E. F. LLOYD.

GAS SCRUBBING APPARATUS.

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1,073,259. Patented Sept. 16, 1913.

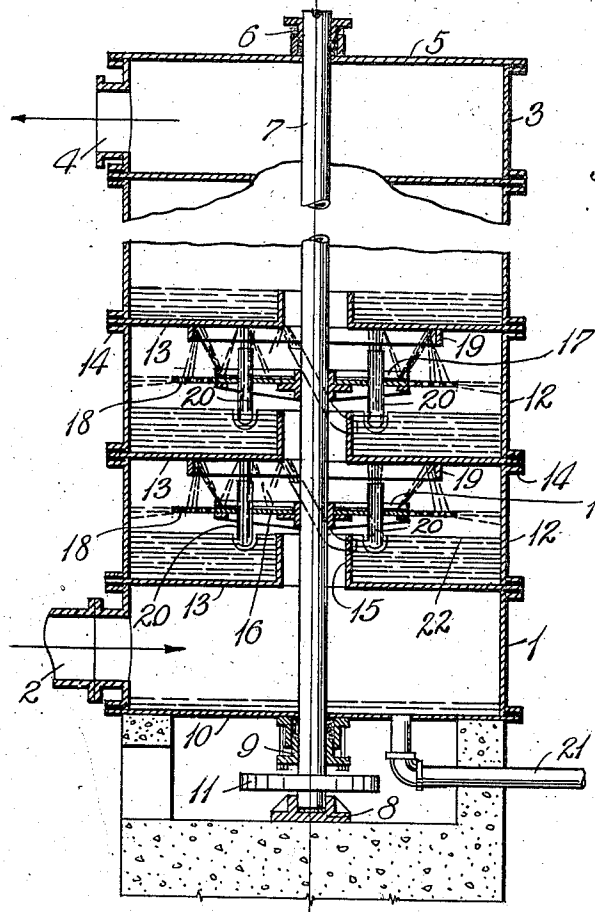

Fig. 1.

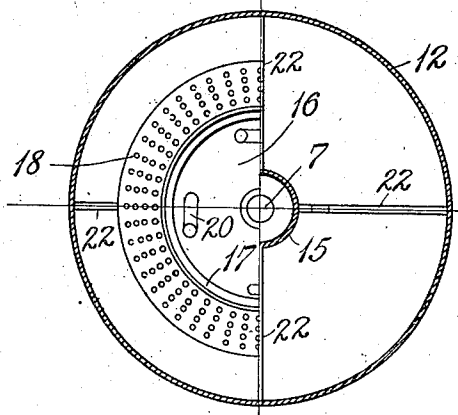

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

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GAS-SCRUBBING APPARATUS.

1,073,259. Specification of Letters Patent. Patented Sept. 16, 1913.

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To all whom it may concern:

Be it known that I, ERNEST F. LLOYD, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Gas-Scrubbing Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a scrubber for a gas generating system, and more particularly to an arrangement thereof whereby an effective cleansing of crude gas is obtained in a comparatively small space.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims and shown in the accompanying drawing in which:

Figure 1 is a view in section, largely diagrammatic, of a scrubber embodying features of the invention. Fig. 2 is a view in horizontal section.

As herein illustrated, a series of cylindrical drums are mounted one above the other to form a cylindrical casing. The base drum 1 has an inlet pipe 2. The top drum 3 has a gas outlet pipe 4 and a cover 5 with stuffing box 6 acting as a guide bearing for an upright shaft 7 extending through the lower drum with its lower end stepped in a suitable pivot bearing 8. A stuffing box 9 in the base 10 of the drum 1 prevents leakage around the shaft, which may be driven as by a pulley 11 or other suitable means.

The intermediate drums 12 are separated from the end drums and from each other by horizontal annular diaphragms 13 which may be conveniently secured between flanges 14 on the drums.

Each diaphragm has an inner annular flange 15 and radial ribs 22 of suitable height to retain a body of liquor on the diaphragm. A plate 16 is secured on the shaft 7 between each pair of diaphragms and has an annular rim or flange 17 on its upper face which separates an imperforate central body of the plate from an outer marginal portion which is provided with a plurality of apertures 18. A depending rib 19 is formed on or secured to the lower face of each diaphragm above the adjacent plate, of somewhat lesser diameter than that of the plate. Obliquely disposed scoops 20, preferably tubular as herein indicated, are secured to the plate and extend through the imperforate body, the lower end or part of each scoop hanging below the plane of the upper edge of the inner diaphragm flange 15 so as to dip below the surface of liquid on the diaphragm, and the upper end of each scoop being arranged to discharge against the under face of the adjacent diaphragm inside the rib 19. A drain pipe 21 for the base drum 2 completes the apparatus.

