(No Model.) 2 Sheets—Sheet 1.

J. LAYCOCK & T. CLAPHAM.

APPARATUS FOR SCRUBBING AND WASHING GAS.

No. 282,994. Patented Aug. 14, 1883.

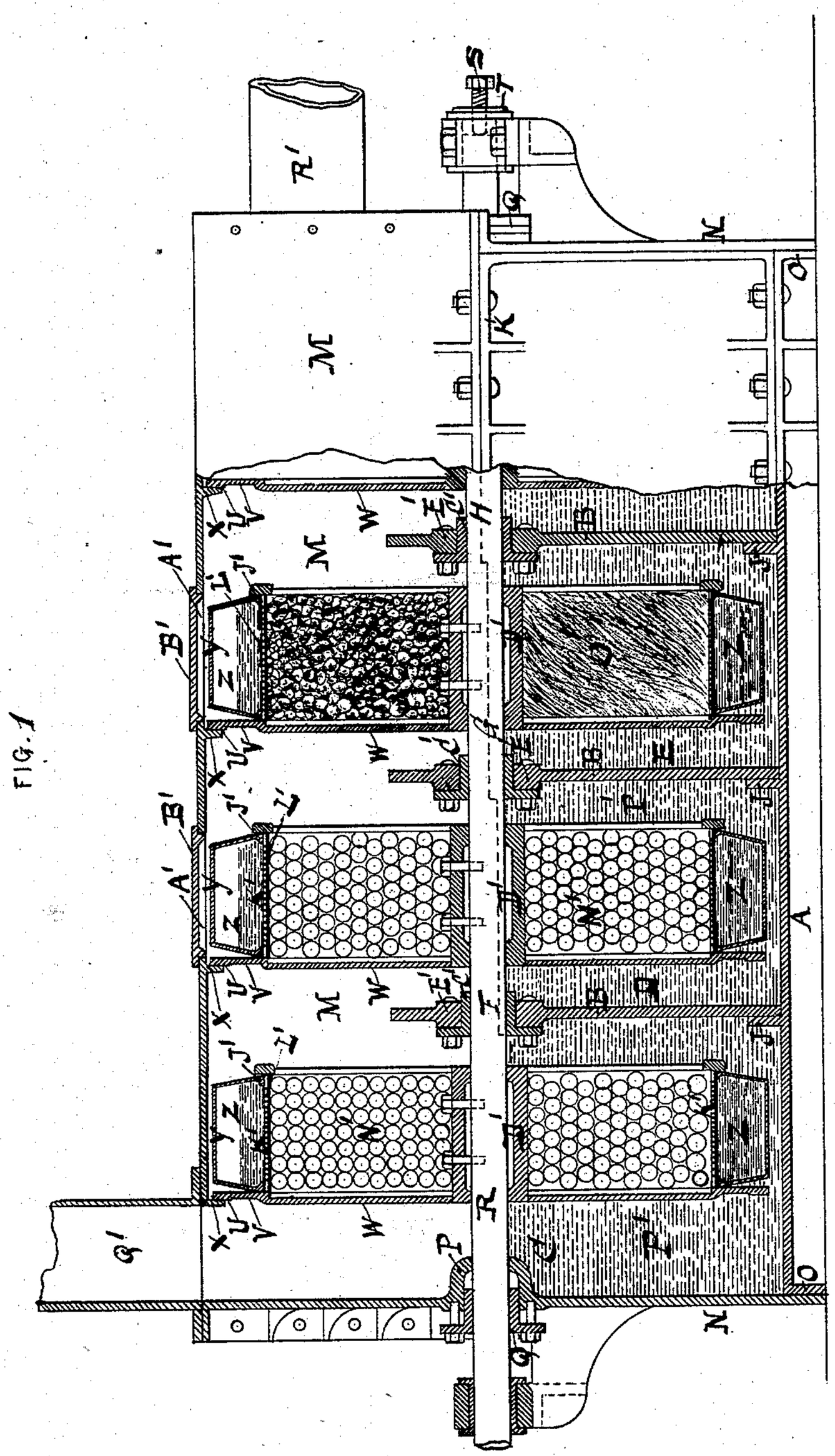

FIG. 1.

