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

GAS WASHING.

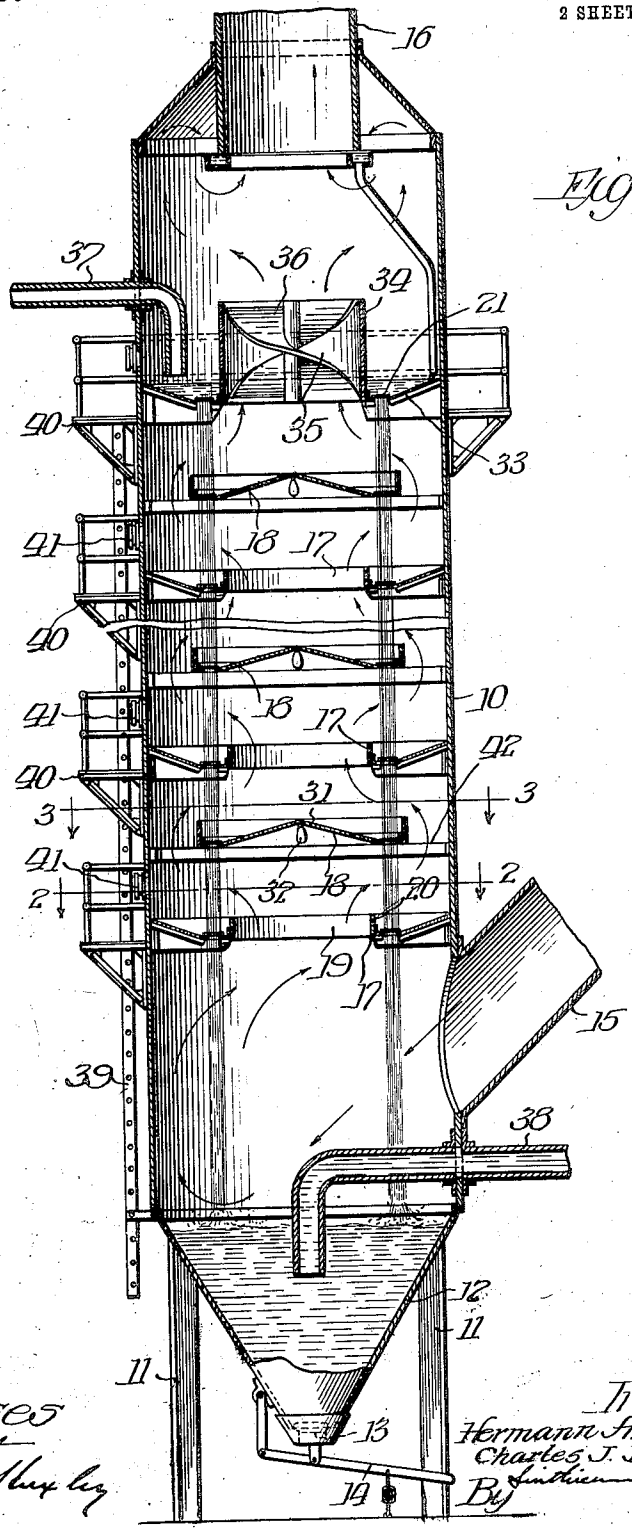
APPLICATION FILED OCT. 15, 1913.

1,123,232.

Patented Jan. 5, 1915.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses

S. H. Barrett

Henry M. Shipley

Inventors

Hermann A. Brassert

Charles J. Bacon

By Lindsey, Betts & Fuller

Attys

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

GAS WASHING.

APPLICATION FILED OCT. 15, 1913.

1,123,232. Patented Jan. 5, 1915.

