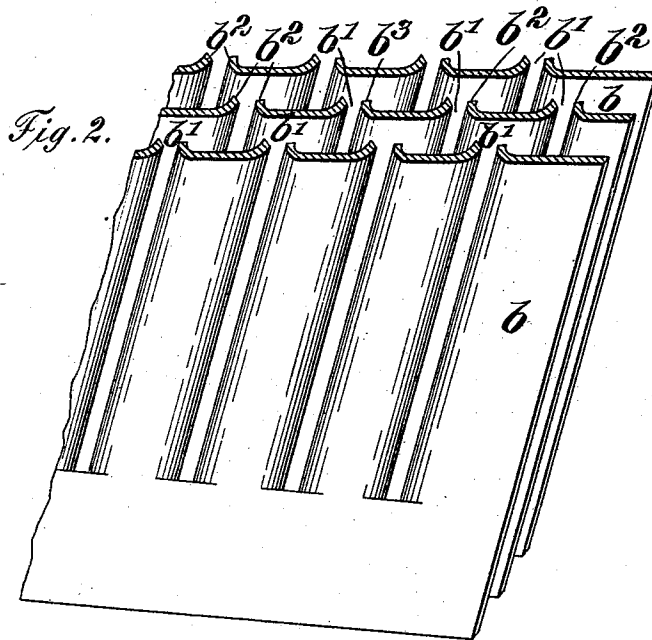
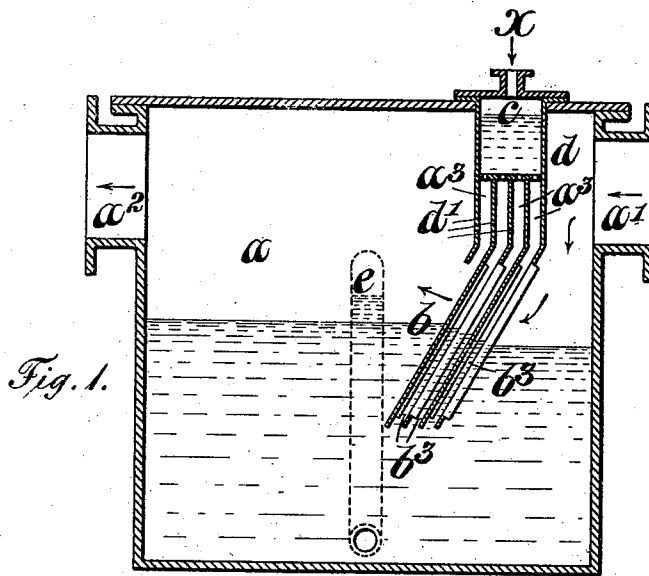


(No Model.)

J. GOETZ.
APPARATUS FOR PURIFYING GAS.

No. 503,133.

Patented Aug. 15, 1893.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOSEPH GOETZ, OF BERLIN, GERMANY.

APPARATUS FOR PURIFYING GAS.

SPECIFICATION forming part of Letters Patent No. 503,133, dated August 15, 1893.

Application filed February 17, 1893. Serial No. 462,763. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH GOETZ, a subject of the King of Prussia, residing at Berlin, Germany, have invented certain new and useful Improvements in Apparatus for Purifying Coal-Gas; and I do hereby declare the following to be a full, clear, and exact description of the invention.

My invention relates to apparatus for eliminating or separating ammonia and tar from coal gas, and it has for its object the provision of means whereby the separation is more effectually and economically attained than heretofore.

The invention consists essentially in the construction of the apparatus, as will now be fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of an apparatus constructed according to my invention, and Fig. 2 is a detail view in perspective of a portion of the separator.

One of the essential features of my invention consists in the construction of the separator so as to form a series of zigzag channels or passages for the gas, and in the combination therewith of means for supplying an absorbing liquid to the same. The zigzag channels or passages I obtain by means of a series of sheet metal inverted gutters, *b*, in such manner as to leave a very narrow slit or passage, *b'*, between adjacent gutters, and so that one series of gutters will overlap or straddle the narrow slit or passage, *b'*, between the gutters of the series in rear or below. In practice the superposed series of gutters are so arranged that the side walls, *b²*, of the gutters of one series will lie in such proximity to the gutters below or in rear, as to leave a narrow slit or passage, *b³*, between them, as shown in Figs. 1 and 2, whereby the zigzag passages are obtained. These sheet metal gutters, *b*, are arranged on an inclined plane within a suitable box, *a*, each individual series extending clear across the box, thus forming, so to say, a slotted partition, and the length of the gutters is so chosen that their lower edges will be some distance from the bottom of the box, *a*, which is thus divided into two compartments that communicate with each other below the separator. The upper end of each transverse row of gutters, *b*, is secured to a vertical partition, *d'*, extending across the

box, *a*, the series of partitions dividing the box at this point into a series of narrow chambers, *a³*. The lower end of the partitions, *d*, to which end a transverse series of gutters is secured, is bent to hold said gutters at the desired inclination to a vertical, as shown in Fig. 1, while the upper end of said partitions is secured to the bottom of a feed box, *c*, that extends also across the box, *a*. The bottom of the feed box is perforated along the chambers, *a³*, and water or weak ammonia liquor enters said feed box at *x*, while the gas enters at *a'*, on one side of the separator, and flows out at *a²*, on the opposite side of said separator, both the gas inlet and outlet being at the upper portion of the box, *a*, which is also provided with an overflow pipe, *e*.

