H. A. BRASSERT & C. J. BACON.

METHOD OF AND APPARATUS FOR GAS WASHING.

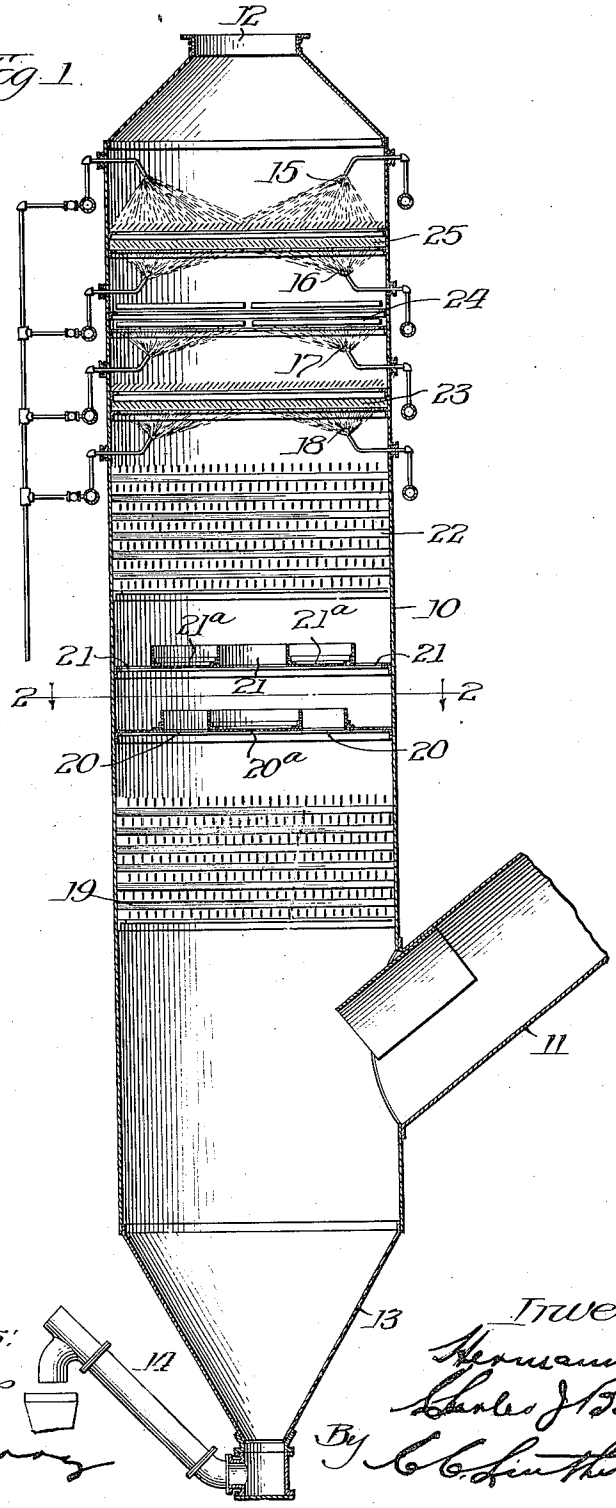
APPLICATION FILED DEC. 8, 1915.

1,172,930.

Patented Feb. 22, 1916.

2 SHEETS—SHEET 1.

Fig 1.



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2 SHEETS—SHEET 2.

Fig 2.