2 SHEETS—SHEET 2.

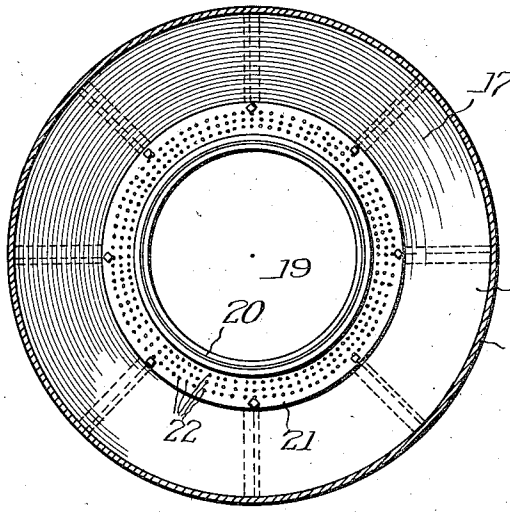


Fig. 2

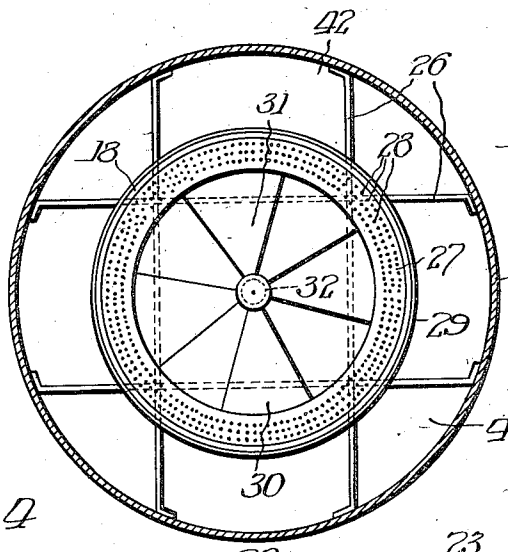
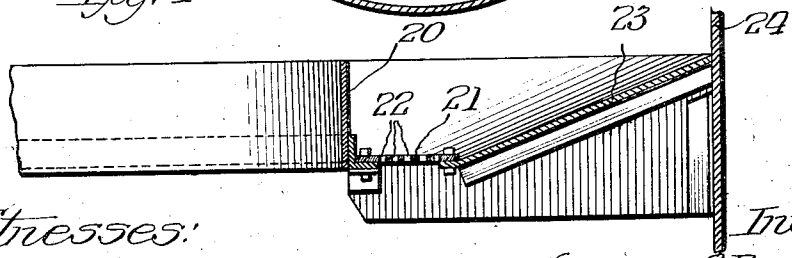


Fig. 3

Fig. 4



Witnesses:
H. G. Barrett
Henry A. Schuyler

Inventors
Hermann A. Brassert
Charles J. Bacon
By Smith, Pelton & Fuller
Attys.

UNITED STATES PATENT OFFICE.

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

GAS-WASHING.

1,123,232. Specification of Letters Patent. Patented Jan. 5, 1915.

Application filed October 15, 1913. Serial No. 795,217.

To all whom it may concern:

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

Our invention relates to gas washing, and refers both to the method and 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.

Gas washing towers as heretofore constructed have consisted chiefly of three principal types: first, that in which a simple spray is used, there being no obstructions to the passage of the water, with the possible exception of a few screens placed in the tower; second, those having a series of baffles in the tower, by which construction the water is caused to strike the baffles in its downward path and the gas is forced to take a zig-zag course through the cascades of water which are formed by the baffles; and, third, the hurdle washers in which a large portion of the contents of the tower is filled with wooden hurdles, which offer a large surface to the water and gas. By striking these hurdles the particles of water and gas are effectively broken up and become intimately mixed, with the result that the gas is cleansed from its impurities.

The disadvantage of the simple spray and the use of baffles in gas cleaning towers is that it is difficult to prevent the gas and water from channeling, so that the gas passes through the washer without coming intimately in contact with the water. The hurdle washers, while securing a good mixture of the gas and water, have the disadvantage of high initial cost and also of offering a comparatively high resistance to the flow of gas, so that it is generally necessary to employ fans in order to propel the gas to its point of consumption.

