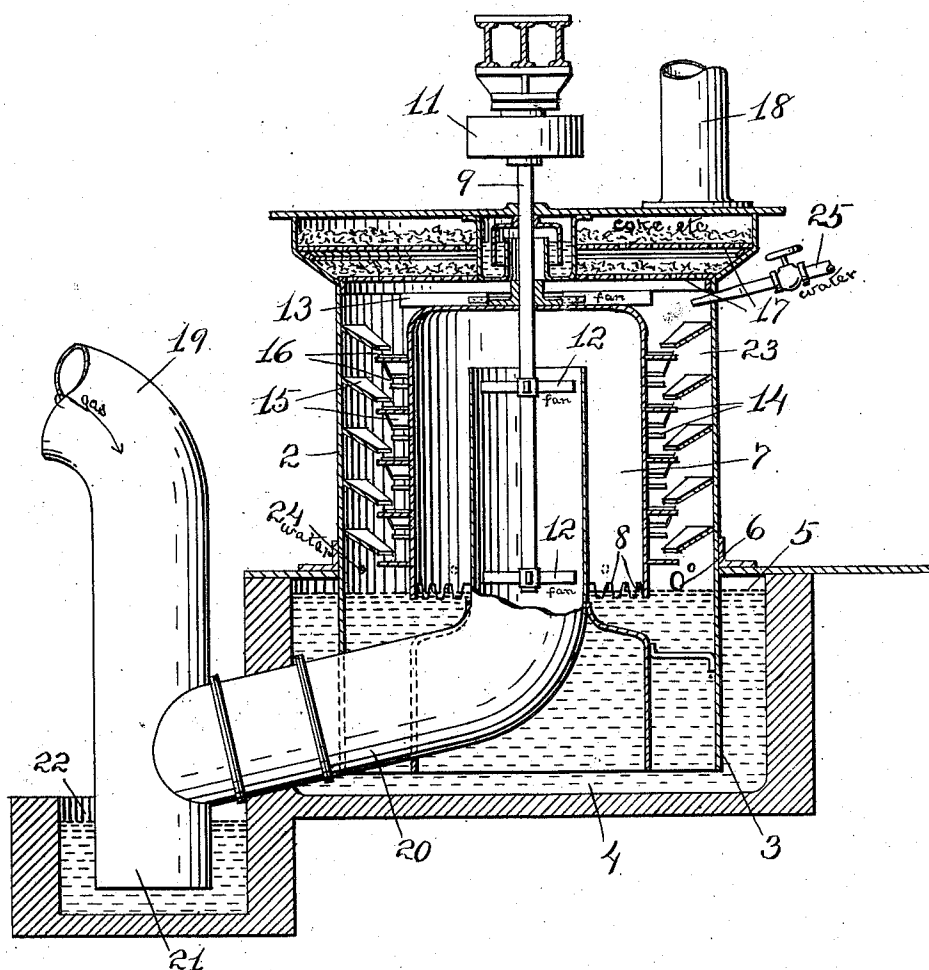


A. ERNST.
GAS CLEANER.
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1,062,445.

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UNITED STATES PATENT OFFICE.

ALFRED ERNST, OF PITTSBURGH, PENNSYLVANIA.

GAS-CLEANER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALFRED ERNST, a citizen of the United States, resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have made a certain new and useful Invention in Gas-Cleaners; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the invention, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The figure is a central vertical section of my gas cleaner.

The invention relates to means for cleaning gases, and particularly such as are liberated from bituminous coal in gas-producers; and it consists in the novel construction and combinations of parts constituting a simple and effective apparatus for the purposes involved, as hereinafter described.

In the accompanying drawings, illustrating the invention, the numeral 2, indicates a cylindrical casing, whereof the wall 3, of its bottom is arranged in connection with a water-holding cistern or tank 4, designed to provide a water seal or water level at 5, some distance above the lower edge of the wall 3, the level being preserved by means of an overflow pipe at 6. An inverted gas-holding cup or cylindrical deflecting chamber 7, open at its bottom, is provided within the casing, the cup or chamber having the lower portion of its wall at about the water level, this lower portion being horizontal and serrated or provided with a circumferential series of notches or passages, substantially in the same horizontal plane, these being preferably continuous around the edge, as represented at 8. This inverted cup 7, is designed to have motion of rotation, and to that end is secured to a spindle 9, the upper portion of which is provided with a water seal at the top of the casing, and with a pulley 11 or other means of rotation outside the casing. On the spindle, within the inverted cup, may be provided radial fan blades 12. The top of the gas-holding cup is designed to have fan blades 13, and its exterior circumferential wall is provided with series of flat-surface brackets or ledges 14, at different levels, and, preferably in staggered relation.

To the interior wall of the casing 2, are

secured series of ledges or flanges 15, inclined downward and inward from the wall and also preferably in staggered relation to each other. These inclined flanges are designed to terminate just above the level of the edges of the exterior ledges or brackets of the cup. Between these various flanges and ledges are numerous intervals or passages which communicate at many points, as indicated at 16.

The upper portion of the casing 2, is preferably made of larger diameter than the part below it, in order to provide for large drier compartments having gratings 17, one above another, upon which are placed coke, wood shavings or other ordinary drying material, through which the gas is forced before leaving the casing at the exit 18.