In Fig. 1 I have shown four superposed transverse series of gutters, *b*, but I do not desire to limit myself to this number, which may be increased or decreased according to the volume of gas passing through the apparatus, nor do I desire to limit myself to any particular cross-sectional area of the individual gutters, as this may also be varied without departing from the nature of my invention.

In practice I have found that the separation of tar takes place in the gutters nearest to the gas inlet, while the separation of the ammonia takes place chiefly after the gas has passed the gutters nearest said gas inlet, so that the apparatus performs the double function of washer and scrubber.

The separation of the ammonia and tar is based upon the fact that the gas is compelled to pass in a zigzag course through passages that are luted with a film of liquid, either water or weak liquor. This luting is obtained through the medium of the feeding devices described, the liquid being supplied under sufficient pressure to form jets which are projected into the chambers, *a³*, and onto the upper face of the gutters over which the liquid flows to the edges, and as the spaces between the gutters of a transverse row and those between such row and the next succeeding one are narrow, said spaces or slits are covered or closed by a thin layer or film of liquid through which the gas is compelled to flow, since it cannot flow around the separator as the lower end thereof is luted by the liquid in the box. The gas will necessarily take the course referred to, owing to the difference in resistance

to its flow, the film of liquid that seals the passages, b' , b^3 , above the level of the liquid in the box offering less resistance to the flow of the gas than the body of liquid within said box.

I have also found that when the apparatus has been in use the slits or passages of communication, b' , b^3 , between the gutters are not only luted or sealed by a film of liquid but also by a film of tar separated from the gas, so that the latter remains in contact with tar until it escapes from the outer transverse row of gutters, or substantially so, which is an advantage as is well known, and has the further advantage of increasing the resistance to the flow of the gas, and thereby more effectually separating the dust, ammonia and tar therefrom.

Inasmuch as the direction of flow of the gas is changed as it passes from one transverse row of gutters to another, and in view of the fact that the gaseous currents meet one another or collide, a constant and somewhat violent agitation or mixing takes place, which materially facilitates the separation of the ammonia and tar as it passes through the liquid films and over the liquid flowing along the upper and under side of the gutters.

In practice I form the gutters, b , of single pieces of sheet metal, so as to give them a greater rigidity and the necessary resistance to the pressure of the gas.

It is obvious that the feed box, c , may be divided into two compartments by a suitable partition for the purpose of supplying thereto different liquids, as for instance, weak liquor to one and water to the other of the two compartments, and this will be found of advantage when large volumes of gas are passed through an apparatus constructed as described.

In practice I make the overflow pipe e , adjustable vertically, so that the level of the liquid within the box, a , and consequently the area through which the gas passes may be varied in accordance with the volume of gas entering said box.

The adjustment of the overflow pipe, e , may be effected by hand in any desired manner, or automatically by the provision of suitable mechanism controlled by the pressure of the gas entering the box, a .

In order to avoid essential variations in the adjusted level of the liquid within the box, due to varying volumes of gas entering the same, and to reduce as much as possible the transmission of these variations to the entering gas, I so arrange the separator that the chamber formed thereby at the inlet side is of considerably less area than that at the outlet side, so that an increase in the pressure at the inlet side of the separator will cause the level of the liquid to sink correspondingly, while owing to the greater area of the chamber at the outlet side of the separator, the level of the liquid will not be materially affected.

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

1. A gas purifier comprising a closed separating chamber provided with gas inlet and outlet ports and with an overflow port at a lower level than said inlet and outlet ports, and a series of interspaced and longitudinally slotted partitions extending across the separating chamber between the inlet and outlet ports and from the top of said chamber to a point below the level of the aforementioned ports, the solid or unslotted parts of one partition lying in front of and overlapping the slots in the partitions next preceding, and means for causing a liquid to flow over said partitions, substantially as and for the purpose set forth.

2. In a gas purifier, the combination with a closed purifying chamber provided with gas inlet and outlet ports in opposite walls thereof, and with an overflow below the said inlet and outlet ports, of vertically slotted interspaced partitions depending from the roof toward the floor of the chamber to a point below the level of the aforesaid ports, said partitions arranged relatively to each other so that a solid portion of one partition will lie opposite and overlap the slot in the adjacent partition, and means for feeding a liquid in a divided state as in the form of jets onto each of said partitions at the upper end thereof, for the purpose set forth.

3. A gas purifier comprising a closed separating chamber provided with gas inlet and outlet ports and with an overflow port at a lower level than said inlet and outlet ports, and a series of interspaced inclined separating partitions extending across said chamber between the gas inlet and outlet ports and from the top of said chamber to a point below the level of the aforementioned ports, said partitions constructed of rows of interspaced channeled plates the channeled side of all said plates facing toward the gas inlet and the plates of one partition facing and overlapping the spaces between the plates of the partition next preceding, and means for causing a liquid to flow over each of said partitions, substantially as and for the purpose set forth.

4. In a gas purifier the combination with a casing, a , having gas inlet and outlet ports and an overflow port arranged as set forth, of the reservoir, c , extending across the chamber, said reservoir provided with a feed port, with a perforated bottom, and with depending cross partitions, as d' , and the interspaced partitions constructed of interspaced rows of channeled plates b , one end of which is secured to said depending cross partitions, substantially as and for the purpose set forth.

In testimony whereof I have hereto affixed my signature in presence of two witnesses.

JOSEPH GOETZ.

Witnesses:

RICHARD SCHMIDT,
PAUL LAUBIER.