J. BLACK & A. H. & H. LENNOX.

APPARATUS FOR CLEANING OR WASHING SMOKE.

APPLICATION FILED JUNE 1, 1908.

904,301. Patented Nov. 17, 1908.

2 SHEETS—SHEET 1.

Fig. 1.

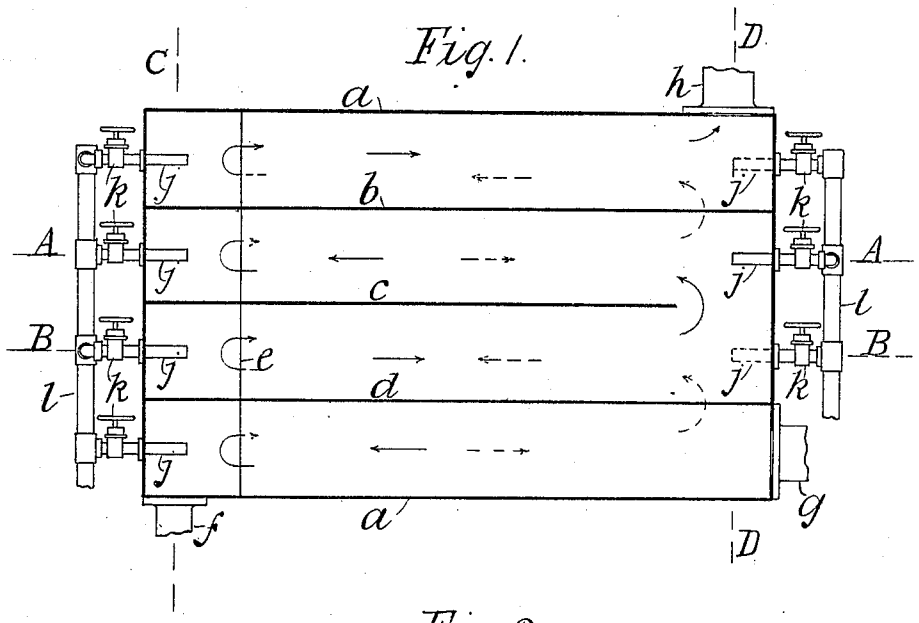


Fig. 2.

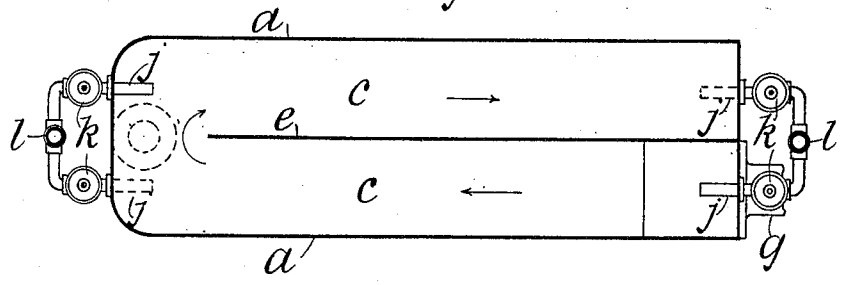
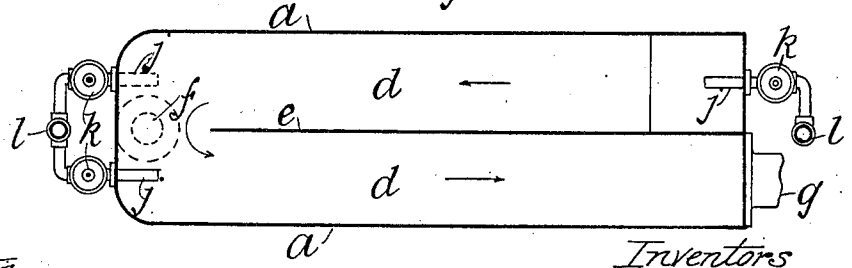


Fig. 3.



Witnesses
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2 SHEETS—SHEET 2.

Fig. 4.

