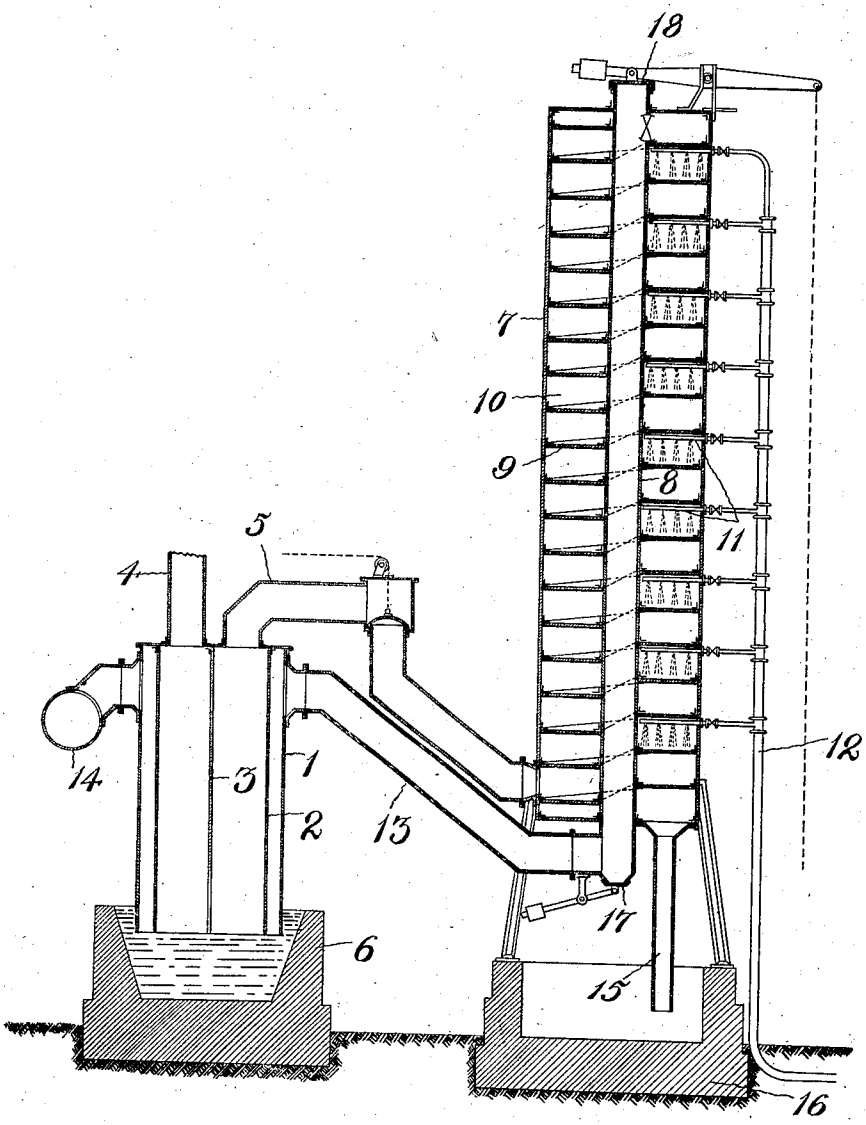
T. KAWAI.

GAS PURIFYING APPARATUS.

APPLICATION FILED JAN. 18, 1918.

1,304,884. Patented May 27, 1919.



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UNITED STATES PATENT OFFICE.

TOKUJI KAWAI, OF ONGA-GUN, FUKUOKA-KEN, JAPAN.

GAS-PURIFYING APPARATUS.

1,304,884. Specification of Letters Patent. Patented May 27, 1919.

Application filed January 18, 1918. Serial No. 212,477.