In operation the several drums are filled with liquor and the shaft rotated so that the scoops take up the liquid, and dash it against the under sides of the diaphragm above them. From this point it drops back on to the plates and is thrown centrifugally outward, and upward on about the path indicated by dotted lines, being trapped and turned back on to the perforated margins of the plates by the depending ribs. It is thrown from these margins by centrifugal force against the surrounding walls of the drums. As a consequence, gas entering the base drum through the inlet and finding its way through the central opening of the adjacent diaphragm, is forced to pass through successive sheets of spray before it reaches the succeeding diaphragm opening, and is thus thoroughly washed by the liquor.

The capacity of the scrubber and the thoroughness of the washing may be increased by adding intermediate sections or drums as is necessary. But little floor space is required and the scrubber is readily taken apart for cleansing or repairing.

Obviously, changes in details of construction may be made without departing from the spirit of the invention and I do not limit myself to any particular form or arrangement of parts.

What I claim as my invention is:—

1. A gas scrubber comprising an upright cylindrical casing with gas inlet at its lower end and gas outlet at its upper end, divided by a series of annular reservoirs, a rotatable shaft concentric in the casing extending through the reservoir openings and having plates between each pair of reservoirs, means on each plate adapted when the shaft is rotated to throw the contents of the adjacent lower reservoir toward the under side of the adjacent upper reservoir, and means on the plate adapted to divert liquor from the upper face thereof against the under side of the upper reservoir and the wall of the surrounding casing when the shaft is rotated.

2. A gas scrubber comprising an upright casing divided by transverse diaphragms having a central flanged opening and constituting annular liquor reservoirs, a rotatable shaft extending through the openings, plates on the shaft above each reservoir provided with scoops adapted to dip into the reservoir contents and project it against the adjacent upper diaphragms when the shaft is rotated, means on each plate adapted to deflect liquor thrown therefrom by centrifugal force against the face of the adjacent upper diaphragm, and means for returning the liquor on to the plate outside the deflecting means.

3. A gas scrubber comprising an upright cylindrical casing having a gas inlet at its lower end and a gas outlet at its upper end, transverse diaphragms having central flanged openings and constituting annular liquor reservoirs in the casing, a rotatable shaft extending through the diaphragm openings, plates on the shaft between the reservoirs each having a central imperforate body and an apertured marginal portion, scoops extending through the imperforate body of each diaphragm adapted to dip into the contents of the adjacent lower diaphragm and to discharge against the under side of the upper diaphragm when the shaft is rotated, a flange on the upper face of each plate surrounding the imperforate body that is adapted to project liquid thrown off the imperforate body by centrifugal force against the under side of the adjacent upper diaphragm, and a deflecting rib on the under side of each diaphragm adapted to direct liquor projected against it on to the apertured portion of the plate.

4. A gas scrubber comprising an upright cylindrical base section having a gas inlet, a corresponding top section having a gas outlet, intermediate cylindrical sections supported on the base, a diaphragm secured between each pair of sections and provided with a central opening, an annular flange surrounding each diaphragm opening, a rotatable shaft extending through the openings of the diaphragm, a plate on each shaft between each pair of diaphragms, an annular flange on the upper face of each plate concentric with the shaft, scoops obliquely disposed on the plate within the annular flange whose lower ends extend below the plane of the upper margin of the adjacent central flange of the diaphragm and whose upper ends are adjacent the upper diaphragm, an annular rib on the under face of each diaphragm concentric with and between the outer edge of the adjacent plate and the annular flange thereof, and a drain pipe from the base section.

5. A gas scrubber comprising an upright cylindrical base provided with a gas inlet, intermediate cylindrical sections secured on the base as extensions thereof, a top section resting on the intermediate sections and having a gas outlet, diaphragms each having a central opening surrounded by an upright flange, each secured between a pair of sections, a shaft concentrically journaled in the casing extending through the central openings of the diaphragms, stuffing boxes in the base and top sections, a circular plate secured on the shaft between each pair of diaphragms having a central imperforate body surrounded by an annular flange, and an outer apertured marginal portion, scoops secured to the imperforate portion whose lower ends extend below the upper margin of the central flange of the adjacent lower diaphragm, and whose upper ends are adjacent the under side of the adjacent upper diaphragm, and a depending rib on the under side of each diaphragm concentric with and within the outer margin of the adjacent plate.

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

ERNEST F. LLOYD.

Witnesses:
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