(No Model.)

W. SIMPKIN.

GAS SCRUBBER.

No. 372,178. Patented Oct. 25, 1887.

Fig. 2.



Fig. 3.

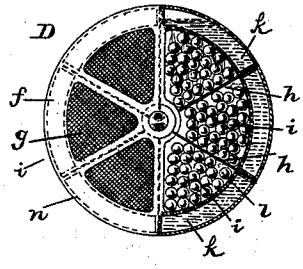


Fig. 4.

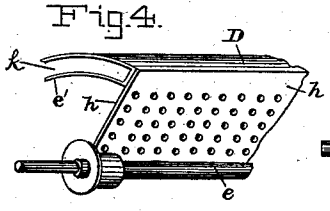


Fig. 5.

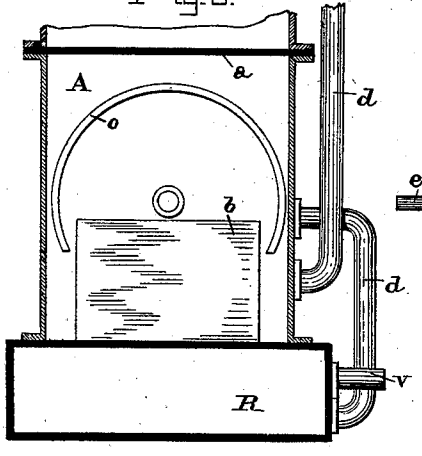
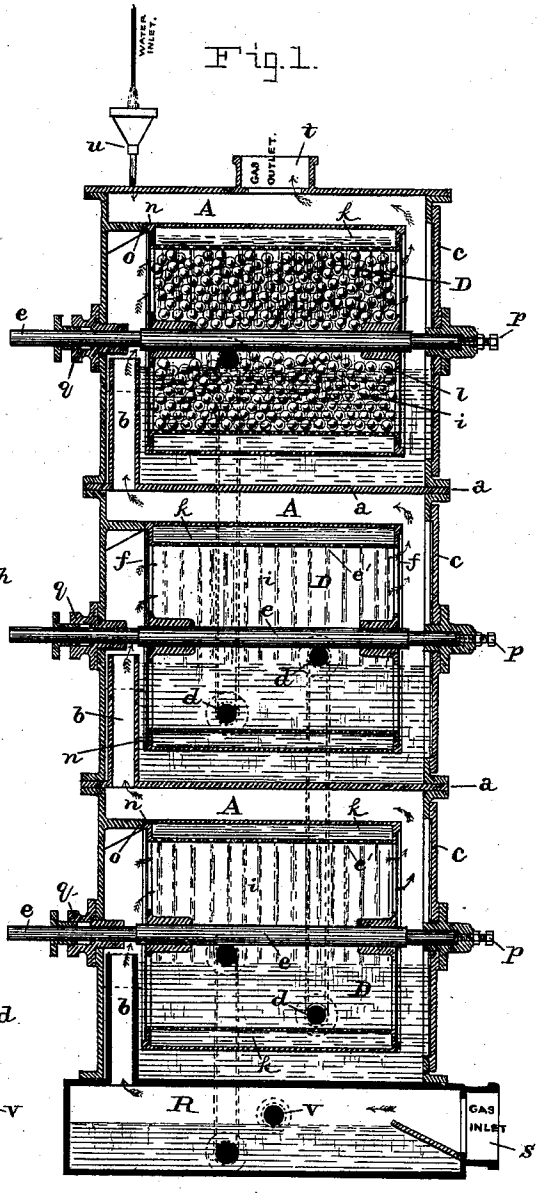


Fig. 1.



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WILLIAM SIMPKIN, OF RICHMOND, VIRGINIA.

GAS-SCRUBBER.

SPECIFICATION forming part of Letters Patent No. 372,178, dated October 25, 1887.

Application filed May 21, 1886. Serial No. 202,844. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SIMPKIN, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Gas-Scrubbers, of which the following is a specification.

My invention relates to an apparatus for washing and scrubbing coal-gas for the purpose of eliminating the ammonia, sulphureted hydrogen, and other deleterious matter.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the apparatus. Fig. 2 is a view, on an enlarged scale, of one scrubbing-ball. Fig. 3 is an end view of the revolving drum. Fig. 4 is a view of a detached portion of the drum. Fig. 5 is a vertical section of the lower part of the apparatus, taken in a transverse direction from that shown in Fig. 1, and without the drum.