WITNESSES

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FIG. 3

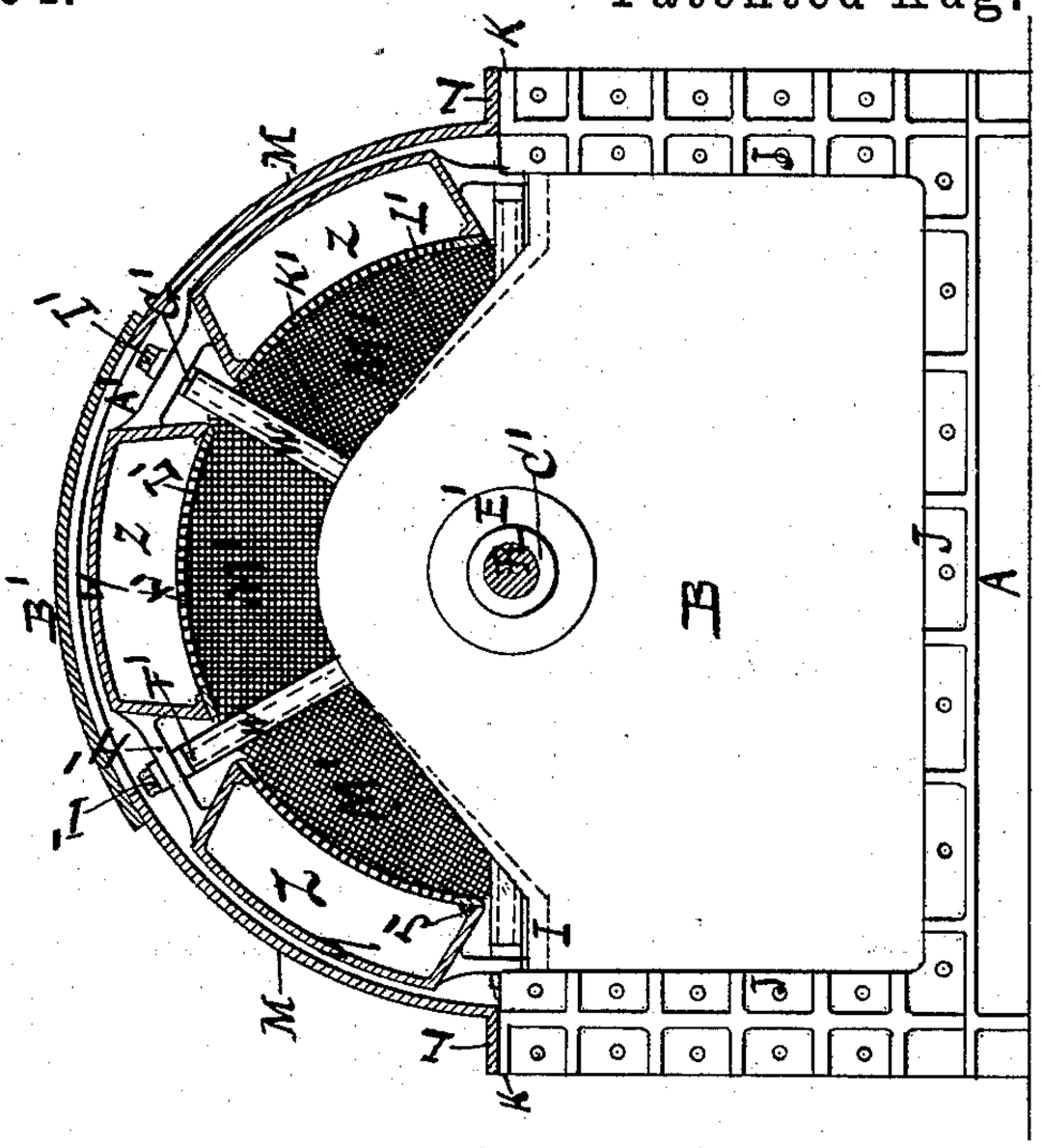
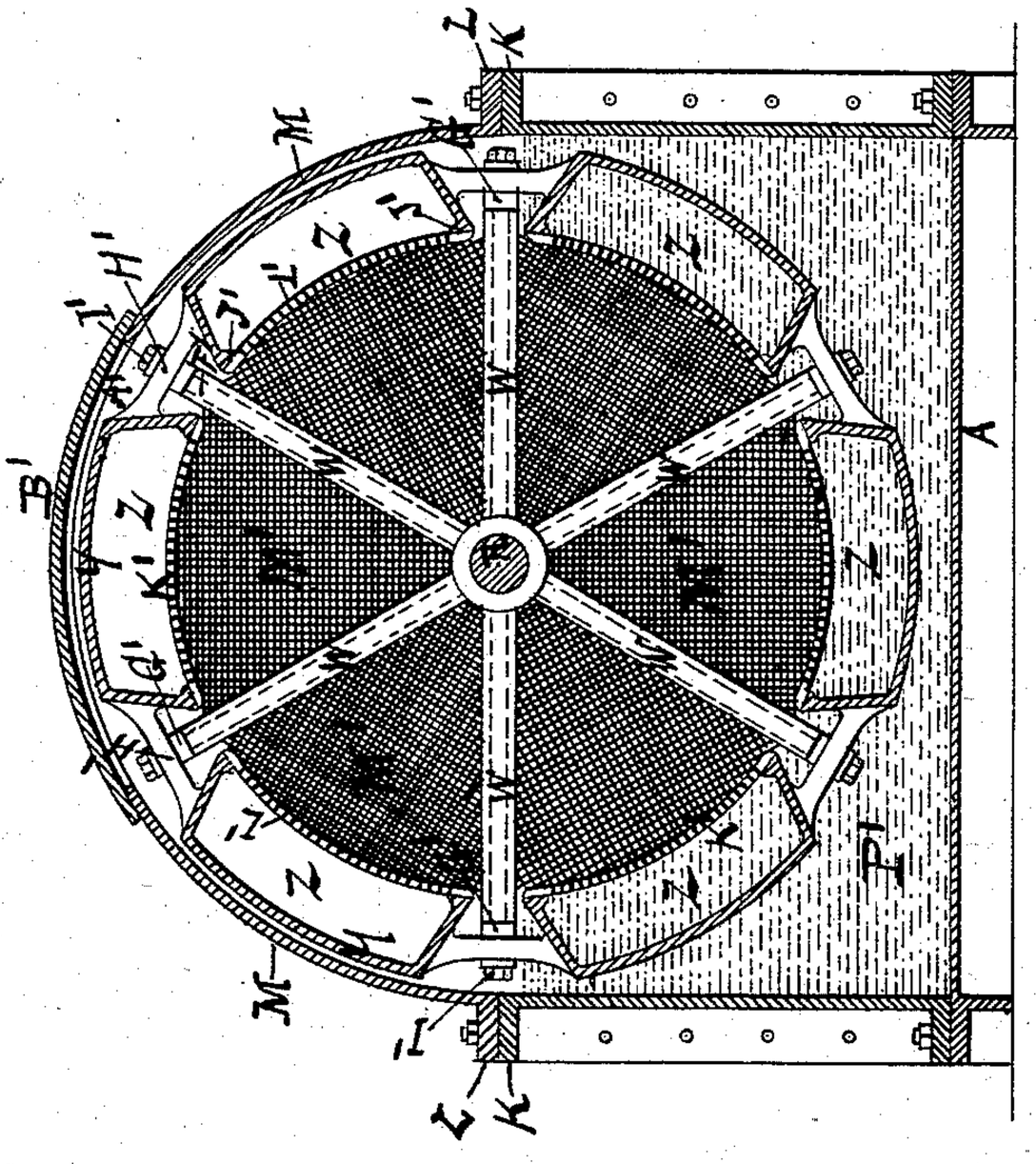


