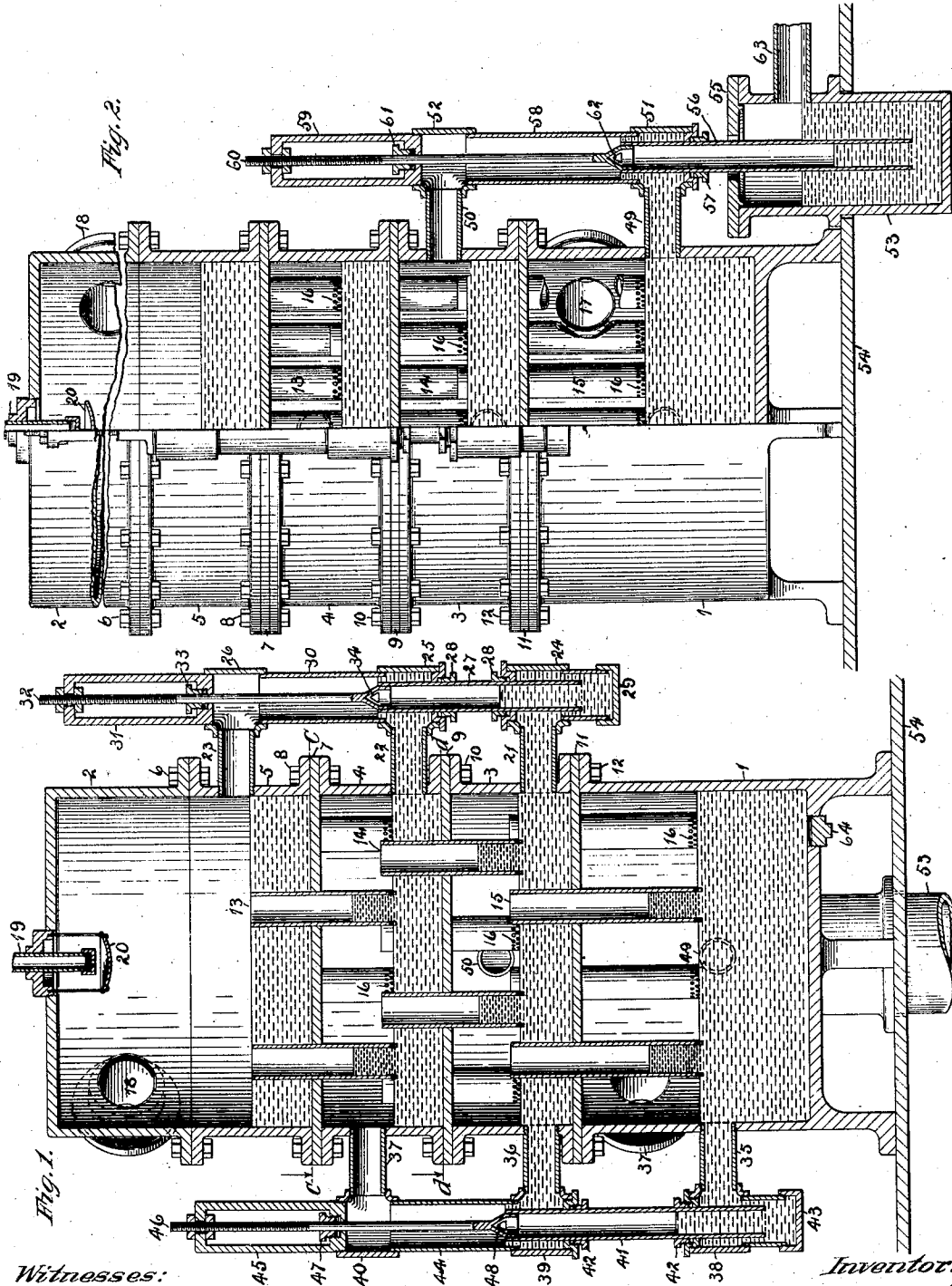


W. C. BUTTERWORTH.
GAS PURIFIER.
APPLICATION FILED JUNE 18, 1910.

1,021,503.

