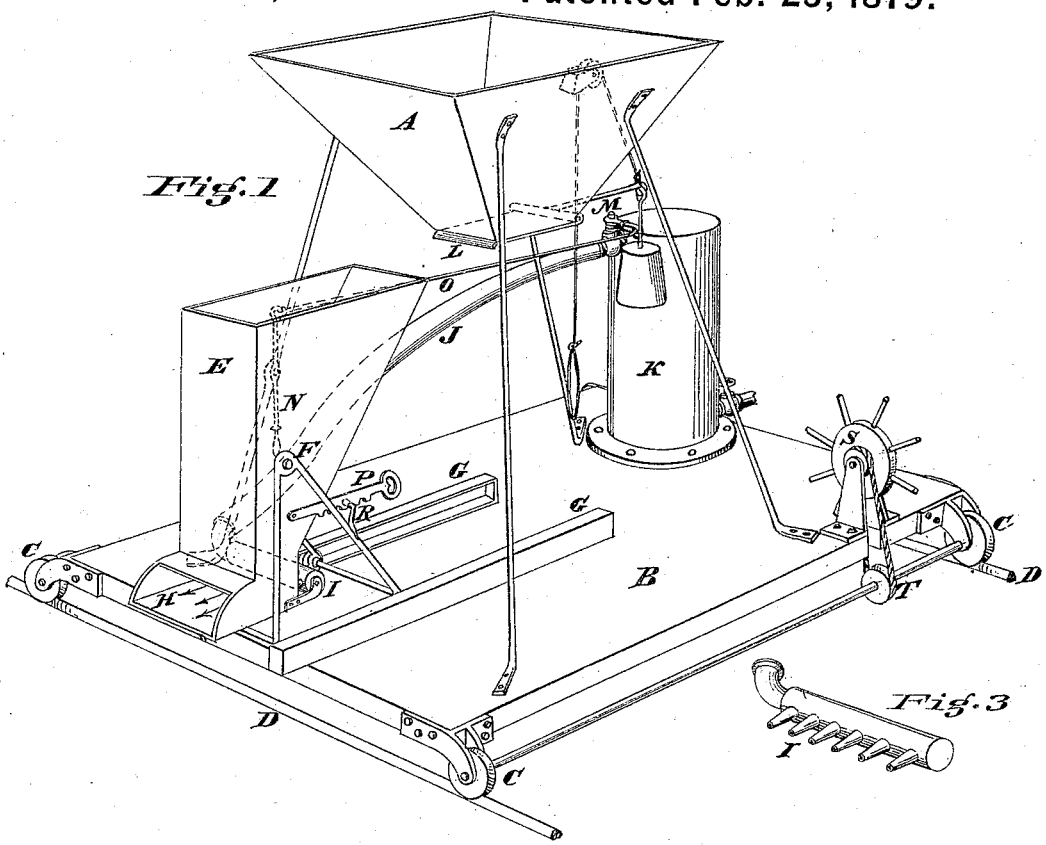
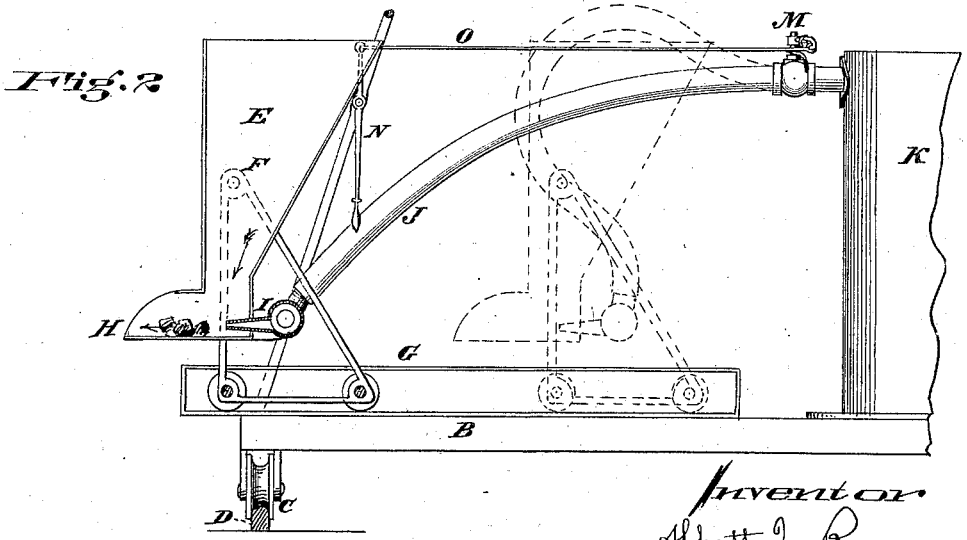


Fig. 3

Fig. 2



Witnesses:

Edgar J. Jones

John E. Jones

Inventor.