FIG. 2



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UNITED STATES PATENT OFFICE.

JOHN LAYCOCK AND THOMAS CLAPHAM, OF KEIGHLEY, COUNTY OF YORK, ENGLAND.

APPARATUS FOR SCRUBBING AND WASHING GAS.

SPECIFICATION forming part of Letters Patent No. 282,994, dated August 14, 1883.

Application filed March 29, 1883. (No model.) Patented in England December 9, 1881, No. 5,399, and in Germany June 14, 1882, No. 20,929.

To all whom it may concern:

Be it known that we, JOHN LAYCOCK and THOMAS CLAPHAM, subjects of the Queen of Great Britain, residing at Keighley, in the county of York, England, have invented new and useful Improvements in Apparatus for Scrubbing and Washing Gas, (for which we have obtained a patent in Germany, No. 20,929, dated June 14, 1882, and in Great Britain, No. 5,399, dated December 9, 1881, and sealed May 16, 1882,) of which the following is a specification.

The said invention relates to improved apparatus for scrubbing and washing gas for the purpose of removing the ammonia and other impurities therefrom. For this purpose we construct our improved apparatus of a cast-iron vessel made of two parts, the bottom part to receive water and the top part for the passage of the gas to be operated on. The bottom part may be made of semicircular or straight form in the front part. In the vessel are fitted divisional plates to form separate water-chambers, and on the tops are cast flanges which are planed to form tight-joints when the cover is bolted on, and this cover is made of a semicircular form. All the joints are made tight and true to prevent escape of gas. The ends of the bottom vessel and cover are fitted with end plates securely bolted to the flanges of the bottom vessel and cover. We may construct the apparatus with securely-connected compartments, and a number of such compartments may be employed, according to the power or efficiency required. The end plates are made with stuffing-boxes, to which are fitted glands, through which is passed and works a shaft driven in the usual manner. The shaft also works in bearings formed on the tops of the divisional plates and over the shaft, and in each compartment are fitted short tubular castings, to which are secured radial arms made the width of the tubular castings, and the tops of the arms are made with bosses, to which are secured lugs formed on the sides of buckets secured to the arms by set-screws. The bottom parts of the buckets are made with a series of small holes, and we fit in each compartment and on the shaft two tubular castings at a certain distance apart, according to the width given to the revolving screens, and which are lined or filled with wood or balls of wood, small coke, cork, or any suitable material kept in by wire secured from one radial arm to the other, or by wire-netting, so as to form highly porous revolving screens. We fit, by preference, a bucket in each wire compartment. The top plates are struck from the center of the semicircular cover and nearly touch the inside of the cover, and on the side of the inlet of gas and inside the cover are cast or fitted rings which are truly turned on the face, so that the sides of the buckets may fit the face of the ring to form joints and prevent escape of gas. The screens in revolving cause the buckets on the upstroke and in passing through the water to get filled, the water entering through the small holes made in the bottom plates of the buckets, and when the buckets arrive at the top the water keeps dripping and falling into the wood, wood balls, small coke, cork, or other suitable material with which the screens are lined or filled and saturates the same. Openings are made in the tops of the buckets to allow gas entering in the buckets to cause the water to pass freely through the small holes and fall in the linings. Gas passes into the apparatus through an outlet or opening made in the top part of the cover and in one of the end-plates. The gas passes through each screen and comes in contact with the moisture and water contained therein, and also in contact with the pieces of wood, wooden balls, small coke, cork, or other material, and in the course of its progress to the outlet the gas is compelled to traverse and pass through the top revolving part of each screen, the gas being separated into innumerable finely-divided streams, which in their passsage undergo a complete washing and a thorough scrubbing, effecting the removal of the whole or nearly the whole of the ammonia. The water is fed to the apparatus through a pipe in the cover, and the liquid is removed through suitable openings made in the bottom vessel.

In order to enable our improvements to be better understood, we will proceed to describe

the same by reference to the accompanying drawings, in which—

Figure 1, Sheet 1, represents a side elevation of our improved apparatus, partly shown in section. Fig. 2, Sheet 2, represents a sectional view of a screen with sections of buckets, and frame-work, andcover. Fig. 3, Sheet 2, represents a sectional view of apparatus with divisional plate.