Patented Mar. 26, 1912.

2 SHEETS-SHEET 1.



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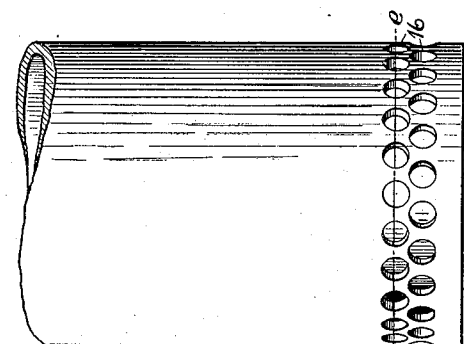


Fig. 6.

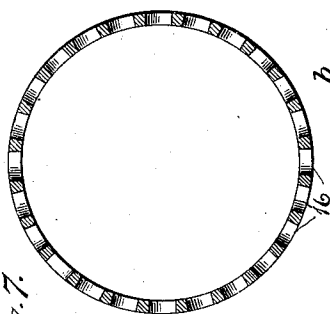


Fig. 7.

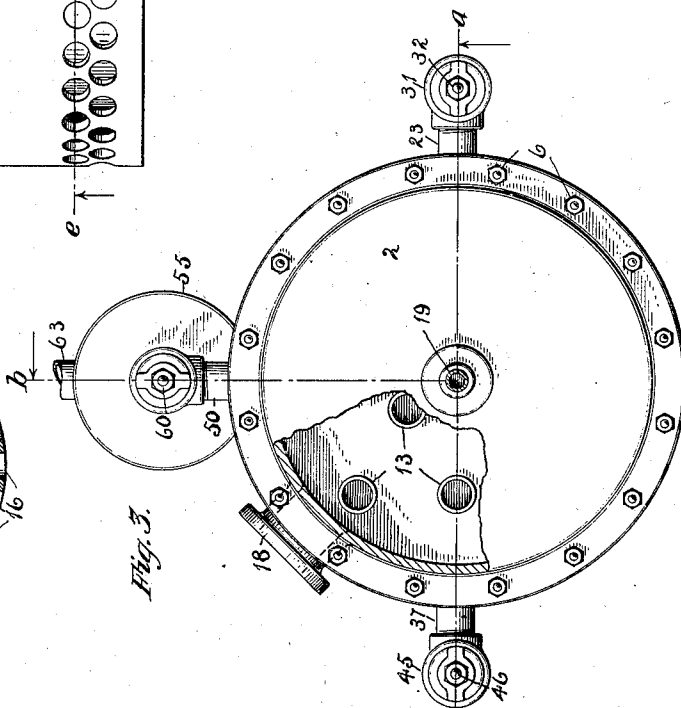


Fig. 3.

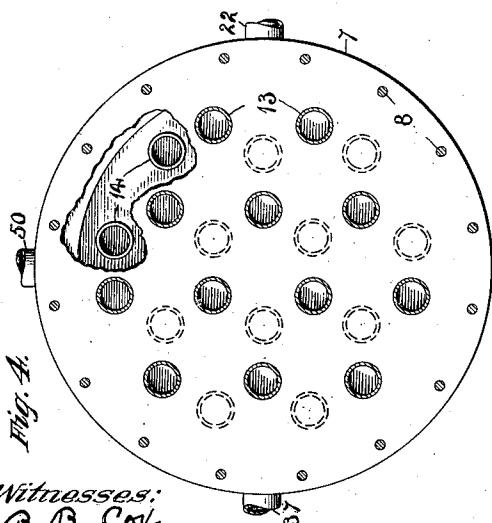


Fig. 4.