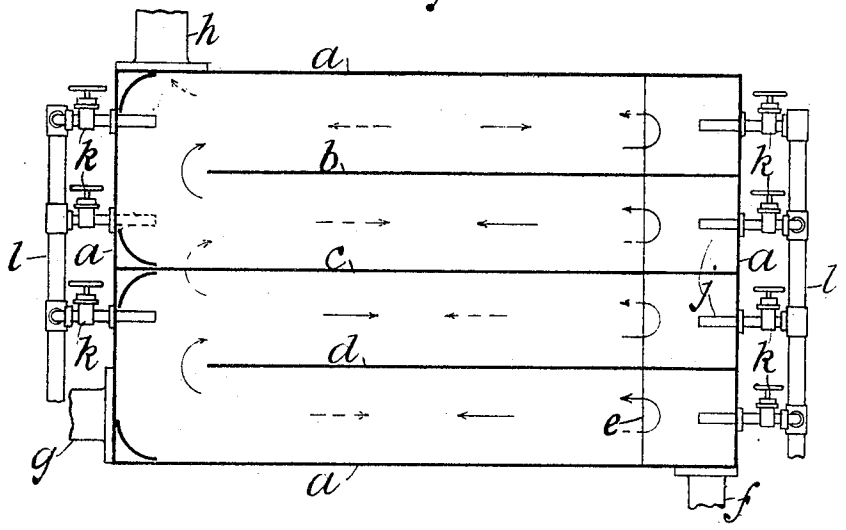


Fig. 5.

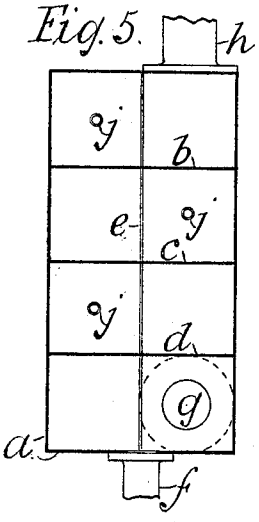
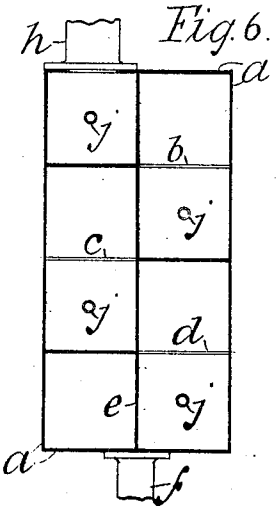


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES BLACK, ALLISON HALL LENNOX, AND HAROLD LENNOX, OF NEWCASTLE-UPON-TYNE, ENGLAND.

APPARATUS FOR CLEANING OR WASHING SMOKE.

No. 904,301. Specification of Letters Patent. Patented Nov. 17, 1908.

Application filed June 1, 1908. Serial No. 435,899.

To all whom it may concern:

Be it known that we, JAMES BLACK, ALLISON HALL LENNOX, and HAROLD LENNOX, subjects of the King of England, residing at Newcastle-upon-Tyne, England, have invented a certain new and useful Apparatus for Cleaning or Washing Smoke, of which the following is a specification.

This invention relates to an apparatus which can be used for cleaning or washing smoke, or for evaporating or cooling water, or as a condenser, and comprises the novel features hereinafter described and specifically pointed out in the claims.

An embodiment of the invention is shown in the annexed drawings, in which

Figure 1 is a vertical section, Fig. 2 a section on the line A—A, of Fig. 1 and Fig. 3 a section on line B—B of Fig. 1. Fig. 4 is a section through the back series of compartments. Figs. 5 and 6 are sections on lines C—C and D—D respectively of Fig. 1 through a front series of compartments hereinafter described.

