E. S. CATHELS.

GAS WASHER.

No. 180,459. Patented Aug. 1, 1876.

FIG. 1.

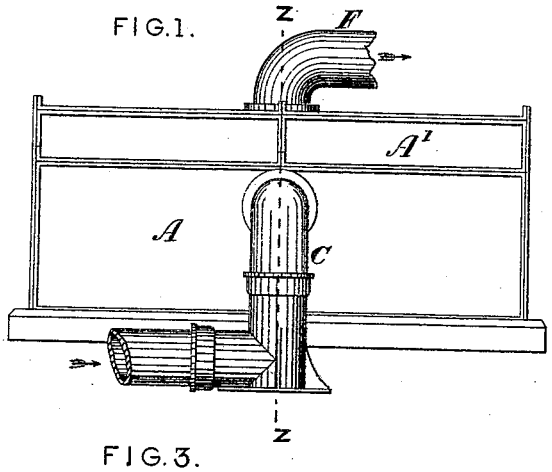


FIG. 2.

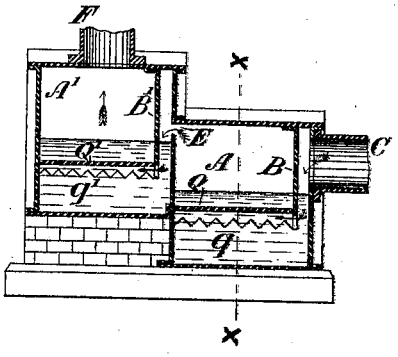


FIG. 3.

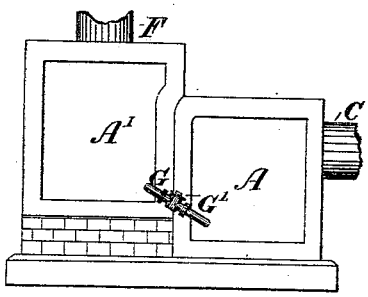


FIG. 4.

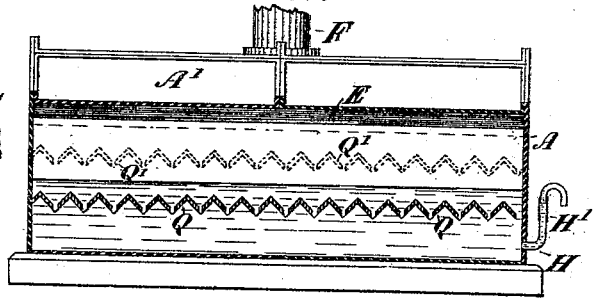


FIG. 5.

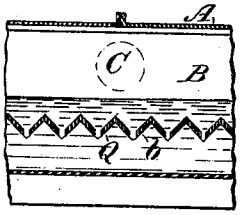
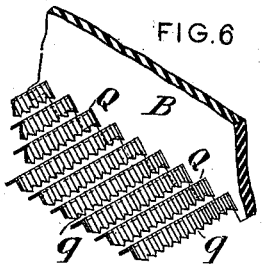


FIG. 6



Witnesses

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EDMUND S. CATHELS, OF MONTREAL, QUEBEC, CANADA.

IMPROVEMENT IN GAS-WASHERS.

Specification forming part of Letters Patent No. **180,459**, dated August 1, 1876; application filed March 28, 1876.

To all whom it may concern:

Be it known that I, EDMUND SMALL CATHELS, of the city of Montreal, in the District of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in the Apparatus used in the Manufacture of Gas; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention has reference more particularly to improvements on the construction and arrangement of the washer or apparatus used for washing and purifying coal or other illuminating gas from the vapors of tar, carbonic acid, sulphureted hydrogen, and other sulphur compounds and impurities.

Hitherto, in the construction of washers, the usual arrangement has been to cause the gas to flow through the vessel lengthwise, the idea being that the longest contact of the gas with the liquid and the greatest amount of wash was thereby obtained. The result, however, as ascertained by actual experiment, is, that in spite of all contrivances to prevent it, the liquid contents of the vessel are driven by the pressure of the gas into a heap at the outlet end, thus seriously impairing the efficiency of the apparatus, (as three-fourths of its length is entirely inoperative,) and also increasing the back pressure.

I propose to remedy this defect by arranging within a rectangular vessel, in which the usual purifying-liquid is placed, a curtain dipping down into the liquor, having its lower edge serrated so as to give a series of uneven dips or seals, and placed at such a distance from the front of the vessel as to cut off therefrom but a very small amount of its cubical area. Extending back from this curtain to the rear of the vessel are a series of inverted V-shaped troughs, corresponding with the serrated edge of the curtain, and having their lower edges also uneven.

The vessel may also be made to communicate with a vessel similarly constructed and arranged, and placed at a higher level, and this again with a third, and so on; but for fuller comprehension of this and the other points embraced in my invention reference must be had to the annexed drawings, where—

Figure 1 is a front view of my apparatus. Fig. 2 is a transverse section on line *z z*, Fig. 1. Fig. 3 is an end view. Fig. 4 is a longitudinal section on line *x x*, Fig. 3, looking to the rear. Fig. 5 is part longitudinal section on line *x x*, Fig. 3, looking to the front. Fig. 6 is a view of the curtain and inverted V-troughs.

Similar letters of reference indicate like parts.

A is a tank or vessel, usually rectangular in shape, and of some such proportion as that shown in the drawings, made preferably of cast-iron plates, jointed and bolted together in such a manner as to resist the pressure and be perfectly gas and water tight. Within this vessel A is secured to its upper surface a plate or curtain, B, extending the whole length of the vessel, and arranged close to its front, the lower edge of this curtain being, as shown at *b*, serrated or uneven. Q Q are inverted V-shaped troughs, corresponding, as shown, with the serrations at *b*, and carried back from the inside of the curtain B to the back of the vessel. These troughs have also their edges serrated, as shown at *g*.

