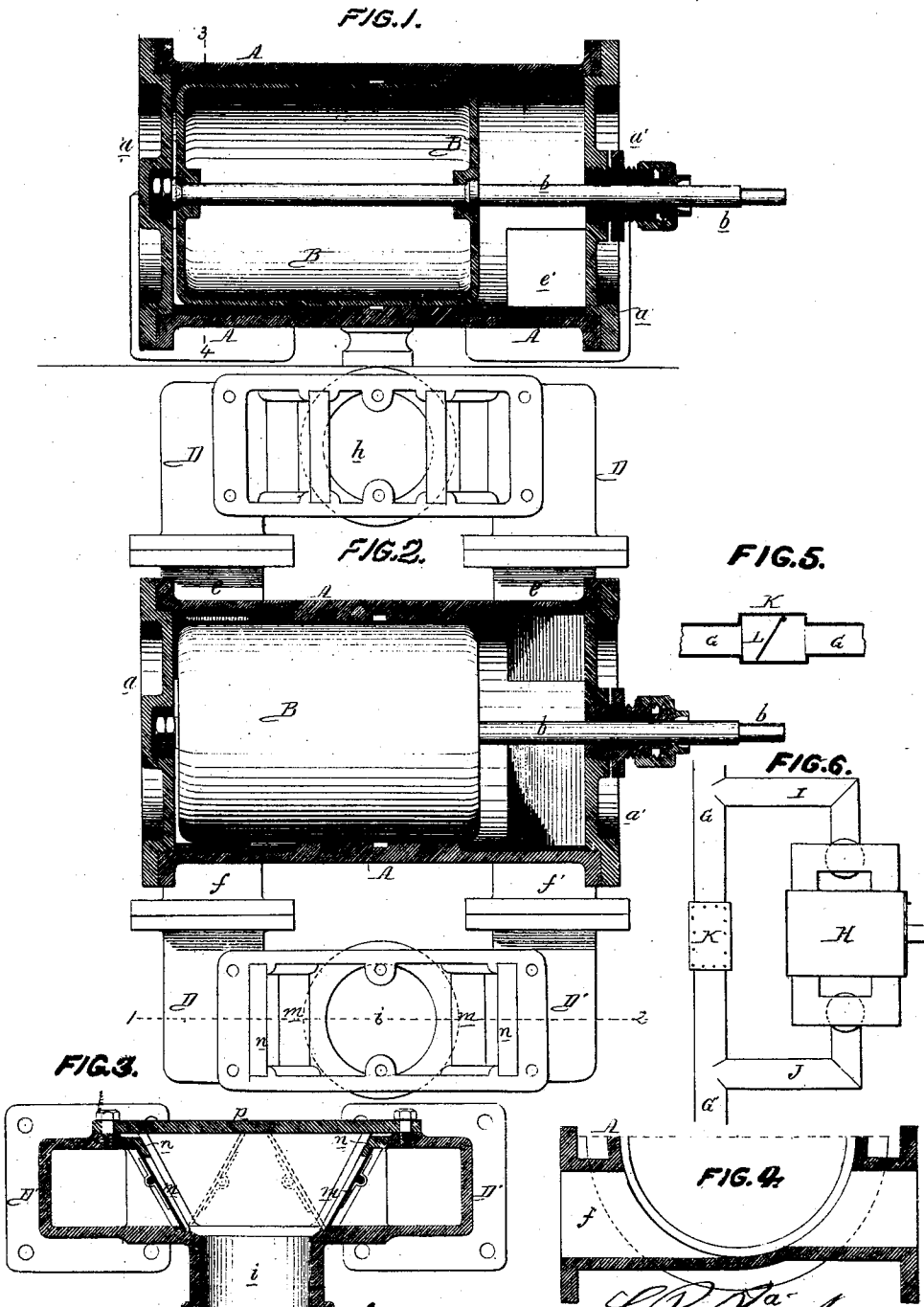


*S.K. Brick,*  
*Gas Purifier.*

*No. 101,348.*

*Patented Mar. 29. 1870.*



WITNESSES { *Wm. Steel.*  
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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN EXHAUSTING APPARATUS FOR GAS-WORKS.

Specification forming part of Letters Patent No. **101,348**, dated March 29, 1870.

### *To all whom it may concern:*

Be it known that I, SAMUEL REEVE BRICK, of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented an Improved Exhausting Apparatus for Gas-Works, of which the following is a specification.

My invention consists, first, in the combination, substantially as described hereinafter, of a double-acting pump with the pipe by which gas passes from the hydraulic main to the purifiers of gas-works, so that the gas may be exhausted from the retorts as fast as it is generated, and so that the accumulation of incrustations inside the retorts may be thereby prevented; secondly, in an arrangement, described hereinafter, of the said double-acting pump, certain pipes, and a valve, so as to permit the gas to take a direct course from the hydraulic main to the purifier should there be a temporary cessation of the pumping mechanism; thirdly, in a peculiar manner, described hereinafter, of constructing the interior of the cylinder and piston of the pump; fourthly, in a peculiar manner of hanging the valves of the pump, so that they can be easily operated; and, fifthly, in an arrangement of the outlet-branch of the cylinder of the pump, whereby tar and other refuse which may collect therein is readily disposed of.