The heated gas from the gas-producer enters the apparatus through the pipe or entrance tube 19, which extends downward, communicating with an upward extending branch tube 20, which projects above the water level into the inverted cup and concentrically around the spindle 9, in such wise as to surround the fan blades thereof. The lower end of this entrance pipe is provided with a drain pipe 21, having a separate water seal tank at 22. The gas entering the apparatus through the pipe 19, passes upward centrally into the inverted cup, by which it is deflected downward and outward under the serrated edge of said cup, and upward into the outer portion or passages of the surrounding chamber 23, of the casing, through and between the ledges of the cup and casing, and finally through the gratings and the drying material thereon, whence it passes through the exit pipe for use.

A series of water spouts are designed to be employed, as at 24, in this apparatus, in order to work away accumulated tar tending to obstruct the passages of the rotary cup at the water level, and prevent free movement of the gas through the water. Another water supply is indicated at 25, in the upper portion of the casing 2, below the grated drier compartments and above the ledges and flanges of the inverted cup and casing.

The rotation of the spindle and the inverted cup creates centrifugal motion in the liquid particles from the spraying devices, and in the intimately commingled gas and vapor, in their passage through the cham-

bers of the apparatus and through the numerous passages between the staggered ledges and flanges. The inclined flanges of the casing serve to return the outward-thrown particles of liquid, somewhat in the form of vapor films, to the external ledges of the cup, the staggered arrangement being designed to have an atomizing effect and to provide for a great number of independently acting vapor films. In this continuous action the upward passing gas and the downward passing particles of water become more and more intimately related, for mutual effect in cooling and purifying the gas, and in expelling the tar and other impurities, which are designed to pass downward into the water of the tank 4. In the same operation the gas, in its outward diving passage under the edge of the inverted cup, through the water, is sub-divided by the horizontal series of notches, passages or serrations of the cup wall, so that it is brought very intimately in contact with the water of the tank. The bubbles in which the gas rises into the outer portion of the casing 2, are of small size, and are designed to be evenly distributed around the inverted cup and in this way to equalize the effect of the ledges and flanges and of the spray and vapor set in motion thereby. The edge of the cup being thin, very little gyrating or whirling motion of the surface of the water is produced, and consequently the subdividing action tends to be regular and even. All the gas passing through the apparatus is subjected to this subdividing and washing in small portions, or bubbling action, whereby its temperature is materially lowered and the tar is separated.

I claim—

1. Apparatus for cleaning gas, comprising an interiorly flanged cylindrical casing, a central upward passage, an extension thereof forming a closed passageway for conducting the gas thereto, a rotary inverted cylindrical deflector having a horizontal series of passages around the bottom portion of its wall, a water holder at the bottom of the casing having an overflow at about the level of said series of passages, and a passage around said deflector for conducting the gas upward and within the flanged casing.

2. Apparatus for cleaning gas, comprising a circular casing, an upward central passage, a passageway for conducting the gas thereto, an overflow water holder, an inverted cup deflector for conducting the gas therefrom, by which the gas is deflected downward and subjected to a bubbling passage through water, a flanged passage between said cup deflector and said casing through which the gas flows upward, means for rotating said deflector and thereby subjecting the gas to centrifugal force during

such upward flow, and means for supplying water to said flanged passage.

3. Apparatus for cleaning gas, comprising a water holder, an overflow therefor, a casing extending into said water holder, an upward passage, a passageway for conducting the gas thereto, a rotary downward deflector cylinder for the gas, means for subjecting the gas to subdivision through a bubbling action at the water level, a second passage around the deflector cylinder for conducting the gas upward from the water level, a water supply in said passage, fan blades and means above said passage for holding drying material.

4. Apparatus for cleaning gas, comprising a casing, a water seal for said casing, means in the upper portion of the casing for spraying the gas, a cylindrical deflector having a series of horizontal passages at the water level for separating the gas into small portions and subjecting said small portions to bubbling passage through water, means for rotating said deflector, a circular flanged passage around the cylindrical deflector for conducting the gas upward from the water level to the spraying means, a fan and drying means in the top of the casing communicating with said flanged passage.

5. Apparatus for cleaning gas, comprising a casing, a water seal tank, a water level opening of said tank, spraying devices, a central vertical gas inlet pipe, a rotary deflecting cup extending downward around the gas inlet pipe within the casing and having a horizontal series of passages operating in connection with the water of said tank at the water level to separate the gas into small portions for separate passage through the water into the outer portion of the casing and upward toward the spraying devices and fan blades carried by said cup.

6. Apparatus for cleaning gas, comprising a casing having a gas inlet in its lower portion and an outlet at its upper portion, a water holding tank, a water level discharge therefor, a rotary deflecting cup within said casing terminating at about the water level of the tank overflow, drier racks in the top of the casing in communication with the chamber of the casing and the outlet, fan blades below the drier racks, a series of water spouts around the cup, and a water supply below the drier racks and outside the deflecting cup.

7. Apparatus for cleansing gas, comprising a circular casing having flanges arranged in staggered relation on its interior wall, a rotary inverted cup within the casing having ledges arranged in staggered relation on its exterior wall, a gas inlet extending upward into said cup, a gas outlet, a water holding connection having an overflow at about the level of the edge of said

cup, a water supply in the upper part of the casing, and drying racks in the casing above the water supply and below the outlet.

8. Apparatus for cleaning gas comprising a casing, a tank, a water level discharge for said tank, a central upward passage in said casing, an inverted deflecting cup around said passage having its wall extending to the water level, a series of serrations in the edge of said wall, an upward passage around said cup within said casing, spray-

ing devices above said cup in said casing, and spout devices of said casing for keeping the serrations of the cup wall clear at the water level.

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

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ALFRED ERNST.

Witnesses:

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