The apparatus consists of a brickwork or metallic casing or chamber *a* of suitable length, breadth and height, divided into a number of compartments of equal size by horizontal partitions *b c d* and by a vertical longitudinal partition *e* in the center. The vertical partition does not extend to one end, say for purposes of description, the left-hand end, so that at this end of the apparatus each pair of horizontal compartments is in communication. On one side of the vertical partition, say the front, for purposes of description, and at the other or right end of the apparatus, the second horizontal partition from the bottom and every alternate partition above, are stopped short, so that the second and third compartments from the bottom, and similarly the fourth and fifth compartments, and so on to the top, are in communication. On the other side or back of the vertical partition, and at the same or right hand end, the first and second compartments from the bottom, the third and fourth, and so on to the top, are in communication. All these ways of communication are well rounded. The horizontal partitions are preferably slightly inclined although shown horizontal in the drawings so that water or the like will flow downwards from one partition to the other and thence to the bottom of the casing where a collecting pipe *f* is provided for conveying the water to a suitable receptacle.

When the apparatus is used for washing or cleaning smoke, the right end of the bottom front compartment is connected at *g* to the flue, and the smoke travels through the compartments as follows, counting from the bottom. First front to first back, second back, second front, third front, third back, fourth back, fourth front, and so on to the top compartment passing thence to the atmosphere through the outlet *h*. Water at a suitable pressure is admitted into one end of each compartment in the form of a jet or spray for example by pipes *j*, the pressure being sufficient to carry the jet or spray to the opposite end of the compartment.

l designates the water supply pipes to the jets, and *k* stop cocks in the jet pipes *j*. The direction of the jet or spray is always the same as the direction of travel of the smoke, the jets or sprays thus causing an increased draft.

As the partitions are slightly inclined as mentioned above, the water together with the smoke impurities flows to the bottom of the apparatus and is conveyed by suitable means to a settling tank or the like.

When the apparatus is used for evaporating water from any impure liquid, hot air or hot gases from any suitable source is or are admitted at *g* to the bottom front compartment in the same manner as the smoke as described above, and the impure liquid instead of water is sprayed into each compartment by suitable means for example through the aforesaid jet pipes *j*. The liquid is contained in a reservoir of suitable size, and is passed through the apparatus and back again to the reservoir, and again through the apparatus until it becomes so thick or viscid that the pump or the like is unable to spray it into the apparatus.

When the apparatus is used for cooling water, cold air is forced into the bottom chamber at *g* and circulates through all the other chambers and out at the top through *h;* and the water to be cooled passes through the jet pipes *j* in the ends of the compartments. In this case the jets may act in the opposite direction to the travel of the air.

When used as a condenser, the steam is admitted into the bottom compartment at *g*, and circulates through the others, and cold water is sprayed into the compartments in

the opposite direction to the travel of the steam through the jet pipes *j*. In both the latter cases, the jets are preferably placed at the other end of their respective compartments.

In some cases we may admit the jets or sprays into both ends of the compartments instead of at one end only as described above.

What we claim as our invention and desire to secure by Letters Patent of the United States is:—

1. Apparatus for the purposes set forth comprising a chamber, horizontal partitions adapted to divide said chamber into superposed compartments, a vertical longitudinal partition dividing said compartments into two series and affording communication between each pair of compartments in the same horizontal plane, the horizontal partitions aforesaid being so disposed that on opposite sides of said vertical partition alternating pairs of superposed horizontal compartments are in communication, a gaseous fluid inlet and an outlet at the lower and the upper parts of the chamber respectively, and means for the supply of a jet of liquid into each of the aforesaid compartments substantially as set forth.

2. Apparatus for the purposes set forth comprising a chamber, horizontal partitions adapted to divide said chamber into superposed compartments, a vertical longitudinal partition dividing said compartments into two series and terminating short of the chamber at one end to afford communication between each pair of compartments in the same horizontal plane, and the ends of alternate horizontal partitions terminating short of the chamber to afford communication between alternating pairs of superposed compartments on opposite sides of the vertical partition, a gaseous fluid inlet to one of the lowermost pair of compartments, a gaseous fluid outlet from one of the uppermost pair of compartments, means for the supply of a liquid into each of said compartments, and means for discharge of liquid from said chamber substantially as set forth.

In witness whereof we have signed this specification in the presence of two witnesses.

JAMES BLACK.
ALLISON HALL LENNOX.
HAROLD LENNOX.

Witnesses:
A. B. LENNOX,
W. MILBURN.