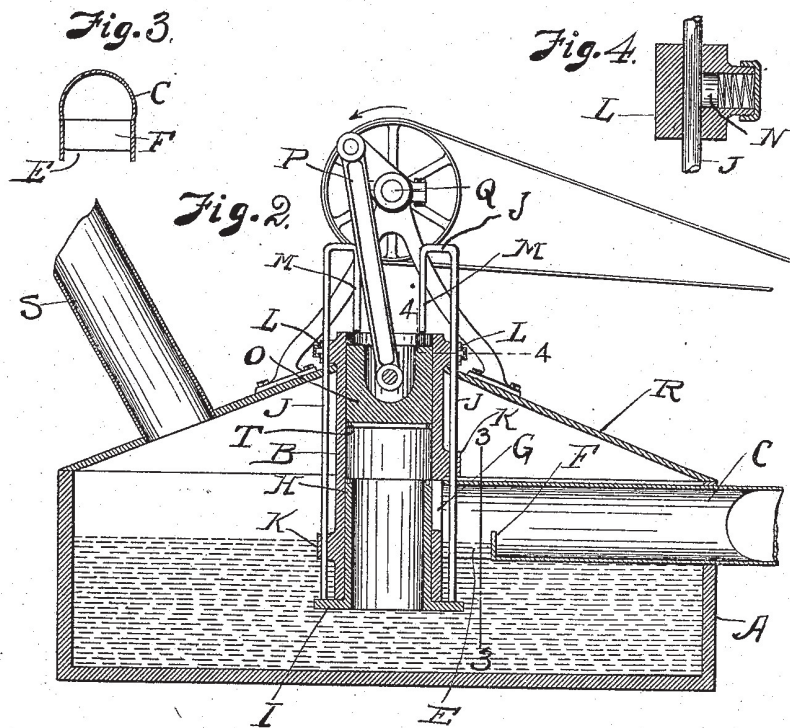
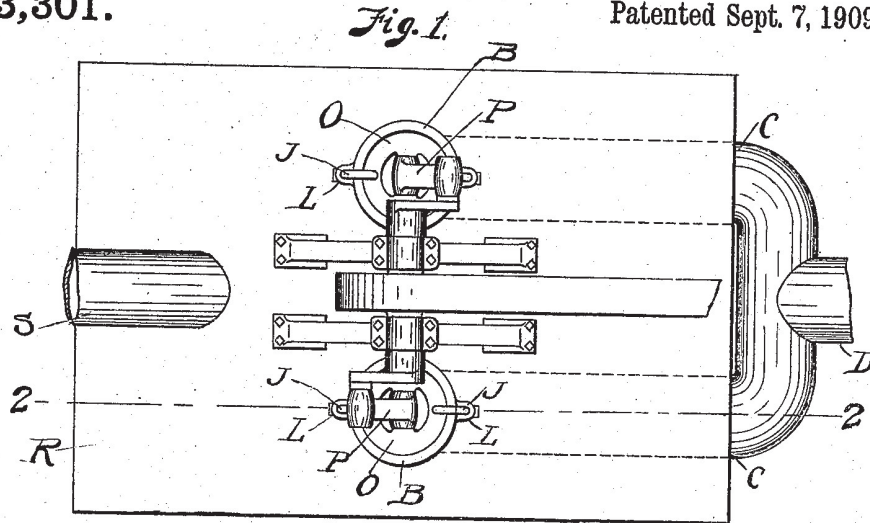


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SMOKE CONSUMER.  
APPLICATION FILED JULY 24, 1908.

933,301.

Patented Sept. 7, 1909.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

SOPHUS HARTMANN, OF CHICAGO, ILLINOIS.

SMOKE-CONSUMER.

933,301.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed July 24, 1908. Serial No. 445,146.

*To all whom it may concern:*

Be it known that I, SOPHUS HARTMANN, subject of the Emperor of Germany, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Smoke-Consumers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a novel construction in a device for separating solid matter from smoke, the object being to provide a simple and efficient device of this character by means of which smoke is so cleansed as to prevent any solid particles carried thereby from being carried out of the chimney or stack, and consists in the features of construction and combinations of parts herein-after fully described and claimed.

In the accompanying drawings illustrating my invention: Figure —1— is a top plan view of a smoke purifier constructed in accordance with my invention. Fig. —2— is a vertical section of the same on the line 2—2 of Fig. —1—. Fig. —3— is a fragmentary detail section on the line 3—3 of Fig. —2—. Fig. —4— is a fragmentary detail section on the line 4—4 of Fig. —2—.

My invention has for its principal object to provide means whereby the smoke from a furnace is cleansed of all solid particles such as soot, and particles of fuel and ashes, so that only the gaseous products of combustion are discharged from the chimney or stack, thereby effectually overcoming the so-called "smoke nuisance" and also saving a large percentage of combustible matter.

A further object of my invention is to provide means for so handling the smoke as to prevent any interference with the draft from the furnace and enabling such draft to be regulated at will to regulate the fire.

My device comprises a tank A adapted to be filled and maintained full of water in any well known manner, and on which two vertical cylinders B are suitably supported, said cylinders being open at both ends and projecting at their lower ends into the water in said tank. Each of said cylinders communicates between its ends with one arm C of a pipe D communicating with or constituting the chimney flue of a furnace, said arms C being cut away adjacent the connection thereof with said cylinders to provide an

opening E in the bottom of said arm, the latter lying partly within the water in said tank, said opening being water sealed against communication with the tank above the water level therein. To prevent water from entering said pipe, a guard plate F is mounted therein, bordering said opening E.