Abbott Q. Ross.

By Ellsworth & Millward

His Attys.

UNITED STATES PATENT OFFICE.

ABBOTT Q. ROSS, OF CINCINNATI, OHIO.

IMPROVEMENT IN CHARGING GAS-RETORTS.

Specification forming part of Letters Patent No. **212,570**, dated February 25, 1879; application filed May 27, 1878.

To all whom it may concern:

Be it known that I, ABBOTT Q. ROSS, of Cincinnati, Hamilton county, State of Ohio, have invented an Improvement in Charging Gas-Retorts, of which the following is a specification:

The ordinary method of charging gas-retorts consists in the use of a shovel or scoop which is loaded with coal and projected by hand into the retort, where it is reversed or turned over to discharge its contents. It requires two loads to charge each retort, and the coal must then be leveled off in some manner to insure its uniform distillation. Comparatively much time and labor are required for this hand process, and the charges cannot be uniformly distributed in the retorts. Many efforts have been made to perform this work by machinery, but thus far without practical success, owing to the expense of the machines and the liability of their being rendered inoperative by the intense heat of the retorts and furnaces, or the disarrangement of the more delicate parts during the process of charging.

My invention has for its object to provide simple and effective means for charging the retorts, whereby the coal is evenly distributed in the most expeditious and thorough manner, one operation only being required to charge each retort.

To this end the invention consists, primarily, in forcing the charges into the retorts by compressed air or steam, preferably superheated steam being employed; and, secondly, in the means by which this result is produced.

Various methods may, of course, be adopted for carrying out my invention, one of which I will now proceed to describe; but I wish it understood that I do not confine myself to any special mechanism, as many kinds and combinations may be used without departing from the spirit of my invention.

Figure 1 is a perspective view of an apparatus by which my invention is carried into effect. Fig. 2 is a longitudinal section of the same, partly in elevation. Fig. 3 is a perspective view of the jets through which steam or compressed air is discharged to force the coal into the retorts.

In the drawings, D D represent guide-rails laid in front of and parallel to the faces of the retorts, and B is a truck or platform mounted on flanged wheels C, which bear on the track D, whereby the truck can be run along from one retort to another and stopped at uniform distances in front of them. A hand-wheel, S, with belt connected to a pulley, T, on the axle of the car or platform, may be employed for convenience in moving the latter along the track.

Arranged on the truck are tracks or guides G, substantially at right angles to the track D, whereby a charger, E, may be guided back across the platform to receive or forward to deliver its charge. The truck and rails D thus enable the charger to be accurately placed with relation to any retort of the series in the works, and the guides G enable it to be accurately adjusted to receive and deliver its charge, and to be conveniently moved back and forth between the charging hopper or chute and the retort for the purposes of its work.

The charger E is, in size, adapted to receive, convey, and deliver into the retort a full charge of about two hundred and fifty pounds of coal at each operation. It is formed with its rear wall considerably inclined, and its front wall either slightly inclined or in a vertical plane, so as to approach each other and form a throat over a horizontal conduit, H, which projects forward toward the retort, so as to be capable of entering its mouth when the charge is advanced.

The charger is hung upon side trunnions in the frame which supports it, said frame being of any suitable construction, and being guided and mounted in any suitable manner, whereby the charger can be advanced and retracted, as above set forth.

A is a hopper or chute, which, as here shown, is mounted on the car B, but may be independent of the car, if preferred. It must be, however, so arranged that the charger may, by means of its guide-tracks G, be run back under it to receive the charge of coal from it.

A weighted valve or door, L, may be provided in the hopper to retain the charge therein until the charger is in position to receive it.

In charging by the use of steam, the steam must be as dry as possible, in order to prevent bad effects in the retort. To this end, when

steam is employed, it is indispensable that a receiver, K, should be provided to contain the steam and receive any water of condensation therefrom.

In charging by compressed air, a similar receiver is also necessary, to give sufficient volume, strength, and steadiness to the air-blast. This receiver is preferably mounted upon the car, but may be used independently thereof.

A flexible, jointed, or telescopic pipe, J, extends from the receiver (and from the upper part thereof if steam is to be used) to the lower rear edge of the charger, where it communicates with a transverse pipe or series of pipes or jets, I, or with one or a series of slots or perforations, through which the air or steam from the pipe J is fed to the charger behind the coal in the horizontal conduit.

The device I, through which the air or steam is delivered against the coal in the conduit H, is rigidly attached to the charger, so that the jets or other discharge-apertures will deliver the steam in lines parallel to the floor of the conduit, whether the latter be horizontal or inclined.