To all whom it may concern:

Be it known that I, TOKUJI KAWAI, a subject of the Emperor of Japan, and a resident of No. 37 3-Chome, Takami-Cho, Aza Tsukita, Yawata-Machi, Onga-Gun, Fukuoka-Ken, Empire of Japan, engineer, have invented a new and useful Improvement in Gas-Purifying Apparatus, of which the following is a specification.

The present invention relates to a gas purifier having in its construction a preliminary dust cleaner made of two concentric cylinders consisting of an outer cylinder and an inner cylinder the latter of which is separated into two compartments by a partition in such a manner that a gas supplied to one of the compartments must be introduced to the other compartment through the under space of the partition, and a secondary dust cleaner formed of two concentric barrels consisting of an outer barrel and an inner barrel, between which barrels a helical passage is provided so that the gas flowing from the inner cylinders of the preliminary dust cleaner to the secondary dust cleaner ascends through the said helical passage, thence flowing back to the outer cylinder of the preliminary dust cleaner through the inner barrel, and has for its object to obtain a gas perfectly purified from any impurities by means of precipitation and washing, while the temperature lost by cooling water is therein restored.

Accompanying drawing illustrates the apparatus according to the invention, shown in longitudinal sectional elevation.

In two concentric cylinders consisting of an outer cylinder 1 and an inner cylinder 2 a partition 3 is suspended in the inner cylinder, by which the latter is separated into two compartments; a gas from a cupola or the like not shown in the drawing is introduced through an inlet pipe 4 to the compartment of the inner cylinder, the inlet pipe being connected and secured to the said compartment, thence the gas flows to the other compartment through the under space of the partition, and from the latter to a secondary dust cleaner by a delivery pipe 5, thus completing the preliminary dust cleaner thereof. The concentric cylinders are inverted in a clinker built water tank 6 to prevent the escape of the gas contained therein, so that crude dusts may be separated and precipitated in the tank 6, thus enabling the precipitants to be removed without discontinuance of the operation.

The second dust cleaner comprises an outer barrel 7 and an inner barrel 8, a helical passage 10 being made between those two barrels by a diaphragm-plate 9. The lower end of the helical passage 10 is connected with the delivery pipe 5 while at upper end it is communicating with the upper end of the inner barrel 8. At 11 are represented water ejectors connected to a water pipe 12. The construction of these ejectors is such that they may either take the form of a coiled pipe extending upwardly along the helical passage, not shown, or, as illustrated, to take a form of a plurality of ejectors branched from the water pipe 12 and entering into each section so that the containing dusts may be washed by the ejecting water as the gas flows upwardly from the delivery pipe 5 to the top of the helical passage 10.

The purified gas thus produced partially recovers its temperature, while it is passed through a return pipe 13, connecting the inner barrel 8 with the outer cylinder 1, to the space between the latter and the inner cylinder 2, where the gas is reheated to be used for any desired purpose, and it delivers from a supply pipe 14. The dust eliminated in barrel 7 comes down with the water and is discharged to the inside of a tank 16 built of clinker, having dipped into the water contained in the said tank the lower end of a discharge pipe 15 so as to prevent the escape of gas therefrom; a scavenging hole 17 is made in the bottom of the inner barrel 8 for the purpose of drainage, and besides a gas discharge valve 18 fitted on the top of the inner barrel, there is a manhole serving for cleaning purpose.

What I claim is:—

In an apparatus of the character described, the combination of a primary gas and dust separator comprising two concentrically arranged cylinders, a partition in the inner cylinder dividing the same into two compartments, and a cleanser juxtaposed to said separator and connected with the same, said cleanser comprising two con-

centrical barrels separated by a helical passage, and water sprinklers in said passage, a pipe connecting the inner barrel with said helical passage, and a return pipe connecting the inner barrel with the outer cylinder of the primary separator, and dust collecting tanks below said cylinders and said barrels for collecting the dust separated from the gas, substantially as described.

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

TOKUJI KAWAI.

Witnesses:
H. F. HAWLEY,
H. YOSUMUO.