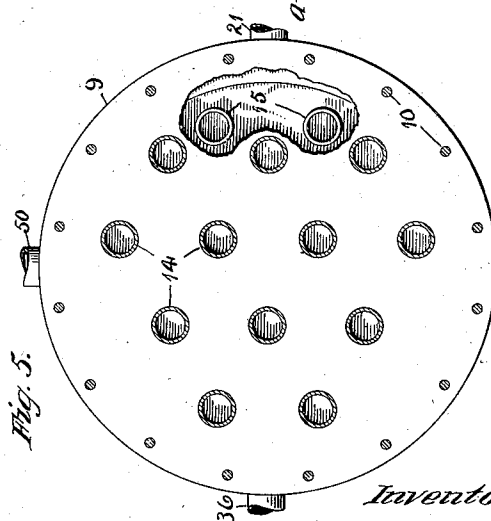


Fig. 5.

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UNITED STATES PATENT OFFICE.

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GAS-PURIFIER.

1,021,503.

Specification of Letters Patent.

Patented Mar. 26, 1912.

Application filed June 18, 1910. Serial No. 567,644.

To all whom it may concern:

Be it known that I, WILLIAM C. BUTTERWORTH, a citizen of the United States, residing at Platteville, in the county of Grant and State of Wisconsin, have invented certain new and useful Improvements in Gas-Purifiers, of which the following is a specification.

The object of this invention is to construct an apparatus for purifying coal gas by removing the impurities therefrom and comprises a plurality of vertically arranged water containing chambers and tubes connecting the chambers, and overflow pipes connecting the chambers so that the water from the upper chamber will descend into the other chambers and finally be discharged, a gas inlet is formed in the lower chamber, and a gas outlet formed in the upper chamber.

In the accompanying drawings, Figure 1 is a vertical central section on dotted line *a a* Fig. 3. Fig. 2 is a vertical section on dotted line *b b* Fig. 3. Fig. 3 is a plan view in which a portion of the top plate is broken away. Fig. 4 is a transverse section on dotted line *c c* Fig. 1. Fig. 5 is a transverse section on dotted line *d d* Fig. 1. Fig. 6 is an elevation of the lower portion of one of the tubes. Fig. 7 is a transverse section on dotted line *e e* Fig. 6.

The outer casing is made up of a lower section 1, top section 2, and in this instance three intermediate sections 3, 4 and 5. The top section 2 is connected to the intermediate section 5 by the bolts 6. A division plate 7 is located between the intermediate sections 4 and 5 and is connected thereto by the bolts 8. A division plate 9 is located between the intermediate sections 3 and 4 and is connected thereto by the bolts 10. A division plate 11 is located between the intermediate sections 3 and bottom section 1, and is connected thereto by the bolts 12.

The division plates 7, 9 and 11 support vertically arranged tubes 13, 14 and 15 respectively, and each tube has its lower portion formed with two rows of holes 16. A gas inlet pipe 17 communicates with the lower section 1, and a gas outlet pipe 18 communicates with the top section 2. A water inlet pipe 19 extends downward through the top section and the water strikes a deflecting plate 20.

From the three intermediate sections 3, 4 and 5 extend tubular extensions 21, 22

and 23 respectively, and these extensions connect with T's 24, 25 and 26 respectively. The T's 24 and 25 are connected by a tube 27, held in stuffing boxes 28. A cap 29 closes the lower end of the T 24. A pipe section 30 connects the T's 25 and 26. A guideway 31 is connected to the upper end of the T 26. A screw-threaded rod 32 is guided in the guideway 31 and through the stuffing box 33, and has its lower end connected to the upper end of the tube 27 and leaving an opening 34.

From the lower section 1 and intermediate sections 3 and 4 extend tubular extensions 35, 36 and 37 respectively, and these extensions connect with T's 38, 39 and 40 respectively. The T's 38 and 39 are connected by a tube 41, held in stuffing boxes 42. A cap 43 closes the lower end of the T 38. A pipe section 44 connects the T's 39 and 40. A guideway 45 is connected to the upper end of the T 40. A screw-threaded rod 46 is guided in the guideway 45 and through the stuffing box 47, and has its lower end connected to the upper end of the tube 41, and leaving an opening 48.