The openings or ports G through which the arms C communicate with the cylinders B are maintained normally closed by means of a hollow trunk-piston valve H equipped at its lower end with an annular flange I which serves as a stop to limit the upward movement thereof. Said valve is supported upon the lower ends of rods J vertically movable in guides K and L on the cylinders, said rods being bent over at their upper ends to provide projections M which are adapted to pass into the cylinders when said valves move downwardly. The upper guides L are equipped with spring actuated shoes N adapted to press upon said rods J to provide sufficient frictional resistance to their movement to support the valves H at the upper limits of their movement. Reciprocally movable in said cylinders are trunk pistons O each connected by a pitman P with the crank of a power actuated shaft Q by means of which said pistons are actuated. Said pistons O serve to actuate the said valves H as said pistons approach the upper and lower limits of their movement respectively. After having completed its upward stroke, each of the said pistons will have raised the valve H to close the port G, the same remaining closed until the piston on its downward stroke strikes the upper end of the valve H and forces the same to the lower limit of its movement. In Fig. 2 the piston O is shown as starting downward and during the downward movement thereof all smoke contained in the cylinder will be forced through the central opening in the valve H and through the water in the tank. The latter will retain all solid particles while the gases will pass out through the flue S. During the entire downward stroke of the piston the port G remains closed. During the initial upward stroke of the piston the port G is opened and smoke will then rush into the cylinder to fill the partial vacuum created by such upward movement, and as said piston continues its upward movement and strikes said projections M, the valve H is again raised so that during the latter part of the upward movement of the piston the said



port G is again gradually closed. Until the port G is uncovered during the initial upward stroke of the piston, any partial vacuum created would cause water to rise in the valve H but as soon as the said port G is uncovered the said water thus rising will recede thereby increasing the vacuum in the cylinder which would be filled by the smoke. Thus no smoke can enter the cylinder except upon the upward stroke of the piston. On the lower end of the piston is an annular flange T which enters an annular groove in the upper end of the valve H to form a fluid tight joint between the same.

The cranks actuating the respective pistons are disposed diametrically opposite each other in order to impart opposite movement to said pistons whereby interruption of draft is avoided.

The number of cylinders may be increased if desired.

The object of the openings E is to permit any water carried to the level of the inlets by the pistons to overflow through the latter and said openings back into the tank without entering the flue.

I claim as my invention:

1. A device, of the kind specified comprising a tank containing water and communicating above the water level therein with a chimney, a cylinder communicating between its ends with a smoke flue and communicating at its open lower end with said tank below the water level therein, a trunk-piston reciprocally movable in said cylinder a hollow cylindrical valve co-acting with said piston to control the inlet to said cylinder, and operative connection between said valve and said piston whereby said valve is actuated to open and close said inlet as said piston approaches the lower and upper limits of its movement respectively, said piston serving to maintain said inlet closed during its downward movement, said valve being interposed in the delivery end of said cylinder and constituting the outlet from the latter.

2. A device of the kind specified comprising a tank containing water and communicating above the water level therein with a chimney, a cylinder communicating between its ends with a smoke flue and communicating at its open lower end with said tank below the water level therein, a trunk-piston reciprocally movable in said cylinder, a hollow cylindrical valve open at its ends and reciprocally movable in the lower end of said cylinder co-acting with said piston to control the inlet to said cylinder, said piston being adapted to strike the upper end of said valve as it approaches the lower limit of its movement to cause the said valve to uncover the said inlet, said piston serving to maintain said inlet closed until it starts its upward stroke, and operative connection between

said piston and said valve whereby the latter is raised to close said inlet as said piston approaches the upper limit of its movement.

3. A device of the kind specified comprising a tank containing water and communicating above the water level therein with a chimney, a vertically disposed cylinder open at its lower end projecting at said end into the water in said tank, said cylinder communicating between its ends with the smoke flue of a furnace, a hollow cylindrical valve open at its ends reciprocally movable in the lower end of the said cylinder and controlling the inlet thereto, a trunk piston reciprocally movable in said cylinder and adapted to rest upon and depress said valve as it approaches the lower limit of its movement and co-acting with said valve to maintain said inlet closed during the downward movement of said piston, and rods connected at one end with said valve and disposed at their upper end portions in the path of said piston and adapted to be engaged by the latter as it approaches the upper limit of its movement to raise said valve to close said inlet, the latter remaining open during only a part of the upward movement of the said piston.

4. A device of the kind specified comprising a tank containing water and communicating above the water level therein with a chimney, a vertically disposed cylinder open at its lower end projecting at said end into the water in said tank, said cylinder communicating between its ends with the smoke flue of a furnace, a hollow cylindrical valve open at its ends reciprocally movable in the lower end of the said cylinder and controlling the inlet thereto, a trunk piston reciprocally movable in said cylinder and adapted to rest upon and depress said valve as it approaches the lower limit of its movement and co-acting with said valve to maintain said inlet closed during the downward movement of said piston, an annular flange at the lower end of said valve, guides on said cylinder, rods passing through said guides and secured at one end to the said flange of said valve, spring pressed shoes mounted in said guides and bearing upon said rods, and projections on the upper ends of said rods extending into the path of said piston, the latter serving to actuate said valve to alternately uncover and close the inlet as it approaches the lower and upper limits respectively of its movement.

In testimony whereof, I have signed my name in the presence of two subscribing witnesses.

SOPHUS HARTMANN.

Witnesses:

FRANK KIELMAN,  
RUDOLPH WM. LOTZ.