It is the object of our invention to overcome all of the above-mentioned difficulties, and this result we accomplish by providing a gas washing tower in which a plurality of horizontally disposed dish-like partitions are used. These partitions are of two types: first, those having gas apertures around their peripheries, and, second, those having the gas apertures through their centers. Each of the dishes is provided with a plurality of water apertures, which preferably consist of a series of minute concentric openings in the dish. The dishes of the two types alternate with each other in the tower so that the upwardly ascending gas first passes through the center of a dish, then through the downwardly falling water, and next through the peripheral portion of the next higher dish. This action continues until the gas reaches the upper portion of the tower, where it is passed through a spiral in order to give it a rotary motion, so that the gas is forced to the outer wall of the tower and in this way is rid of the moisture which it mechanically entrains. At the upper portion of the tower a suitable water inlet is provided and at the bottom of the tower the water is removed by means of a siphon, this water at the same time forming a water seal at the bottom of the tower. It will be evident that by the use of this apparatus we accomplish a very efficient cleaning of the gas, with a minimum cost for the original installation. These and other advantages of our invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section through our improved gas washing tower; Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1; Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 1; and Fig. 4 is a fragmentary enlarged vertical section showing in detail a portion of the construction of the washing dish shown in Fig. 2.

The gas washing tower of our invention consists of an outer casing 10 suitably supported on the pillars 11. The lower portion of this tower is formed into a water-receiving cone 12, at the bottom of which is the outlet valve 13 controlled by the lever 14. Near the lower portion of the casing 10 is the gas inlet conduit 15, and the upper portion of the casing is formed to receive the gas outlet conduit 16, which, as clearly shown in Fig. 1, projects a substantial distance into the casing. The casing 10 is provided with a plurality of horizontally disposed washing dishes, which are of two

types, represented, respectively, by the dishes 17 and 18. Each of the dishes 17 is provided with a central gas aperture 19, immediately adjacent to which is the upstanding flange 20. Just outside of the flange 20 is the water plate 21, which is in the form of a ring and has a plurality of concentrically arranged apertures 22. The sloping plate 23 incloses the water plate 21 and extends to the circular frame 24 which is fastened to the casing 10 by bolts or other suitable means.

Each of the dishes 18 consists of the circular frame 25 to which are fastened the cross-members 26, which, in turn, serve to support the water plate 27 having therein the concentric apertures 28. Just exterior to the water plate 27 is the upstanding flange 29. The central portion of the dish 18 consists of the plates 30 which are formed into the shape of a cone 31. The water plates 21 and 27 are arranged so that one water plate is substantially directly above another. In order to afford illumination inside of the tower an electric light 32 may be placed in each of the cones 31.

The upper dish 33 of the washing tower is similar in construction to the dishes 17, with the exception that it is provided with a flange 34 of a much greater height than the flanges 20 of the dishes 17. The gas aperture 35 is formed by the flange 34. In this aperture is located the spiral 36, the object of which is to give the gas a rotary motion, as will be explained hereafter. Directly above the dish 33 is the water inlet 37. The water outlet 38 is in the form of a siphon having an end projecting into the cone 12, and serves to remove the water accumulating in said cone.

If desired, our improved tower may be equipped with a ladder 39 and a plurality of platforms 40 located at different levels. Peep-holes 41 may be provided in order to facilitate the inspection of the inside of the tower.

Having thus described a preferred embodiment of the apparatus which we use, the method of operation may now be readily understood: Before gas is allowed to pass through the tower water is admitted through the inlet pipe 37. This water is caught on the sloping plate 23 and passes downwardly to the water plate 21. The water then passes in the form of fine spray through the concentric water apertures 22, and falls just inside of the flange 29 of the dish 18. The water rises slightly in the dish 18 and then passes downwardly onto the water plate of the next lower dish 17. From this point the water continues to pass downwardly through the successive dishes 17 and 18 until it accumulates in the cone 12, from which it is removed by the siphon outlet 38. Gas may then be admitted through the inlet opening 15. This gas is forced to pass through the sprays descending from the lowermost dish 17, and then passes upwardly through the gas aperture 19 in the lowermost dish 17. From this point the gas is again forced to the outer side of the circular spray of water and passes upwardly through the peripheral gas aperture 42 of the dish 18. The gas then again passes through the circular spray to the gas aperture 19 to the next higher dish 17, and so on until it finally reaches the uppermost dish 33. In passing through the gas aperture 35 of the dish 33 the gas is given a rotary movement by means of the spiral 36, and is thrown outwardly against the casing 10 of the washing tower. This latter action serves to free the gas from the moisture which is mechanically entrained with it. The gas finally passes out through the gas outlet pipe 16 to the point at which it is to be used.