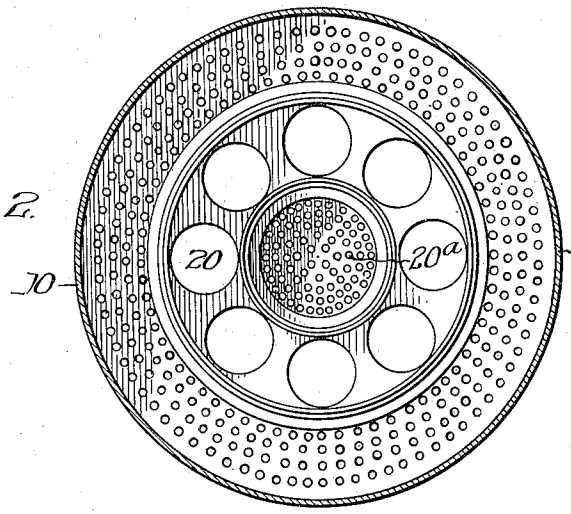
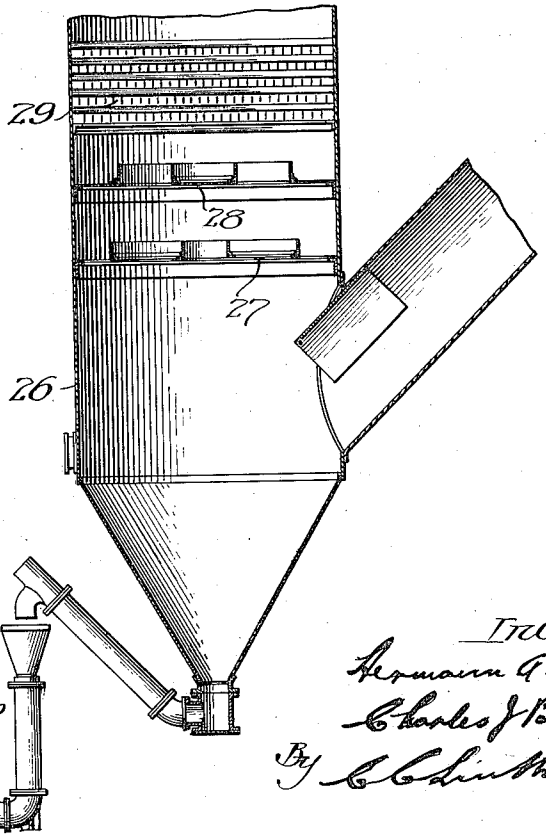


Fig 3.



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UNITED STATES PATENT OFFICE.

HERMANN A. BRASSERT AND CHARLES J. BACON, OF CHICAGO, ILLINOIS.

METHOD OF AND APPARATUS FOR GAS-WASHING.

1,172,930. Specification of Letters Patent. Patented Feb. 22, 1916.

Application filed December 8, 1915. Serial No. 65,673.

To all whom it may concern:

Be it known that we, HERMANN A. BRASSERT and CHARLES J. BACON, both citizens of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Methods of and Apparatus for Gas-Washing, of which the following is a specification.

Our invention relates to gas washing and refers to the apparatus used in connection therewith.

While our invention is particularly adapted for use in connection with washing gas from blast furnaces, it may be used for cleaning gas of any description which contains mechanical impurities such as soot, flue dust or the like.

The gas washing apparatus hereinafter described is an improvement upon applicants' co-pending application, Serial No. 42,361, filed Oct. 25, 1915.

In order to sufficiently wash gas in vertical towers it is necessary to secure an equal distribution of both the gas and the water over the entire cross sectional area of the apparatus containing the washing elements; in other words, channeling of both the gas and water must be avoided. We have found that this is best accomplished by compelling a repeated distribution of both the gas and water at different levels of the tower. The washing is carried on in successive stages in which the rough washing is accomplished in the lower stages and the fine cleaning in the final stage at the top of the tower. Each one of the rough or lower stages differs radically from the preceding one, and compels a complete rearrangement of both gas and water.

The invention will be more readily understood by reference to the accompanying drawings, wherein,

Figure 1 is a vertical sectional view through a gas washing tower constructed in accordance with our invention; Fig. 2 is a section on the line 2—2 of Fig. 1, and, Fig. 3 is a fragmentary sectional view of a modified form of the apparatus shown in Fig. 1.

In the drawings it will be seen that we provide a vertical casing 10, having a gas inlet 11, and an outlet 12. The lower end 13, of the casing is in the form of a cone, thereby providing a gas seal and overflow 14, serving to permit the escape of the water collected. The water for washing is provided by the sprays 15, 16, 17, 18. The gas collects in the bottom of the apparatus and flows upward, first striking a nest or group of horizontally disposed hurdles or baffles 19, arranged in rows, preferably not more than six or eight rows in the group, the baffles being set on edge and parallel to each other, which breaks the gas up into many small streams. These baffles are preferably in the form of narrow wooden strips, all of which are placed vertically, alternate rows being located at right angles to each other. The placing of such baffles in vertical towers is old, but heretofore the entire tower, or a greater portion of it, was filled with them, and if the gas started its flow one-sided or otherwise unevenly distributed, it continued to do so throughout the tower, sweeping the water to the other side and resulting in a low efficiency of cleaning. In our construction if there is any one-sided flow of gas through the first group of baffles, it is broken up and redistributed by the concentric gas passages at 20, 21, formed by superimposed circular perforated trays 20^a, 21^a, arranged in concentric tiers as shown, which collect the water from above and cause a shower of water to fall through the gas. These trays in combination, cover the entire cross section of the tower and therefore collect and redistribute every drop of water falling from the upper stages so that every section of the tower below these trays is bound to receive an equal amount of water. The gas being forced through these properly proportioned tray passages is also equally distributed in reference to each section of the tower. Leaving the tray sections the gas strikes another hurdle section 22, in which the baffles may be placed a little closer together than in the first section. This section again divides the gas into many small streams and receives the water falling from the elements above. Leaving the last hurdle section, the gas then strikes the inclined baffles which form the fine cleaning stage by the impinging action of the gas against the many inclined surfaces. The fresh water is applied to these inclined baffles by suitable spray nozzles placed at the bottom and top of these sets of baffles; or if desirable, Zschocke type or other forms of sprays may be applied to the top in order to furnish additional water. These baffles are preferably arranged in three series 23, 24, 25, two rows or baffles being placed in