C is the inlet-pipe, through which the gas is admitted to the washer. Man-holes in its top and charging and emptying pipes (not shown in the drawings) are also provided.

The washer, as thus described, is complete in itself as a single-compartment washer, being provided with proper outlet; but I prefer the arrangement shown in the drawings, and now to be described, by which the efficiency of the apparatus is very highly increased.

A^1 is a washer of exactly similar construction to A, with curtain B′, serrated at its lower edge, as at *b′*, and troughs Q′, with serrated edges q^1. This washer A^1 is arranged in combination with A, so that its front is partly formed by the back of A, A^2 being at such height above A as to permit of its contents being emptied thereinto when required.

In the division between the two washers A and A^1 is formed, as shown at E, Figs. 2 and 4, an oblong slot or opening the full length of the vessel. This serves as the outlet from A, and is of such depth that its area shall at

least equal that of the connecting (*i. e.*, the inlet) pipes. F is the outlet-pipe, by which the gas is conveyed from the washer for further purification.

Although but two washers are shown in combination in these drawings, it will be obvious that a third one may be arranged in precisely a similar relative position to the washer A^1 as that is to A, and beyond that again a fourth, or any additional number, the outlet-pipe being always taken out of the last and highest vessel.

G shows the pipe connecting the two washers A A^1, having proper stop-cock, as shown, and H is the overflow-pipe, (one being provided for each compartment,) arranged with long screw H′, to raise or lower its height, and thus regulate the height of the wash in each chamber.

The following pipes, although included in the apparatus, are not shown in the drawings, as they form no part of the invention. With an elevated cistern or pump is connected a filling-pipe, leading to the uppermost of the compartments, and provided with a stop-cock and an inverted siphon, to prevent escape of gas. One or more of these pipes may be used where different liquids are required. The lowest compartment is provided with an outlet-pipe, properly sealed, provided with a stop-cock, and led to any tank or vessel desired.

In each compartment there will also be a test-cock, and the whole apparatus will be provided with an inlet and outlet pressure-gage.

The operation of my invention will be as follows: The stop-cocks G′ of the connecting-pipes G between the compartments being opened, ammoniacal liquor diluted with water, water or lime-water, or any other purifying-liquor, is let into the uppermost compartment, and from it flows into the others successively, until it reaches in each a height sufficient to cover the serrations of the curtains B B′, &c., and the troughs Q Q′, &c., or to any greater height desired. The cocks G′ are then closed.

The strength or degree of saturation of the several compartments is as their relative order, that of the first or lowest being the strongest, and that of the last or uppermost the weakest or cleanest.

The vessel being thus charged, the gas is turned into the compartment A, and impinges against the curtain B, spreading both ways the whole length of the vessel, and blowing the contents of the narrow chamber contained between the curtain B and the front of the vessel into the body of the compartment A, not, however, thereby appreciably increasing the depth of its contents, owing to its much greater relative area.

The volume of gas passing under the curtain B is, by means of the unequal dips or seals formed by its serrated edge, broken up into small equally-divided streams, in which condition of separation it flows into and along the inverted troughs Q, escaping therefrom by the serrations in their sides in minute streams or threads, in which attenuated form it bubbles up through the wash-liquid. From the compartment A the gas passes into A^1, the shape of the inlet-opening E causing it to do so in a thin sheet the whole length of the washer, which impinging against the face of the curtain B′, slides down it, passing through the uneven dips or seals forming its lower edge, and flows, as before, along the inverted troughs Q′, and out through their serrated sides, thence passing, if desired, into a third, fourth, and fifth, or any other number of compartments, and out through the pipe F for further treatment.

When the contents of the first compartment are sufficiently strengthened or saturated, they are run off for the usual treatment for sulphate of ammonia, and are replaced by those of the second one, which, in its turn, receives that of the third—when there are three—each in turn, when there are several, being refilled from the compartment above it, the last or highest one only requiring to be replenished with a fresh charge.

It will be obvious that any one or more of the compartments composing this washer may be worked separately and independently by simply providing separate filling and emptying pipes. Thus, say, in a four-compartment vessel, the two first compartments could be conveniently used for absorbing carbonic acid, and the other two for bisulphide of carbon and other sulphur compounds, by which arrangement the carbonic acid set could be emptied and refilled independently of the other set.

The advantages offered by the use of the washer herein described will be obvious to all those acquainted with the manufacture of gas. It is, for instance, the simplest, cheapest, and best way of depriving gas of the vapor of tar, which is so objectionable in scrubbers and purifiers, and even where scrubbers are used will be found a valuable adjunct.

Having thus described the construction and operation of my invention, what I claim is as follows:

1. In a gas-washer, the combination, substantially as specified, of the vessel and the curtain, arranged directly in front of the gas-inlet opening, and extending from one end or side to the other, so that the inflowing gas will meet the curtain, and will be thereby deflected downward in a thin sheet.

2. In a gas-washer, the combination, substantially as specified, of the vessel and the curtain, arranged directly in front of the gas-inlet opening, so as to extend from one end or side to the other, and having its lower edge serrated, giving a series of uneven dips or seals.

3. The combination, with a gas-washer, of the

curtain B, giving unequal dips or seals, and the inverted V-shaped troughs with serrated or uneven edges, as and for the purposes herein set forth.

4. In an apparatus for the purification of gas, the combination of two or more compartments, A A^1, &c., each successive compartment being set at a higher level than the preceding one, and communicating therewith through opening E, as and for the purposes herein set forth.

Montreal, 9th day of March, A. D. 1876.

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Witnesses:

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