Similar letters of reference are used in all the figures to represent similar parts.

A is the bottom cistern to receive water, and which may be made semicircular in the front.

In the cistern are fitted divisional plates B, to form separate chambers C D E, and the plates B are made with levels F G H, (see dotted lines in Fig. 1,) the top plates being cut away, as at I. The plates are secured to flanges J, cast with the cistern A, and the cistern is made with top flanges, K, which are planed to form tight joints when the flanges L of the cover M are bolted on the flanges K, so as to prevent any escape of gas. The ends of the cistern A and cover M are fitted with end plates, N, which are securely bolted to the flanges O of the cistern A and to the cover M.

It is obvious that we may construct the apparatus with securely-connected compartments, and a number of such compartments may be employed, according to the power or efficiency required.

The end plates, N, have stuffing-boxes P, which are fitted with glands Q, in which work the shaft R of the apparatus. This shaft is driven in the usual manner by pulleys and belting, or may be driven by wheel-gear. One of the ends of the shaft R is actuated by a set-screw, S, which works through a collar, T, to press up the shaft when required and keep the sides U of the tops V of the radial arms W pressed against the face of the rings X, cast inside the cover M. The rings are truly turned on the face and made to fit the face of the sides U for forming joints to prevent the escape of gas. The top plates, Y, of the buckets Z are struck from the center of the cover M and nearly touch the inside of the cover M, and the cover is made with alternate openings A′, to which are secured covers B′.

The divisional plates B are made with bosses E′, in which are fitted iron bushes C′, through which passes and in which works the shaft R. On the shaft and in each compartment are secured tubular castings or bosses D′, having radial arms W made the width of the bosses, and the ends F′ of the arms W are made with projections or lugs G′, on which rest lugs H′, cast on the sides of the buckets Z. The lugs of the buckets are cast alternate, and the buckets are secured to the radial arms by set-screws I′, which are passed through the lugs H′ and screwed in the lugs G′, thereby securing the buckets in position. The buckets are also made with flanges J′, to which are secured the bottom plates, K′, of the buckets. These plates are made with series of small holes, L′.

From one radial arm, W, to the other are secured wires or wire-netting M′, and between the wires or netting are placed wooden balls N′ or cork O′, or pieces of wood or small coke, or any other suitable material, whereby highly-porous revolving screens are formed.

The screens in revolving pass through the water P′ in the bottom cistern, A, and the water enters through the small holes L′ of the bottom plates, K′, of the buckets Z, and on the buckets arriving by the revolution of the screens at or near the top of the cover M the water drips and falls through the small holes L′, passing on and between the wooden balls or through the cork, small coke, &c., of the screens, saturating the same. Small holes are made in the tops of the buckets to allow gas to pass in the buckets, allowing the water to freely pass through the small holes.

Gas passes into the apparatus through the gas-supply pipe Q′, and is forced to pass through or traverse the top revolving parts of each screen. The gas in its passage thereby undergoes a complete washing and a thorough scrubbing, effecting the entire or almost entire removal of the ammonia, and the gas thus treated passes on through the outlet-pipe R′.

The water for feeding the apparatus passes through a pipe fitted to the cover, and the liquid is removed through suitable openings made in the bottom cistern or vessel, to which are secured doors.

Having thus described our improvements and the best means we are acquainted with for carrying the same into effect, we would have it understood that we do not confine ourselves to the precise details shown and described, as they may be varied without departing from the peculiar character of the invention; but

What we do claim is—

1. In combination with the stationary cistern A, having the divisional plates B, constructed and applied as shown, the revolving screens, each lined or filled with pieces of wood, coke, cork, or equivalent material incased within wire or netting, the extremities of the screens having severally secured to them buckets Z, provided with small openings at their bottoms, as described, and whereby when the bucket reaches its highest point its contents shall drip through such openings and into and through the screens.

2. In combination, the cistern A, revolving shaft R, division-plates B, revolving screens lined or filled, as described, their perforated buckets Z secured thereto, as shown, the gas-supply pipe Q′, and outlet-pipe R′, the combination being and operating as set forth.

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Witnesses:
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