In operating our invention, sufficient water is supplied to the dishes 17, 18 and 33 so that a slight head of water is maintained in these dishes at all times, thereby preventing any gas from passing through the water apertures 22 and 28. As the gas passes upwardly through the tower it gradually becomes cooled and contracts, so that we preferably make the distance between the dishes progressively less toward the top of the tower.

It will be apparent to those skilled in the art that considerable change could be made in the detailed construction of the various parts which we have described without departing from the spirit or scope of our invention.

What we claim is:

1. A gas washing tower, comprising the combination with a casing, of a plurality of horizontally disposed dishes one above another, in said casing, each of said dishes having a water plate with a plurality of apertures therethrough and means for directing water to said plate, said directing means comprising inclined portions slanting downward toward the respective water plate, adjacent dishes having gas apertures in their central portions and around their peripheries respectively, whereby the gas in passing from the gas aperture of one dish to the gas aperture of an adjacent dish traverses the water flowing through the apertures of the higher dish, substantially as described.

2. A gas washing tower, comprising the combination of a casing, and a plurality of horizontally disposed dishes one above the other within said casing, each of said dishes having a water plate with a plurality of water apertures therein, said water plates being arranged so that one is substantially

directly above another, and adjacent dishes having gas apertures on opposite sides of said water plates, whereby the gas in passing from the gas aperture of one dish to the gas aperture of an adjacent dish traverses the water flowing through the apertures of the higher dish, substantially as described.

3. A gas washing tower, comprising the combination of a casing, a plurality of horizontally disposed dishes one above the other within said casing, each of said dishes having a water plate with a plurality of water apertures therein, said water plates being arranged one above another, adjacent dishes having gas apertures on opposite sides of said water plates, whereby the gas in passing from the gas aperture of one dish to the gas aperture of an adjacent dish traverses the water flowing through the apertures of the higher dish, and means for imparting a rotary motion to said gas after its passage through said dishes, whereby said gas is brought into contact with said casing and freed from entrained moisture, substantially as described.

4. A gas washing tower, comprising the combination of a casing, a plurality of horizontally disposed dishes one above the other within said casing, each of said dishes having a water plate with a plurality of water apertures therein, said water plates being arranged one substantially directly above another, adjacent dishes having gas apertures arranged interiorly and exteriorly of said water plates respectively, whereby the gas in passing from the gas aperture of one dish to the gas aperture of an adjacent dish traverses the water flowing through the apertures of the higher dish, and a spiral in the gas aperture of the uppermost of said dishes whereby the gas will be given a rotary motion and brought into contact with said casing, substantially as described.

5. A gas washing tower, comprising the combination of a casing, and a plurality of horizontally disposed dishes one above the other within said casing, each of said dishes having an annular water plate with a plurality of concentrically arranged water apertures therein, said water plates being arranged one substantially directly above another and adjacent dishes having gas apertures arranged interiorly and exteriorly of said water plates respectively, whereby the gas in passing from the gas aperture of one dish to the gas aperture of an adjacent dish traverses the water flowing through the water apertures of the higher dish, substantially as described.

6. A gas washing tower, comprising a casing, a gas inlet at the lower portion of said casing, a gas outlet at the upper portion of said casing, a plurality of horizontally disposed washing dishes within said casing, said dishes being arranged one above another and having water plates with a plurality of apertures therethrough, said water plates being arranged one substantially above another, adjacent dishes having gas apertures therethrough on opposite sides of said water plates, a water inlet at the upper portion of said tower, and means for removing the water collecting in the lower portion of said tower, substantially as described.

HERMANN A. BRASSERT.
CHARLES J. BACON.

Witnesses:
JOHN THORBURN,
PAUL SCHROEDER.