This apparatus is of the form known as a "tower scrubber." It is composed of a series of chambers one above the other, which form a tower. The chambers A are preferably rectangular boxes of cast-iron having planed joints. They are divided from each other by a horizontal plate, *a*, having a vertical curb or passage-way, *b*, cast therein. The area of this passage-way is greater than the area of the gas inlet pipe. One side of each chamber A is fitted with a cover-plate, *c*, through which the revolving drum D, to be hereinafter described, can be put in and taken out. Each chamber A is to be filled nearly half-full with water or other liquid. The top of the curb or passage-way *b* is higher than the level of the water. This passage-way is for the flow of the gas as it passes up from chamber to chamber. Each two chambers are connected on the outside by a pipe, *d*, which conveys the overflow-water from an upper to a lower chamber. The position of this pipe finds the water-level.

A revolving hollow drum, D, is placed in each of the chambers A, and is mounted on a shaft, *e*. These drums are formed, preferably, of two circular-ring cast-iron heads, *f*, which are filled in with wire-netting or perforated plates *g*. The drums are divided up lengthwise by radial perforated plates *h* into any number of compartments, *i*, according to the capacity and size of the apparatus.

On the periphery of the drums D a number of water boxes or buckets, *k*, are attached. Each box is thus segment-shaped and covers one of the compartments *i*. The outer plate of these boxes or buckets is tight, while the bottom next to the interior of the drums is perforated, as shown at *e'*.

The compartments *i* of the drums are filled, preferably, with hard wooden balls *l;* but balls of any other material may be used. Each ball is pierced with two holes.

Each drum has a facing strip or edge, *n*, on one side, which is turned true and bears against the semicircular facing-strip *o*, cast on the side plate of the box forming each chamber A. The facing-strips *n o* are kept in contact by means of the tail pin or screw *p* acting on the opposite end of the drum-shaft *e*. One side of the chambers A is fitted with stuffing-box and gland *q*, through which the shaft *e* works. Each chamber A is provided with one or more hand-holes and covers (not shown) for cleaning purposes.

The apparatus stands on a suitable box-base, R, which serves to catch the tar which may come over from the condensers. The tar passes down with the water through the pipes *d*. The gas-inlet *s* is in the base-box, and the outlet *t* is at the top. The water or other liquid is supplied in the usual manner through the trapped pipe *u* at the top. The overflow or discharge for the liquid and tar is at *v*.

The apparatus operates as follows: Water or other liquid is first introduced into the apparatus through the supply-pipe *u* until the chambers A are filled up to the level of the overflow-pipe *d*. Rotary motion is now given to the drums D. They may be rotated by any suitable or well-known gearing—say sprocket-wheels and chains, bevel-gear, or worm-gear—fixed on the end of the shafts *e*. The particular means employed for rotating these drums is not important. It is simply necessary that the drums be rotated at about five revolutions per minute. The water-buckets *k* on the periphery of the drums in passing through the water or liquid contained in the lower half of the chamber A are filled and carry up and allow the liquid to fall through the perforations on the inside of the boxes, thus thoroughly wetting the balls *l* in the drums. The water also falls from one compartment to

another through the perforated plates *h*, which form the divisions between the different compartments of the drum. At the same time the water enters the drums through the net *g* in the heads, and as the liquid thus gathered up by the balls runs off the liquid from the buckets *k* falls down on the balls, thus keeping them constantly wet. The gas enters the base of the apparatus and passes up through the passage-way *b* into the first scrubbing or washing chamber A. Here the gas must pass through the whole length of the drum D—that is, from head to head—and cannot pass this chamber A in any other way. The gas in passing through these drums is brought most intimately in contact with the continually-moving and freshly-wetted surfaces of the balls, which thereby actually scrub the gas. After passing through the whole length of the drum of the first chamber the gas finds its way over the top of the drum and up the passage-way *b* into the next chamber A. This process is repeated in each chamber until the gas passes out from the scrubber at the outlet-nozzle *t*. The surplus liquid impregnated with the ammonia and tar is drawn off through the pipe *v*, which is situated in the base. The amount of water required is from three quarts to one gallon for every thousand feet of gas, according to the desired strength of the impregnated ammonia-liquor.

By this apparatus no back-pressure can possibly occur. The apparatus will not foul, but instead is self-cleansing, and it will give the same results, no matter how long used.

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a gas-scrubber, a drum having its ends and periphery of reticulated material, and provided with perforated radial partitions *h* and with water-buckets secured to its periphery, all substantially as shown and described.

2. In a gas-scrubber, the combination, with the water-chamber A, of a drum, D, on shaft *e*, said drum having its ends and periphery provided with reticulated material, and the buckets *k*, connected together on the periphery of the drum, said drum also provided with perforated partitions *h*, forming compartments *i*, having perforated balls *l* therein, whereby the liquid or water enters the compartments through the ends and periphery of the drum and is discharged from one compartment to another through the perforated partitions *h* to thoroughly clean the gas, as shown and described.

In testimony whereof I affix my signature in the presence of two witnesses.

WM. SIMPKIN.

Witnesses:
GEO. B. GAINES,
A. B. SUTTON.