The charger E, mounted on the trunnions F, can be so inclined and secured by a rack and detent, P R, or otherwise, that the floor of the conduit H will direct the charge at an inclination upward into the retort, thereby causing the coal to be projected to the rear end of the retort; or it can be depressed to less inclinations, or to a horizontal line, thereby causing the coal to be projected to a less distance, whereby the retort can be evenly and uniformly charged, it being only necessary to incline the floor H upward when first beginning to charge, and then gradually reduce its inclination as the charging proceeds.

The mouth of the conduit H is adapted in shape and size to enter very loosely into the mouth of the retorts, so that the pressure produced therein by the steam or compressed air may have an escape around said conduit.

The object of making the pipe J telescopic or flexible is to enable the charger to be run back and forth on its guides G without detaching said pipe from either the reservoir or the transverse section I.

It is obvious that to control the operation of the pipe it must be provided with a cock to shut off or let on the steam or compressed air, and it might be supposed that a cock at any convenient point along the pipe would answer the purpose; but I have, after many experiments and practical trials, discovered that such cock must be arranged immediately at the reservoir K, so that when it is closed the pipe J will not be filled with steam or compressed air.

The reason of this necessity is, that if arranged near the discharge end of the pipe, the latter will be kept full of steam or air under compression, and will be so rigid as to interfere with and obstruct the movement of the charger, and, besides, will be liable to leakage and injury; and if steam is used, the steam will condense in the pipe, blow into the retort, and render the whole operation abortive.

It is, therefore, a part of my invention to arrange the cock M at, in, or near the reservoir, whereby the water of condensation will run back and drop to the bottom of the latter, whence it can be drawn off by a cock, thus keeping the steam dry, and the pipe, when not charging, flexible, light, and easily handled.

The cock M so arranged may be controlled from the front of the car by means of a rod, O, and hand-lever N, or other suitable appliance.

The operation of the apparatus is as follows: The hopper being supplied with coal, the charger is run back under it in the position shown by dotted lines in Fig. 2, and the weighted door L at the bottom of the hopper is opened, so as to fill the charger with the requisite quantity of coal to charge one retort—say, about two hundred and fifty pounds. When this is completed the door L is closed, and the charger moved forward upon the guides G, so that the conduit H shall enter the mouth of the retort to be charged. The cock M is then opened, so as to supply steam or air from the reservoir to the charger, which, rushing through the jets or perforations against the coal, forces it instantly into the retort, the coal above falling into the conduit as rapidly as the contents of the latter are blown into the retort. By this means one load of the charger will fill each retort, beginning at the back end thereof, and distributing the coal evenly upon the bottom, so as to avoid the necessity of afterward leveling it off by hand.

In charging a bench of retorts I prefer to use three chargers, properly arranged, so that one-half of the bench may be charged at one time.

I am aware of the mode, heretofore described in the patent of Crutchett, of charging gas-retorts by pulverizing the fuel and blowing it in, in small quantities, either intermittingly or continuously, so that all the fuel shall instantly become incandescent as soon as it reaches the retort, and I do not claim the same as my improved mode, or any part thereof; but,

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The adjustable charger E, constructed with substantially vertical front and inclined rear walls and a horizontal conduit, H, formed upon the lower end in continuation of the walls, with an opening or openings at the rear end to admit a blast, substantially as described, for the purpose specified.

2. The combination, upon one platform, of a movable charger, E, a hopper, A, a reservoir, K, and a flexible or yielding connection between the charger and reservoir, substantially as described, for the purpose specified.

3. In combination with a coal hopper or chute, a steam or air reservoir and a charger

capable of being moved back and forth between the hopper or chute and the mouth of the retort, the flexible, jointed, or telescopic pipe J, extending from the charger to the reservoir, and provided with a cock, M, arranged in or near the reservoir, whereby the water of condensation is kept back and the pipe left empty when not charging, substantially as described.

4. In combination with a charger, E, having a directing-conduit, H, at its lower end, and a blast-pipe to force steam or air through the conduit, a movable supporting-frame mounted on the track G, and connected to the charger by trunnions F, whereby the charger can be advanced and retracted, and can be inclined to direct the coal to the proper points in the retort, substantially as described.

5. In combination with the charger and conduit H, adjustable at different inclinations for the purposes described, and with the flexible or jointed pipe J, capable of yielding to the adjustment of the charger, the transverse discharge pipe or section I, rigidly attached to the charger or conduit, so as to follow the movements of the latter and insure the passage of the steam through it in lines parallel to its floor, substantially as set forth.

6. The mode of charging gas-retorts as herein set forth, consisting essentially in first separating from the mass of coal a full charge for the retort, and then blowing said charge in quickly at one operation by the action of dry steam or compressed air.

In testimony of which invention I hereunto set my hand.

ABBOTT Q. ROSS.

Witnesses:

JOHN E. JONES,

EDGAR J. GROSS.