From the lower section 1, and the intermediate section 3 extend tubular extensions 49 and 50 respectively, and these extensions connect with the T's 51 and 52. A drum 53 is supported by the base 54, and has a perforated cap 55. The drum 53 and T 51 are connected by a tube 56 held in the stuffing box 57. A pipe section 58 connects the T's 51 and 52, a guideway 59 is connected to the upper end of the T 52. A screw-threaded rod 60 is guided in the guideway 59 and through the stuffing box 61, and has its lower end connected to the upper end of the tube 56, and leaving an opening 62. From the drum 53 extends an overflow pipe 63. A screw plug 64 is supported in the bottom of the lower section 1.

Water is admitted through the pipe 19 which will be deflected by the plate 20 within the top section 2. After the intermediate section 5 is filled up to the pipe 23, the water will overflow down the pipe 30, and by way of the pipe 22 into the intermediate section 4 until the water will overflow down the tube 27, thereby filling the intermediate section 3 until the water will overflow down the tube 41 into the bottom section 1. When the bottom section has been filled to a point of overflow down the tube 56 it will fill the drum 53 up to the overflow pipe 63 there-

from. As the water is constantly entering the top section, it will constantly overflow from the drum.

By means of the screw-threaded rods 32, 46 and 60 the respective tubes supported thereby can be adjusted vertically to regulate the level of the water in the respective sections 4, 3 and 1. When the water levels in the various sections are at the height of the upper ends of the tubes 27, 41 and 56, the holes 16 in the tubes 13, 14 and 15 will be covered. Gas under pressure is admitted into the bottom section 1 through the opening 17, over the water in this section. The pressure of the gas will increase until the water in this section is diminished sufficiently to expose at least the upper row of holes 16 in the tubes 15, when the rush of gas through these openings will cause the water in the tubes 15 to rise with the gas in bubbles to a greater height than the level of the water in the lower section. The gas will finally escape up the tubes 15 into the space above the water in the intermediate section 3 when its operation is repeated. This operation is repeated in each of the intermediate sections 4 and 5, and the gas will finally escape through the opening 18 in the top section. The gas in passing through this process is purified. The saturated water is discharged by way of the pipe 63, and the excessively heavy liquor is drawn off by removing the plug 64.

The gas is not forced through the main body of water in the various sections, but only through the water in the tubes, which, owing to the action of the gas thereon will be formed into bubbles, thereby giving the water a better opportunity to come in contact with the gas and remove the impurities therefrom. As the water becomes more

saturated with impurities, it becomes heavier, and will finally be discharged from the drum.

I claim as my invention.

1. A gas purifier, comprising a plurality of sections located one above the other and having means for conducting gas from one to the other, a plurality of water conducting tubes extending from one side of the sections, a stationary vertical pipe connecting the upper of the tubes, a vertically sliding pipe connecting the lower of the tubes and having its upper end sliding in the stationary vertical pipe, and means for adjusting the vertically sliding pipe.

2. A gas purifier, comprising a plurality of sections located one above the other and having horizontal partitions between them, vertical pipes located in the partitions and extending above and below the same, said pipes terminating short of the adjacent partitions and having lateral openings in their lower ends, a plurality of water-conducting tubes extending from one side of the sections, a stationary vertical pipe connecting the upper of the tubes, a vertical sliding tube connecting the lower of the tubes and having its upper end sliding in the stationary vertical pipe, and means mounted on the upper end of the stationary vertical pipe for adjusting the sliding pipe, said means including a stem extending through the stationary pipe and connected to the upper end of the sliding pipe.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM C. BUTTERWORTH.

Witnesses:

L. A. BRUNCKHORST,
S. J. FLYNN.