each series and each row being inclined at right angles to the baffles of the adjacent row. These baffles are preferably composed of narrow wooden strips and located in an inclined position, all the baffles of a single row having the same angle of inclination, the baffles of the adjacent row in the same series extending in the same direction but having an angle of inclination substantially 90° removed from the baffles of the adjacent angle. The baffles in the adjacent series, however, extend in a direction at right angles to the baffles in the next series, the individual arrangement of the baffles in that series, however, being the same as in the other.

If a shortage of water exists, as is the case at many plants removed from lakes and rivers, then the discharge water at the bottom may be lifted up to the top of the tray section and used once over again, thus cutting down the amount of fresh water at the spray nozzles in the final washing stage. In this way great economy of water may be reached without detracting from the efficiency of the washing tower. We have designed towers of this description with two gas inlets so that the gas from two sources may be cleaned in the one tower. It is only necessary to dimension the tower and the gas passages in such a manner that the proper velocity of the gas, as has been found by us to give the best results is obtained. We have ascertained that the velocity through the lower parallel baffle sections should be between five and fifteen feet per second; through the tray sections between fifteen and twenty-five feet; and through the final washing stage between the inclined baffles it should be between five and fifteen feet per second.

In the modified construction shown in Fig. 3, the gas enters the tower 26, in the usual manner and immediately is caused to pass through trays 27, 28, whereupon it is distributed by a hurdle section 29, as in the construction just described. In some instances this arrangement may be found to be desirable. We have found likewise that the efficiency of the gas washing apparatus depends largely upon the velocity of the gas through the different stages or portions of the tower and the velocities herein mentioned while possibly not absolutely imperative have been found to secure the best results in the apparatus employed.

Obviously the construction is capable of considerable modification and such modifications as are within the scope of our claims we consider within the spirit of our invention.

We claim:

1. The method of washing gas which consists in passing the gas vertically through a plurality of different forms of gas washing elements thereby causing the gas to form in alternate large bodies and numerous small streams, causing the gas to travel at a velocity of fifteen to twenty-five feet per second while combined in the large body, and at a velocity of five to fifteen feet per second while subdivided into the small streams, whereby the gas is alternately redistributed and its flow equalized, in the meantime causing the gas to contact descending streams of water, substantially as described.

2. In apparatus for gas washing, the combination of a vertical tower, means for admitting gas at the lower end of the tower and discharging it from the upper end thereof, a plurality of rows of vertical hurdles in the lower end of the tower, redistributing trays separating said vertical hurdles and a plurality of series of inclined closely spaced baffles in the upper end of said casing, substantially as described.

3. In gas washing apparatus, the combination of a vertical casing having a lower inlet and an upper outlet opening, the lower portion of said casing containing a relatively large number of rows of vertical hurdles, a pair of distributing trays interposed in said rows of vertical hurdles, and a plurality of series of rows of inclined closely spaced baffles in the upper end of said casing, substantially as described.

4. In a gas washer, the combination of a vertical tower of relatively great height, means for admitting gas at the lower end of said tower and discharging the same from the upper end thereof, means for admitting water to the upper end of said tower by a plurality of sprays, a relatively large number of rows of vertical hurdles in the lower portion of said tower, a pair of water and gas distributing trays located above said hurdles, a further series of vertical hurdles above said trays, and a plurality of rows of closely spaced inclined baffles in the upper portion of said top, substantially as described.

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