In the accompanying drawings, Figure 1 is a vertical section of my exhausting apparatus for gas-works; Fig. 2, a sectional plan of the same; Fig. 3, a vertical section on the line 1 2, Fig. 2; Fig. 4, a transverse section on the line 3 4, Fig. 1, and Figs. 5 and 6 diagrams illustrating the application of my invention.

If gas generated in a retort is permitted to remain therein under pressure an accumulation of tenacious carbonaceous matter takes place on the inner surface of the retort, and this incrustation has not only injurious effect on the gas itself, but is the principal cause of the rapid destruction of the retorts. Hence it has been customary in large gas-works to employ exhausting apparatus so connected with the pipe communicating with the hydraulic main that the gas will be withdrawn from the retorts as fast as it is generated therein, the collection of the objectionable incrustation being thereby prevented.

The exhausting apparatus hitherto employed

for this purpose has consisted of a rotary pump, which, however, can only be employed with advantage in large gas-works, on which account exhausting apparatus have been entirely dispensed with in the small works in country towns, where the loss by the rapid destruction of retorts is consequently severely felt. More especially is this the case with clay retorts, which, when properly exhausted, are more durable than iron, but which are soon destroyed when the incrustation is permitted to collect in them.

My invention has been especially designed with the view of furnishing small gas-works, where rotary exhausters would be impracticable, with efficient apparatus for withdrawing the gas from the retorts.

In Figs. 1, 2, 3, and 4, A represents a hollow cylinder, provided with suitable heads, *a* and *a*, the latter having a stuffing-box, through which passes a piston-rod, *b*, this rod being secured in the manner shown or in any other suitable manner to the light, hollow, elongated piston B, which is somewhat smaller in diameter than the interior of the cylinder, excepting where it bears against the latter, for the cylinder is contracted at the middle to receive and serve as a guide for the piston, and this contracted portion may have annular grooves for receiving packing. This, however, may be dispensed with if the piston be properly fitted to the said contracted portion of the cylinder. On one side of this cylinder are two branches, *e* and *e'*, secured to and communicating with the chest D of the exhaust-valves, the said chest communicating through an opening, *h*, with the pipe leading from the hydraulic main of the gas-works. On the opposite side of the cylinder are also two branches secured to and communicating with the chest D' of the discharge-valves, the said chest also communicating with a branch, *i*, connected to the pipe which leads to the condenser.

The discharge-valves *m m* (best observed in Fig. 2) are hinged to inclined frames *n n*, so adapted to grooves in the chest D' as to be readily withdrawn therefrom after the cover *p* of the chest has been removed. These valves are not hinged at their upper edges to the frames, as is usual in arranging ordinary clack-valves, but at such a distance from their upper edges that, while they have a tendency to remain in

contact with their seats, they can be elevated by a very slight pressure of gas, the valves themselves being made of thin metal, so as to be as light as possible, and yield readily to the pressure of the gas.

It will be seen that the seat of the upper edge of each valve is at the rear of the frame to which it is hung, while the seat for the lower edge is in front of the frame.

The exhaust-valves in the chest D are hung in a precisely similar manner, but are arranged at angles the reverse of those of the discharge-valves, the position of the exhaust-valves being indicated by dotted lines in Fig. 3.

The disposal of the above-described exhausting apparatus, or, as it may properly be termed, "double-acting pump," is illustrated in the diagram, Fig. 6, where G G represent the pipe from the hydraulic main to the condensers. H is the pump, between which and the pipe G there is a communication through the exhaust-pipe I, while the discharge-pipe J affords a communication between the pump and the pipe G, the latter having, between the two pipes G and G', a box, K, containing a light self-closing valve, L.

As long as a reciprocating motion is imparted to the piston B the gas will be exhausted from the retorts through the pipes G and I and forced through the pipes J and G'; but should there be a temporary cessation in the operation of the pump the gas will raise the valve L and will pass directly through the pipes G G'.

Small quantities of tar would be apt to accumulate on the cylinder and interfere with the free working of the piston, but the tar is scraped, as it were, from the latter by the ledges which occur on the cylinder, where the latter is contracted. It will be observed, too, in reference to Fig. 4, that the discharge-branch *f* is lower at the bottom than the inlet-branch *e*. Hence the tar and other refuse has a tendency of itself to flow from the cylinder.

I claim—

1. The combination, substantially as described, of a double-acting pump with the pipe communicating between the hydraulic main and the purifiers of gas-works.
2. The within-described arrangement of the pipe G G', its self-closing valve L, pipes I and J, and double-acting pump.
3. The combination of the hollow piston B with the cylinder A, having a portion of its interior contracted to receive the said piston.
4. The valves *m* hung, in the manner described, to the frames *n*.
5. The arrangement described of the outlet-branch *f* of the cylinder A in respect to the latter and to the inlet-branches.

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

SAMUEL REEVE BRICK.

Witnesses:

J. W. COLGAN,  
HARRY SMITH.